TREATMENT PLANT OPERATOR
tpo™
DEDICATED TO WASTEWATER & WATER TREATMENT
tpomag.com
DECEMBER 2022

SPECIAL FEATURE:
PLANT PROFICIENCIES | 22

HEARTS AND MINDS:
Teacher toad in Davis, California | 14

SUSTAINABLE OPERATIONS:
Indirect potable reuse in Maryland | 12

TECHNOLOGY DEEP DIVE:
Biosolids gasification | 76

Robert Magee
Operator in Responsible Charge
Denver, Colo.

Both Sides of the Street

ROBERT MAGEE EARNED THE TITLE OF OPERATOR IN RESPONSIBLE CHARGE AT TWO WATER PLANTS
8

Blue-White®

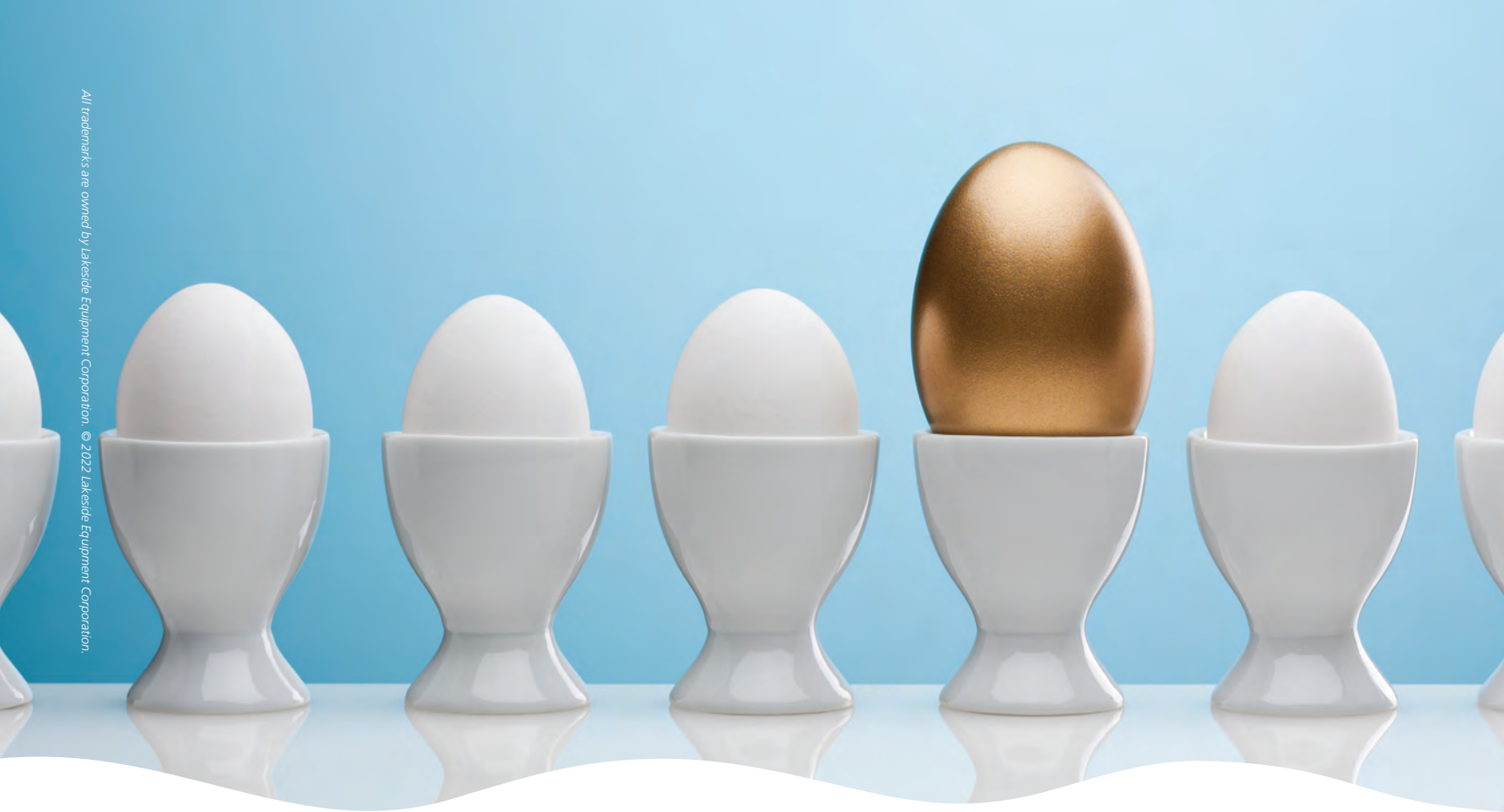
NEW Space Saving
Wall Mount Skid System

Free-Up Valuable Floor Space!

CHEM-FEED® Wall Mount Skids ship fully assembled with your choice of four piping options. One or two pump configurations and installation is fast and easy.

Made in USA

***Find out more about the* CHEM-FEED® Wall Mount Skids *at* www.blue-white.com**



WE STAND OUT FROM THE CROWD.

As you would expect from Lakeside, our ***Raptor*® Multi-Rake Bar Screen** is an efficient, proven screen technology for rapid removal of inorganic solids in municipal and industrial applications. But what sets it apart is the simple fact that ours is built to Lakeside's renowned standards and features superior quality. As with everything we do, our *Raptor* Multi-Rake Bar Screen is well-engineered, designed for optimum performance and durability, and is manufactured in the USA. That's important on a lot of levels. When critical decisions are made on design and specifications, stand out with the Lakeside *Raptor* Multi-Rake Bar Screen, the gold standard of the industry.

For more information on how you can achieve Lakeside quality and performance, contact one of our experts at **630.837.5640**, email us at **sales@lakeside-equipment.com** or visit our website **www.lakeside-equipment.com**

LAKESIDE EQUIPMENT CORPORATION
Water Purification Since 1928

Cleaner Water for a Brighter Future®

***Raptor*® Screening Products**

- Fine Screen
- Micro Strainer
- Rotating Drum Screen
- Septage Acceptance Plant
- Septage Complete Plant
- Complete Plant
- Multi-Rake Bar Screen
- FalconRake® Bar Screen
- Rotary Strainer Screen
- Wash Press

contents

December 2022

SPECIAL SECTION: plant PROFICIENCIES 22

top performers

coming next month: January 2023 FOCUS: Reuse, Recovery and Energy Management

» Let's Be Clear: Rethinking the Clean Water Act » TOP PERFORMERS – Water Plant: Long Pond Water Filtration Facility, Falmouth, Massachusetts | Wastewater Operator: Mark Descoteaux, Unalaska, Alaska | Laboratory: Tiffany Poole, Metro Water Reclamation District of Greater Chicago » How We Do It: Recycling sand from catch basins » In My Words: Optimizing nutrient removal in Montana » Sustainable Operations: Boosting biogas with food waste » Hearts and Minds: Boston's Water Truck » Technology Deep Dive: Precisely measuring biomethane

advertiser index **December 2022**

share
discover
connect

facebook.com/TPOmag
instagram.com/TPOmag
twitter.com/TPOmag
youtube.com/TPOmagazine
linkedin.com/company/treatment-plant-operator-magazine

The Sewer Crew Theory of Government

A COLLEGE FRIEND'S PET THEORY, BUILT ON EXPERIENCE, POINTS TO A FLAW IN TRADITIONAL APPROACHES TO MANAGING PUBLIC INFRASTRUCTURE

By Ted J. Rulseh, Editor

A good college friend earned part of his yearly tuition by working summers for his home city's public works department, specifically on a sewer maintenance crew. A major in English and political science, he wrote an extended poem (quite humorous) about his pipe cleaning experience and the friends he made on the job.

Later, in a final paper for a political science class, he put forward The Sewer Crew Theory of Government. He observed that his sewer maintenance squad took pride in responding to crises — in showing up at the scene of a big stoppage, fixing the problem and looking like heroes. That, he said, was a lot more fun than traveling around doing preventive maintenance or, even more mundane, planning long-term strategy.

TO THE RESCUE

His theory held that public officials, especially elected officials, tend to think like, well, a sewer crew. They may not like it when constituents complain, but at the same time, they enjoy stepping in at such times with a solution to whatever problem caused the complaints.

The theory further held that it was futile to expect politicians to think long-term — to spend time and money dealing with things that might not cause problems until five, 10 or 20 years down the road. In other words, from my friend's somewhat cynical college student perspective, the government was inherently managed by crisis.

No one wants to denigrate sewer crews or treatment plant operators by comparing them with politicians. And of course, water professionals always have dealt and always will deal with emergencies. That's a big part of their job, and very necessary.

A COMMON FAILING

With that disclaimer, there is much truth in my friend's theory, and it doesn't apply only to government. Look back some decades to the way United States automakers kept building cars with reliability issues, changing only when Toyota, Honda, Nissan and others began eating their lunch.

Look at homeowners, who don't maintain their sewer laterals until some nasty stuff backs up into the basement. And when is the last time you heard a homeowner talk about starting a septic system inspection regimen or creating a sinking fund for eventual septic system replacement? No, generally problems will develop and worsen until an expensive failure occurs.

In government, it's often people just one or two removes from the front lines who see issues building into problems and want to develop preventive remedies. Such people include municipal sewer, water and utility managers. Those ranks also take in academics and associations.

Part of this magazine's job is to recognize and elevate those who advocate long-term, strategic thinking; who do not line up with the annual chorus that goes, roughly, "The budget is tight this year — can't we just cut back on maintenance?"

PAY ME NOW OR …

The Sewer Crew Theory calls to mind that old TV oil filter ad that showed a mechanic hoisting a ruined engine out of a car because its owner failed to change the oil. I suppose basic maintenance is a rudimentary form of strategic thinking in that it looks beyond management by crisis and an endless, costly cycle of break-fix. But real strategic thinking looks beyond the next maintenance interval to the long-term future of infrastructure.

In government, it's often people just one or two removes from the front lines who see issues building into problems and want to develop preventive remedies.

It admits that ultimately pumps, valves, pipes, tanks and assorted mechanical systems have finite service lives — that they will eventually need replacing or at the very least rehabilitation or rebuilding. It also recognizes that communities grow, and that plans must be made and dollars earmarked for eventual expansion.

Those who think in such ways inevitably face the criticism that goes with raising taxes or user fees to fund the necessary strategic investments. They don't look as heroic as the people who step in to deal with emergencies.

But because they think ahead to keep such emergencies from happening, and because they make provision for systems that function smoothly and efficiently far into the future, they can claim credit for quality public services at the most affordable cost. And as such, whether so recognized or not, they are true heroes. **tpo**

tpo TREATMENT PLANT OPERATOR

DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS

Published monthly by COLE Publishing, Inc.
P.O. Box 220, Three Lakes, WI 54562

In U.S. or Canada call toll free 800-257-7222
Mon.-Fri., 7:30 a.m.-5 p.m. CST

Website: www.tpomag.com / Email: info@tpomag.com / Fax: 715-350-8456

SUBSCRIPTION INFORMATION: A one year (12 issues) subscription to TPO™ in the United States and Canada is FREE to qualified subscribers. A qualified subscriber is any individual or company in the United States or Canada that partakes in the consulting, design, installation, manufacture, management or operation of wastewater and water treatment facilities. To subscribe, visit tpomag.com or call 800-257-7222.

Nonqualified subscriptions are available at a cost of $60 per year in the United States and Canada/Mexico and $150 per year to all other foreign countries. To subscribe, visit tpomag.com or send company name, mailing address, phone number and check or money order (U.S. funds payable to COLE Publishing Inc.) to the address above. MasterCard, VISA and Discover are also accepted. Include credit card information with your order.

ADDRESS CHANGES: Submit to TPO, P.O. Box 220, Three Lakes, WI 54562; call 800-257-7222; or email holly.gensler@colepublishing.com. Include both old and new addresses.

Our subscriber list is occasionally made available to carefully selected companies whose products or services may be of interest to you. Your privacy is important to us. If you prefer not to be a part of these lists, please contact Holly at holly.gensler@colepublishing.com.

ADVERTISING RATES: Call Kim Bruss at 715-891-0404 or email kim.bruss@colepublishing.com, or call Phil Hahn at 715-493-9913 or email phil.hahn@colepublishing.com. Publisher reserves the right to reject advertising which in its opinion is misleading, unfair or incompatible with the character of the publication.

EDITORIAL CORRESPONDENCE: Address to Editor, TPO, P.O. Box 220, Three Lakes, WI 54562 or email editor@tpomag.com.

REPRINTS AND BACK ISSUES: Visit www.tpomag.com for options and pricing. To order reprints, call Jeff Lane at 800-257-7222 or email jeff.lane@colepublishing.com. To order back issues, call Holly at 800-257-7222 or email holly.gensler@colepublishing.com.

CONTROLLED CIRCULATION: 60,500 per month

@tpomag.com

Visit the site daily for new, exclusive content. Read our blogs, find resources and get the most out of *TPO* magazine.

TESTING THE WATERS

A Look at Lagoon Performance

Alarmed about rising levels of nitrogen and phosphorus in America's water, the Environmental Protection Agency has invested $1 million in West Virginia University assistant professor Kevin Orner's wastewater treatment research. His team will assess the performance of small community wastewater lagoons.

tpomag.com/featured

OVERHEARD ONLINE

"Building future water resilience across the U.S. will require solutions as diverse as the types of water risk the country faces."

New Research Reveals $3.7 Trillion Impact of Water Risk to the U.S. by 2050

tpomag.com/featured

EUROPEAN HACKATHON

Participants Tackle Water Crisis

A team of hackathon participants recently developed an innovative app to promote sustainable water consumption. Team WatApp won HackZurich 2022's Xylem Water Challenge with its social gaming app that helps people make smart water choices in their everyday lives, build long-term water-saving habits and share their results with friends.

tpomag.com/featured

CHOOSING VALVES

Why Cheaper Isn't Always Better

Engineers often make decisions based on the cost of valves, with utilities focusing on cost-saving measures when working on complex projects requiring diverse valve designs and sizes. But that can mean a tradeoff in desirable physical qualities and performance capabilities of these crucial flow-control devices.

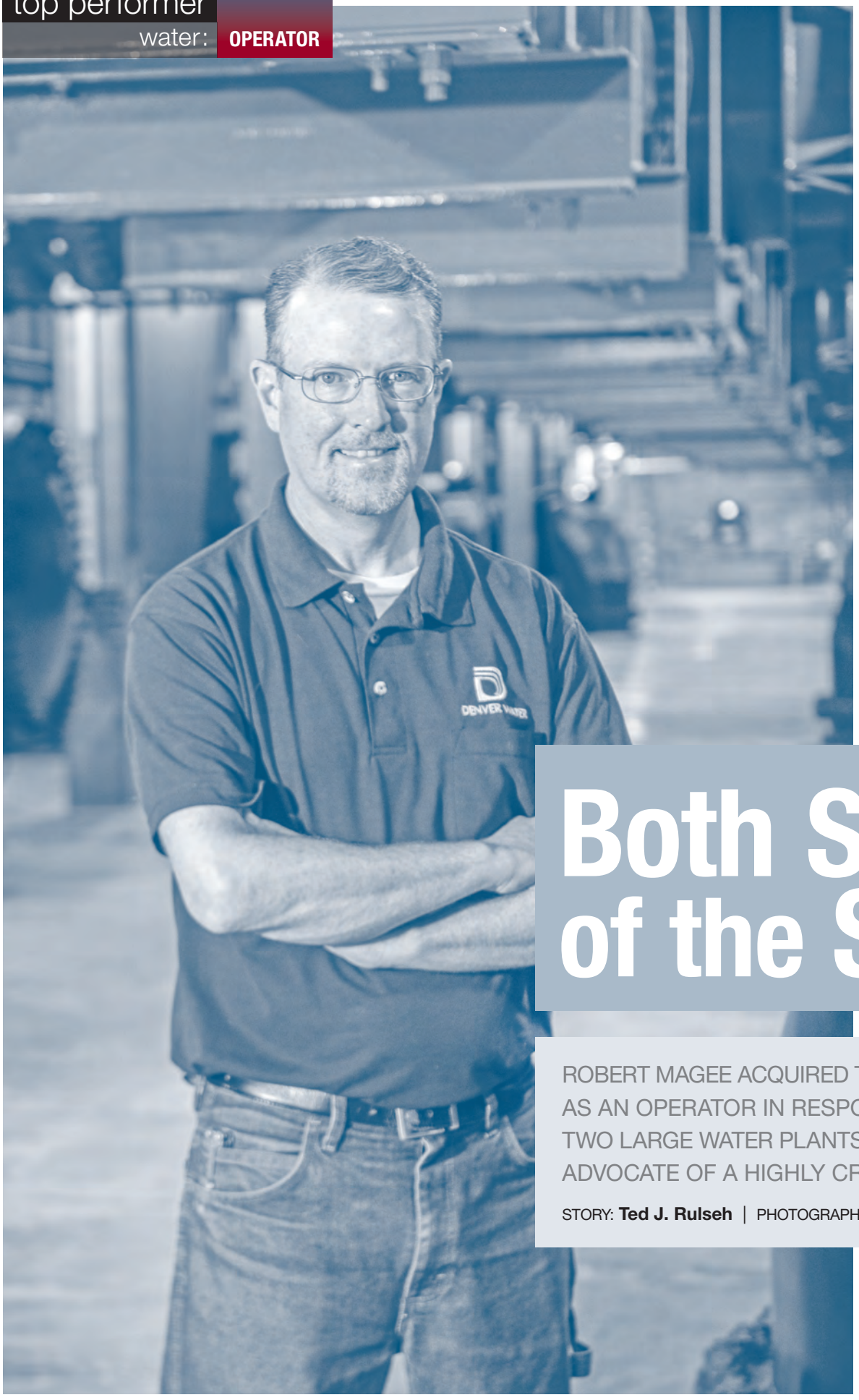
tpomag.com/featured

Emails & Alerts

Visit **tpomag.com** and sign up for newsletters and alerts. You'll get exclusive content delivered right to your inbox, and you'll stay in the loop on topics important to you.

Join the Discussion

Facebook.com/tpomag
Instagram.com/tpomag
Twitter.com/tpomag



Robert “Rob” Magee, operator in responsible charge at Denver Water’s Marston and Foothills water treatment plants.

Both Sides of the Street

ROBERT MAGEE ACQUIRED THE SKILLS TO FUNCTION AS AN OPERATOR IN RESPONSIBLE CHARGE AT TWO LARGE WATER PLANTS. HE BECAME A STRONG ADVOCATE OF A HIGHLY CROSS-TRAINED TEAM.

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Carl Scofield**

> “I’m open to other opportunities, but right now I’m looking to stick with operations. I enjoy spending time with the new technicians and showing them the ropes.”
>
> **ROBERT MAGEE**

Denver Water’s Marston plant received a 2018 Outstanding Large Water Treatment Plant Award from the Rocky Mountain Section AWWA and a 2018 Directors Award from the Partnership for Safe Water.

It wasn’t enough for Robert “Rob” Magee to master one of the two treatment plants in Denver Water’s South System.

Variety was part of the appeal of working in the water sector. So while functioning as an operator in responsible charge at the utility’s 280 mgd Foothills Treatment Plant, Magee wanted a new challenge. Five years ago, on his request, he transferred to the 200 mgd Marston Treatment Plant and learned the process there.

He used what he learned to share best practices between the two facilities, improving efficiency and performance at both. Today he holds the ORC designation at both plants and is instrumental in cross-training operators and asset management team members alike.

“I really like operating the plants,” says Magee, winner of the 2021 Ralph M. Leidholdt Award for operator excellence from Rocky Mountain Section AWWA. “I’ve been asked to step into a management position, which would be more of a desk job. I’m open to other opportunities, but right now I’m looking to stick with operations. I enjoy spending time with the new technicians coming on and showing them the ropes.”

CHANGE OF DIRECTION

Denver Water gets its source from snowmelt in the Colorado Rockies. Its North and South systems serve 1.5 million residents. Magee was introduced to the utility while working toward an associate degree in accounting at Red Rock Community College in Denver. He never finished those studies.

Wanting to move out of his parents’ house, he asked longtime friend Jason Warwick (now an operations supervisor with Denver Water) for advice. Warwick’s father, Kim, then a Denver Water staff member, helped him get a part-time summer job. “Once on board, I was able to bid on internal jobs,” Magee recalls. “So I started bidding on all kinds and I got a meter reading job.”

Robert Magee, Denver Water

POSITION:
Senior operator/operator in responsible charge

RESPONSIBILITIES:
Oversee operations of Marston and Foothills water treatment plants

EXPERIENCE:
25 years in the industry, all with Denver Water

CERTIFICATION:
Class A Water Treatment (highest)

AWARDS:
2021 Ralph M. Leidholdt Award, Rocky Mountain Section, AWWA

GOAL:
Continue operating the plants and training new team members

About six months later, plans for a remote meter reading system made his job obsolete, so Magee moved to the Foothills plant in a utility worker slot, “which was basically a glorified janitor position.” About a year later he got a job in operations, obtained his licensing, and moved steadily up the ladder, to lead technician and ORC, a role that requires a Class A Water Treatment license and thorough knowledge of plant processes.

His move to the Marston facility, after 20 years at Foothills, has made him valuable as one of few qualified for the ORC role at both facilities. “My ability to go back and forth gives Denver Water quite a few options,” Magee says.

QUALITY SURFACE WATER

The Foothills plant draws water from the Strontia Springs Reservoir on the South Platte River. The Marston plant draws from below the dam and from a lake downstream; at any time it can use one source or the other or blend the two, “depending on the water quality we want to achieve at the front end

The Marston Water Treatment plant staff includes, from left, Jeffery Thomas, water treatment lead, South System; Jason Warwick, water treatment plant supervisor, South System; Robert Magee, operator in responsible charge; Russell Plakke, water treatment plant supervisor, South System; and Mary Thompson, water treatment lead, South System.

COUNTING CRITTERS

The amount of algae and the species of plankton entering a surface water treatment plant can affect finished water quality and require process adjustments.

Robert Magee, an operator in responsible charge at Denver Water's Foothills and Marston plants, took it on himself to learn microscopy and the procedures for identifying and counting algal cells.

"We have taste and odor issues that arise every now and then, especially at the Marston plant," says Magee. "We also see some filter-clogging organisms that can limit the filters' efficiency. When we see a certain amount of plankton coming into the plant, we may have to change our treatment techniques a little bit — maybe adding more alum, maybe changing the way we backwash the filters."

To help with that, Magee acquired a microscope and a camera and worked with the utility's water-quality lab team to learn the fine art of plankton counting: "I wanted to document the creatures coming into the plant and lay out exactly what was in our water — what we're treating for and what is causing us issues."

He trained with the lab team, learning to take accurate counts and to identify the species in the source water. The lab's standard operating procedure calls for taking 500 mL samples of source water and concentrating them to 10 mL. Samples are examined at 200x magnification.

"Now that I've gotten better at it, I've started training a couple of other operators who are interested," Magee says. "We'll continue to expand as other operators express interest and have time. Eventually, everybody will know how to do plankton counts and recognize what is coming into the plant."

of the plant," Magee says. Water from the lake tends to be more challenging to treat because it is more alkaline and has higher mineral content.

Both plants use conventional treatment. "The biggest difference at Foothills is that the eight two-level flocculation and sedimentation basins are only 2.3 million gallons apiece," Magee says. "The water rushes through so fast that we don't get as much settling as we would prefer. Marston has six 5 million-gallon single-level basins; that makes it easier to achieve the final settled water quality. Filter run times are quite a bit longer at Marston. Other than that the processes and the chemicals we use are the same."

At Foothills in cold weather, alkalinity falls and there are manganese issues. "We used to have a lime system but we got rid of it," Magee says. "That presents a challenge because the absence of lime limits our ability to coagulate at a higher dose during spring runoff." Potassium permanganate and a small dose of chlorine are added to treat for manganese.

Both plants have chlorine contact basins for disinfection after the multimedia filters; chlorine is added at the front and back ends of those basins. At the far end, some liquid ammonium sulfate is added to help maintain a chlorine residual in the distribution system.

MAKING BOTH PLANTS BETTER

Magee's switch to the Marston plant turned out to benefit both treatment facilities. "I thought there would be quite a big difference going to Marston," he recalls.

"There are a few differences, but what I thought was going to be the biggest challenge has actually been really good. There were some things we were doing at Foothills that we weren't doing at Marston, and vice versa. So we could pull things we were doing at one plant and make them work at the other. That made the treatment and the working conditions better."

For example, Magee discovered that the standard operating procedure documents weren't uniform: "When someone came from one plant to the other, it was kind of foreign to them; it didn't look the same. So we standardized how they looked — the layout and the descriptions. That made it easier for people to come over and train.

"Another challenge was trying to get people out of their comfort zone and go over to the other plant and train. We've been doing that the last couple of years, and we're getting quite a few operators up to speed; they're going to be able to become ORCs."

> "There's something new every day. I really love the challenges."
> **ROBERT MAGEE**

The value of cross-training became abundantly clear during a blizzard in 2021, when operators became stranded and couldn't get to the Foothills plant. Although scheduled to work at Marston that day, Magee managed to make a two-hour trip to Foothills, keep that plant online, and relieve operators who had been working 12-hour shifts.

Some cross-training also goes on between the plant operators and the asset management team that takes care of both plants: "Sometimes when a plant is shut down for maintenance, the operators come over to the asset management side and help work on the equipment."

Training in general is a priority at Denver Water. The utility pays for operators to attend training courses sponsored by the AWWA, community colleges or other providers. Most of the training is provided in-house as newer team members accompany senior technicians on their daily routines.

"When events happen at the plants, that's the best time for training," Magee says. "When there's an upset condition, when something goes wrong with a pump or something breaks, they can see what you're doing to address the issue."

Plant leaders also have created PowerPoint presentations that break down all areas of the process, from source water to finished water. These enable

Robert Magee found that working at both of Denver Water's treatment plants created opportunities for sharing of best practices.

newer operators to learn on their own. They can also take a laptop with them and watch and listen to a PowerPoint while checking out or working on a piece of equipment.

SPECIAL PROJECTS

Magee's work often includes working on special projects around his day-to-day duties. One project about six years ago involved addressing the cost of electricity: by shifting pump operations and filter washing to night hours with lower utility prices, the plant team reduced monthly bills significantly.

Early in his tenure at the Marston plant, Magee led the creation of an SOP that helped operators improve the control of valves regulating water flows and levels at the front end of the plant and on the filter side. Last year Magee became part of an operational analyzer team, whose members verify the accuracy of all online analyzers weekly and monthly to meet regulatory requirements, adjust flows to the analyzers and clean and maintain them as needed. For any major issues, a work order is written for the process control team to address. Data invalidations are generated when data gets out of its normal range; grab samples are taken to verify the actual data.

Magee is the first to admit he's not the sole source of good ideas; leading a high-performing team means being open to suggestions from anyone. "I may think there's only one way to do something, because that's how I've always done it," Magee says. "But there have been instances where a younger operator said, 'Why are you doing it like that? Why aren't you doing it like this?' We've tried it, it works great, and it becomes our new way of doing things.

"When a situation arises, it's important to have a game plan and to have trained and practiced. So for example, if something bad happens with the chlorine system, we have a plan and are ready to go right away. We can tell the operators what they need to do and give them the direction they need to fix the problem as soon as possible."

As for screening potential new hires, Magee has successfully tried a procedure less formal than sitting the person down in front of a panel to answer questions. The process started with a brief panel discussion; then Magee led each candidate on a tour of the plant.

"As a veteran, I got to ask pointed questions in a more relaxed environment," he recalls. "They opened up a lot more, and the people who were really interested and had done some homework about the industry had questions for me. A number of those people were hired, and they turned into great operators."

GRATEFUL FOR THE CAREER

Magee's efforts have earned recognition for the facilities he helps run. The Marston plant received a 2018 Outstanding Large Water Treatment Plant Award from the Rocky Mountain Section AWWA and a 2018 Directors Award from the Partnership for Safe Water.

For the Directors Award, he gathered data to document turbidity at various process stages to show that the plant was consistently meeting Partnership standards. Source water turbidity at Marston ranges from 1.0 to 1.5 NTU; finished water regularly achieves 0.05 NTU or less.

Magee credits much of his success to his colleagues, most notably the South System Treatment Operations and Asset Management Teams, and specifically Patty Brubaker, manager of South System asset management; and Jason Warwick and Ed Rubenstein, South System operation supervisors: "I really appreciate all of their support, guidance, leadership and, most important, their friendship over the past 25 years of my career.

"When I started out I thought, 'I'm just going to work here for a summer and make a little money while I'm getting my degree.' Then I got interested in the industry and all its different aspects. There's a mechanical side, you get to use math and science a lot. There's something new every day. I really love the challenges." **tpo**

The Marston plant's backwash water supply system uses a Peerless pump driven by a motor from US Motors (Nidec).

featured products from:

Nidec Motor Corporation
888-637-7333
https://acim.nidec.com/motors/usmotors

Peerless Pump Company
800-879-0182
www.peerlesspump.com

Climate Change Insurance

A MARYLAND CITY UNDERTAKES INDIRECT POTABLE REUSE TO ENSURE A RELIABLE WATER SUPPLY DURING DROUGHT AND TO ACCOMMODATE GROWTH

By Steve Lund

In drought conditions the city of Westminster sometimes has to impose lawn watering or other restrictions. But that's not the reason the city is developing the state's first indirect potable reuse project to supplement its water supply.

"We have enough water that we can provide everything we normally need to, but we can't grow anymore," says Mark Mellendick, assistant superintendent of the Westminster (Maryland) Water Reclamation Facility.

To provide enough water to accommodate growth, the city hopes to pipe up to 1 mgd of highly treated effluent from the reclamation plant upstream to the reservoir that is the main source of water. The project is named PUREWater Westminster, and a pilot ran for about nine months in 2021-22. The city has been approved by the state Department of the Environment to begin design and then construction, expected to begin in late 2023.

The PUREWater Westminster pilot project is a 20 gpm version of what the city hopes will become Maryland's first indirect potable reuse project. The goal is to supplement the city's water supply with up to 1 mgd.

PIPE IN PLACE

A 14-inch pipe to carry the effluent back to the reservoir is already in place from a project that began in 2005, not long after a drought temporarily dropped water capacity to below demand. "We actually started trucking water in," Mellendick says.

A 6.5-mile pipeline connects the reservoir with a nearby limestone quarry; water from there can be pumped to the reservoir to boost the supply, but only during drought, per state regulation.

"Most of the time, water is not flowing in that pipe," Mellendick says. "The line from the quarry runs right past our plant. We plan to tie into that pipe and then pump the reclaimed water all the way to the reservoir."

The additional effluent treatment includes ultrafiltration, reverse osmosis, a UV advanced oxidation process for disinfection, and granular activated carbon. The pilot operated at just 20 gpm (28,800 gpd) but generated encouraging data on the project's operational and economic feasibility.

> "The plan is to start with a half million gallons a day when we build the building with the filters and everything else. We're going to build it so everything can be scaled up to 1 mgd."
> **MARK MELLENDICK**

The city now hopes to take the project to the next level and grow it incrementally. All testing and design parameters are modeled after existing California water reuse standards. "The plan is to start with a half million gallons a day when we build the building with the filters and everything else," Mellendick says. "We're going to build it so everything can be scaled up to 1 mgd. The intent is to use it constantly, so we're continuously replenishing the reservoir."

PLANT UPGRADE

The pilot project was operating while the water reclamation facility (5 mgd design, 4.3 mgd average) was being upgraded to enhanced nutrient removal. The denitrification filters weren't in place then, so the effluent was taken right out of the secondary clarifiers for the PUREWater Westminster process.

"That's like a worst-case scenario," Mellendick says. "When the denitrification filters get completed, we'll run the pilot again with that water for a month or so and compare the results."

In another aspect of the upgrade, the reclamation facility recently began a partnership with a cement plant for a beneficial use of biosolids; the material is dried to 90% solids. "At that level, it has about half the Btu value of coal," Mellendick says. "Lehigh Cement burns coal for its kiln, and they'll take the biosolids and burn it."

To achieve 90% solids, the material is first dewatered on a belt filter press (Alfa Laval) to about 18% solids. The new part of the system is a Wyssmont TURBO-DRYER. "It works like a food dehydrator," Mellendick says. "There are multiple trays with a fan blowing up through them. The material falls down from one tray to the next. The whole thing is maintained at about 450 degrees, and the heat drives off the water."

Another view of equipment in Westminster's pilot project for indirect potable reuse.

The reclamation facility does not have digesters, and until the new system is in place, the dewatered biosolids are being trucked to a landfill. When the project is fully operational, the dried biosolids will be hauled to the cement plant. "They don't pay us, but they don't charge us, either," Mellendick says. "Currently, we were paying about $120 a ton to have it landfilled."

AERATION UPGRADES

The reclamation facility upgrade also included a switch from medium- to fine-bubble diffusers (Sanitaire) in the four aeration tanks, and a switch from 150 hp positive displacement blower to more efficient 100 hp turbo blowers (APG-Neuros).

"We get better oxygen transfer with the smaller bubbles, and we don't have to run as many blowers," Mellendick says. "We did two tanks a while ago. We were running two 150 hp blowers for those tanks, and when we put the fine-bubble diffusers in there, we were able to completely drop off one blower. We're just running one blower, and we aren't even running that at maximum speed on the VFD."

Since PUREWater Westminster is the first indirect potable reuse project in Maryland, it could have wide-ranging impact in the state and elsewhere in the Chesapeake Bay watershed. Among the organizations supporting it are WateReuse and the Chesapeake Bay Foundation.

Effluent from the reclamation plant flows into Little Pipe Creek, which is protected as a recreational trout water and a public water supply. When the enhanced nutrient removal and efficiency upgrades are complete, and if the PUREWater project gets a green light for scaling up, Westminster will have improved water quality downstream and the water supply upstream.

"As climate change begins to create more frequent water shortages due to changing weather, with less snowfall and extended droughts, the demand for additional sources of fresh water is constantly increasing," Mellendick says. "Water reuse can help to fill that balance, providing more water for human consumption, and for other purposes like irrigation, fire protection and refrigeration." tpo

An Instructive Amphibian

A CARTOON TOAD IS A FEATURE OF ONLINE INTERACTIVE GAMES THAT TEACH CHILDREN IN A CALIFORNIA COMMUNITY HOW TO HELP CONSERVE WATER DURING DROUGHTS

By Sandra Buettner

A severe drought in 2015 led the California city of Davis to educate the public on how to help conserve water.

The city engaged an environmental consultant to help brainstorm ideas. The result is an interactive online video game designed to engage students and ultimately parents.

Davis, home to a University of California campus, has numerous walkways, parks and bike trails. It is known for its environmentally aware and socially innovative culture. The city (population 70,000) lies 11 miles west of Sacramento. Its wastewater treatment plant is permitted for 7.5 mgd.

CREATING THE GAMES

Since the city has a storied history for its toads and its college roots, the consultant suggested a cartoon toad mascot, Professor Davis Green. Because of the drought, the focus for the first game was on water conservation. It's designed to work with the Chromebook platform kids use in schools.

Students can choose from two games centered on water conservation. One is a picture-matching game set to lively music with tips on how to save water. For example, a player who matches two plant pictures gets a reminder to choose plants that require little water. Two faucets bring a reminder to install aerators.

The other game asks students to click around a map of the city; they get points for identifying water leaks. Both games are led by Professor Davis Green. When they finish the two games, students can download a certificate. The games are tailored to grades 2-5.

HELP FROM COLLEGIANS

Based on the success of those games, the city approached Sacramento State University to help create another. The university requires its senior computer science students to help a local business or nonprofit create a computer program. Businesses and organizations submit their requests, and the students pick the ones they find the most engaging to work on.

For Davis, the students created an interactive recycling game called "Professor Davis Green Goes Zero Waste." Using matching pictures, it shows players which products can be recycled and composted. A second game, "Zero Waste Sorting," asks players to match the product with the correct bin:

- Plastics, glass, and metals
- Organics
- Paper
- Landfill

"This game proved to be another hit with the kids," says Jennifer Gilbert, conservation coordinator. "So the following year, we submitted a request for a third game." This time the college students created a game focused on preventing stormwater pollution.

The game first teaches player what should not go down a storm drain and how pollutants that get in storm drains affect the watersheds and wildlife. Because the stormwater game is a little more challenging, it is for grades 3-12.

City staff members created all the graphics, and the computer science students wrote the code. The city hosts the games on its website and updates them when needed.

ABOVE: Professor Davis Green is the animated character used in the city of Davis online conservation games. RIGHT: A child tries out the Zero Waste Sorting game at a community event.

PROMOTING THE GAMES

The city promotes the games through social media, at local events, and in an electronic newsletter sent to 17,000 subscribers,

"Before COVID, we were visiting classrooms and showcasing the games, along with environmental assemblies for kids," Gilbert says. "In addition, we took iPads to Earth Day events and other places where we had booths and encouraged the attendees to play them. We were surprised how popular they were with adults."

The residents attending said the games weren't as easy as they thought, and reported that they learned a lot from them. The city gives out flyers in classrooms and events that children and adults can take home, as reminders of water-saving practices.

GOOD FEEDBACK

The games have been well received by the teachers and students. Dawn Calciano, conservation coordinator for the city, observes, "We handed out surveys at some classroom visits. The educators' feedback was positive, and they mentioned how much their students enjoyed the games."

Gilbert adds, "In some classes, teachers compete with the students, and the students usually win. The children are well trained from their time in the cafeteria about what bin their trash should go in, so they have an edge that way. Besides, they grew up on video games."

Calciano concludes, "The games engage the students and the public, causing them to ask more questions about what they can do to help. And that's just what we want to hear." tpo

A New Lease on Pump Life

REPLACING AGING SLUDGE PUMPS WITH A LOW-FRICTION, LOW-MAINTENANCE DESIGN KEEPS A MAINE SEWERAGE DISTRICT'S CLEAN-WATER PLANT RELIABLE AND EFFICIENT

By Preston Campbell

Pumps are critical components in wastewater treatment facilities. The Sanford (Maine) Sewerage District experienced just how critical when the pumps feeding biosolids to the centrifuges at its wastewater treatment plant began to fail.

The district, serving a community of 21,000, has been in operation since 1947. The treatment plant (4.4 mgd design, 1.56 mgd average) is fed by 70 miles of gravity sewers and 16 pumping stations. It also treats the septage from surrounding towns.

The activated sludge oxidation ditch treatment process includes biological nutrient removal with chemical addition for additional removal of phosphorus. This is followed by multimedia filtration (Roberts Filter Group) to reduce phosphorus still further. After UV disinfection (Trojan Technologies), the tertiary effluent is discharged to the Mousam River, which has a dam impoundment several miles downstream of the outfall.

On the solids side, waste activated sludge is directed to holding tanks at 0.5-0.9% solids. The material is dewatered to 20% solids in two centrifuges (GEA Group) with a capacity of 800 pounds per hour at 165 gpm per machine. The dewatered biosolids are sent to the district's compost facility and ultimately landfilled.

TROUBLE WITH PUMPING

The delivery of sludge to the centrifuges leaves no room for pump failure. So, when the two aging centrifuge feed pumps experienced excessive wear on seals, rotors and stators, it was time for action.

"It became apparent that we needed to do something with our pumps," says Scot Lausier, chief plant operator. "It became costly with repairs and parts needing to be replaced constantly, and our pumps began to experience downtime because the replacement parts had long lead times.

"This is not something you want happening when you are the wastewater facility protecting the waterways in your own and surrounding areas. Our customers are counting on us. They trust us. We can't have our pumps failing. We can't let our community down."

SEEKING A SOLUTION

The district needed new pumps with technology able to handle grit with less susceptibility to wear and tear. "We couldn't risk any more setbacks or failures," says Lausier. "We needed to look at our issue in a different way because replacing the pumps with units like the ones we had been using wasn't going to solve the problem in the long run." The district evaluated several types of pumps but did not find a model the staff trusted to withstand the harsh environment they would be exposed to, day after day.

Among the variety of pumps used in the plant for transfer of liquids, the district had been using a septage transfer pump from Penn Valley Pump for some time. The pump had capacity to transfer millions of gallons of septage with no issues. Knowing this, Lausier contacted Penn Valley Pump to explore replacement possibilities.

ABOVE: Two centrifuges (GEA Group) dewater biosolids delivered by newly installed Double Disc Pumps from Penn Valley Pump. LEFT: The Double Disc Pumps are designed for ease of maintenance with maintain-in-place hinged housings that enable quick disassembly and reassembly.

The company suggested its Double Disc Pumps, engineered for an extremely low wear rate with a low-friction design and able to last thousands of hours between rebuilds. At first, Wright-Pierce engineers were concerned about possible sludge feed pulsation from that type of pump, but after installation that concern was nullified.

SUITED TO THE TASK

"The Double Disc Pumps were a perfect option for us," says Lausier. "There was a local representative from the company who could answer any questions or concerns we had. There were also replacement parts at the ready if we ever needed them.

"The pumps are easy to maintain because of their maintain-in-place hinged housing that allows for quick and straightforward disassembly and reassembly. Each pump only has five elastomeric components and a gasket set. That makes it quick and easy to get them back into service if they ever go down."

The district has used the pumps for more than two years. "We have had zero maintenance issues," says Lausier. "Pump 1 has 4,500 hours of run time, and Pump 2 has 3,500 hours. We could not be happier."

By replacing the sludge pumps, the district continues to operate a reliable, natural and efficient process of purifying wastewater and protecting local water resources.

Preston Campbell (pcampbell@pennvalleypump.com) is applications engineering director at Penn Valley Pump. tpo

Recognizing Water Champions

THE NEW ENGLAND WEA REVIVES AND REFRESHES A WATER FOR LIFE CAMPAIGN TO RAISE AWARENESS OF CLEAN WATER AND THE PROFESSIONALS WHO MAKE IT POSSIBLE

By Ted J. Rulseh

Few would claim that clean-water and drinking water operators receive the credit they deserve or are held in the same esteem as people like police and fire chiefs and public works directors.

The New England Water Environment Association's Water for Life Campaign aims to raise awareness of water professionals and the work they do by showcasing the ideas, people and projects that keep the region's water environment safe and accessible.

That includes steps toward helping residents understand the work NEWEA and its members do and the contributions they make to the quality of life. The association launched the campaign in 2016 and is now looking to expand it. The plan is to raise awareness of water quality and share success stories throughout the region.

The campaign uses an advertorial and educational style. In the endeavor, NEWEA will partner with water industry professionals and with organizations and people outside the industry who support environmental protection and water resource quality.

Specific aims include highlighting career opportunities for diverse water industry professionals and the critical need for adequate funding of water infrastructure. Jordan Gosselin, NEWEA communications and public relations coordinator, talked about the campaign in an interview with *Treatment Plant Operator.*

tpo: What was the impetus behind the Water for Life campaign?

Gosselin: Our Public Awareness Committee wanted to reach out beyond our industry because people outside the water sector don't necessarily understand what water professionals do for their communities. So in 2016 they partnered with a consultant who helped create a variety of marketing collateral to start the campaign.

tpo: What did these materials consist of?

Gosselin: They created banners and one-page ads. Ultimately, some of them turned into ads on the sides of Metropolitan Boston Transit Authority buses and trains, in MBTA stations and on a digital billboard over I-93. They also did interviews with well-known professionals within the NEWEA membership, including John Sullivan of the Boston Water and Sewer Commission.

tpo: What was done with the interviews?

Gosselin: They were published as articles on NEWEA website. We still have all these materials available. Some are being revamped and new interviews are being completed because we're refreshing the campaign.

tpo: When did NEWEA decide to revitalize the Water for Life campaign?

Gosselin: NEWEA's Executive Committee voted to create the communications/public relations coordinator position in 2018, and then I was hired to fill it. Before that the campaign was largely run by volunteers with support from the NEWEA office and the outside consultant. The Water for Life campaign and NEWEA's other outreach efforts were a lot to manage on a volunteer basis. The communications and PR position created an opportunity to put more focus on the campaign. In the year or so after I came on, I worked with the Public Awareness Committee, exploring how we could continue this campaign and how we wanted it to look.

Jordan Gosselin

tpo: What audiences outside the water industry are the most critical to reach?

Gosselin: The most important audiences are the local communities and the ratepayers who support the water professionals and the services they provide. People don't think about water industry work. They turn on their tap and water comes out, they use it and it goes down the drain. They don't think about where it comes from, where it goes, and the huge industries that are behind keeping our water clean and available. Some of our materials were designed to make people aware that rain water flowing into the storm drains often flows back into our water sources, so we need to keep the storm drains clear of chemicals and pollutants.

> "People turn on the tap, and water comes out, they use it, and it goes down the drain. They don't really think about where it comes from and where it goes."
> **JORDAN GOSSELIN**

tpo: What new direction is the Water for Life campaign taking now?

Gosselin: Right now our focus is on refreshing and updating things like our website and FAQ pages. We're also putting together some Water Champion stories that highlight members within our organization. And we're reaching out beyond our industry. We'd like to form partnerships with people and organizations that rely on clean water. The thought is that they would join us in building awareness of what the water industry is doing and how we support other industries.

tpo: What kinds of organizations might that outreach include?

Gosselin: Breweries and recreation-related businesses are two that we've been focusing on. Many recreation companies have corporate social

> “There is so much important work being done in our industry. We would like to see a great deal more awareness of it.”
>
> **JORDAN GOSSELIN**

responsibility departments because their business relies on a clean environment. As for breweries, there are many in the local communities, including some that we’ve worked with and have hosted events with. Some breweries have their own treatment systems, and it makes sense to have partnerships with organizations that already have close connections to clean water and water treatment.

tpo: What other communication tools are you developing?

Gosselin: We’re creating a series of Water for Life videos. It’s a three-part series. The first one is already published on our YouTube channel. We went to Upper Blackstone Clean Water and did interviews with professionals in all different positions, highlighting the work they do. The second video focuses on stormwater and combined sewer overflow projects around the region and how they are helping to keep the environment clean. The third one will be about innovation and how new technology is keeping our water clean and making us more efficient.

tpo: How will you promote these videos and other materials?

Gosselin: I worked with our Public Awareness Committee to create a publication guide that outlines who our target audiences are and what NEWEA’s publication schedule will be for each item. We’ll share that with our sponsors and encourage them to share the materials through their channels. The guide is also sent to our committee members, our executive committee and other companies and organizations within our industry, who in turn distribute it through their networks to give it a broader reach.

tpo: Have local utilities been able to make use of these materials with their customers?

Gosselin: We definitely encourage that, and we have done so in the past. One utility took one of our bus and train graphics and put it on the side of one of their utility trucks, so when they drive around the community, people see that. We also partnered with Think Blue Massachusetts to create an ad focused on stormwater pollution prevention and helped them get that out to MS4 communities as part of the educational requirement for their permits.

tpo: What do you see happening in Water for Life in the next few years?

Gosselin: We’d like to film our third video so we can get that out in spring. Then we’ll do a lot of work internally to update materials and create new Water Champion stories to use in reaching out to organizations about potential partnerships. That’s a great opportunity to get our messages out to a broader audience. There is so much important work being done in our industry. We would like to see a great deal more awareness of it. **tpo**

CHECK OUT THIS VIDEO

NEWEA’s first Water for Life video captures a day in the lives of people in a wide variety of roles at Upper Blackstone Clean Water based in Millbury, Massachusetts.

In just under four minutes, people in various roles at the treatment plant describe the importance of clean water and the work they do to protect it. Above all, it captures how dedicated, humble and genuine people in the water industry are.

Although this video focuses on one utility and was created for the public in one region of the U.S., it would be worth showing to members of the public anywhere at all. The message it delivers is universal.

Upper Blackstone Clean Water owns and operates an advanced wastewater treatment facility (80 mgd design, 45 mgd average) that serves the city of Worcester and surrounding areas. It discharges to the Upper Blackstone River.

To view the video, visit www.youtube.com/watch?v=4dM372yahyM, or search YouTube on “NEWEA Water for Life.”

Posters celebrate the importance of NEWEA members’ work on behalf of water quality.

Home Cooking

JEFF BACKMAN AND HIS TEAM IN A SMALL NEW HAMPSHIRE COMMUNITY HAVE ACCOMPLISHED GREAT THINGS BY TAKING ON SIGNIFICANT IMPROVEMENTS WITH IN-HOUSE INGENUITY AND TALENT

STORY: **Ted J. Rulseh**
PHOTOGRAPHY: **Adam Perri**

When it came time to build a SCADA system for the Allenstown Wastewater Treatment Facility, the plant team didn't have to look far for help.

Operator Jeff Backman and plant superintendent Dana Clement set the project in motion. On taking over as superintendent in 2015, Backman kept it on course. "I've been replacing our older PLCs with CompactLogix PLCs (Rockwell Automation)," says Backman.

"For all the controls I tie in, I try to use Ethernet-ready products. Our instrumentation all communicates over Ethernet. The HMI, the software that runs the plant, we built that all from the ground up."

A homemade SCADA system is just one example of the work Backman and his team perform to help keep costs down for the 4,400 residents of their south-central New Hampshire community. "We do most of our fabrication and building in-house," says Backman. "We know our skill level. There are things we just can't handle, like major electrical projects. If we don't know how to do something, we learn how to do it. But we also know our limits."

Carl Caporale, an Allentown Sewer Commissioner from 2012-21, observes, "Jeff has the great ability to look forward at what's next and plan ahead for the needs of the plant. He always presented the board with well-thought-out, signature-ready projects."

HOME-GROWN TALENT

Backman grew up in New Boston, about 30 minutes from Allenstown. After high school he earned an associate degree in water-quality technology from White Mountain Community College. Upon graduation he applied for three jobs, got three interviews and two job offers, and chose Allenstown because it was close to home. He has been there for 17 years.

The Allenstown plant has a design capacity of 1.5 mgd and an average flow of 0.62 mgd.

Allenstown, a mostly residential community, lies north of Manchester and south of Concord, the state capital. It's home to the 10,000-acre Bear Brook State Park, largest in the state. The treatment plant serves the towns of Allenstown and Pembroke, parts of which make up the village of Suncook.

The treatment plant was the first municipality in the United States to install the BioMag ballasted activated sludge process (Evoqua Water Technologies). Magnetite is added to the aeration basins and impregnates the floc before the wastewater goes to the secondary clarifiers. It allows the solids to settle faster. Effluent is disinfected with sodium hypochlorite and dechlorinated with sodium bisulfite before discharge to the Merrimack River.

> We try to get everything done at the best possible cost for our users. If we don't know how to do something, we learn how to do it. But we also know our limits."
>
> **JEFF BACKMAN**

POLICING THE PERMIT

One of Jeff Backman's proudest accomplishments at the Allenstown Wastewater Treatment Facility had nothing to do with a plant repair or improvement project. It was commentary on a proposed NPDES permit in 2021 that would have required a strict limit on effluent aluminum.

If enacted, that requirement likely would have meant a multimillion-dollar plant upgrade, according to consulting engineers. Based on Backman's argument, the U.S. EPA and the New Hampshire Department of Environmental Services rescinded the aluminum limit.

"Our draft permit had many changes for Allenstown," Backman recalls. "The biggest thing I disagreed with was the aluminum limit with a five-year compliance schedule. The state's data showed that there was a problem with the concentration of aluminum in the Merrimack River. New Hampshire is rich in aluminum that comes from the White Mountains." The proposed aluminum limit was 87 µg/L limit.

Backman did his own research and issued comments on the permit without help from engineers. In essence he argued that the state's method for measuring aluminum was not appropriate and that his review of data from neighboring communities indicated that enforcement of aluminum limits was "inconsistent at best."

He further stated, "The U.S. EPA and the NHDES willingness to take a stern position in favor of public protection is admirable in a sense, but regulation based on bad science and assumptions is unreasonable and has damaging economic and social impacts by way of forcing capital expenditures where they just may not be necessary in the end."

Backman observes, "I really think it was a big win getting that out of our permit."

Jeff Backman

Allenstown, New Hampshire

POSITION:
Plant Superintendent

EXPERIENCE:
17 years, all with Allenstown

EDUCATION:
Associate degree, water quality technology, White Mountain Community College, New Hampshire Department of Environmental Services Wastewater Managers School

CERTIFICATIONS:
Grade 4 (Highest) Wastewater Operator, Grade 4 Collections Systems Operator, Grade 1 Lab Technician

GOAL:
Complete replacement of original-equipment shallow secondary clarifiers

Commissioned in 2011, the BioMag process increased the plant's design capacity from 1.05 mgd to 1.5 mgd and freed Allenstown from a sewer extension moratorium the state Department of Environmental Services had imposed in 2004. Average plant flow is 0.62 mgd.

The rapid settling process helped overcome a key deficiency of the Allenstown plant: secondary clarifiers just 7 feet deep. The two 45-foot-diameter clarifiers have low hydraulic detention time. "The next challenge is to replace them," says Backman. "The conceptual design is four 45-foot-diameter clarifiers with 14- to 15-foot depth."

HANDLING SEPTAGE

Another challenge involves dealing with a high volume of septage. Only about 45% of Allenstown is on sewers. The septage program began near the time Backman came on board. The plant began by charging haulers 8 cents per gallon.

"Then they lowered the price to 6 cents a gallon, and since then we have been getting over 20 million gallons per year," Backman says. "Last year we were at 24 million gallons. In 2020 we had 26 million, and it was the same in 2019." That volume includes septage, grease, portable restroom waste and a limited amount of landfill leachate.

Russell McMahon, left, operations foreman, and Jeff Backman make process adjustments on the plant's SCADA software (Ignition by Inductive Automation).

True to form, the team built major components of the process in-house. That includes a receiving station with a kiosk where haulers enter a PIN code. They drive over a scale and are assigned to one of four lanes where they empty their tanks before weighing out.

The septage first enters one of four specially in-house- designed stainless steel rolloff cans built by Wastequip (Hi-Vac Corporation). Each holds 25 cubic yards. Grease passes through a Muffin Monster grinder (JWC Environmental) before blending with the septage.

In the cans the settleables and floatables separate by gravity. The liquid is drawn off by way of valves at the bottoms and is delivered to three 200,000-gallon storage tanks, which also receive waste activated sludge (the plant has neither digesters nor primary clarifiers).

"What makes us unique and able to handle as much septage as we do is the amount of storage we have," Backman observes. "We don't put the septage directly into the treatment process. It is pumped by three new progressive-cavity pumps (SEEPEX) straight to dewatering on three screw presses (HUBER Technology) installed in 2012-13."

From left, operations and maintenance technician Corbin Ellsworth, Jeff Backman, and operator Kyle Gagnon inspect the fine screen in the headworks.

> "Everybody has a role that they fall into. They excel at certain things. I want to use what they're good at and let them excel in their work."
> **JEFF BACKMAN**

The storage tanks are stirred by a Rotamix hydraulic mixing system (Vaughan Company). "Before the Rotamix system we mixed our sludge, septage and grease with air from blowers," Backman says. "When we mixed with air, we were getting odor complaints daily. With the Rotamix system, each of our storage tanks has six jet nozzles for mixing. Last year we only had two odor complaints.

Water separated from the solids on the screw presses is fed slowly into the process so that it can be treated efficiently. The solids are landfilled. Meanwhile, once any rolloff can has gravimetrically separated 400,000 gallons of septage, it is drained to thicken the residuals and remove any free liquids. The container contents are then sent to landfill.

ALWAYS A PROJECT

While this and other processes run smoothly, life is never dull at Allenstown plant. A major project early in Backman's tenure was the building of a new Suncook Pond Pump Station, funded by hauled-waste revenue at no cost to sewer users. It eliminated a section of sewer that ran under the Suncook River to Pembroke and then returned to the Allenstown plant. The station includes two 12-inch Gorman-Rupp pumps with that company's controls. An 80 kW Kohler natural gas generator supplies emergency power.

A more recent project replaced the aging transfer switch that in case of a utility outage connects to a 1970 Cummins 450 kW diesel for backup power. A future project would extend sewers up Route 28 in Allenstown to a site planned for commercial development.

Meanwhile, plans are in place to secure funding for the new deeper clarifiers." We anticipate getting a 30% grant for the engineering," says Backman. "The remainder will be funded by sewer users. Once the engineering is done it looks promising for us to acquire funding under the federal Infrastructure

Investment and Jobs Act. We're hoping for 50%, but realistically it could be only 30%."

Backman's efforts drew praise from John Jackman, P.E., an asset management consultant who has worked at the plant: "Jeff runs the wastewater facility as a business and understands the need to provide a high level of service to customers. You can see this in the upgrades he has initiated and in the staff members who work for him."

COHESIVE TEAM

That staff includes Russell McMahon, operations foreman; Dan Chagnon, maintenance foreman; Kyle Gagnon, operator; Pret Tuthill, Scott Dukette, Corbin Ellsworth and Hobie Shireling, operations and maintenance technicians; and Jaye Wallace, administrative assistant.

"Everybody really likes coming to work," Backman says. "Everybody gets along, and we get things done. We all have the attitude that we want to be here and we want to contribute. Everybody has a role that they fall into. I want to use what they're good at and let them excel."

Three consultants also function as part of the staff: Roxanna Chomas, Allenstown Wastewater assistant superintendent from 2015-21; previous superintendent Clement, still employed part time by the town; and Peter Boettcher, an electrical consultant. "These three have played an integral part in Allenstown's and my own success," notes Backman.

Backman's primary interest is in information technology, and he applied that when developing the SCADA system (which uses Ignition software from Inductive Automation). "I get focused on something, and I can't put it aside until I figure it out," he says. "I just research it until I find a solution."

McMahon, meanwhile, led a team in developing the plant's asset management program. Two principal-forgiveness state loans of $30,000 helped get the project started. The program is built on the VUEWorks asset management system. The team started by GIS mapping the assets and then logging them into the system.

"Now we're at a point where we've identified our assets," says McMahon. "We have pictures of them. We have work orders to follow the prescribed maintenance criteria, whether it be applying a couple of pumps of grease or inspecting a belt.

"Everybody helps with the work orders. Even though it may seem mundane to do the same check of something every week, it gets us into areas where we see things we might not see if not directed to be there on a regular basis. We catch little things that we can nip in the bud."

Hobie Shireling, operations and maintenance technician, and Backman perform calibration and maintenance on the pH monitoring system in the dechlorination room.

The team at Allenstown includes, from left, Dan Chagnon, maintenance foreman; Corbin Ellsworth and Hobie Shireling, operations and maintenance technicians; Jaye Wallace, administrative assistant; Jeff Backman, superintendent; Kyle Gagnon, operator; and Russell McMahon, operations foreman.

STILL GROWING

All that attention leads to a smooth-running plant that gives Backman time for recreation. In his spare time he enjoys hiking and climbing. He's a member of New Hampshire's 4,000-Footer Club, for having summited all 48 peaks in the White Mountains that exceed 4,000 feet of elevation. He also enjoys fishing for striped bass in the Atlantic Ocean.

Meanwhile some of his spare time goes to continuing education. He has taken community college classes in electricity and accounting, as well as public speaking, which comes in handy when addressing decision-makers and members of the public and budget review meetings.

His main interest, though, lies in the inner workings of the plant. "I like the technology of everything. I like working with computers. That's where I would like to progress, with server and database administration." **tpo**

plant PROFICIENCIES

Innovative technologies and skilled operators make an unbeatable combination in water and wastewater treatment plants.

Explore the possibilities in this special section.

Manage Debris Removal With Brackett Bosker Automatic Raking Machine

Brackett Bosker automatic raking machines are fully customizable and automated systems that combine debris cleaning and conveying systems while offering a range of benefits.

Brackett Bosker automatic trash rakes have been installed at a wide variety of water intakes where a key objective has been the provision of simple and effective coarse screening. Brackett Bosker automatic trash rakes often act as the very first screening stage. They are a vital means of removing a large volume of awkward debris (such as driftwood and tree trunks) from the water and protecting critical power-generation equipment or downstream pumps.

For normal applications at slightly smaller plants, a traveling Brackett Bosker automatic trash rakes and trolley assembly can service a multiple screen installation. With either design, the overhead positioning of the rake's trolley creates the advantage of a clean and entirely accessible screen deck.

PROTECTED MACHINERY

Motors for Brackett Bosker automatic raking screens are concealed and protected within the trolley assembly. A hoist motor (which lowers and lifts the rake's gripper) drives through a gearbox to the main hoist shaft. The main lift cables are wound on cable drums fitted to the shaft. The Brackett Bosker automatic trash rake's power pack is a self-contained unit where core components such as the motor, pump, solenoid valve, filters and pressure relief valve can all be easily accessed for maintenance. The control cabling is routed through the supporting framework. Hydraulic drums — which contain the hoses to the grab's close and open rams — are driven by the main hoist motor with a spring tension system to ensure a constant and equal tension is always maintained. The trolley also contains the traveling motor and hydraulic pack. Drives are protected within the track assembly.

The Brackett Bosker smart design makes operation trouble-free. If for example, the gripper is unable to submerge due to a large buoyant object, it will close and cease to descend, preventing possible cable entanglement. By locating the hoses behind the hoist cables, the chance of damage by floating debris is reduced. Mounting the hydraulic cylinders directly on the gripper minimizes the number of submersible moving parts. No moving parts are permanently submerged.

HOW IT WORKS

The Brackett Bosker automatic trash rake traverses on a monorail track over the screen and dump areas. Travel speeds are between 10-20 meters per minute. At installations where there is a long track length and a heavy debris loading, a dual travel speed of 30-60 meters per minute would be specified to reduce the overall cleaning cycle time. At the start signal, the Brackett Bosker automatic raking screen travels to the designated screen area and stops over its first pickup point. Next, the gripper descends to the bottom of the screen, collecting debris in its jaws. Cylinders close the gripper, and the hoist elevates the gripper and debris to the trolley. Then the trolley and gripper return to the dump area where the gripper opens, releasing debris into the hopper, trailer or other dumpsite. The Brackett Bosker automatic trash rake then moves back to the second pickup point at the screen, continuing the cycle until the selected screen area is clean.

Choose Peristaltic Metering Pumps for Fluids With Particulates or Chemicals That Off-Gas

A peristaltic metering pump is a type of positive displacement pump. Fluid is pumped through a flexible tube in a peristaltic motion. Rollers are attached to a rotor which is controlled by a motor. As the rotor turns, the rollers pinch the tubing to force the fluid through. When the tube is not compressed, the fluid flow is brought into the tube.

Peristaltic metering pumps excel at pumping dirty fluids that contain particulate matter into lower pressure systems because they have no check valves to clog. The gentle forces created during the peristaltic pumping action will not damage delicate fluids within the tube.

Peristaltic pumps are also extremely effective when pumping fluids that contain trapped gases. Fluids such as sodium hypochlorite and peracetic acid tend to release absorbed or occluded gases when subjected to a vacuum or changes in temperatures. Whereas a diaphragm pump can lose prime or vapor lock and fail when gasses build up in the pump head, peristaltic pumps are capable of pumping both fluid with particulates and those that off-gas without loss of prime or vapor lock.

Peristaltic pumps easily prime under maximum pressure, but are usually limited to maximum discharge pressures of around 125 psi. In addition, they are capable of injecting into a vacuum without the need for metal spring loaded valves. Their output volume does not change due to changes in the system pressure.

M3 PERISTALTIC CHEMICAL DOSING PUMP FEATURES

The advanced performance features of Blue-White's new M3 Peristaltic Chemical Dosing Pump include a bright, easy to access and highly responsive 5-inch display screen. The screen is as simple to operate as a cell phone, even with gloves on, and the text is easy to read. Icons are quickly recognizable.

In addition to legacy communications such as 4-20mA, the M3 offers advanced communication protocols, including Profibus, Modbus TCP and Ethernet IP. The superior design of the M3 includes firmware that can be field updated.

Additionally, M3 may be ordered with Blue-White's exclusive FlexAPrene multichannel tube technology, which saves maintenance time and expense. These innovative pump head tubes provide optimal performance while operating at higher pressures than conventional single tube designs. The multi-tube design delivers tube life up to four times greater than average single tubes, according to the manufacturer.

Should a tube rupture, the FLEXFLO M3 is equipped with Blue-White's built-in Tube Failure Detection system. This technology detects a wide range of conductive chemicals with no false triggering. If the TFD detects tube failure, the pump will automatically shut off and energize a relay switch. This permits communication with external equipment, such as a back-up pump or alarm. It also serves to prevent chemical spills and added downtime.

FLEXFLO pumps can also be equipped with Blue-White's quick-disconnect fittings. They're designed to aid in ensuring operator safety by helping prevent chemical spills and splashing during tube changes.

In conclusion, peristaltic metering pumps have been proven to be accurate, dependable and tough in a multitude of commercial, industrial and municipal chemical metering applications. They are a suitable choice when pumping fluids that contain particulates or trapped gas. The constant flow and gentle peristaltic pumping action help deliver precise amounts of chemical to a system without loss of prime.

Blue-White has prided itself on cutting-edge technology, quality materials and excellent customer service since 1957. The company's approach is to simplify the chemical metering and fluid measuring process to give users peace of mind and to invent new technologies. The company has a worldwide network of factory authorized representatives, distributors, dealers and warranty centers.

714-893-8529 | info@blue-white.com | www.blue-white.com

No Lower Bearings, Sprockets, Bushings or Guides With Raptor FalconRake Bar Screen

The Lakeside Raptor FalconRake Bar Screen is an efficient, proven, cost-effective screen technology for inorganic solids removal providing protection to downstream equipment in municipal and industrial applications.

High removal efficiency and low headloss is achieved with multiple rakes continuously removing captured material. The Raptor FalconRake Bar Screen features a durable stainless steel chain-link design for solids removal without the need of lower bearings, sprockets, bushings or guides, thus eliminating any fouling or jam conditions in the channel.

The Raptor FalconRake offers a wide range of bar shapes and depths to ensure successful operation regardless of the application, creating an efficient, durable and dependable rapid debris-removal system.

DESIGN AND CONSTRUCTION

Product features include an all stainless steel construction to resist corrosion, and a low-horsepower energy efficient drive system. The unit requires minimal headroom above the operating floor.

The Raptor FalconRake offers bar spacing available from 1/4 inch, and features a variable speed to ensure quality cleaning and a durable cast stainless steel chain-link system.

Customers can optionally add a cover for odor control, an explosion-proof design or weather protection system, or teardrop-shaped bars for reduced headloss.

THE COMPLETE PACKAGE

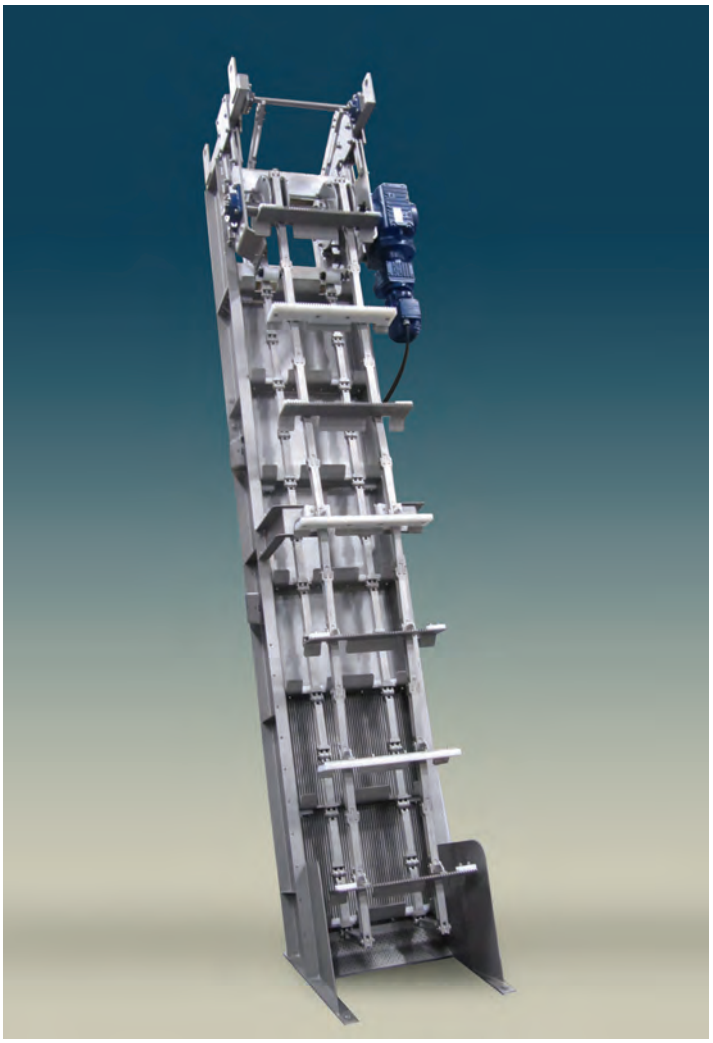
The Raptor FalconRake Bar Screen can be used in tandem with the Raptor Wash Press to wash, compact and dewater captured screenings. The screen and wash press equipment controls can be integrated into one control panel for smooth and efficient operation.

LOW MAINTENANCE, HIGH PERFORMANCE

The Lakeside Raptor FalconRake Bar Screen operation is simple. As wastewater flows through the screen, solids are captured on the face of the bar screen. Multiple rake heads with teeth that penetrate the bar screen transport solids to the top of the unit where a debris wiper blade removes solids into a discharge chute. Materials then fall from the chute into a conveyor, washer/compactor or dumpster for disposal.

The low-horsepower, energy-efficient drive operates at low or high speed to ensure the most effective capture/solids removal in the wastewater stream. Maintenance, although rarely needed according to the manufacturer, is easily achieved at the operating floor level since no part of the drive system is located below the water surface.

The Raptor FalconRake offers efficient, economical performance for municipal wastewater treatment plants, pump stations, surface water intake structures and combined sewer overflows.



LAKESIDE EQUIPMENT CORPORATION
Water Purification Since 1928

Cleaner Water for a Brighter Future®

Lakeside Equipment Corp. is an engineering and manufacturing company concentrating on helping to improve the quality of water resources. Lakeside started engineering water purification systems for municipalities and companies throughout North America in 1928. Today, the company operates globally. For more details on the design and performance of Lakeside's Raptor TalonRake Bar Screen, contact Lakeside Equipment Corp.

630-837-5640 | sales@lakeside-equipment.com
www.lakeside-equipment.com

Vaughan Co. Ensures Fast Lead Times for Reliable Pumps

Vaughan Co. products have been made in the United States since 1960. With four generations of expertise, the company says it's committed to giving its customers outstanding service throughout the country — whether providing unique pump solutions or post-installation support. Every pump user faces a unique situation, and each Vaughan system is configured to the end user's desired specifications.

For federally funded projects, Vaughan's pumps and pumping equipment meet all requirements to receive federal aid under the Build America, Buy America Act. All Vaughan pumps and pumping equipment are produced with materials sourced in the U.S. and are constructed in the company's 140,000-square-foot Washington-based manufacturing facility. With an extensive $10 million inventory and strong relationships with domestic suppliers and foundries, Vaughan ensures fast lead times, reliable product quality and access to spare parts as needed.

VAUGHAN CHOPPER PUMP

When the going gets tough, you can turn to the touch Vaughan Chopper Pump, which can handle everything from food processing to silt ponds.

This centrifugal pump has the unique ability to chop all incoming solids prior to pumping. Not only does this protect the pump from clogging, but it also benefits downstream components, processes and the environment. All wear components are cast steel and heat treated for maximum impact and wear resistance. These heavy-duty patented components are engineered together to create the ultimate pump for handling severe solids.

VAUGHAN ROTAMIX SYSTEM

The Vaughan Rotamix System is a cost-effective means of mechanical hydraulic mixing for sludge tanks, digesters and other high-volume applications.

Combining high-velocity mixing nozzles and the Vaughan Chopper Pump, the Rotamix creates a multizone mixing pattern while simultaneously chopping all accumulated solids. This produces an easy-to-pump, homogeneous mix that eliminates floating mats or solids settled at the bottom of your tank.

With guaranteed performance and a 10-year full nozzle warranty, the Rotamix System aims to keep your operations running smoothly.

VAUGHAN CONDITIONING PUMP

The Vaughan Conditioning Pump is here to save you from costly cleanout cycles and maintenance.

This submersible chopper pump is mounted on a portable stand and fitted with a high-velocity mixing nozzle. The Conditioning Pump recirculates the contents of the wet well, chopping and mixing to produce a homogeneous mixture that is more easily pumped out. As the pump is mounted on a portable stand, it can easily be used in multiple applications at a single job site, facility or municipality.

From reducing vacuum truck visits to removing floating grease and debris in your lift station, the Vaughan Conditioning Pump is your portable solution for next-level sludge and grit mixing.

Vaughan
Unmatched Reliability

Vaughan Co. is a pumping and mixing equipment manufacturer located in Montesano, Washington, that provides products for both domestic and international businesses and municipalities. Vaughan focuses on producing quality pumps and mixers for tough applications within the municipal, industrial and agricultural markets. This focus on quality means the company takes time on each project to ensure that the pumps and/or mixers are properly sized for each installation.

888-249-CHOP | info@chopperpumps.com | www.chopperpumps.com

GUARANTEED SINCE Vaughan 1960 PERFORMANCE

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.

Choose the unmatched reliability of Vaughan. Free sample CFD's upon request.

Vaughan
Unmatched Reliability

888-249-CHOP | **ChopperPumps.com**

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

HF scientific Empowers Beaumont, Texas Water Treatment Plant to Control Water Quality

Reagent availability, accuracy and reliability are critical instrumentation needs for any water production plant. Whether a plant is urban, suburban or rural, it can't settle for good enough or second-best. That's the situation that the city of Beaumont, Texas, found itself in.

The City of Beaumont Water Production operates a 40 mgd surface water treatment plant and a 14 mgd groundwater treatment plant. Both facilities serve a population of 112,000 with an average daily demand of approximately 32 mgd.

"We had been dealing with supply chain issues with our chlorine analyzers and accuracy and reliability issues with our monochloramine analyzers," says Daniel Baquera, assistant superintendent at the City of Beaumont Water Treatment Plant. "The poor customer service received from the manufacturer of the chlorine and monochloramine analyzers only served to aggravate the problems we were experiencing."

To combat the less-than-stellar performance of their current instrumentation and ensure superior water quality for their community, Beaumont turned to HF scientific for a free trial run of the MCX™ Monochloramine Analyzer and the CLX Online Residual Oxidant and Chlorine Monitor.

REAGENT AVAILABILITY

"We were introduced to their readily available dehydrated reagents labeled JAW, which stands for 'just add water.' The availability was an immediate good sign for us," says Baquera.

The HF scientific JAW Chlorine Reagent Kits have been specifically formulated for use in the CLX Chlorine Monitor. Boasting significant advantages over current pre-mixed reagents, the JAW Reagent Kits offer savings on shipping weight; no chance of freezing, making storage more convenient; and an extended shelf life of five years (before being mixed with water and DPD), according to the manufacturer. This easy, 30-day reagent replacement schedule allows for continued flawless operation.

ACCURACY

"We then noted the accuracy of both analyzers when compared to benchtop analyzers. This was a second good sign," says Baquera.

The safety of a community's water rests in the hands of the experts manning its water treatment facilities. There is no room for second-guessing your data. The MCX™ easy-to-understand monitors produce regular, accurate readings every 15 to 20 minutes. Accurate data allows you to make good decisions and work to control nitrification in your system.

RELIABILITY

"Finally, we noted that the monochloramine analyzer, or MCX, had remained in operation for a good, solid three months," says Baquera. "We were lucky if we had one full month of operation from our previous monochloramine analyzers."

Wasting time troubleshooting your analyzer can be frustrating. That's why the MCX™ is designed with easy, reliable operation in mind. Designed for 30 days of unattended operation between reagent changes, the MCX™ performs its vital task while simultaneously minimizing downtime, saving you and your community money with lower costs of reagents and maintenance.

CONCLUSION

The city of Beaumont needed new monitoring solutions that could provide them with what their current instrumentation lacked: reagent availability, accuracy and reliability. In their own words, "Our Vector Controls representative listened to our complaints and was confident that HF scientific would be able to resolve our issues," says Baquera. "We purchased the CLX and MCX analyzers and have been happy with our purchase. We intend to buy another CLX and MCX analyzer in the near future."

HF scientific offers good customer support, too, according to Baquera. "Their great customer service is the final selling point that we needed."

Use Your Chloramination Analyzer with Confidence

HF scientific
A WATTS Brand

MCX™ Monochloramine Analyzer

1. Reliable, Easy-to-Use Instrumentation
2. Accurate Readings Every 15 Minutes
3. Save Labor, Time, & Money

See if You Qualify for a 2-Month Demo

HFscientific.com | (888) 534-4708

Solve Your Clogging Problems With envie3 Submersible Pump

The Barnes family of pump products from Crane Pumps & Systems provides versatility, high performance and great value. For more than a century, engineers, plumbing contractors, builders and developers have relied on Barnes wastewater pumps and pressure sewer systems for reliability and durability.

In 2021, Barnes introduced the envie3 series portfolio. This next generation of dry pit submersible pumps can run in wet applications and in dry pits. These pumps took Barnes' proven nonclog and chopper wet ends and outfitted it with a premium, efficient IE3 motor that can run in both vertical and horizontal configurations. The patent-pending closed loop glycol cooling system allows for stress-free, easy maintenance and installation in the most demanding of applications. The envie3 is Barnes' most versatile and efficient solution to date that will solve clogging problems in any application, according to the manufacturer. This is proven in the case study below.

CITY OF BLUEFIELD, WEST VIRGINIA

The city of Bluefield is one of the core cities that sits on the West Virginia-Virginia border. Serving a population of about 22,000 people, Sanitary Board of Bluefield is comprised of approximately 350 miles of sanitary sewer lines all leading back to two treatment plants. About 9.5 million gallons of wastewater run through the two plants every day, with the Westside Treatment Plant treating 8.3 million gallons and the Ada Treatment Plant treating 1.2 million gallons.

PUMP STATION DETAILS

Bluefield has seven pump stations, all of which have had consistent problems with clogging issues, mechanical failures and constant maintenance. The pump issues had become daily occurrences, and frequently hair and plastic would get stuck in the existing pumps. Each time a pump would clog or fail, it resulted in costly downtime for the treatment plant. Surrounded by mountains, the city of Bluefield prides itself on a community oriented and safe atmosphere. With these daily issues, the Sanitary Board of Bluefield knew it needed to upgrade its equipment to live up to these promises to the community.

INSTALLATION

This was the perfect opportunity for Buchanan Pump Service & Supply, a local Barnes distributor, to step in and test a new solution for Bluefield. In February 2021, it installed an envie3 nonclog Barnes pump in a triplex dry-pit station at the treatment facility. The pump is a 4-inch ESH 15 hp nonclog with a maximum flow of 800 gpm. With the help of the 4x6 base elbow, the envie3 was easily installed with minor piping changes from the original competitor.

Since installation, the pump's average daily runtime has been seven hours, starting approximately eight to 12 times each day. The Bluefield team has noticed a significant reduction in surface temperature of this new pump in comparison to the other units in the station due to the envie3's glycol cooling system. The max temperature that it has reached has been 90 degrees F due to the pumping volume doubling on that specific occasion.

Since installation, Bluefield has not experienced any issues with the envie3 pump. Due to the cooler surface temperature, reduced clogging issues with no occurrences since installation and the easy installation, the Sanitary Board of Bluefield is considering replacing the other units in the triplex station with the Barnes envie3. They are also planning to outfit the sister station with a Barnes solution as well.

CRANE
PUMPS & SYSTEMS

CHOPPER
NON CLOG
SUBMERSIBLE
DRY PIT
HORIZONTAL
VERTICAL

envie^3

HAS YOU COVERED

Visit **envie3.cranepumps.com** to learn more!

Keller's non-fouling level transmitter solves tough measurement problem

In wastewater measurement, accurate readings are essential to ensuring proper pump operation. A failure in this area can result in unhygienic liquid waste overflow and costly repairs to pump mechanisms.

In Newport News, Virginia, several restaurants were built in an area serviced by the same municipal wastewater lift stations. These restaurants introduced heavy grease content to the wastewater and caused the municipality's existing level measurement equipment to foul and fail.

ANTIQUATED SOLUTIONS

Before development of the commercial district, Newport News Waterworks and Hampton Roads Sanitation District relied on a combination of mechanical floats and traditional submersible level transmitters. However, with the restaurants in operation, the increased volume of grease clung to both instruments and, as a result, the primary and redundant level measurement failed to properly transmit level data to the pump controller.

The accumulation of grease to the submersible level transmitter clogged the pressure ports that blocked the free flow of liquid and proper application of hydrostatic pressure to the sensing diaphragm. On the redundant float switch, which should trigger the pump in the event of a failed level transmitter, the accumulation of grease blocked the mechanical operation of the float ball. With the level transmitter and backup system inoperable, the affected lift stations failed, either reading too much wastewater or too little, thus causing the pumps to run continuously or not at all.

IDEAL SOLUTION

Several instrumentation companies offer non-fouling solutions with only minor variations of the existing and unsuitable solutions. These instruments use a Teflon-coated elastomer diaphragm, which is relatively weak and prone to puncture. Their answer is to use a bulky protective cage, consisting of a shield mounted on bolts and standoffs. However, these shields can collect rags, grease and biosolids in the wastewater, which leads to erroneous readings.

Newport News officials contacted Keller America, whose LevelRat provided a unique approach to wastewater level measurement.

The tougher Kynar diaphragm used on the LevelRat provides superior abrasion and puncture resistance relative to other wastewater level transmitter solutions. This design also minimizes the 36 XKY profile, creating a sleeker design without the need for bulky shields. The result is a truly non-fouling instrument that provides superior operation in environments that would clog traditional level transmitters.

The LevelRat is specifically designed for extended service in lift stations and, thanks to Keller's guaranteed lightning protection, the unit is ideal for areas prone to chronic lightning damage. The LevelRat is assembled in the U.S. to customer specifications, including custom pressure ranges and cable lengths.

KELLER

Keller America is a leading manufacturer of level and pressure measurement instrumentation headquartered in Newport News, Virginia.
877-253-5537 | www.kelleramerica.com

ACCURACY

- Standard 0.25%FS static accuracy
- 1%FS Total Error Band accuracy
- Wide 0...50° C compensated temp. range

VERSATILITY

- Available in nominal ranges 30 psi...15000psi
- Durable 316L stainless steel construction
- Industry standard 4-20 mA analog output

AVAILABILITY

- Built to order in the U.S.
- Short 3 business days lead time
- No minimum purchase quantities

GUARANTEED

- 2 year warranty covering defects in materials or craftsmanship
- NSF/ANSI 61 & 372 certified safe for drinking water

CLASSIFIED UL WATER QUALITY

877-2-KELLER
KELLERAMERICA.COM

KELLER

ECONOLINE

Low cost multipurpose pressure transmitter

System Offers Accurate Hands-Off Chlorine Measurement

Chlorine is an ideal disinfectant. But while proper residual chlorine levels in drinking water ensure that water is safe for human consumption, too much can cause environmental harm and harm organoleptic properties of tap water. That's why it's important that the chemical be accurately monitored.

The Model Q46H/79PR Total Chlorine Measurement System from Analytical Technology, A Badger Meter Brand, is a highly versatile online monitoring system designed for the continuous measurement of total chlorine in solution. It is well suited for potable water systems, water reuse systems, cooling towers and for monitoring wastewater treatment effluents. According to Bill Popp, North America sales manager in water quality for Analytical Technology, the basic sensing element used in the total chlorine monitor is a three-electrode amperometric membrane sensor that measures chlorine directly. The chlorine measurement does not alter the sample or add any chemicals to the sample stream, so the water flow can return to the system if desired.

"This direct measuring system does not require the addition of chemical reagents to measure total chlorine," he says. "That means that the unit can be deployed for months without having to change anything. Reagents typically need to be maintained on a monthly basis."

In addition to total chlorine measurement, the Q46/79PR is also available with an optional pH input which provides a two-parameter monitoring system. It can be supplied complete with sample flow controls mounted to a PVC back plate ready to mount. Simply connect the power, water sample and analog/relay outputs and you're ready to go. Systems are available with or without a flow switch for remote indication of loss of sample.

"Its simplicity in design means less investment in replacement parts, and because it takes less manpower to operate, the overall operating cost is very manageable," says Popp. "The fact that we were able to add features like a pH input to its basic functionality makes it all the more valuable in water and wastewater applications."

Popp added that while Analytical Technology has offered chlorine monitoring systems for years, technological advancement has necessitated multiple upgrades to the legacy system.

"We've evolved from an analog to a digital world, and our chlorine measurement system certainly reflects that," he says. "Every upgrade we've made has been customer driven. That's why even though this is our most popular product, it will always evolve."

AutoTest lets you say goodbye to manual bump testing

Smart gas detectors that automatically check functionality with self-generated tests

ATi is the only manufacturer in the world that offers the patented AutoTest verification system*. AutoTest eliminates manual bump testing by performing self-generated tests daily. Our entire smart gas detector product range can measure over 60 different gases and vapors. With a sensor, amplifier and memory module in one compact gas sensor, interchangeability between devices is simplified, allowing you to easily measure anything from phosgene to ammonia in under one minute.

analyticaltechnology.com

ATi
A Badger Meter® Brand

*Dependent upon gas sensor specified

New Monitor/Controller Features Seven Parameters in One Unit

The Myron L Company 900 Series multiparameter water quality monitor/controller is easy to install, easy to use, and does the job of multiple monitors and controllers.

The 900 Series multiparameter monitor/controller includes everything required to simplify water quality management of municipal unit processes in one flexible, powerful instrument. Users can simultaneously monitor and control critical water quality parameters through multiple inputs/outputs with the accuracy and reliability the Myron L Company has come to be known for. The 900 Series is user-intuitive with an LCD touch-screen GUI along with pluggable terminal blocks for quick and easy equipment installation and configuration.

Seven inputs make it possible to monitor all the most common water quality parameters simultaneously: two conductivity, resistivity, TDS or salinity; one pre-amplified pH or ORP; one BNC pH or ORP; one 0-20/4-20 mA; one RTD temperature; and one flow/pulse. Percentage rejection is available as a derived value.

Advanced conductivity and TDS functions feature three preprogrammed solution modes, KCl, NaCl, and Myron L's own 442 Natural Water Standard. You can also program a user solution mode when the constituents and behavior of the solution are known. The ability to match the solution mode to the actual characteristics of the water being monitored instead of using one set solution model yields far greater precision conserving chemicals and ensuring regulatory compliance. Temperature compensation is automatic to 25 degrees C but can be disabled by the user if required.

The pH/ORP input channel is designed for use with Myron L pre-amplified pH and ORP sensors. These sensors contain precision circuitry that increases accuracy and permits application of the sensors over greater distances. A 0-20/4-20 mA input accepts user-defined 0- to full-scale values and units of measure for an array of sensor types. The 900 Series is also low maintenance and user serviceable with both electronic and wet calibration functions.

ADDITIONAL FEATURES

Outputs include up to three relays; two remote alarms; one 0-20/4-20 mA; one 0-5/0-10 VDC; and one RS-485 ASCII serial output. Relays output to any user-supplied control equipment requiring up to 250 volts each and can trigger on any input parameter. The 0-20/4-20 mA output can transmit a signal for any input parameter. 0-5/0-10 VDC can be scaled to optimize resolution and can output to a recorder, PLC or SCADA system. 0-1 VDC is possible with an optional resistor. Hysteresis values can be specified by the user or automatically set by the 900 Series to prevent chatter.

The user-adjustable cell constant (conductivity, resistivity, TDS and salinity) and sensor cable length (conductivity, resistivity, TDS, salinity, pH and RTD) assure precise measurements from sensor to sensor. Administrator and operator password protection levels prevent unwanted tampering. A brightly colored red, yellow and/or blue LCD background instantly alerts the user to the solution status. And a 1/4 DIN size chassis makes it easy to mount.

MYRON L COMPANY

Myron L Company has been a leading manufacturer of water quality instrumentation for over 60 years. Because it is a privately held, customer-focused corporation, it is able to remain committed to excellence in accuracy, reliability and simplicity while investing heavily in research and development. The result is a product line that includes innovative, high-performance multiparameter monitor/controllers, handheld meters and pocket testers built to last with convenient features like touch-screens and Bluetooth connectivity. The company offers a wide variety of measurement parameters including conductivity, resistivity, TDS, salinity, pH, ORP, free chlorine equivalent, dissolved oxygen, nitrate concentration, hardness, alkalinity, temperature, flow, percent rejection and more. The company also backs its products up with live service and technical support for life.

760-438-2021 | info@myronl.com | www.myronl.com

Water Quality Testers for Fast, Lab-Accurate Field Analysis

Ultrameter II™

Model 6PFC^{E}

Conductivity
Resistivity
TDS
ORP/Free Chlorine Equivalent (FC^{E} ™)
pH
Temperature

MYRON L® COMPANY
Water Quality Instrumentation
. . . Since 1957

www.myronl.com
760-438-2021

DESIGNED, ENGINEERED AND ASSEMBLED IN THE USA

Aeration Crisis: Sulzer's HST Turbo Blowers Fly in to Save the Day

Aeration processes in the wastewater treatment industry are essential in meeting water quality figures, so the blowers need to be reliable and as efficient as possible. For one facility in California, repeated maintenance issues led to the decision to remove the existing turbo blowers and install Sulzer's HST units, which in turn reduced energy consumption for the site.

Equipment reliability is at the forefront of concerns for plant owners, especially when the backup machines are due for retirement as well. In this case, the treatment works had previously invested in two new 400 hp (300 kW) turbo blowers to replace aging diesel-powered units. This decision also supported the site's objectives relating to the local Environmental Protection Agency and air-borne emissions.

COST ASSESSMENTS

After an initial period of trouble-free operation, both frontline blowers experienced reliability issues following their installation 10 years earlier and eventually suffered catastrophic failures, caused by high dust levels in the local area. According to the treatment plant management team, support from the original equipment manufacturer to repair the blowers was going to cost upwards of six figures in U.S. dollars. To add insult to injury, the treatment plant was compelled to run the diesel-powered blowers to maintain the aeration processes.

This could only be a short-term solution due to the increased pollution levels and stringent Californian laws. The local EPA was already threatening possible fines for continued use of the diesel-powered blowers.

Faced with these considerable challenges, the plant management and maintenance teams made the decision to move away from the original supplier and contacted Sulzer to discuss the options and timings for replacement blowers. Sulzer's HST product line has an excellent reputation in Southern California for reliability as well as efficiency, according to company officials.

The management team from the wastewater treatment plant — as they were doing their research and investigating a variety of options — visited another Sulzer installation site in the state that operates six HST units. The operators and management staff at that plant provided further support for the blowers, confirming their low operational costs and continued reliability.

HIGH-SPEED SOLUTION

Having completed a site survey, Sulzer proposed two 250 hp (186 kW) HST30 units. This solution quickly resulted in a purchase order with the additional request of air freight for the units to minimize project timings as much as possible.

Rick Barile, Sulzer's regional sales manager, says "Sulzer's HST30s were able to meet the requirements of the plant's aeration processes. Using 250 hp blowers instead of 400 hp units also resulted in a considerable energy saving for the site."

Sulzer's range of HST turbo blowers feature magnetic bearing technology and a high-speed motor, which provide wear-free operation with low noise levels and high energy efficiency. With a compact footprint, they can be easily installed in existing buildings and connected to the aeration infrastructure. They can be integrated with other blower designs, if necessary, to ensure a smooth transition during an upgrading project.

The HST range can be specified for a variety of different installations and control configurations that ensure the aeration process is optimized both in terms of biological efficiency and energy efficiency. Sulzer's experts can provide customers with design support, detailed specifications and options that will maximize project savings and highlight the return on investment.

For more information about Sulzer's range of turbo blowers and other equipment designed for water treatment plants, contact Sulzer.

SULZER

Sulzer is a global leader in fluid engineering. The company specializes in pumping, agitation, mixing, separation and purification technologies for fluids of all types. Sulzer has been headquartered in Winterthur, Switzerland, since 1834.
www.sulzer.com/en

SULZER

The perfect match.
Water solutions by Nordic Water and Sulzer.

Updating water and wastewater treatment processes with modern equipment can improve availability and reduce operational costs. Sulzer and Nordic Water have the expertise and process knowledge to deliver innovative solutions that tackle modern water treatment challenges. Take advantage of the companies' global engineering network for local support with:

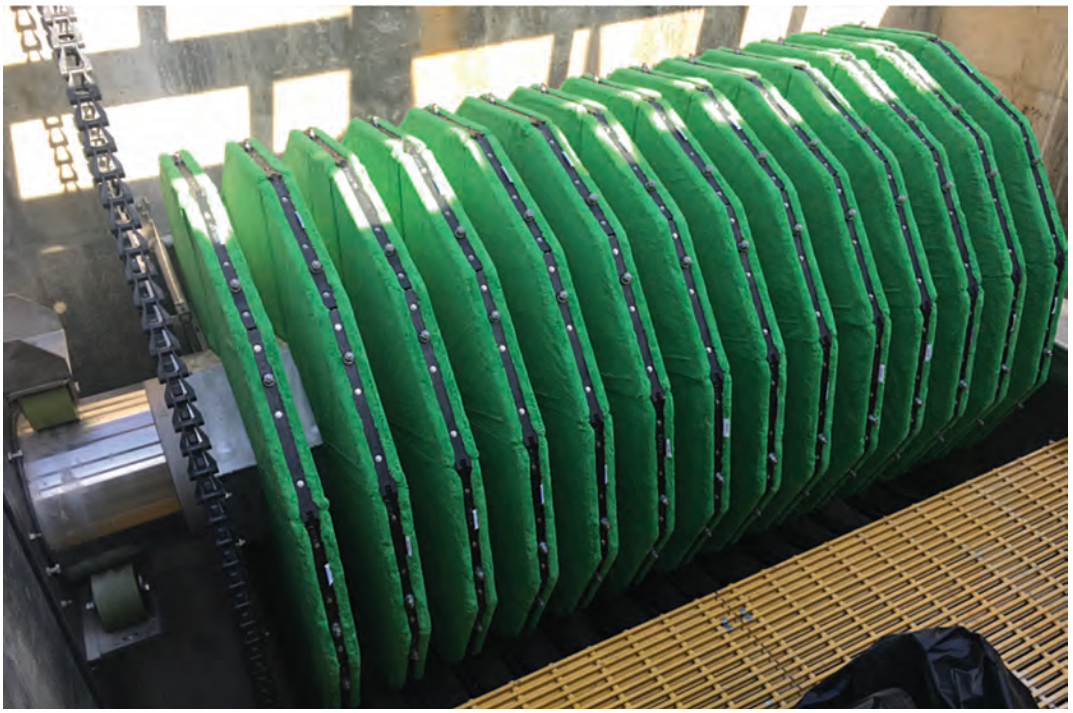
Submersible pumps	Mixers
Aeration systems	Scrapers
Filters	Screens
Flow boosters	Separators

Set a new standard in water and wastewater treatment for efficiency and reliability with Sulzer and Nordic Water.

Rushville Installs AquaStorm Cloth Media Filters to Treat CSO Discharge Instead of Wet Weather Storage Tank

The city of Rushville, Indiana had to remedy a consent order filed in 2007 for its untreated combined sewer overflow discharges that were polluting the Flatrock River, a violation of the Clean Water Act. The city originally planned to install a 1 mgd stormwater storage tank, but was approached by Aqua-Aerobic representatives with a pilot test proposal utilizing a new technology.

The pilot proposal featured the AquaStorm Cloth Media Filter using 5-micron microfiber cloth media, which would be tested during five wet weather events. This study captured events from May through July 2015, and produced impressive results. The successful pilot test prompted the city to request a design for an AquaStorm filtration system in February 2016. The request came with two stipulations: The filters were to treat both dry and wet weather conditions, and alum coagulant was to be injected upstream of the filters to meet future effluent phosphorus limits and eliminate fine CSO particles.



INSTALLING THE FILTERS

Startup of the two 14-disk AquaStorm filtration systems began in July 2017 with a design average flow rate of 1 mgd in dry conditions and peak wet weather flow rate of 12.6 mgd. Each cloth media disk is 6.6 feet in diameter and provides an effective filtration area of 53.8 square feet for a total filtration area of 1,506.4 square feet.

The filters were retrofitted into the plant's existing, abandoned sand media filter structures, saving the city considerable capital costs. In addition, the new filtration system was $1 million less than the original, conventional storage tank design. The AquaStorm filter features a disk configuration and an outside-in flow path, which allows for three zones of solids removal. These zones are especially critical in wet weather applications due to the high solids typically associated with the first flush after wet weather events.

HIGH-QUALITY EFFLUENT

The AquaStorm cloth media filters experienced the first wet weather events shortly after startup in October and November 2017. Due to the continuous treatment capacity, no untreated overflows have occurred.

Rushville's new tertiary/wet weather filtration system also included replacement of its existing gas chlorine disinfection system with a UV disinfection system. The UV system was installed in the existing tank, which also provided significant project cost savings.

Completion of the filtration/disinfection phase of the city's upgrade project was achieved five years earlier than required by the state regulation agency. This project is the first AquaStorm filter installation in the nation for dual tertiary/wet weather treatment and will keep approximately 50 million gallons of raw sewage from entering the nearby Flatrock River annually.

"With the addition of the AquaStorm Filter System and new UV disinfection system, Rushville is discharging the best quality of water to our receiving stream, Flatrock River, than in years past," says Rushville Utilities Director Les Day.

SOLVOX Oxygen Dissolution Technology Offers Simple Solution for Capacity Increase

Plant operators are challenged to maintain treatment throughput at reasonable cost even when the plant reaches design capacity. This challenge can be compounded by changes to production runs and formulation mixes, often requiring additional investment to maintain stable plant performance. However, extending plant capacity to maintain or increase throughput while handling a new mix is often prohibitively expensive.

Many operators are looking to support variable oxygen demand more cost-effectively and efficiently than traditional aeration techniques, which require energy-intensive air compression equipment. In addition, air only contains about 21% oxygen, making some conventional aeration techniques not particularly efficient as temperature fluctuates or influent load varies.

PURE OXYGEN FOR WWTP UPGRADES

In many cases, gas-enabled wastewater technologies are an effective way to balance conflicting cost, temporary capacity increase and compliance needs. Innovative, gas-based solutions are often a low upfront investment solution to inject new life into existing assets and extend their longevity. Often these technologies are also seen as a flexible way to bridge seasonal peaks in oxygen demand.

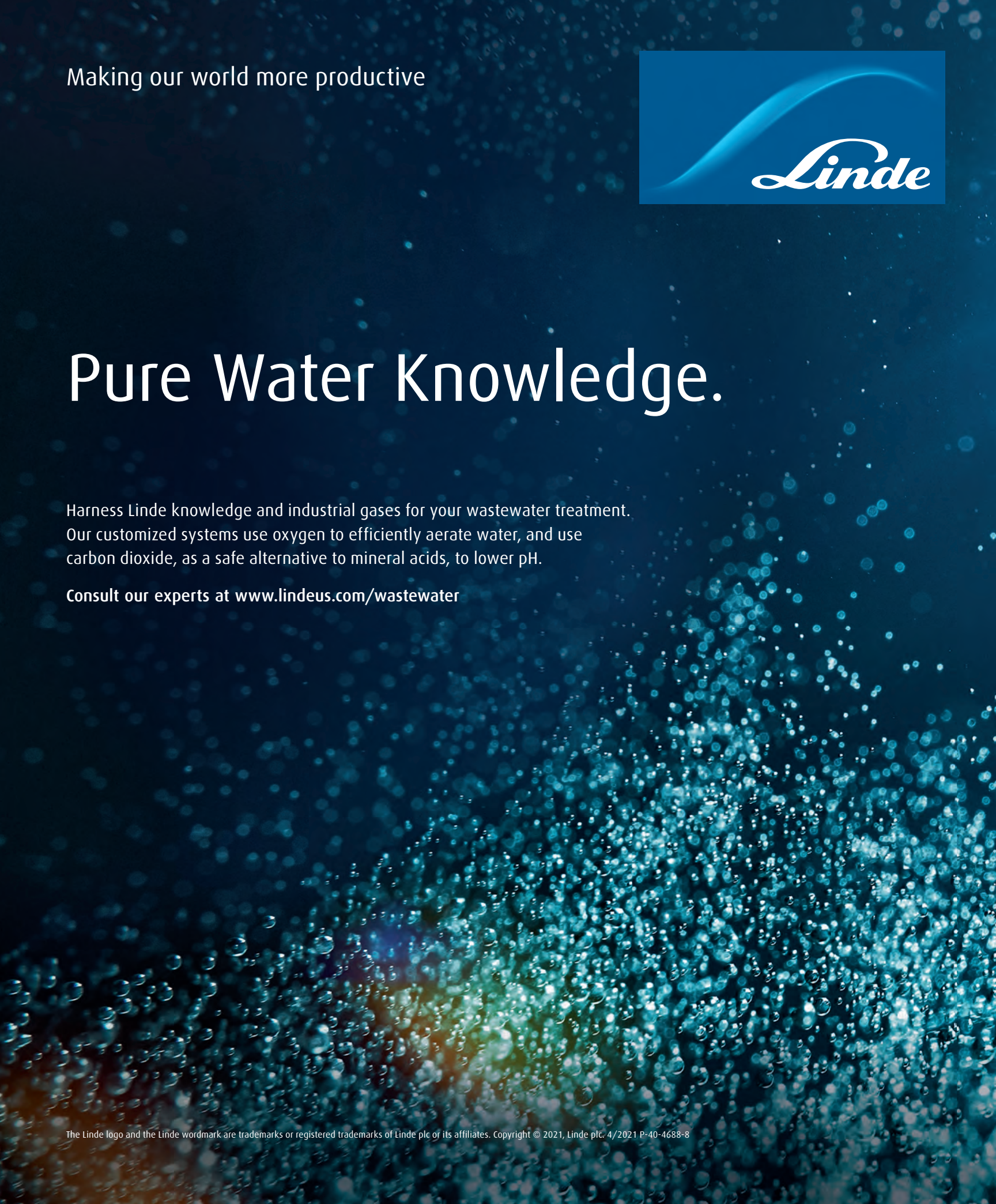
The biological treatment of industrial wastewater can be significantly enhanced through a secondary treatment stage with dissolved oxygen. Linde's SOLVOX Mobile oxygen dissolution technology has been optimized for application of pure oxygen, additional process mixing and efficient oxygen transfer performance. The SOLVOX process results in excellent oxygen utilization performance and high transfer rates. Assembly and installation requirements are minimal, with little or no construction work required. SOLVOX mobile is ready to operate within a very short period and can also be installed in fully operational tanks, avoiding the cost and inconvenience associated with process shutdowns and drain downs.

SUITABLE FOR VARIOUS OPERATING CONDITIONS

Linde's extensive range of SOLVOX products are suited to a wide array of wastewater treatment plants with different operating conditions. Regardless of the individual treatment challenges, Linde can enhance existing aeration capabilities by introducing pure oxygen into wastewater activated sludge in a variety of ways. Adding pure oxygen with the SOLVOX process can also increase the performance of an existing plant during peak loads and maintenance of main equipment. Requiring a very low investment, it offers a flexible way for operators to adjust to BOD or COD peaks and production campaign demands.

With its innovative concepts and developing technologies, Linde has a leading role in the global market. Traditionally driven by entrepreneurship, the company is working steadily on new high-quality products and innovative processes. Each concept is tailored specifically to meet its customers' requirements, offering standard as well as customized processes. This applies to all industries and all companies regardless of size, according to a Linde spokesperson.

"If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimization and enhanced productivity are part of daily business," the spokesperson says. "However, we define partnership not merely as being there for you, but being with you. After all, joint activities form the core of commercial success."


Making our world more productive
Linde
Pure Water Knowledge.
Harness Linde knowledge and industrial gases for your wastewater treatment.
Our customized systems use oxygen to efficiently aerate water, and use
carbon dioxide, as a safe alternative to mineral acids, to lower pH.
Consult our experts at www.lindeus.com/wastewater
The Linde logo and the Linde wordmark are trademarks or registered trademarks of Linde plc or its affiliates. Copyright © 2021, Linde plc. 4/2021 P-40-4688-8

Hurst Boiler & Welding Boosts Efficiency at Wisconsin Paper Plant

ST Paper, one of several companies owned by the STGroup, faced a challenge similar to that of other paper manufacturing plants: inefficient boilers fired by fossil fuels, high transportation and landfill costs incurred during paper byproduct disposal, and a business plan that needed to address sustainability.

Together, Global Energy Solutions Inc. of Wheaton, Illinois, and Hurst Boiler & Welding Co. Inc. of Coolidge, Georgia, helped address all three of ST Paper's stated concerns. Not only has ST Paper reached several important energy and efficiency goals, the company recently was awarded a grant from the state of Wisconsin's Focus on Energy.

"ST Paper celebrated the completion of its renewable energy system with the presentation of a check for $237,500 from Focus on Energy," wrote the *Green Bay Press Gazette*. "The grant will be used to defray the cost of the company's new biomass energy system."

The equipment used in the project included a Hurst 1,500 hp boiler; a substoichiometric combination wet softwood biomass plus sludge fuel gasifier, combustor and heat-recovery system fed via metering bins; a dry electrostatic precipitator; and a mixed biomass fuel-handling system using a six-tree walking floor.

A Hurst Boiler & Welding Co. Inc. 1,500 hp boiler is delivered to ST Paper, Oconto Falls, Wisconsin.

THE FUEL

A readily available fuel for ST Paper to consider was paper sludge — a clean, renewable manufacturing process byproduct. However, with a moisture content of nearly 70 percent, paper sludge alone was not a viable solution. In order to reduce the fuel's overall moisture content to a more acceptable level, ST Paper opted to mix fuels, adding clean, residual, construction wood products, also readily available.

THE SAVINGS

Both fuels — paper sludge and construction wood products — were previously transported for disposal at Wisconsin landfill sites at significant monetary and environmental expense. In addition, fossil fuel for the less efficient boilers represented a variable cost that was, at times, prohibitive. With the new solid fuel system, fuel costs are predictable and have been offset by the elimination of landfill and transportation fees.

Global Energy Solutions Inc., a Hurst Boiler representative, has assisted many Wisconsin-based manufacturing concerns with solid-fuel procurement and boiler efficiency challenges. Hurst Boiler & Welding Co. Inc. has exclusive solid-fuel boiler agents and boasts industrial and institutional campus renewable success stories throughout the Midwest and beyond.

HURST

Commercial & Industrial Boiler Room Systems

Find us in

MasterSpec®

Powered by Deltek Specpoint®

Access our Product Specifications & CAD files at Product MasterSpec®

MasterSpec® allows designers, architects, and engineers to select expertly written specification content for thousands of products without having to waste time writing detailed explanations that already exist. Subscribers to MasterSpec® can pick and choose the Basis of Design content and documentation needed for their project and accelerate the process with Hurst Boiler on MasterSpec®.

www.hurstboiler.com/masterspec

2023 AHR EXPO *Atlanta*
Georgia World Congress Center | Feb 6-8

Join Hurst Boiler at AHR EXPO Atlanta - Booth C6104

Hurst BOILER

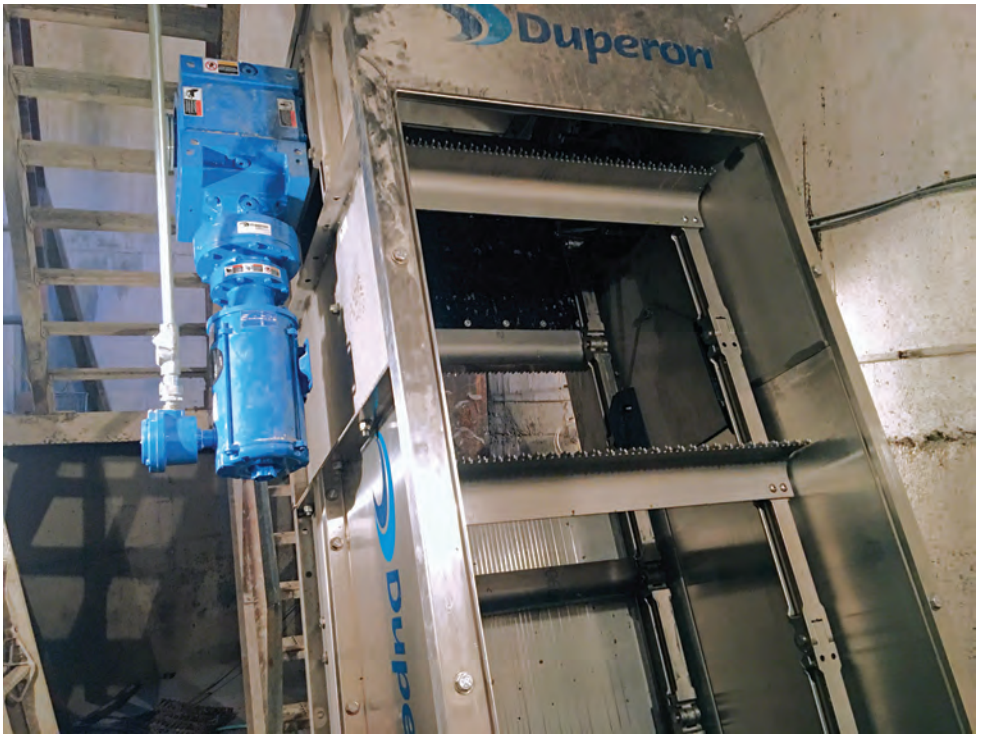
MORE MODELS CHOICES SOLUTIONS

hurstboiler.com

www.hurstboiler.com **1-229-346-3545**

FlexRake IQ Screens Increase Safety, Decrease Costs and Minimize Risk in Crookston, Minnesota

The city of Crookston, Minnesota, treats wastewater for a community of about 8,000 residents. Its pond treatment system uses several pump stations to remove solids from incoming sewage before sending it out for treatment. At one of these pump stations, an aged climbing screen was no longer operational, resulting in more frequent pump plugging that required service calls and even the station manager having to physically enter the channel with a pitchfork to shovel out debris.



WINTER SNOWS DELIVER SPRING RAINS

Like many Minnesota towns, Crookston is a river community that coexists with the ebb and flow of water that begins as winter snow. When that snow melts in the spring, it fills the rivers and carries with it rocks and sand, much of which enters Crookston's antiquated underground sewer lines through inflow and infiltration. Wastewater and its own challenging contents — including flushable wipes, which are very hard on a sewer system — then carries the rocks and sand to the pumping stations, where solids are removed.

Pump Station No. 3 has an average flow of 0.75 mgd and a peak flow of 2 mgd, and for years it had been dealing with an old screening system that was failing to do its job. Pumps were regularly getting plugged, which resulted in increased calls to a service provider to unplug them. The station manager himself was even climbing into the channel with a pitchfork to remove rocks and rags. Sand and grit were getting into the pumps, causing unnecessary wear and tear.

A stopgap solution was the use of double drum grinders to intercept the problem contaminants, but the volume was so high that the station was wearing out grinders much too fast, increasing operational and capital expense costs.

A COST-EFFECTIVE, PERMANENT SOLUTION

In the fall of 2019, the station manager and one of his service providers began researching solutions to their dangerous and expensive problem. They chose the FlexRake IQ screen from Duperon.

Designed with a patent-pending sequence technology, the FlexRake IQ screens deliver exceptional debris removal. The scrapers have an enhanced tooth profile and unique collection geometry that handle stones and remove solids cleaned at the higher speed while also dramatically reducing the likelihood of damaged teeth and stones embedded in bar openings. Large debris is managed without shutdown, and the FlexLink system ensures that scrapers return to cleaning the screen field faster.

Additionally, the FlexRake IQ screen delivers an intelligent response to actual hydraulic and debris conditions in the channel by automatically detecting flow rates and adjusting raking speed accordingly. This feature enhances the screen's performance and extends its life.

MULTIPLE BENEFITS, LONG-LASTING PERFORMANCE

In addition to better debris removal, the station is saving on service calls, grinder purchases and reduced pump wear, as the FlexRake IQ is keeping sand and grit out of the pumps. Other benefits to the city of Crookston include the decreased risk of sewage backing into homes due to a plugged pump and increased worker safety, as no one is having to physically enter the channel to remove debris.

Three years after installation, the original rake is still a workhorse, pulling everything out that was previously getting stuck, without operator intervention. In fact, the manager says that the screen is one of the best pieces of equipment he's ever installed and looks forward to using more Duperon products in the future.

DUPERON®

THE DUPERON® FLEXRAKE IQ® IS A WORKHORSE, PULLING EVERYTHING OUT WITHOUT OPERATOR INTERVENTION

The FlexRake IQ Platform tackles high peaking factors due to extreme weather and menacing debris like “flushable” wipes, first flushes and settled solids. This is accomplished by design enhancements and a patent-pending sequence of operations that automatically responds in real-time to optimize the screen field.

The re-imagined design of the FlexRake IQ focuses on managing heavy solids loading events with 4x increased debris removal capacity, improved grit and rock handling, and greater solids capture.

The FlexRake IQ is an intelligent screening system that knows what to do, and more importantly, when to do it without operator intervention.

www.duperon.com | 800.383.8479 | dcsales@duperon.com

Pair Energy Efficiency With Better Uptime and Reliability for True Efficiency

Efficiency is often used across municipalities and industrial companies throughout the U.S., and rightly so. When it comes to air compressors and blowers, "efficiency" should never be limited to energy efficiency. Of course, it's important to preface that by acknowledging that up to 80% of the life cycle costs of a compressor or blower come from energy usage.

Considering this, and the continued advancement in variable-speed drive technology, the rotary screw compressor is a backbone of the industrial world, and it has evolved into a mainstay of the municipal world, generating even greater energy savings. Ideal for many applications, this technology offers a wide range of volume and pressure bandwidths, yielding ultimate efficiency and flexibility. While a great option, screw technology should not be a default choice without first auditing your facility. That's the main reason Atlas Copco offers seven different technologies available for every unique application.

SERVICE EFFICIENCY

Let's now focus on service efficiency, which encompasses time, money and downtime. Like most machinery, the time between service intervals has increased on many compressors and blowers due to continued improvements in designed components. When choosing your next compressor or blower, this is a critical consideration to calculate your return on investment or total cost of ownership.

Considering handling some service procedures in-house? If so, consider the physical time required, whether some parts need removal, any specialized equipment or tools needed, and the cost of the components. Finally, note that saving a few dollars on non-OEM or guaranteed parts is generally one of the least efficient practices, as it can limit the energy performance of the machine, or lead to failure, which brings us to the last point on efficiency: The cost of downtime.

MORE UPTIME

Every facility manager knows the cost of downtime. Keeping up with service needs when relying on a single machine is challenging. These days, it's possible to build a system that isn't all or nothing. For example, this can be achieved by easily adding a second machine or running two smaller ones in parallel.

Remote monitoring and 24/7 connectivity is offered with many new or retrofitted compressors and blowers. This gives peace of mind to ensure you can always be in control — no matter where you are working from. Your supplier can see exactly the same messages that you are seeing in real time and can guide you in proactive steps. Lastly, you can also think of remote monitoring as an ongoing audit that happens 24/7, offering constant visibility to flag issues before they become serious problems.

To put it simply, efficiency is an all-encompassing topic. Energy efficiency is nothing without the efficiency of uptime and reliability!

Unlock Your Plant's Potential

We know how important aeration is to wastewater treatment. It plays a critical role in protecting both your processes and your reputation. No matter which of our seven technologies you choose, we design our blowers with you in mind. Boasting long service intervals, 24/7 remote monitoring, leading energy efficiency, and a design focused on ease of service.

866-472-1013 | www.atlascopco.com/blowers-usa

Protect RO Membrane Assets With Hach's DR1300 FL for Dechlorination Control

In many reverse osmosis RO systems, the absence of an oxidant or biocide leads to extreme biofouling, resulting in rapid performance degradation and shortened membrane life. To prevent biofouling, chlorine (Cl_2) is often used due to its ability to eliminate most pathogenic microorganisms. However, in RO systems, membranes are easily damaged by chlorine in the feed water. Chlorine damage to the membrane can lead to lower salt rejection and poor-quality permeate, which will result in expensive membrane replacement and downtime.

To protect the membranes, it is necessary to keep the chlorine concentration very low. Sodium bisulfite is often used to reduce the chlorine going into the RO. Correct dosage of sodium bisulfite is critical. Bisulfite also reacts with dissolved oxygen in the water which leads to an increased anaerobic biological growth with the potential to rapidly foul the systems. Since chlorine concentration can also change, it can be challenging to get the correct bisulfite dosage relative to the chlorine concentration.

This also means that monitoring low concentrations of chlorine and bisulfite is difficult. Traditional analytical methods are limited in terms of range, accuracy, precision and ease of use. Excessive bisulfite decreases pH, which will cause the ORP reading to increase, even if no chlorine is present. The control system will respond by adding even more bisulfite, eventually followed by biofouling. Thus, an accurate system to analyze bisulfite independent from pH is required.

Additionally, residual chlorine monitoring requires a very sensitive, accurate and easy-to-use chlorine test. Existing technologies – such as colorimetric DPD methods or amperometric titration – are often not satisfactory for efficient dechlorination control due to insufficient accuracy at very low chlorine concentrations, potential sample matrix interferences or a cumbersome test procedure.

THE SOLUTION

Accurate testing of bisulfite and residual chlorine is essential to monitor the efficiency of the dechlorination process and to ensure longer membrane life. Hach developed a new test system based on fluorescence technology for very low free and total chlorine concentrations (2-100 ppb), as well for bisulfite (6-500 ppb).

The method is as easy to perform as any Hach's colorimetric test, with much higher sensitivity, providing highly accurate results at below 20 ppb Cl_2 and in the full range of bisulfite.

THE BENEFITS

Chlorine and bisulfite testing is an essential part of maintaining a well-running RO system. Regular, accurate monitoring of these parameters helps protect RO membranes from unwanted oxidation to extend membrane life.

Hach's new DR1300 FL fluorometer is an easy-to-use, portable system for fast testing of residual chlorine and bisulfite onsite, as well as verification of process analyzers like the ULR CL17sc.

The DR1300 FL provides highly accurate chlorine and bisulfite results below 20 ppb to minimize biofouling and ensure less damage to the membranes, resulting in less frequent replacement, less maintenance and less downtime, according to the manufacturer.

Illuminate Your Process Possibilities

The NEW DR1300 FL

Protect your RO membranes, your product and your process with new fluorescent technology only from Hach®.

◂ LEARN MORE

HACH®

Be Right™

Next Generation Belt Press Increases Capacity and Performance

The wastewater treatment plant in Plattsburgh, New York, had four belt presses that were originally installed in the 1980s. As those machines started to show their age, the city began looking at replacement options, initially considering screw press and centrifuge technology.

The City of Plattsburgh worked with CDM Smith to evaluate dewatering options and design the upgrade. They decided to go with two 3DP Belt Presses from BDP Industries. One machine is able to process the full loading requirements and the discharge cake solids have increased from 23% to 27%.

This result is not all that unique, according to the manufacturer. "The 3DP Belt Press from BDP Industries has pushed the boundaries of belt press technology for over two decades," says a company spokesperson. "From the beginning, the 3DP set a new bar for increased performance and reduced O&M, and the latest generation jumps even further ahead of traditional belt presses."

Features include an independent gravity zone, feedbox paddlewheel, curved wedge zone, vertical pressure section, rack-and-pinion hydraulic tensioning, and 70 PLI construction with heavy-duty rollers and bearings. Today's 3DP is now also offered with odor and filtrate containment, along with full system automation.

BDP INDUSTRIES

BDP Industries is a leading supplier of dewatering, thickening and composting equipment with thousands of installations worldwide. Products include belt presses, screw presses, gravity belt and rotary drum thickeners, and in-vessel composting systems. All products are custom designed and manufactured in Greenwich, New York.

518-695-6851 | info@bdpindustries.com | www.bdpindustries.com

Delta Hybrid Compressor Prioritizes Efficiency, Reliability

Aerzen's Delta Hybrid rotary lobe compressor is an innovative solution in compressor technology, and it's among the most efficient machines by far in the vast 25 to 100 percent control range. The Delta Hybrid brings together the benefits of blower and compressor technology in one single unit with energy savings of up to 15 percent.

DESIGN AND FEATURES

Some of the key features of the Delta Hybrid are exceptional energy efficiency, reduced life-cycle costs, increased range of applications and pressures, high levels of reliability and long service life, reduced maintenance needs, and processed air 100 percent free of oil and absorption material.

Its flexible modular design means that the Delta Hybrid can be designed or retrofitted for all rotary lobe compressors and belt-driven motor sizes within a range of nominal widths if a standard solution won't do the job.

There's no absorption material to interrupt operation. Absorption materials can cause wear or reduce operational safety. To solve this, Aerzen's research and development team came up with a solution: A discharge silencer completely free of absorption material. It decreases noise purely by rerouting airflow, guaranteeing that downstream process systems won't be contaminated. In sewage treatment technology, this avoids clogs in the aeration system, and with them operational constraints and high maintenance costs.

SealRyt Bearing System Keeps Conveyor in Operation Long-Term

A wastewater treatment plant in Florida was replacing conveyor screw ball-bearings much more rapidly than the OEM scheduled service interval, and at great expense in downtime and maintenance labor. The conveyor uses a 4-inch shaft that drives the conveyor screw. Sludge would penetrate the pressurized grease-sealed ball-bearing cases and accelerate the wear, eventually resulting in a complete failure approximately nine months from the last rebuild.

THE SOLUTION

SealRyt designed a PackRyt bearing from SR01081 material, along with a reconfigured housing that utilized a pressurized air flush system. The PackRyt BLR (bearing with integrated lantern ring) is designed with close clearances to eliminate shaft movement, allowing it to seal effectively. Once the shaft has been stabilized, the air flush system creates a pressure differential that keeps sludge from entering between the BLR bearing and sleeve, eliminating excessive wear. The design also eliminates any internal moving parts.

THE RESULT

The PackRyt BLR was installed over 10 years ago (in September 2012) and continues to run today without replacement or adjustment.

SEALRYT CORPORATION

The SealRyt Corp. was founded in 2001 to develop, patent and manufacture alternative sealing devices. The company's personnel have substantial experience in the fluid and gas sealing industry — some over 30 years.
413-564-5202 | www.sealryt.com

Reliability, Ease of Operation, Define Komline-Sanderson's Product Line

Since 1946, Komline-Sanderson has supplied reliable equipment solutions that are easy to maintain and exceed expectations.

- The K-S Kompress Belt Filter Press is ruggedly designed and used for dewatering municipal biosolids and industrial sludge. It is easy to maintain and exceeds production goals.
- The K-S Biosolids Drying System operates with full integration of all components. The company has successfully installed systems for more than 20 years, which illustrates the equipment's durability and the company's commitment to supporting customers over the long haul.
- The K-S Gravabelt gravity belt thickener is available for very small to extremely large flows and includes Roto-Kone performance enhancing technology. With several models available, the unit can meet specific requirements and exceed performance expectations.
- K-S Plunger Pumps continue to perform after 40 years of operation. These rugged pumps are the workhorse of the industry.

K-S employs highly skilled and technical field service engineers who know the equipment and listen to and respond to customer needs and concerns, which results in installations that perform well. The company provides factory-made original equipment parts and filter fabrics for belt filter presses, gravity belt thickeners and more, and it works with customers to ensure that equipment exceeds expectations.

The company's experience ranges from simple one-machine installations to complex multistep processes and systems. Reliability, ease of operation, rugged design, proven performance and superior customer service are hallmarks of Komline-Sanderson installations.

Komline-Sanderson

Since its incorporation in 1946, **Komline-Sanderson** has provided quality equipment for process/production filtration, drying, wastewater treatment, sludge processing and pollution control.

800-225-5457 | info@komline.com | www.komline.com

Ascel Arsenic Field Testing Kit Developed for Speed, Safety and Accuracy

Years in the making, Industrial Test Systems' Ascel Arsenic test kit was developed with considerations for safety, accuracy, ease of use and speed.

Convenience has not been compromised for safety in the Ascel kit. All reagents are in powder form and have been weighed and carefully selected to minimize the hazards and inconveniences associated with conventional arsenic testing. All components needed to detect and measure arsenic accurately are included in a portable ready-to-use kit. Ascel has a detection range of 0 to 1,000 ppb (µg/L) and is patented and patent pending.

ACCURATE RESULTS

The Ascel field test kit yields accurate results for both technical and non-technical users in 7 minutes. The company's easy-to-follow test procedure requires only two reagents that are clearly labeled to simplify testing. A matching color chart includes extra-large color blocks for quick and accurate color matching. The test kit can also accommodate different water temperatures.

Industrial Test Systems, Inc.
Innovators of Water Quality Testing

Industrial Test Systems Inc. was established in 1989 by Ivars and Daryl Jaunakais in Rock Hill, South Carolina. The company is a leading American manufacturer of instruments and chemistries designed to test water quality parameters.

800-861-9712 | www.sensafe.com/ascel

Bright Technologies' Dewatering Equipment Helps Overcome Disposal Problem

Officials at a wastewater utility in Louisiana recently faced a sludge disposal problem and knew they couldn't afford to pay for 5,000-gallon tankers to haul it to a land application site.

But by using dewatering equipment by Bright Technologies, the utility was able to make a stackable, dry-solids cake that allows it to haul 30,000 gallons worth of sludge in a single 30-cubic-yard container.

Since roll-off trucks are less expensive and more fuel-efficient than semi tankers, each load costs less than a single tanker would have otherwise.

One of the key equipment features the utility praised is the sludge-retention manifold of looping pipes, which gives the polymer contact time and gentle mixing before it's introduced to the press. This is a unique feature to Bright Technologies skid-mounted belt press systems.

BELT FILTER PRESS DEWATERING

Bright Technologies offers complete belt filter press dewatering systems that are skid or trailer mounted. The company designs and manufactures the skid equipment package for high throughput, low maintenance and superior cake solids.

The skid-mounted dewatering systems are designed with long-term value and ease of operation in mind. A stainless steel frame and roller construction are included as standard features. An Allen Bradley touch-screen and programmable logic controller integrate the press and support equipment to accomplish unattended operation and easy integration into SCADA systems.

Bright Technologies, a division of Sebright Products Inc., manufactures high-quality recycling equipment as well as equipment for dewatering and solidification of wet materials. The company also offers integrated recycling and solids waste-disposal solutions through Sebright Products including hydraulic compactors, cart dumpers and custom waste carts.

800-253-0532 | www.sebrightproducts.com

Reduce Sludge Cake by 60% Without Thermal Drying With Elode Dehydrator

Sludge cake reduction is what many plant operators have in mind lately with ever-increasing disposal costs. But further reduction equipment can be costly and inefficient. What option do you have?

ELODE DEHYDRATOR

An Electro-Osmosis Dehydrator might be a better option for a lot of plants. In just three minutes, it removes far more water after typical sludge cake is dewatered using a belt press, screw press, rotary press or centrifuge.

"Imagine reducing your sludge disposal cost by 60% and landfill acceptable by having much drier sludge cake," says an Elode spokesperson. "One way is to add a costly thermal dryer and boil all the water away using a lot of heat, but a better method could be to use this new dehydrator."

The Elode dehydrator can reduce your cake weight efficiently at a lower expense and equipment cost. This compact machine can easily retrofit in line with many existing presses, according to the manufacturer.

NO HEAT ENERGY

This dewatering machine does not use thermal heat energy to pull water away from your sludge cake. It is so efficient the sludge cake never gets too hot to the touch, according to the spokesperson. It uses electrical potential difference in the sludge cake to separate water in the process and it works on 95% of municipal wastewater treatment plant sludge cakes tested, according to Elode. That is done without any chemical, polymer, heat or mechanical press.

"Discover all the benefits of Elode dehydrator, turning out 15% dry solids cake to 40%, or your 20% dry solids cake to 45% almost instantly," says the spokesperson. "Ask to see how much your sludge cake could be reduced. It could be far easier than you might think."

Electro Osmosis Dehydrator ELODE

Elode USA's main product is the Electro-Osmosis Dehydrator and related equipment.

201-568-7778 | alexm@elodeusa.com | www.elodeusa.com

YSI Offers New Ammonium and Nitrate Sensors for C1D2 Rated Areas

The VARiON Plus 700 IQ H is YSI's new Class I, Division 2 rated sensor for measuring ammonium and nitrate in hazardous locations. The VARiON is an online ion selective electrode probe and works directly with IQ SensorNet for process monitoring and control. IQ SensorNet is the only networked water-quality monitoring system available that can measure ammonium and nitrate in C1D2 rated areas, according to the manufacturer.

The VARiON is certified for use in C1D2 areas and conforms with NFPA Standard 820, groups A, B, C, D and T6 to reduce the potential of fire or explosion in hazardous locations in wastewater treatment facilities. The sensor is a reliable and safe option for measuring nitrate and ammonium in aeration basins that are not preceded by a primary settling tank.

A LOW-MAINTENANCE SENSOR

The VARiON provides accurate, reliable data. Measure ammonium and nitrate plus one compensation electrode (potassium or chloride). Individually user-replaceable electrodes have a typical lifetime of 18 to 24 months and a one-year warranty, minimizing maintenance efforts and ownership costs. The VARiON reference system is very stable over long periods, according to the manufacturer.

The VARiON is compatible with IQ SensorNet, YSI's network of online controllers and sensors designed for process monitoring and control. IQ SensorNet can now measure pH, ORP, ammonium, nitrate, potassium, chloride, dissolved oxygen (FDO H), TSS (ViSolid H) and temperature in C1D2 hazardous locations. IQ SensorNet continuously monitors water quality throughout the wastewater treatment process, increasing operational efficiency, lowering operating costs and improving performance.

YSI, a Xylem brand, offers lab, field and process monitoring instrumentation for municipal water and wastewater facilities. YSI's IQ SensorNet continuously monitors water quality to help improve process control and operational efficiency. YSI lab and portable instruments provide accurate, reliable measurements.

937-767-7241 | info@ysi.com | www.ysi.com/iqsn

Stay in Control of Your Pumps With Siemens Advanced Level Controllers

When it comes to tank or well level measurement at a water or wastewater treatment plant, there are many ways to monitor liquid level and efficiently move the liquid from point to point by utilizing pump systems. A fully fledged level controller, however, is a preferred technology to accurately monitor level while also controlling the pumps needed to move enormous amounts of water.

A DUAL-PURPOSE DEVICE

A variety of pump routines are available with the SITRANS LT500 HydroRanger advanced level controller from Siemens. The benefit of using these multifunctional instruments is that a single device can handle all of the level measurement and control — whether the pumps are operating in a wet well, lift station or distribution network. These controllers even have the ability to monitor the level of two assets independently (such as two wet wells or a wet well and a chemical tank), and are designed with one, three or six relays. If you are managing two wet wells with two pumps, a dual-point level controller with six relays can perform the same task for both and use the spare relays for additional tasks such as level alarms.

Additionally, in today's data-driven world, instrument data collection can prove beneficial for improving processes and efficiencies. This type of data can be harnessed by advanced level controllers like the LT500 HydroRanger and logged, accessed or transmitted utilizing any available industrial communication protocol.

SIEMENS **Siemens Process Instrumentation** is a global market leader in measurement systems with broad process industry and deep technology experience. Siemens offers a comprehensive portfolio of intelligent level, pressure, temperature and flow measurement technologies suitable for water and wastewater applications.
800-365-8766 | www.usa.siemens.com

Stay in control of your pumps **with Siemens advanced level controllers**

When it comes to tank or well level measurement at a water or wastewater treatment plant, there are many ways to monitor liquid level and efficiently move the liquid from point to point by utilizing pump systems—but no technology can surpass the ability of a full-fledged level controller to accurately monitor level while also controlling the pumps needed to move enormous amounts of water.

A variety of pump routines are available with the SITRANS LT500 HydroRanger advanced level controller from Siemens. The benefit of using these multifunctional instruments is that a single device can handle all of the level measurement and control—whether the pumps are operating in a wet well, lift station or distribution network. These controllers even have the ability to monitor the level of two assets independently (such as two wet wells or a wet well and a chemical tank), and are designed with one, three or six relays. If you are managing two wet wells with two pumps, a dual point level controller with six relays can perform the same task for both and use the spare relays for additional tasks such as level alarms.

Additionally, in today's data-driven world, instrument data collection can prove beneficial for improving processes and efficiencies. This type of data can be harnessed by advanced level controllers like the LT500 HydroRanger and logged, accessed, or transmitted utilizing any available industrial communication protocol.

With broad process industry and deep technology experience, Siemens Process Instrumentation is a global market leader in measurement systems. Siemens offers an unrivaled comprehensive portfolio of intelligent level, pressure, temperature, and flow measurement technologies suitable for water and wastewater applications.

Contact information: *sales support – 1-800-365-8766 or email – process.automation.us@siemens.com*

Ontario WWTP Maximizes Digester Capacity to Increase Sludge Handling

When the Brockville, Ontario wastewater treatment plant faced more stringent effluent limits that increased sludge volumes, it overwhelmed existing digester capacity. They needed a cost-effective alternative to building another digester for $2.9 million.

THE SOLUTION

JWC recommended installing two Monster Drum Thickeners to meet the new effluent requirements, the handling of which the plant supervisor's team estimated at an additional 20 to 30m³ of primary sludge and another 200 to 250m³ of secondary sludge per day. These rotary drum thickeners feature adaptive controls to compensate for sludge concentration and flow fluctuation. With the Monster Drum Thickener's 98%-plus sludge dewatering capture rate, the plant can now convert 200m³ secondary sludge into 20m³ of 5% thickened waste activated sludge.

As a result, less water is sent to the digesters, which reduces sludge volume and maximizes digester capacity. Although the digesters are handling an additional 40 to 50m³ of primary and secondary sludge, they remain well within their capacity limits. In addition, Monster Drum Thickeners are engineered for fast flocculation and low polymer use to reduce operating costs and further support digester efficiency.

Installing two Monster Drum Thickeners for less than $1 million allowed the Brockville, Ontario, wastewater treatment plant to meet stringent effluent limits without building a new digester, saving the municipality more than $2 million.

JWC Environmental™
A Sulzer Brand

JWC Environmental engineers and manufactures a complete range of municipal wastewater solids reduction and removal equipment solutions.
800-331-2277 | www.jwce.com | jwce@jwce.com

How Portable Flow Instruments Can Benefit Your Plant

Accurate flow measurement is critical for process control or regulatory compliance, and portable flow instruments can prove beneficial in many circumstances.

For instance, when operational or process changes are made, it sometimes results in flow rates that don't match the installed instrument's optimal performance range. A portable instrument provides a stopgap measure until a permanent solution can be procured, according to Joe Incontri, director of marketing for KROHNE Inc.

"If flow rates are steady, data can be manually entered into a monitoring or control system," he says. "Otherwise, real flow data can be used to procure a new permanent flowmeter that matches the actual process requirements. Using real data from a portable instrument avoids over- or undersizing instruments based on faulty process engineering data."

Verifying that a flowmeter is performing properly is a good idea, even if it's not required for compliance, says Incontri. "Where existing flowmeters need verification, use of a portable instrument avoids the need to take an existing flowmeter offline or shut down a process since the portable unit can be installed on the existing pipe next to the target meter."

A portable meter also provides flow data at the proposed point of measurement to help inform the purchase of a permanent flowmeter.

Portable instruments also help identify problems at treatment plants since they're equipped with data loggers. Correlating the data with the time of upset may reveal pertinent issues leading to resolution.

It's All About Maximum Debris Capture

The Kenosha Water Utility in Kenosha, Wisconsin, could not agree more. The utility embarked on an ambitious, two-part cost reduction project. The first part of the project was a plan to increase the generation of methane gas and the second part focused on disposal costs by turning their unusable sludge into a reusable Class A biosolid product.

From the beginning, KWU realized that to achieve these two goals, it was critical to capture and remove as much debris as possible at the headworks of the plant. The plant's maximum average daily flow is 28.6 mgd, but it can increase by a factor of five during large rain events. Although the collection system has separate storm and sanitary sewers, the amount of inflow and infiltration from various sources create problems similar to a combined system especially during the initial rain event surge.

REPLACING BAR SCREENS

To increase debris capture and handle those debris ladened "sewernamis," the utility replaced its old 1/2-inch coarse bar screens with two SAVECO FSM perforated plate Filterscreens Model FRSIII 1500 x 70/6 with a verified debris capture of more than 85%. Each screen has 6 mm holes and is rated for a peak flow of 50 mgd. The Filterscreens are equipped with FSM's proprietary auto adjusting cleaning brushes which require no manual adjustments and guarantee maximum capture efficiency for the life of the brush, according to the manufacturer.

Kenosha almost immediately saw the benefits of the increased debris capture. Since the screens were installed, there have been no primary clarifier failures, no floatables on the clarifiers or the wet wells or the aeration tanks, and no rags in the centrifuge tanks. To reduce the volume of the captured debris going to landfill, Kenosha also installed two FSM washer compactors.

Low-Friction Graphalloy Bearings Ensure Long Service Life

Graphalloy bearings in pillow block and flange block housings are a maintenance-free solution for wastewater treatment plants. Graphalloy bearings are self-lubricating, non-galling and dimensionally stable, meaning they can operate for years in tough wastewater applications.

Graphalloy is a graphite-metal alloy. As such, it will not swell when submerged or lose lubrication like other bearing materials. Graphalloy bearings are both reliable and low friction.

Available in standard size pillow blocks and flange blocks, the bearings are easily installed in such wastewater applications as flocculators, clarifiers, aerators and more.

LONG SERVICE LIFE

In one example, Graphalloy bearings in pillow blocks were installed in the rotating biological contactor systems at a wastewater treatment plant. The bearings were on either end of each shaft, and one system was always running. Over 20 years later, the bearings were pulled and replaced with new Graphalloy bearings. However, the original bearings were found to be still functional, after all those years of tough service.

The Graphite Metallizing Corp., makers of the Graphalloy bearing material, was founded in 1913 in Yonkers, New York. Over the years, the company continually innovated around the product to create more products and grades, including FDA-acceptable grades and NSF-certified grades.
914-968-8400 | sales@graphalloy.com | www.graphalloy.com

Reliability Is Paramount for VF-100 Volumetric Feeder

As an operator, you want all the features you can get in a dry chemical feeder to ensure good accuracy, reliability and long life. Eagle Microsystems' VF-100 volumetric feeder offers all this in a durable, user-friendly build.

EASY MAINTENANCE

There is no lubrication, greasing or oiling required; and there are no belts, gears, sprockets or chains to maintain. The VF-100 is a hassle-free product designed specifically to meet the requirements of the water and wastewater treatment industry.

Features of the VF-100 include a rugged drive for reliable operation, feed rates from 0.04 to 17 cubic feet per hour; an electronic SCR speed control; stainless steel construction; gravimetric control option; and a two-year warranty.

Eagle Microsystems has been an active industrial weighing specialist for nearly half a century. Founded as manufacturers representatives, the company has grown into a full-service developer of high-quality mechanical and electronic scales.
800-780-8636 | www.eaglemicrosystems.com

Electro-Osmosis Dehydration Cost-Effectively Increases Solids Content

Technologies like belt presses, screw presses, rotary fan presses and centrifuges dewater biosolids and water treatment sludges effectively.

But what if circumstances require material with higher solids content than those devices can provide? For example, what if a landfill suddenly requires material at 40% solids instead of 20%? Or what if the cost of hauling material at 20% solids becomes too high to sustain?

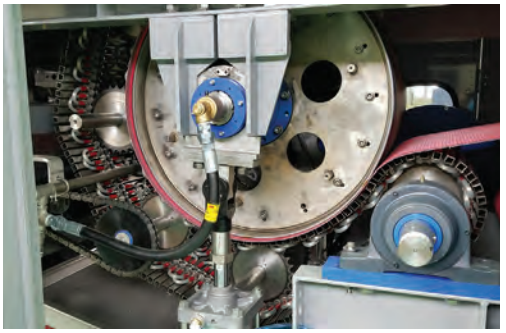
One option is to add a thermal dryer to the process, essentially boiling off some of the excess water. Another option, new to the U.S., is an electro-osmosis dehydrator, a technology that uses electric fields to pull the water out of the material.

That's the ELODE system, distributed by Charter Machine Co. It removes water at much lower cost than thermal drying. The system comes in a compact footprint and is easily installed downstream of a facility's mechanical dewatering process.

HOW IT WORKS

The ELODE system works by feeding dewatered cake into the unit, which includes a distribution chamber where it's flattened onto a belt. Tension holds the material in contact with the drum to keep it moving. At that point, a DC current causes water to be released and in a few minutes the solids content is doubled, according to Charter Machine Director of Sales Christopher Boyd.

"If you're paying $60 or $70 a wet ton to landfill cake solids, you can cut your cost in half by using our equipment. After paying for the equipment and the electricity, there is a very short payback. For large cities paying high rates for landfilling, it can be very attractive."



Increase Debris Capture Efficiency With Raketec

Raketec features an innovative multiple rake screen design that increases debris capture efficiency, prevents costly downtime and repairs, and allows safer and more efficient wastewater treatment plant operation.

Among the benefits of using Raketec are:

• No downtime: No jamming or debris blocking the mechanism.

• No submerged moving parts: No sprockets, bearings or sensitive moving parts under grade level.

• Up to 80 mgd: Drastically reduced period of blinding.

• Maximum efficiency: It cleans and collects debris

• Smooth and safe debris collection: No more stuck waste between the teethrake and the screen.

Aqualitec's experts designed a simple, robust and versatile system to meet the tough demands of today's wastewater treatment environment. Raketec, Aqualitec's innovative multiple rake screen solution, offers up to 80 mgd flow capacity. It is highly resistant to clogging and debris damage because it has absolutely no submerged moving parts.

"We have gotten more screenings in a couple days of operation than we got in months with the old auger screen," says a spokesperson from the city of Hiawatha, Kansas.

Aqualitec Corp. provides a wide selection of cost-effective, innovative wastewater screening equipment and sludge treatment solutions.

310-703-2174 | contact@aqualitec.com | www.aqualitec.com

Increase Disinfection Safety With Ton Container Scale and Valve Shutoff System

To protect your chlorination system from a dangerous leak, the Halogen Eclipse emergency valve shutoff system instantly closes the container valve when a signal is received from a leak detector, panic button or from SCADA.

During an emergency shutdown event, the Eclipse system measures the actual torque applied to the valve to ensure the valve is closed to Chlorine Institute recommended standards and provides remote confirmation that the emergency close operation successfully closed the valve.

CONTAINER SCALE

Operators can also maximize the safety of chlorine disinfection systems by using a ton container scale and an emergency valve shutoff system. The Chlor-Scale ton container scale from Force Flow safely cradles a chlorine ton container while providing critical feed and chemical inventory information. Operators will know in real-time exactly how much chlorine has been fed and how much remains in the tank. Warnings for excessive or insufficient feed rates allow you to remotely monitor from your PLC or SCADA system.

Force Flow is an industry leader in innovation with its chlorine and chemical tank scales. The company's scales monitor and control chemical feed at your water and wastewater treatment plant or in your industrial process.

925-893-6723 | www.forceflowscales.com | www.halogenvalve.com

KUHN Knight SLC 100 Series Spreaders Provide Fast, Efficient Spreading

The KUHN Knight SLC 100 Series Pro-Twin Slinger commercial manure spreaders set the standard for fast, efficient spreading. They provide a suitable combination of efficiency, versatility and rugged durability to maximize value.

SLINGER DESIGN

The unique twin-auger design and heavy-duty body construction allow the Slinger to handle a wide variety of wet and dry materials. A fully adjustable discharge allows faster unloading and improved material breakup for more consistent, accurate spreading.

An aggressive hammer design provides more wear surface on the bottom edge to extend hammer life. The heavy-duty drive requires minimal maintenance and provides years of reliable service.

The SLC series manure spreaders are available in 2,600- to 5,000-gallon trailer and 3,200- to 4,100-gallon truck capacities, and truck and trailer configurations.

Kuhn North America is a leading innovator in the field of agricultural and industrial equipment, specializing in spreaders, mixers, hay and tillage tools. KUHN products are sold through farm equipment dealers throughout the U.S., Canada and many other countries.

608-897-2131 | www.kuhn.com

Get Centralized, Uniform Data Management With AllMax's Operator10

Operators asked and AllMax Software listened. The company's Operator10 Wastewater is the answer for centralized and uniform data management. Operator10 Wastewater provides centralized storage for all wastewater operations data.

Plants that record data from external labs, LIMS, SCADA, Historians and more need a place to house, organize, review, manipulate and report on their data. Operator10 includes multiple options to get data into the database, and powerful tools to run calculations, create charts and run reports.

AllMax Software's Operator10 can handle plant issues in a budget-friendly, straightforward and secure database solution.

AllMax Software has been a leader in the development of data management and reporting software specifically designed for wastewater, water, pretreatment and industrial applications for over 25 years. Innovative software solutions, product and purchase options, value-added services, and experienced personnel address unique needs of plants and facilities and positively impact overall operations.

800-670-1867 | www.allmaxsoftware.com

LaMotte's Waterproof Chlorine Colorimeter Meets Tough Field Standards

LaMotte Company's DC1500 waterproof chlorine colorimeter now includes a rechargeable battery and is packaged with DPD tablets for 100 tests or liquid DPD reagents for 140 tests. The unit can be used in the field or lab, and it covers the entire critical chlorine range of 0-4 ppm with an MDL of .03 ppm.

The colorimeter includes a sturdy carrying case and six glass vials, a USB cable and wall adapter. The unit meets IP67 waterproof criteria so users in high-moisture environments can take the DC1500 anywhere.

Operation is easy and efficient, thanks to a large graphic, backlit display and a simple menu-driven operation.

LaMotte

Since 1919, **LaMotte** has offered quality equipment and guidance for water analysis. The company produces a broad line of portable test equipment and focuses on specific needs by offering strong technical support and an extensive custom test kit service.

800/344-3100 | mkt@lamotte.com | www.lamotte.com

Eurus Blowers Are in Stock and Ready to Ship

Eurus Blowers is a manufacturer of positive displacement blowers, PD blower packages and multistage centrifugal blowers. The types of positive displacement blowers include bi-lobed rotor and tri-lobed rotor positive displacement blowers.

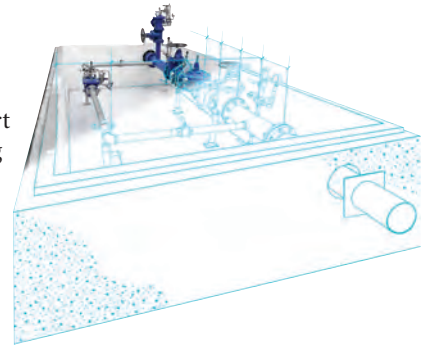
Applications include pneumatic conveying, wastewater treatment, automated milking, potholing and slurry recovery, vacuum processing and conveying, chip conveying and process vacuum, fly ash conveying and aeration, blending and conveying, material vacuuming, fluidization and conveying, and aeration and backwashing. Replacement blowers are also available.

Industries served include municipal, bulk material handling, dairy, vacuum excavation, chemical, pulp and paper, power generation, milling/baking, cement and lime, and wastewater. Blowers are available with 24 months warranty from the date of shipping or 18 months warranty after the date of installation.

Eurus offers three different models of bare blowers. The company's ZZ Series are drop-in replacements for Roots URAI, Sutorbilt Legend or MD Competitor blowers. Its MB Series are bi-lobed rotor blowers and its ZG Series are tri-lobed blowers which are replacements for Gardner-Denver DuroFlow and Roots RCS/RAM models. Eurus also offers standard MB blower packages.

Eurus Blower has supplied competitively priced, high quality blowers for new or replacement blower applications to industrial and wastewater treatment markets since 2008.
918-361-0285 | www.eurusblower.com

Cla-Val Announces New Engineered Piping Systems



Cla-Val now offers complete start to finish engineered piping systems. These can be as simple as a short spool attached to a new control valve or a complete piping layout for an existing valve station — or even a brand-new valve station including the concrete chamber, hatch and ladder.

The company's Engineered Piping Systems provide:

- Custom/engineered solutions
- A controlled-environment factory assembly
- Capital savings compared to on-site fabrication
- Premium grade products

For more information, visit www.cla-val.com/waterworks/engineered-piping-systems.

Cla-Val has been known as a leading manufacturer of automatic control valves since 1936 and has built a well earned reputation for providing superior quality products designed for mission-critical water distribution solutions throughout the United States and around the world.
800-942-6326 | www.cla-val.com

Ed Fritz named WEF's Chair of Solids Separation Subcommittee


Ed Fritz

Operators Unlimited Wastewater Process Engineer and Project Manager Ed Fritz was named the Water Environment Federation chair of the solids separation subcommittee. Dedicated to researching wastewater solutions, the subcommittee is organized under the Residuals and Biosolid Committee and focuses on the many aspects of thickening and dewatering. The subcommittee has more than 40 members.

E.F. "Chip" Johnson joins EnBiorganic team

E.F. "Chip" Johnson joined EnBiorganics' business development, industry education and market outreach team. Johnson has been involved in the environmental civil engineering field since his graduation from Auburn University in 1979. His career has taken him from a sales engineer role to head of technical services and business development for consulting engineering firms, trenchless technology contractors and manufacturers. He previously worked at American Cast Iron Pipe, Brown and Caldwell, Metcalf & Eddy, CH2MHill, Insituform and most recently Sprayroq, where he continues in a consultative contract role.

Jenkins Electric welcomes industry veteran Billy Johns


Billy Johns

Jenkins Electric welcomed Billy Johns to its outside sales team. Johns brings decades of experience and will be a key team member responsible for continuing the company's 115-year legacy. Over the last 20 years, he's had roles in sales and customer service. Johns previously worked for both motor manufacturers and repair shops across the industry. He served on the Electro-Mechanical Authority Southeastern Chapter board of directors since 2016 and as chapter president from April 2020 to Oct. 2021.

Centrisys/CNP awarded solids handling upgrade

Centrisys/CNP announced it was awarded the city of Seaside, Oregon Wastewater Treatment Plant solids handling upgrade. The upgrade of the wastewater treatment plant will include a Centrisys USA-manufactured CS21-4 HC dewatering centrifuge and a DLT420 low-temperature belt dryer. The upgraded equipment will replace aging dewatering and sludge drying equipment. It will allow the city of Seaside to meet Western Oregon regulations that mandate the elimination of Class B cake in landfills.

NuTech to offer access to wastewater treatment

To help provide access to affordable and sustainable methods for the treatment of wastewater, industrial and municipal wastewater industry veterans Kevin Ayers and Chris Evans have joined forces with EnBiorganic Technologies as a licensee. Headquartered in Lafayette, Louisiana, NuTech Innovations will deliver EnBiorganic's autonomous bioaugmentation technology solution to smaller communities and industries throughout Louisiana and Mississippi.

Duperon expands leadership team


Steve Macomber

Duperon Corp. welcomed Steve Macomber as business development manager. Macomber brings 25 years' experience and will lead the company's business development efforts. Hailing from Charlotte, North Carolina, he has spent six years with Black & Veatch, and more than 18 years working for equipment manufacturers in the screening, dewatering and thickening sector.

Michael Campbell joins Bentley Systems, expands executive roles


Michael Campbell


James Lawton


Claire Rutkowski


Suzanne Little

Bentley Systems announced that Michael Campbell has been appointed chief product officer and will lead more than 1,500 colleagues in the company's product advancement group. Campbell joins Bentley from product engineering software company PTC Inc., where he has spent his whole career since earning his mechanical engineering degree from Boston University in 1995.

The company also named James Lawton to the newly created role of chief digital officer. Lawton joined Bentley with the acquisition of geosciences software company Seequent in 2021. He will lead Bentley's digital experience strategy and its IT organization. After six years as chief information officer, Claire Rutkowski was named senior vice president, CIO champion. Rutkowski joined Bentley in 2016 from the position of CIO at infrastructure engineering firm Stantec/MWH. And Suzanne Little was promoted to the newly created role of chief colleague success officer. Little will lead Bentley's global HR functions and teams. Previously, as vice president of talent, Little led global talent operations, including talent acquisition, talent management, total rewards and talent systems and analytics.

Axine completes PFAS destruction test program

Axine Water Technologies has successfully completed a comprehensive test program to verify the performance of its proprietary electrochemical oxidation technology for onsite destruction of PFAS compounds in water and wastewater. The company's EOx system destroys PFAS in wastewater as opposed to removal options that collect PFAS for hazardous disposal or secondary destruction.

Franklin Electric adds to management team


Matt Murray


Mike Smith

Franklin Electric welcomed two new members to its growing industrial and engineered systems business unit. Matt Murray joins the company as senior business unit manager for industrial distribution and Mike Smith joins as senior business unit manager for fleet. In their new roles, Murray and Smith will set the strategic vision for their segments, leading all commercial activities and supporting the needs and growth of Franklin Electric's customers.

Kent County DPW hires communications and marketing manager

The Kent County Department of Public Works hired Steve Farber as its new communications and marketing manager. Faber has a background in strategic communications, public relations and conservation. He holds a master's degree in public administration and nonprofit management from Grand Valley State University and a bachelor's degree in geography from Calvin University. tpo

Online Exclusives at www.tpomag.com

Let's face it, business opportunities ebb and flow on a daily basis. But there is ONE thing you can count every year—The WWETT Show.

It's the world's largest annual trade show for wastewater and environmental service professionals. The WWETT Show offers a robust educational program with nearly 100 live and online sessions, live demos, multiple networking opportunities and an expo floor brimming with the latest technology and innovations in the industry.

Get in the flow and join thousands of your peers in Indianapolis for THE business event of the year.

REGISTER NOW

WWETT 2023
CONFERENCE: FEBRUARY 20-23
EXPO HALL: FEBRUARY 21-23
INDIANA CONVENTION CENTER
WWETTSHOW.COM

wwett 23

Shared Excellence

A NEW HAMPSHIRE UNIVERSITY AND TOWN COLLABORATE ON A NEW ZERO-DISCHARGE WATER PLANT BUILT FOR SUSTAINABILITY AND RESILIENCY

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

The main operations building at the Durham Water Treatment Plant, which also serves the University of New Hampshire.

> "We wanted a plant that was as robust as it could possibly be, able to treat widely varying water quality and flow rates."
>
> **JOE GEARY**

Universities and the water profession have long collaborated to bring innovative and effective treatment technologies to the field.

But it's not often that the two institutions share the same site and work together to deliver clean water to both municipal and campus users.

That's the case at a new zero-discharge water treatment plant that serves students and staff at the University of New Hampshire and the 15,000 residents of the town of Durham.

"About 55% of our consumption is at the university, though that population is seasonal," says Matthew O'Keefe, former director of the school's Department of Energy and Utilities, who recently moved on to another position. "The remainder is in the town."

Ownership of the raw water sources and the distribution system is shared as well.

The plant is operated under a contract with Woodard & Curran, which designed and built the facility in a partnership with Waterline Industries. The project won the Silver Engineering & Excellence Award from the New Hampshire chapter of the American Council of Engineering Cos. It also earned a New England Silver Award from the Design-Build Institute of America, and a Bronze Engineering Excellence Award from the ACEC of Massachusetts.

A NECESSARY CHANGE

For years Durham drew raw water from the Oyster River and

Glenn Sutson, operations and maintenance specialist, calibrates a UV analyzer (Chemtrac).

treated it at the Arthur Rollins Water Treatment Plant, built in 1935. That plant's age and condition as well as the university's zeal for sustainability prompted construction of the new facility, which is only the latest in a series of measures in the community and the school to make the infrastructure more resilient.

The new plant continues to draw source water from the Oyster but supplements it with higher-quality water from the Lamprey River south of the town. In a unique setup, Lamprey River water is also used to recharge and store water in the aquifer through basins at Spruce Hole. In turn, the Spruce Hole well can provide water when the river flow is below specific thresholds.

It's a way for the university and the community to help protect water resources and the environment, while still supplying source water during drought. Once at the plant, the water undergoes a series of carefully selected treatment processes. First, water from the different sources is blended. Online analyzers (Hach and Chemtrac) monitor flow, pressure and the changing raw water quality of the different streams.

In the chemical pretreatment stage, polyaluminum chloride promotes coagulation. Sodium hydroxide is added for pH control and, if needed, potassium permanganate can be added to help remove naturally occurring manganese. The flocculation-coagulation step follows; the speed of mixers (SPX Flow) is closely controlled to keep the floc together.

Flowmeters help plant operators direct the water to three separate process trains. The design ensures complete redundancy in case one train, or one basin or piece of equipment, requires maintenance or emergency repairs. "Process and equipment redundancy and flexibility are critical in both water and wastewater treatment operations," explains Rob Little, national practice leader for drinking water with Woodard & Curran.

Durham (New Hampshire) Water Treatment Plant

www.unh.edu

BUILT:
2020

AREA SERVED:
Town of Durham, University of New Hampshire

SOURCE WATER:
Lamprey and Oyster rivers, groundwater wells

TREATMENT PROCESS:
Conventional

PRODUCTION CAPACITY:
2 mgd

SYSTEM STORAGE:
3.6 million gallons

INFRASTRUCTURE:
30 miles of distribution lines

SETTLING OUT

Water exiting the mix and flocculation stage is directed to one of three clarification basins, where inclined plate settlers (Meurer Research), allow solids to collect on the plates and slide off into collection troughs at the basin bottom. Clarified water flows over weirs to the filters.

"The plate settlers are very efficient, and provide a much greater surface area for settling in a much smaller overall footprint than conventional clarifier basins," says Little.

The four filters (Leopold) consist of 36-inch-deep beds of anthracite and 10 inches of fine sand. Extra filter depth is available in case granular activated carbon needs to be added in the future to deal with emerging contaminants. Sodium hydroxide can be added for additional pH control; blended phosphate protects against corrosion in the piping.

Chlorine is added for disinfection and fluoride for dental health. The flow is then pumped to the distribution system, a portion of which is owned and maintained by the town, and the remainder by the university. A state-of-the-art SCADA system (GE iFIX) controls the plant, allowing it to operate remotely while regulating and monitoring the incoming raw water streams and effluent water quality.

CAREFUL VIGILANCE

The plant is staffed with two full-time operators and one part-time specialist, notes Joe Geary, area operations manager with Woodard & Curran. Mike Sullivan is plant manager, John Ciaburri is water treatment plant operator and Glenn Sutson serves as the specialist on site about two days a week.

Geary explains that the three raw water sources make it necessary to constantly and carefully monitor incoming water quality: "We wanted a plant that was as robust as it could possibly be, able to treat widely varying water quality and flow rates," says Geary.

Mike Sullivan, plant manager, operates the filter control console (Leopold) in the main control room.

"The quality of the Lamprey is good, though variable. The Oyster is not as good and also variable, and the water from Spruce Hole is pretty clean. The main challenge was having a process that could anticipate and adjust to changing quality based on the three sources."

The plant uses streaming current detectors (Chemtrac) to optimize pH and alkalinity adjustment and coagulant addition. "The detectors read out the electrical charge in the water, and that serves as a guide to enable the staff to adjust coagulants accordingly," Geary says.

In addition, the staff monitors water flowing into the distribution system. That's because a separate groundwater well that the town of Durham owns feeds directly into the water mains serving the town, providing about 30% of the flow. "We get samples of that water every day and test it in our plant laboratory," says Geary. The testing assures proper water quality throughout the system.

HERE AND GONE

Seasonal consumption is another feature of the Durham-UNH system. Unlike most public systems, demand drops in summer because the university is on break. "We get reductions in water usage when the students are on winter and spring breaks, as well," Geary says.

The plant staff also operates and maintains the various smaller water treatment systems on the campus: membranes, softeners and UV systems used in labs and various university buildings. With this range of responsibilities, communication among all parties is critical. Geary says his firm, along with town and university representatives, meets face-to-face every two weeks to discuss operations and address any issues.

The filters are air-scoured and backwashed every four days on average. Backwash water, along with solids settled out in the treatment process, are directed to one of three residuals-handling lagoons on the plant site. One

THE PLANT AS A CLASSROOM

The location of the water treatment plant on the University of New Hampshire campus provides a host of opportunities for students and teachers to learn about water quality and treatment technologies firsthand.

"We engage with the university staff and teaching staff," says Matt O'Keefe, former director of the school's Department of Energy and Utilities. "We provide tours. It's not every day that a treatment plant is located on campus. Having it here is a resource."

The university takes full advantage of the relationship. Dr. Robin Collins, professor of civil and environmental engineering, along with colleagues including Drs. Weiwei Mo and Paula Mouser, frequently arrange student tours of the plant. Collins also directs undergraduate and graduate students conducting experiments and projects there.

"All of our environmental and civil engineering students tour the plant, beginning in their first year," Collins says. "One of our Discovery Classes is open to all UNH students, who must do three field trip tours each semester. One of those is always at the water treatment plant. That's usually 150 to 200 students."

Students studying water treatment design have around-the-clock access to a special training laboratory at the plant, separate from the main entrance. That's important, because the old plant was locked on weekends and students had no access to their experiments.

"Our advanced water treatment design class requires students to prepare, conduct, analyze and report on four laboratory-based assignments, all conducted at the training lab," says Collins.

In the first lab exercise, students optimize coagulation/flocculation design variables to reduce turbidity and color from a natural source water. In the second, they develop a filter sand media meeting selected specifications from a local sand and gravel quarry.

In exercises three and four, students evaluate the performance of selected powdered activated carbons in reducing color from a natural water source and compare actual versus calculated hardness removals from various chemical additions.

"Some of our senior capstone design projects have been directly associated with the water treatment plant, including one project that had the seniors design a pilot treatment plant to be located in the training lab," Collins adds.

At the graduate level, a current project uses the natural surface water source to maintain an active biofilm on sand media, helping to determine the biodegradable fraction of natural organic matter. In another project, which Mo and Collins advised, a Ph.D student uses water plant data to develop protocols that plant operators could follow to minimize drinking water disruptions from contaminants introduced to the watershed from upstream spills and accidents.

The new plant location is a plus. "Over the years," says Collins, "I have had numerous projects using the old water treatment plant as many of our studies involved treating natural water on a continuous basis. Having direct access to the water plant avoids significant effort required in transporting large volumes of water to our analytical and testing laboratories, especially during winter months when the water could freeze. It's a major advantage.

> “The main challenge was having a process that could anticipate and adjust to changing quality based on the three sources.”
>
> **JOE GEARY**

design challenge involved the desire of the university and the town for zero discharge: no liquid discharge to any receiving streams or groundwater. “We were able to achieve that goal with a very innovative and unique design,” says Little.

The solids lagoons are the key. Clear liquid including supernatant above the settled solids, as well as rainwater and snowmelt on the surface, are regularly decanted from the lagoons. The residuals lagoons have a sand underdrain that collects filtrate from below, promoting more rapid drying of the lagoon contents. The decant and filtrate are returned to the head of the treatment process. Dried solids are trucked to a disposal site. The goal is to remove water and achieve the driest possible material so that the university is not paying to haul water weight.

The plant has a 10% limit on the incoming flow that emanates from the lagoon system recycle, but the actual amount is well below that. “It varies in concentration, but it’s really a very small portion of the overall flow,” says Little.

The team at the Durham Water Treatment Plant includes, from left, Michael Sullivan, plant manager; Joe Geary, area manager; Glenn Sutson, operations and maintenance specialist; and John Ciaburri, operator.

Sullivan checks the lubricant level in one of the three finished water pumps (Sulzer Pumps Solutions) in the plant’s process area.

LOOKING FORWARD

The new water plant is the latest example of the forward-looking approach the university takes on climate change and the concept of resiliency and sustainability. The campus heating facility reduces emissions by using landfill gas instead of natural gas as its fuel. “We produce hot water, steam and chilled water,” says O’Keefe. In fact, the campus is powered entirely by renewable energy.

The measures are being noticed. UNH is just one of 10 in the United States to hold STARS (Sustainability Tracking Assessment and Ranking System) Platinum Award status from the Association for the Advancement of Sustainability in Higher Education. The school also incorporates sustainability into all departmental course offerings

“We were one of the early adapters of climate policy,” says O’Keefe. “Our administration has been a strong supporter of this approach.” Security is one challenge. “This is critical infrastructure. We’re compliant with security needs today, but we need to be protected against future IT risks,” he says.

Contaminants are another issue. “Planning, design and construction of our plant was a 10-year process,” O’Keefe explains. “Now there are contaminants, like PFAS, that not everybody knew about at the time.” He suggests that designs today need to be flexible and easily adaptable to future considerations. “This plant accomplishes that. These are things you are going to have to deal with in the future. It’s a learning process, for sure.” tpo

featured products from:

Chemtrac, Inc.
800-442-8722
chemtrac.com

Hach
800-227-4224
www.hach.com
(See ad page 51)

Leopold - a Xylem Brand
855-995-4261
www.xylem.com/treatment

Meurer Research, Inc.
303-279-8431
www.meurerresearch.com

SPX
800-252-5200
www.spx.com

Sulzer Pumps Solutions Inc.
800-525-7790
www.sulzer.com
(See ad page 39)

Woodard & Curran
800-426-4262
www.woodardcurran.com

1. The Ecoremedy gasification process is fully automated but generally requires an on-site operator to monitor the controls.
2. Ecoremedy technology marries gasification with conventional direct-contact drying. It can operate with cake at 15% solids and up.

1

2

A Flexible Remedy

A PROVEN GASIFICATION PROCESS ENABLES RESPONSIBLE BIOSOLIDS MANAGEMENT WITH CAPABILITY TO PRODUCE RENEWABLE ENERGY AND A MARKETABLE PRODUCT

By Ted J. Rulseh

Biosolids management has become more challenging with tight emission regulation for incinerators and concern over PFAS placing structures even on land application.

Ecoremedy now offers a gasification technology for municipal wastewater treatment plants that aims to resolve those issues. It converts biosolids into a marketable product while reducing emissions and operating without fossil fuel input. The U.S. EPA has affirmed that the process is not a form of incineration, the company observes.

The Fluid Lift gasification process is self-sustaining and has been shown to destroy PFAS and other pollutants of concern. Unlike incinerators, the process does not release pollutants such as dioxins and furans. It can be used to create FlexChar, a biochar containing 1% to more than 60% carbon. It also can be tuned to maximize recovery of renewable energy.

The design uses industry-standard components to produce a modular solution that can operate economically at any scale, according to the manufacturer. Advanced controls help maximize performance and flexibility.

A single unit can process 15 to 75 wet tons per day, depending on the feedstock, from dewatered biosolids. Systems can be optimized in real time to achieve multiple combinations of nutrient recovery, waste reduction and energy recovery. David Mooney, president and chief technology officer with Ecoremedy, talked about the offering in an interview with *Treatment Plant Operator.*

tpo: Is this a brand new technology?
Mooney: We have proved out this technology over the last 20 years in the agriculture industry. It is new and unique to the biosolids sector, and it has been shown to work very well there.

tpo: What is the rationale for bringing this technology to a new market?
Mooney: Roughly two-thirds of the biosolids produced in U.S. wastewater treatment plants are land-applied. The rest is landfilled or incinerated. Incinerators cannot operate within emission requirements without upgrades that make them cost-prohibitive. Landfills face social pressure from neighbors complaining about odor, and they face more regulatory pressure about PFAS, microplastics, pharmaceuticals and other contaminants in their leachate. Meanwhile, various states have placed extreme regulatory strictures on land application. We offer a solution that empowers communities to manage biosolids in an environmentally friendly manner.

tpo: How does gasification differ from incineration?
Mooney: Incineration is simply burning something. In that instantaneous reaction a tremendous amount of heat energy released, and air pollutants are created. Gasification stretches that combustion process out over time. First we convert carbon to carbon monoxide and a hydrogen-rich gas. Then seconds later that gas burned simply by adding oxygen to it. The process is orders of magnitude cleaner than incineration in terms of emissions.

tpo: In simple terms, how does the gasification process work?
Mooney: We have married a proven, simple gasification process with

a conventional direct-contact drying facility. Rotary-drum drying basically burns natural gas to evaporate water from the biosolids. We start with the same dewatered material that goes into a rotary drum dryer. It serves as the fuel source for the gasifier and provides all the energy needed to self-sustain the process. We can operate with cake at 15% solids and up.

tpo: What is the end product of this process?

Mooney: We concentrate all the biosolids down to its ash fraction or to a carbon-rich biochar that we call FlexChar. The material is sterilized, and the chemicals are reduced to nondetectable or trace levels. The volume is reduced by 95-98%. The material can go to landfill or to value-added products. Our system can uniquely flex from no carbon to high carbon in the biochar product. Operators have flexibility to make real-time decisions based on market conditions. We can convert all the carbon in biosolids to renewable energy. Or if the user has market drivers that make it advantageous to produce a high-carbon biochar, we can give them that.

> "We have proved out this technology over the last 20 years in the agriculture industry. It is new and unique to the biosolids sector, and it has been shown to work very well there."
> **DAVID MOONEY**

tpo: What can the FlexChar product be used for?

Mooney: Biochar made from biosolids is best suited for agronomic benefit. The carbon in the biochar acts like a sponge and holds moisture, which can be very beneficial for sandy, fast-draining soils. Another application is in concrete. Adding carbon to concrete improves its strength and its porosity rating. If concrete containing biochar is used for pouring basements, it will dramatically reduce the seepage of groundwater through the basement walls.

tpo: How is renewable energy captured in this process?

Mooney: We provide a renewable energy facility inside the fence of the wastewater treatment plant. The biosolids itself is the fuel source and also the energy demand. The primary use of the thermal energy is to evaporate the water, but the system balance almost always is such that more energy is produced than is needed for the evaporation. So the customer can choose the form in which to receive that excess energy. They can take it as a high-carbon FlexChar in which the carbon represents the excess energy that was in the system. Or they can receive Class A dried biosolids for land application or for sale as a fuel source.

tpo: Can the excess energy be used on site for process heating?

Mooney: That is another option. The excess energy can be captured in a heat loop for heating digesters or buildings, or for other purposes.

tpo: How much operator attention does the gasification process require?

Mooney: The process is fully automated, but it is necessary to have a full-time operator on staff to monitor the controls.

tpo: How long does it take to deploy this technology at a treatment facility?

Mooney: We offer different models and sizes. They include modular units that we can design, fabricate, deliver, install and commission within 12 months of receiving a purchase order. The larger facilities take a little more time on site to assemble. Everything we build is a modular type of deployment. Our smallest models come as preassembled plants. All our components are American made using American steel. **tpo**

exam STUDY GUIDE

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

WASTEWATER

By Rick Lallish

What operational parameters are able to be controlled by the operator in an activated sludge treatment process?

A. BOD load, hydraulic load and detention times
B. Influent solids, flow and solids retention time
C. Dissolved oxygen, return rate and wasting rate
D. Weather, flow and demand

ANSWER: C. The activated sludge process has many variables to be aware of, but operators have total control over only these three. Operators may set the DO to the point necessary to maintain aerobic conditions and fulfill the needs of the microorganism population. They also can set the return rate to ensure that the sludge can settle in the clarifiers to an acceptable detention time. Operators also can decide how much sludge needs to be wasted from the system. Operators who understand these parameters can make the necessary choices to ensure proper treatment. Many things are outside operators' control, but should be considered in making changes in the process.

More information may be found in the Office of Water Programs, CSU-Sacramento textbook *Operation of Wastewater Treatment Plants,* Seventh Edition, Volume 2, Chapter 11.

DRINKING WATER

By Drew Hoelscher

What is the maximum residual disinfectant level for chlorine dioxide?

A. 4.0 mg/L as ClO_2
B. 1.0 mg/L as ClO_2
C. 0.8 mg/L as ClO_2
D. 0.5 mg/L as ClO_2

ANSWER: C. Chlorine dioxide is an effective primary disinfectant, if *Cryptosporidium* or the development of trihalomethanes are of concern. However, chlorine dioxide is unstable at elevated concentrations, so on-site generation by reacting sodium chlorite with chlorine is required. Feeding chlorine dioxide creates a scenario where elevated chlorite levels may hinder the quality of the finished water. To ensure that the finished water quality meets the national primary drinking water regulations, operators sample the water at the distribution entry point and have it analyzed for chlorite. Chlorite has a maximum contaminant level of 1.0 mg/L.

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**

Patterson Davit Crane lifts large loads in tight spaces

With a boom that can be adjusted to nearly 45 degrees, the Patterson Davit Crane offers adequate reach and allows for clearance over obstructions such as handrails. The low maintenance, easy-to-assemble design is available in ½-ton and 1-ton capacities and comes standard with a hot-dipped galvanized finish and stainless steel hardware to prevent rust and corrosion in wet work environments. Following Patterson's tradition of safety-focused innovation, the davit features a reliable brake to keep loads in position without creeping. For over 160 years Patterson has been a trusted supplier of winches, rigging, fittings and custom products for lifting applications. Patterson Davit Cranes are made in the U.S.A. and deliver on the company's promise of helping businesses run safer, easier and faster.

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

Hemco chemical resistant island canopy hoods

Hemco's island canopy hoods are designed to collect and exhaust corrosive vapors, heat, steam and odors when mounted over areas with water baths, hot plates or portable equipment. Manufactured of molded one-piece composite resin, the canopy hoods are lightweight and can be wall-mounted or suspended from the ceiling. The canopy fume hood's glass smooth surfaces provide chemical, corrosion and heat resistance. Optional side panels prevent cross drafts and further improve airflow while providing a way to contain chemical spills.

800-779-4362;
www.hemcocorp.com

product spotlight

wastewater

System offers accurate hands-off chlorine measurement

By Craig Mandli

Chlorine is an ideal disinfectant. But while proper residual chlorine levels ensure that water is safe, too much can cause environmental harm and harm organoleptic properties. That's why it's important that the chemical be accurately monitored.

The **Model Q46H/79PR Total Chlorine Measurement System** from **Analytical Technology, A Badger Meter Brand,** is a highly versatile online monitoring system designed for the continuous measurement of total chlorine in solution. It is well suited for potable water systems, water reuse systems, cooling towers and for monitoring wastewater treatment effluents. According to Bill Popp, North America sales manager, water quality for Analytical Technology, the basic sensing element used in the total chlorine monitor is a three-electrode amperometric membrane sensor that measures chlorine directly. The chlorine measurement does not alter the sample or add any chemicals to the sample stream, so the water flow can return to the system if desired.

"This direct measuring system does not require the addition of chemical reagents to measure total chlorine," he says. "That means that the unit can be deployed for months without having to change anything. Reagents typically need to be maintained on a monthly basis."

In addition to total chlorine measurement, the Q46/79PR is also available with an optional pH input which provides a two-parameter monitoring system.

Model Q46H/79PR from Analytical Technology, A Badger Meter Brand

It can be supplied complete with sample flow controls mounted to a PVC back plate ready to mount. Simply connect the power, water sample, and analog/relay outputs and you're ready to go. Systems are available with or without a flow switch for remote indication of loss of sample.

"Its simplicity in design means less investment in replacement parts, and because it takes less manpower to operate, the overall operating cost is very manageable," says Popp. "The fact that we were able to add features like a pH input to its basic functionality makes it all the more valuable in water and wastewater applications."

Popp added that while Analytical Technology has offered chlorine monitoring systems for years, technological advancement has necessitated multiple upgrades to the legacy system.

"We've evolved from an analog to a digital world, and our chlorine measurement system certainly reflects that," he says. "Every upgrade we've made has been customer driven. That's why even though this is our most popular product, it will always evolve."

800-959-0299; www.analyticaltechnology.com

Spencer Strainer Systems self-cleaning filters

Spencer Strainer Systems self-cleaning filters remove oversize particles from process or wastewater flows of up to 2,500 gpm without filter elements or bags. Various sized models are available for continuous process flow of up to 100 gpm, up to 400 gpm, and up to 2,500 gpm. Wedgewire or perforated screens of various openings are available and interchangeable, allowing one strainer to be used for multiple applications. They are suitable for aseptic operations and work well as prefilters upstream of membranes, centrifuges and other fine filter media. An optional mobile stand allows the units to be moved where needed.

800-801-4977;
www.spencerstrainer.com

Andritz C-Press screw press

The Andritz C-Press screw press provides high performance combined with compact design, and a low operating cost in the sludge dewatering process. With its direct drive system and conical shaft with constant screw pitch, the C-Press has a feed capacity ranging from 4 to 418 gpm, with an outlet capacity from 44 to 2,866 lbs/h. In addition

to a long life cycle, the press also offers easy operation, low maintenance and reduced water consumption. The screw speed is automatically adjusted according to the input oscillation, ensuring a continuous flow with optimized performance in drying and capture rate, even during the washing phases. The C-press complies with all regulations on such issues as safety, hygiene and environmental protection.
800-433-5161; www.andritz.com

Endress+Hauser disinfection sensors and accessories

Endress+Hauser released new liquid analysis disinfection sensors and accessories for measurement in more applications, adding the CCS55D Memosens free bromine sensor, CCS58D Memosens ozone sensor and Flowfit CYA27 assembly to its product family. The CYA27 assembly is designed to be freely configurable, accommodating a wide range of sensors, including disinfection, pH, conductivity and dissolved oxygen. It also offers flow monitoring and diagnostic indicator options to ensure reliable measurement, covering a wide range of disinfection applications. The CCS55D measures free bromine in seawater, swimming pools, process and cooling water, fish farming applications and more. The CCS58D ozone sensor supports this with inline measurement using the Liquiline transmitter and Memosens digital sensor technology platforms.
888-363-7377;
www.us.endress.com

OZ Lifting Products Tele-Pro davit crane

OZ Lifting Products' patented Tele-Pro davit crane features an industry-first telescoping boom adjustment that can be moved in and out while under load. A ratchet screw jack allows the user to adjust the boom from horizontal to 45 degrees while under load and the 360-degree rotation of the crane allows a full range of motion. Smart latch technology at the boom/mast means no tools are required for assembly. A zinc-plated finish provides added corrosion protection. The Tele-Pro is available in 500-, 1,200- and 2,500-pound capacities. AC and DC electric winches are optional on the 500- and 1,200-pound models, or manual winch with drill drive adapter is available for all three models. The cranes are made in the U.S. and each one is individually tested and certified at 125%.
800-749-1064;
www.ozliftingproducts.com

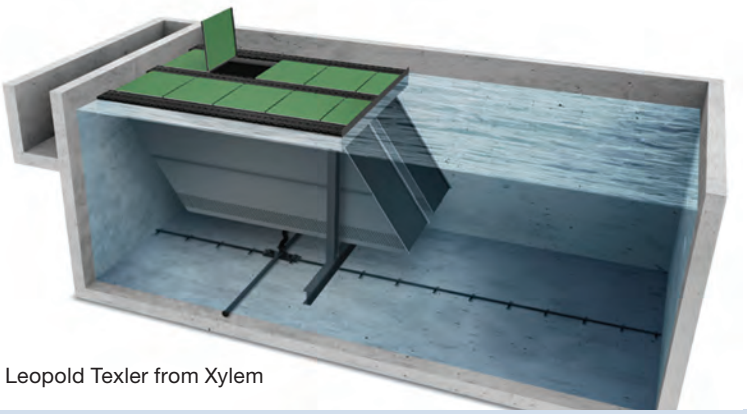
QED LANDTEC BIOGAS 3000 fixed gas analyzer

QED Environmental Systems' new LANDTEC BIOGAS 3000 fixed gas analyzer offers continuous monitoring of the complete gas production process. The compact, self-contained system can utilize up to four sample ports to monitor meth-

product spotlight water

HDPE clarifier plates help substantially reduce maintenance costs

By Craig Mandli



Leopold Texler from Xylem

Throughout history, sedimentation has served as a tried-and-true method for water and wastewater treatment. That doesn't mean the technology can't be upgraded, though. **Xylem's Leopold Texler lamella clarifier** is a great example as its lamellae are made from a recyclable, durable, high-density polyethylene geotextile material — which reduces service and maintenance requirements while cutting solids by more than 80%.

The lamella plates typically found in clarifiers are made from heavy stainless steel plates, which require extensive support structures and significant capital investment. According to Matt Schomaker, regional manager — Western NA, Xylem, when exposed to sun, steel reflects UV rays and promotes algae growth in the clarifier, reducing the clarification performance and requiring regular, manual cleaning. "The repellent and flexible nature of the geotextile prevents sludge accumulation on the lamella sheets, which reduces the need for regular cleaning," says Schomaker.

Lamella sheets are installed at an inclined 55-degree angle. Solids settle as the water travels upward between the lamella sheets and flows through trough covers featuring an integrated v-notch weir, resulting in even distribution of flow throughout the clarifier.

"The inclined plate arrangement of the Texler system allows for an increase in the clarification area and allows for higher surface overflow rates, reducing the required basin dimensions by up to 80% for new builds or allowing more than 100% increase in flow within existing sedimentation basins," says Schomaker. "The geotextile material has been proven in similar applications to last over 20 years. The width of the lamella sheets can be adapted to optimize use of existing basins."

As a result, water treatment capacity of existing rectangular clarification systems can be increased by up to 100%, with over 80% reduction in solids and turbidity values reaching levels less than 1 NTU. The solution's modular design allows for easy maintenance as each lamella sheet can be easily removed independently. The flexible design allows for cost-effective retrofitting of existing rectangular basins, which significantly reduces the overall construction costs while significantly increasing flow capacity.

"With the Texler system we are taking an existing technology and making it lighter, easier to install and more cost efficient," says Schomaker. "The majority of our construction materials are HDPE-based and the system weight is about 80% lower than stainless-steel plate settler systems."

Schomaker says that reviews have been positive. "Performance in the field has matched our expectations," he says. "The system has also been relatively maintenance free with minimal sludge accumulation over time on the geotextile sheets."
855-995-4261; www.xylem.com/treatment

ane, carbon dioxide and oxygen, with optional monitoring of hydrogen sulfide, hydrogen and carbon monoxide levels. Operators can choose up to five gases to monitor. The device features easy self-installation and maintenance, and QED provides a temporary replacement unit during service, resulting in zero operational downtime for servicing. The BIOGAS 3000 system offers simple user calibration and an easy-to-operate system. The system is calibrated to ISO/IEC 17025 standards for optimum accuracy.
734-995-2547; www.qedenv.com

Blackline Safety G6 personal gas detector

Blackline Safety's new connected, wearable for single-gas detection, the G6 personal gas detector, offers fast incident response time and a more efficient way to manage safety and compliance. G6's long-lasting connectivity means industrial organizations can fully harness real-time vital safety data in scenarios where disposable, traditional beep-and-flash detectors are commonly used. Using the latest in IoT cellular connectivity, G6 delivers expanded benefits such as longer battery life, lower cost of ownership and fewer false alarms. Sensor options quickly alert workers to exposure of toxic gases, including hydrogen sulfide, carbon monoxide, oxygen and sulfur dioxide. Utilizing the Blackline Live software portal, it provides the ability to view an entire fleet of devices from a single screen and deliver automatic, over-the-air firmware and configuration updates.
877-869-7212; www.blacklinesafety.com

ControlAir Type 855 BP miniature back pressure regulator

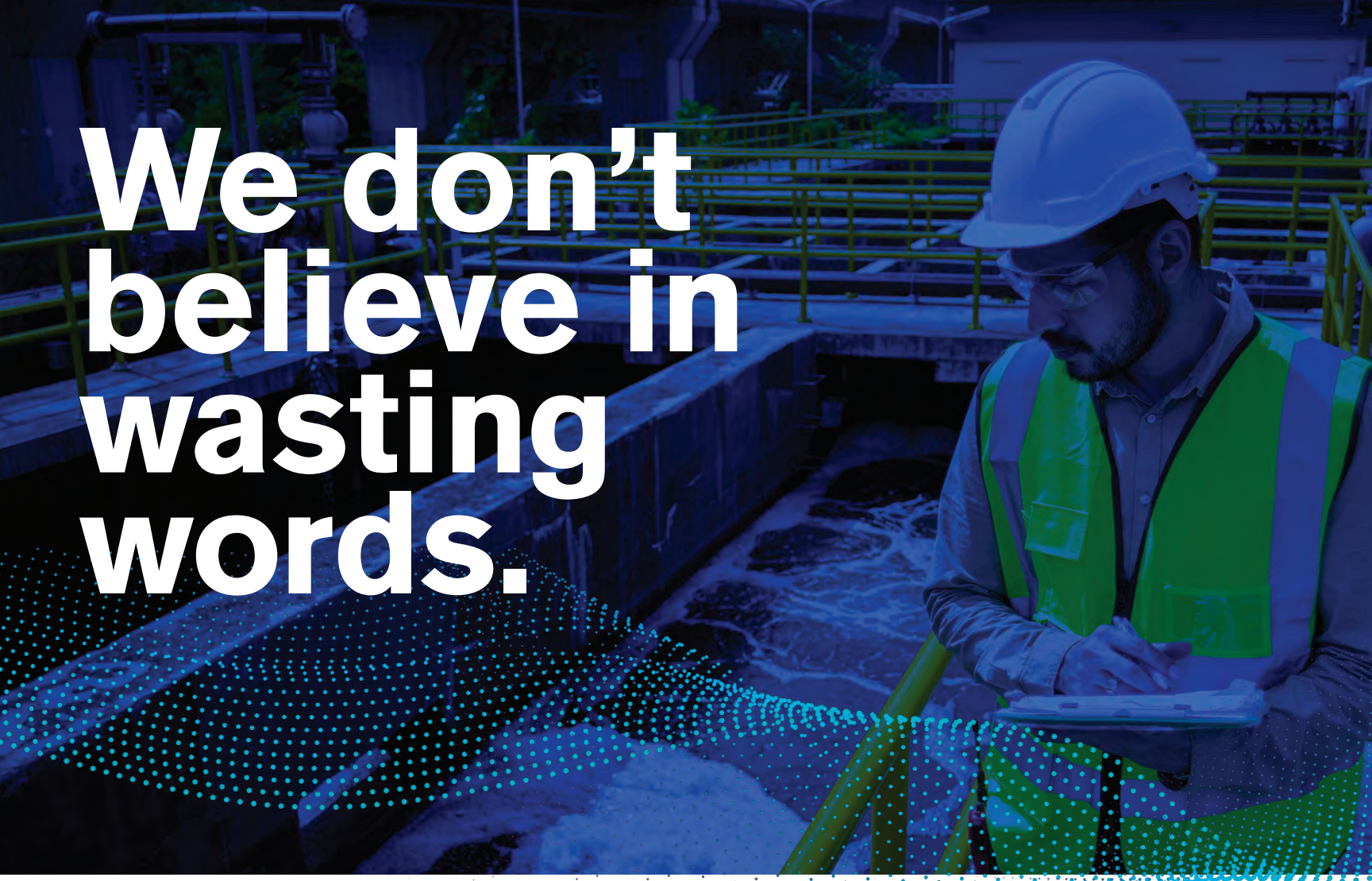
ControlAir's Type 855BP miniature back pressure regulator is a compact relief valve that provides economical, high performance pressure relief with an adjustable set point. It is a normally closed valve that will remain closed until the inlet pressure exceeds the regulator's set point. The Type 855BP is capable of relieving at a rate up to 35 scfm and is available in 1/4-inch NPT porting. The regulator will handle a 250 psi maximum system pressure and offers five setpoint pressure ranges from 0 to 5 psi, up to 0 to 100 psi. The push-pull locking knob feature prevents inadvertent pressure adjustment.
603-886-9400; www.controlair.com

Industrial Scientific Ventis Pro5 personal gas monitor

Industrial Scientific's new Photo-Ionization Detector sensor for the Ventis Pro5 Multi-Gas Monitor makes it a compact, versatile and connected five-gas personal monitor that can reliably detect volatile organic compounds. The Ventis Pro5 with PID sensor allows users to detect VOCs with their personal monitor, reducing the need for additional bulky handheld monitors and supplementary devices. Additionally, with peer-to-peer, satellite, Wi-Fi, and cellular connectivity options, the Ventis Pro5 continues to increase situational awareness and decrease emergency response times by sharing real-time location data, man-down alarms, and gas alerts (including VOC exposure), so safety teams immediately know who needs help, what happened and where they're located.
800-338-3287; www.indsci.com

Lovibond TB350 turbidimeter

Ideal for field and environmental testing, the EPA-approved TB350 turbidimeter from Lovibond delivers reliable measurements for low range to high range samples without sacrificing accuracy. The optical system is engineered with dual detectors to deliver a ratio reading which mitigates common measurement stability issues. The intuitive, touchscreen interface makes it easy to perform procedures and interpret results. The data logging capabilities allow you to record the testing location, operator's identification, time and date along with the measurement. Stored data can be transferred to a computer via USB. It comes ready-to-use with sample cells, silicone oil and calibration standards in a carrying case. And a fast-settling mode increases accuracy of readings with large or heavy particles.
800-922-5242; www.lovibond.com tpo



We don't believe in wasting words.

We thought we'd share them with you instead.
Introducing the WWETT Making Waves Podcast.

Industry thought leaders delivering real solutions.
Making Waves is a fresh audio experience that gives wastewater and environmental service professionals a glimpse into the latest news, insights and the real people who are making waves in the industry. Plus, listen to the stories and behind-the-scenes secrets about how WWETT comes together.

Listen where you get your podcasts or visit WWETTshow.com

wwett Making Waves

worth noting

people/awards

Steve Faber was named communications and marketing manager for the Kent County (Michigan) Department of Public Works.

Howard University civil and environmental engineering assistant professor **Dr. Jeseth Delgado Vela** received the National Science Foundation Faculty Early Career Development award for her biological wastewater treatment research.

The **Soquel Creek Water District's** butterfly logo for its Pure Water Soquel project earned the Award of Distinction from the California Association of Public Information Officials.

Melanie Kennedy, executive vice president and chief human resources officer for American Water, received a Diversity in Business Award from the Philadelphia Business Journal.

The **Cullman Wastewater Treatment Plant** was named a 2021 Best Operated Facility by the Alabama Department of Environmental Management.

Las Cruces (New Mexico) renamed the Griggs Walnut Groundwater Plume Remediation Project in honor of retired long-time employee water production supervisor **Pascual Rodriguez Jr.** It is now called the Pascual Rodriguez Jr. Griggs Walnut Groundwater Plume Superfund Site Treatment Facility.

Mark Dettle, public works director in Santa Cruz, California, announced his intention to retire at the end of 2022 after serving the city for more than two decades.

Maine Water Co.'s **Saco River Drinking Water Resource Center** received the Envision Silver Award from the Institute for Sustainable Infrastructure.

events

Dec. 7
AWWA and Environmental Justice – Can Community Engineering Corps Play a Role? webinar. Visit www.awwa.org.

Dec. 14
AWWA 2022 Regulatory Update, webinar. Visit www.awwa.org

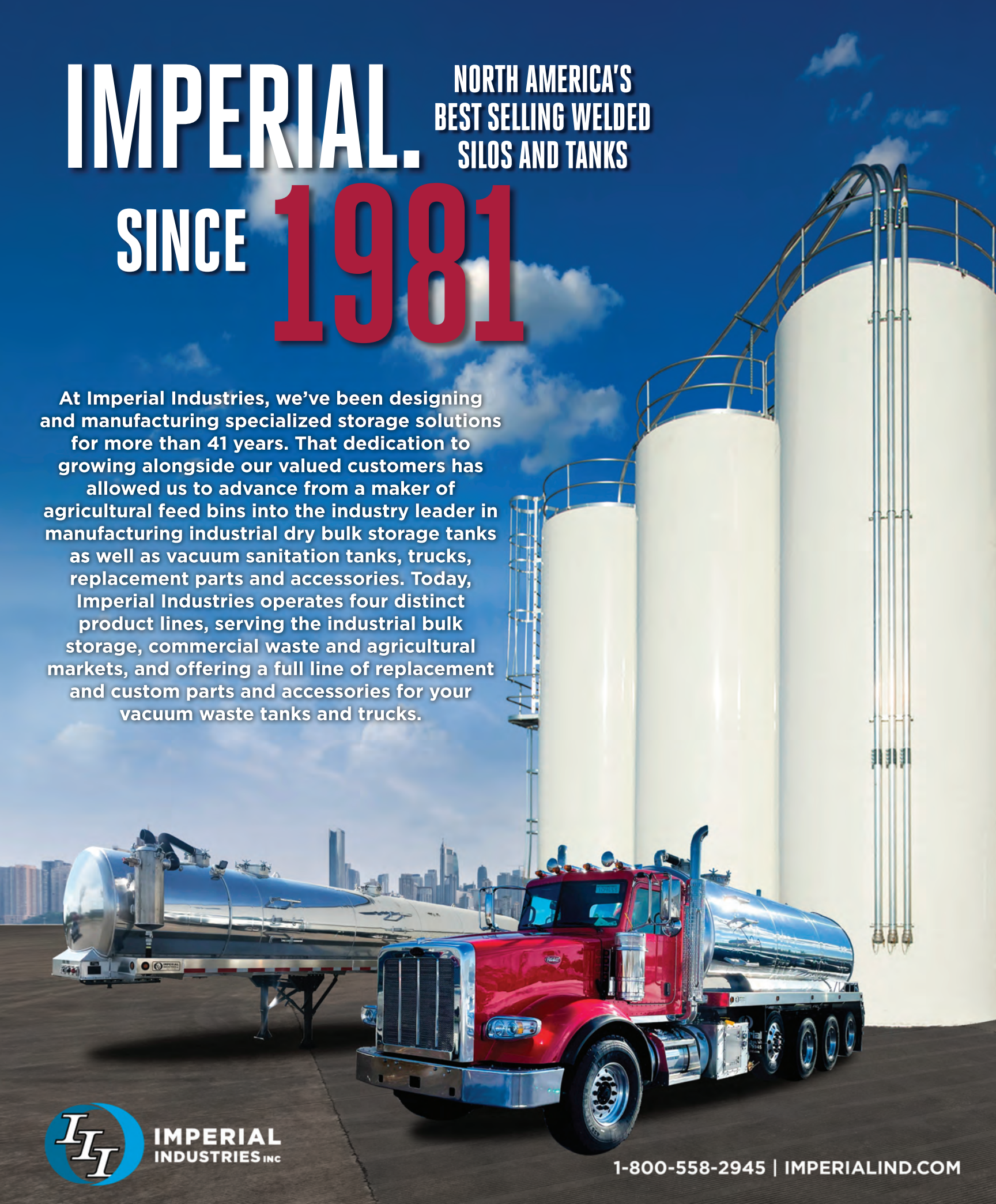
TPO *welcomes your contributions to Worth Noting. To recognize members of your team, please send notices of new hires, promotions, certifications, service milestones or achievements as well as event notices to editor@tpomag.com.* **tpo**

IMPERIAL.

NORTH AMERICA'S BEST SELLING WELDED SILOS AND TANKS

SINCE 1981

At Imperial Industries, we've been designing and manufacturing specialized storage solutions for more than 41 years. That dedication to growing alongside our valued customers has allowed us to advance from a maker of agricultural feed bins into the industry leader in manufacturing industrial dry bulk storage tanks as well as vacuum sanitation tanks, trucks, replacement parts and accessories. Today, Imperial Industries operates four distinct product lines, serving the industrial bulk storage, commercial waste and agricultural markets, and offering a full line of replacement and custom parts and accessories for your vacuum waste tanks and trucks.



IMPERIAL INDUSTRIES INC

1-800-558-2945 | IMPERIALIND.COM

BRACKETT BOSKER® AUTOMATIC RAKING MACHINE

- Capable of depth over 400 ft
- Capacity ranges from 250 kg to 3000 kg of safe working load
- Clear access at deck level optimizes safety and working areas
- The flexibility of the monorail system will suit a variety of water intake environments
- Rakes while descending, pushing debris into the gripper
- Multiple gripper options for special debris loading
- Units can be powered by festoons or Hot Rail track in high wind areas
- Hydraulic or fully mechanical options

Regardless of industry, intake water must be treated before it can be used downstream. Ovivo's Head-works/Inlet works conditioning equipment ensure that even the most stringent screening, screening handling and grit removal requirements are achieved.

The Brackett Bosker® Automatic Raking Machine is designed for a wide range of applications where highly effective bar screen cleaning is required. Applications include municipal wastewater facilities, power stations (nuclear, fossil and hydro), land and storm drainage pumping stations, and industrial pumping stations. Simplicity of design and efficient debris handling make the raking machine the ideal solution for cost efficient cleaning of single or multiple bar screens.

ovivowater.com
OVIVO USA, LLC | 4246 Riverboat Road, Suite 300
Salt Lake City, UT 84123 | **T-801-931-3000**

OVIVO
Worldwide Experts in Water Treatment