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let's be clear

People. Water. Energy. Food.

THEY'RE ALL CONNECTED. THE CONCEPT OF AN EXPANDING WATER NEXUS ELEVATES THE IMPORTANCE OF WATER AND THE WORK OF WATER PROFESSIONALS

By Ted J. Rulseh, Editor



Several years ago, the water-energy nexus became a buzzword. The two were intimately connected, it was said. It takes energy to produce, treat and distribute water. It takes water to produce energy — as in steam to drive power plant turbines and water to cool the power-making machinery.

Now increasingly there's talk of a larger nexus involving water. Tom Kunetz, Water Environment Federation president, has spoken and written about the people-water nexus.

It starts, he says, "with an understanding of how everyone — not just water sector professionals — is connected to water. People affect water. We degrade water quality, move water from place to place, drain aquifers, and disrupt the water cycle and the climate. Conversely, water affects people. We need it to drink, for sanitation, to grow food and for transportation.

"We all are physically connected to water. We also are connected to water emotionally. If you have gone to the beach, kayaked down a river, sailed on a lake or sat by a fountain, then you have experienced the draw of water."

EXPANDING FURTHER

Meanwhile, the Alberta Water Portal Society promotes the Alberta Water Nexus: "Food, energy and people demand water and other resources, and meeting the requirements is challenging due to population growth, economic development and climate change.

"Each sector uses water in different ways and has different priorities. Decision-makers in each sector may not recognize their impacts on other water users. Individual and collective decisions made by people and communities have a large impact on the water-food-energy nexus. Simply stated, our actions and choices result in consequences for our water, food and energy resources."

This broadening of the picture serves to emphasize the role of water in life, and that only casts a brighter light on the water production, treatment and recycling sectors.

THE GLOBAL PICTURE

Global conditions clearly illuminate the connections between water, people and food. The United Nations says that water scarcity affects every continent. About 1.2 billion people live in areas of scarcity, and another



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“ Individual and collective decisions made by people and communities have a large impact on the water-food-energy nexus. Simply stated, our actions and choices result in consequences for our water, food and energy resources.”

ALBERTA WATER PORTAL SOCIETY

half a billion are approaching that status. Water use has been growing at more than twice the rate of population in the last century.

There is enough freshwater on the planet for our population, but it is distributed unevenly. An increasing number of regions have chronic water shortages, and a great amount of water is wasted, polluted and unsustainably managed. Here in the United States, we are adept at placing huge population centers where there is very little native water.

Then there's food security. According to the United Nations, one in nine people in the world today — that's 815 million — are undernourished, the vast majority of them in developing countries, and two-thirds of them in Asia.

Poor nutrition causes 45 percent of deaths in children under age 5; that's 3.1 million each year. Some 66 million primary school children attend classes hungry in the developing world. And is there any doubt that ample water supplies are essential to food production?

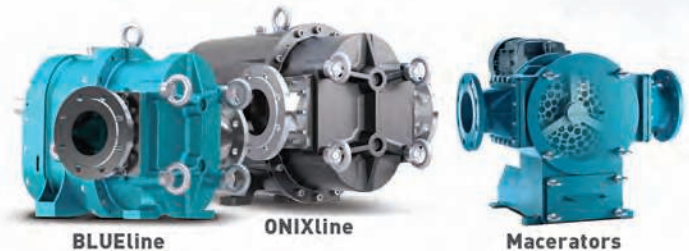
THE INDUSTRY'S ROLE

A nexus of people, water, energy and food illuminates the need for water stewardship across the board, from industries to utilities to households. The municipal water sector seems to be trending in the right direction. Water utilities are aggressively encouraging conservation, and not just in water-stressed cities and states. They're stepping up efforts to plug leaks in their systems. In short, they are becoming better stewards of water resources.

On the wastewater side, agencies increasingly reclaim water and use it for in-plant purposes, irrigation and industrial processes. More important, there's substantial exploration and growth in direct and indirect potable water reuse. Less stress on traditional drinking water supplies means freshwater resources can stretch farther.

The lesson is that the water industry is about much more than just water. That's a simple, yet essential concept to understand. **tpo**

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ANTARCTICA OPERATORS

Treating Waste at McMurdo Station

Jeanne Sabin always liked the idea of going to Mars. When an opportunity arose to operate a wastewater treatment facility at the most analogous place on this planet — Antarctica — she took it. Spending five months at the bottom of the world in the Southern Hemisphere summer, when the sun never sets, was “psychologically intensive” according to Sabin, but also an experience like nothing else on earth. In this online exclusive article, read about how McMurdo Station’s wastewater treatment crew goes above and beyond mandated treatment standards.

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BROADER FUNCTION

Wastewater Plants to Biorefineries

Researchers out of Sweden plan to validate a concept in which they produce and extract fatty acids using membrane bioreactors in an effort to produce acetic acid and hydrogen. The study seeks to illustrate that wastewater treatment plants may have a broader function in the future doubling as biorefineries producing biogas along with other useful materials.

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OVERHEARD ONLINE

“The downward trend in water use shows a continued effort towards efficient use of critical water resources, which is encouraging.”

U.S. Water Use Declines to Levels Not Seen Since 1970
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INFRASTRUCTURE CORROSION

A Major Threat

Along with much of the nation’s infrastructure, drinking water pipelines across the country are nearing the end of their service life. A recent report based on input from more than 1,300 corrosion professionals identifies aging water infrastructure as a pressing, costly yet fixable threat to public health and recommends the adoption of Corrosion Management Systems as an immediate solution for water utilities and municipal systems.

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Making It Great

KEVIN ZEBROWSKI PUSHES HIMSELF AND ENCOURAGES HIS TEAM TO EXCEL IN EVERY AREA OF MAINTENANCE IN HIS NORTHEAST OHIO DISTRICT

STORY: **Jim Force**

PHOTOGRAPHY: **Amy Voigt**

Kevin Zebrowski is passionate about making things better. Over his career with the Northeast Ohio Regional Sewer District, he has focused on improving the wastewater infrastructure, encouraging his employees, communicating with customers and safeguarding the environment, especially Lake Erie.

When out of the office, he's devoted to the success of his children. "I try to make sure that everything we're doing is for the greater good," says Zebrowski, recently named superintendent of Maintenance Services at the district. "It's what I do."

His attitude and achievements haven't gone unnoticed. He received the Ohio Water Environment Association's William D. Hatfield Award in 2017. It was an honor richly deserved, according to Debbie Houdeshell, water reclamation facilities engineer with the City of Canton, Ohio, who nominated him.

"Kevin continually works on improving the situation, whether with employee morale or the process," she says. "He strives for excellence, and I respect that in him. He truly cares about people and what his team is achieving."

EARLY INTEREST

Zebrowski's passion for clean water began when he majored in environmental policy and analysis at Bowling Green State University. His degree had an emphasis in water-quality management and covered the political science aspect of clean water. After graduating, he worked as an industrial pretreatment operator in the private sector; the assignment gave him perspective that was useful when he joined the district in 2004.



Kevin Zebrowski,
superintendent of
maintenance services,
Northeast Ohio
Regional Sewer District

RIGHT: Zebrowski (left) and Bill Wareham, system utility maintenance technician, at the district's Mary Street Pump Station.

LOWER RIGHT: From left: Tony Reese and Alfred Harrison, field technician operators; David Glisic, sewer system and maintenance operation supervisor; and Zebrowski, with the Cleveland skyline, next to a Vactor 2100 Plus combination sewer cleaner.



There, he took a position inspecting industrial facilities, some of which he had operated in his earlier job. After two years, he moved to the Southerly Wastewater Treatment Center (736 mgd design, 125 mgd average) just outside Cleveland as a unit process manager. He worked in operations and developed an expertise in lift stations, preliminary, primary and secondary treatment.

Next he served as assistant superintendent for operations at the district's Easterly Wastewater Treatment Plant, where he gained experience preparing regulatory reports, budgets, facilities plans and projects, and coordinating maintenance and training. He returned to Southerly in 2011 as assistant superintendent of maintenance and after seven years became superintendent.

MULTIPLE DUTIES

In addition to its three large treatment plants, the district maintains 318 miles of sewer interceptors that accept flow from more than 3,500 miles of local sewers. His team also takes care of 750 regulators to divert or re-divert combined and separated sewers, eight odor-control facilities, 12 pump stations, 10 combined sewer overflow netting facilities (for floatables), and two deep tunnels that can store 76 million and 60 million gallons.

Zebrowski and his team of 87 employees support all these facilities and their operations. Specifically, they are responsible for sewer system maintenance and operation, systems integration, building maintenance, fleet services and administrative services.

Zebrowski says the new position made sense to him because of his years of experience with the district's treatment facilities, buildings and collections systems, as well as regulatory requirements, planning and budgeting. "I appreciated the opportunity to move to Maintenance Services," he says. "It really rounds me out."

With such a wide range of experience and positions, it's not surprising that Zebrowski's management style includes "a lot of walking around." It's his way of getting a feel for what's going on in the department, and it helps make the employee experience better. "As you move up, you can lose touch with what's really happening at the front line," he says. He practices what he calls the Platinum Rule: Treat employees as *they* want to be treated.



Kevin Zebrowski, Northeast Ohio Regional Sewer District

POSITION:
Superintendent of Maintenance Services, Cleveland

EXPERIENCE:
21 years in the industry

RESPONSIBILITIES:
Oversee five Maintenance Services departments

EDUCATION:
Bachelor's degree, environmental policy and analysis, Bowling Green State University; MBA, University of Phoenix

CERTIFICATION:
Class IV Wastewater

AWARDS:
2017 William D. Hatfield Award, Ohio Water Environment Association

GOALS:
Enhance Maintenance Services; create a cohesive team atmosphere; "keep Cleveland's Great Lake great"





Kevin Zebrowski received the Ohio Water Environment Association's William D. Hatfield Award in 2017.

SUCCESS ON THE COURT

Kevin Zebrowski played three sports at West Geauga High School, including basketball. So when his three daughters wanted to play hoops in grade school, he took an interest. And, as in every other area in his life, he worked to improve the situation.

At the time, 11 years ago, there was no girls' program. So he worked to get one started and ended up serving on the board of directors of the West Geauga Women's Traveling Program for nine years. Working on the association took time and effort, but in the end, he got to watch his girls learn the game and evolve into some pretty good players.

"My oldest girl didn't get to play her senior year because of a knee injury from soccer," he says. But his middle daughter started on the high school varsity team as a freshman last year. His youngest daughter, a freshman this year, also has a good shot at making the varsity.

"It was energizing," Zebrowski says. "It got the kids off the phone and doing something athletic." While he's no longer on the board, the association he helped start is going strong.

Zebrowski notes that operators generally take to new technology. "That's a positive thing. It provides them more opportunity to monitor equipment and processes." But he also sees another challenge inherent in the technical workplace: "We risk a loss of manual skills in our field, like troubleshooting."

As he explains it, when technology fails, it's still essential to maintain the human senses of hearing, touch, sight and smell — to be able to determine when a pump is running harder or warmer or something doesn't smell right. "Technology is good for real-time data and response, but we need to maintain the manual operational skill sets," he says. "We don't want to lose those skills as we leverage technology."

He credits the Ohio Water Environment Association, the Operator Training Committee of Ohio, and the district's wastewater plant operator-in-training apprentice program for helping maintain the hands-on skills, but he notes that the issue becomes more and more critical as tenured employees retire.

"They have a lot of knowledge," he says. "They might know exactly where a specific valve is, even though we only use that valve once a year." He has tried to obtain as much knowledge as he can before it "gets lost in the shuffle" as employees approach retirement. He encourages others to do the same.

Specifically, the district uses tablets and GIS technology to capture knowledge before it is lost, especially in the collections system: "The district has a lot of assets. We are implementing an operational readiness program, making sure we have standard operating procedures for common practices across all our facilities. We make sure they are updated and correct and are available anytime. If you've got veterans retiring, grab as much knowledge as you can, and get it documented."

IMPROVING OUTREACH

Another way to make things better is to connect with customers, Zebrowski believes. He is a big advocate of public outreach. "We cover 355 square miles

“As a manager, you're continuously learning. New developments. New ways to refine or enhance processes. In the long term, you want to keep your staff current. They're the next level of leadership in the organization.”

KEVIN ZEBROWSKI

"I try to be available to the staff," Zebrowski says. "I try to lead by example, and I don't expect anyone to do what I wouldn't do. I have high expectations for them, and they have high expectations for me. I get out into the field to be side by side with the staff when I can. I'm part of the team. We're all in this together.

"As a manager, you're continuously learning. New developments. New ways to refine or enhance processes. In the long term, you want to keep your staff current. They're the next level of leadership in the organization. The day you think you know it all, that's the day you should retire."

HARD AND SOFT TECHNOLOGY

Zebrowski believes technology has improved wastewater treatment, but he doesn't give up on the human component: "We're now able to leverage technology to enable us to address issues more quickly. We have access to real-time data. We've reduced our response time to overflows and alarms and minimized the pollutants we release into our lakes and rivers."

and serve a million residents in Cleveland and 61 suburbs,” he says. “We need to let our ratepayers know what we’re doing and why we’re doing it, especially as federal funding has disappeared and water and sewer rates are going up. They need to know what their money is being used for.”

During his years at the Southerly treatment center, he helped host about 30 tours a year, as well as an annual open house in September that showcased all departments and activities: engineering, operations and maintenance, construction, watershed management. “We’ve had as many as 3,000 people go through the plant to see the lab and the treatment processes. I remember one elderly gentleman who remarked the water was so clean we probably weren’t charging enough for it.”

While the district follows conventional outreach methods like attending community meetings and working with stakeholders and local universities, it does the unconventional, too. Bike rides, for example.

“The district has reached out to local bikers and bike clubs and sponsored bike tours of the treatment facilities,” Zebrowski says. “We held two last year and three this year. We divide the group into about 20 bikers, and we tour the entire plant. It’s a 5.2-mile bike ride, and it gets pretty intensive. We stop at 11 points and describe the treatment processes. They really get to see stuff — the thickeners, the outfall. It takes about an hour and 45 minutes.”

INDUSTRY PERCEPTIONS

Perhaps as a result of such outreach, the public perception of the clean-water industry and its professionals is getting better, Zebrowski feels. Where once wastewater might have been perceived as a dirty job, growth in technology, education and the importance of clean water have changed that, he says.

“There’s a lot we can still do in our industry, but it is now seen as a profession; a good profession with viable positions that make great careers. We have a lot of good momentum.”

KEVIN ZEBROWSKI

“There’s a lot we can still do in our industry, but it is now seen as a profession; a good profession with viable positions that make great careers. We have a lot of good momentum. Our roles are highly respected today and extend to the wider community. In my position, I have a greater impact on the quality of the water for the people in our area and those who visit the region.”

WELCOME RECOGNITION

The William D. Hatfield Award is presented for outstanding performance and professionalism, especially in operational improvement, public relations and dissemination of information about advancements in the field. Nominator Houdeshell says she can’t think of anyone more deserving.

“Kevin is a great individual and terrific operator,” she says. “He treats all employees with respect, and he expects the same. He cares about all parts of

the process and treatment plant, not just his area. You see the professionalism in everything he does.”

Zebrowski says the award surprised him: “I feel I am just doing the best I can every day for my customers and for the environment.” In other words, just making things better. **tpo**

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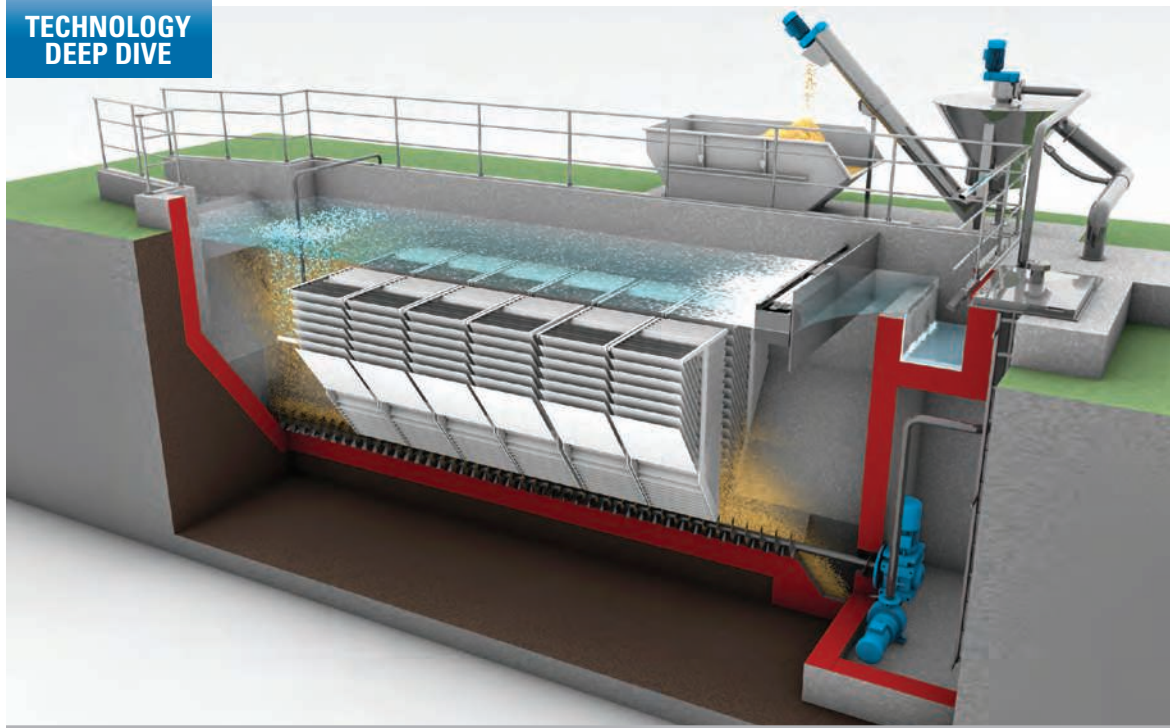
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The Grit Trap GritWolf system has an aerated chamber where FOG is collected and a separate un-aerated chamber that traps grit by way of a lamella separator.

Two Jobs in One Package

GRITWOLF TECHNOLOGY IS DESIGNED TO ENABLE EFFICIENT CAPTURE OF SMALL GRIT PARTICLES WHILE ALSO REMOVING FOG FROM THE WASTEWATER STREAM

By Ted J. Rulseh

Grit passing through wastewater treatment plant headworks can cause substantial damage to equipment downstream, wearing out pumps and accumulating in downstream basins. Over the years, engineers and product manufacturers have tried different approaches to removal, with varying degrees of efficiency.

Capturing grit has been largely an exercise in slowing down the flow, changing flow patterns, creating obstacles to grit particles' progress and various combinations of these. Now HUBER Technology has introduced a high-efficiency grit removal system that also helps take FOG out of the wastewater stream.

The Grit Trap GritWolf system has an aerated chamber where FOG is collected. A separate un-aerated chamber traps grit by way of a lamella separator that uses a multitude of settling surfaces for maximum removal efficiency. It can remove 95 percent of grit grains 75 microns and larger, although the actual removal efficiency depends on the flow rate and the treatment plant's objectives.

The system is available in different sizes for flow rates from 1 to 20 mgd and is designed to require significantly less space than conventional grit-removal systems. Gary Wesselschmidt, central regional sales director, and Sandra Schuler, team leader for mechanical treatment, talked about the technology in an interview with *Treatment Plant Operator*.

tpo: What market need led to the development of this technology?

Wesselschmidt: The traditional approach to remove grit was to put in a wide channel to slow down the flow so that the grit would settle. Vortex

grit removal has been popular for about the past 40 years. Stacked tray separators emerged about 10 years ago. The GritWolf system is designed to address the removal of fine particles from the waste stream independent of flow variation and to do that with a very little energy requirement.

tpo: How would you describe the basic design of the system?

Wesselschmidt: The GritWolf is basically a grit settling tank that is aerated in the first stage to remove grease, and a second stage that incorpo-

“The GritWolf system is designed to address the removal of fine particles from the waste stream independent of flow variation and to do that with a very little energy requirement.”

GARY WESSELSCHMIDT

rates stacked parallel plates, or lamellas. The wastewater enters the unit and in the process of flowing to the outlet weir, the grit comes in contact with those parallel plates and settles. So in a smaller-size tank, with the addition of the parallel plates, we are enhancing the surface settling area.

tpo: What is the importance of capturing grease as part of a grit-removal system?

Wesselschmidt: Feedback we received from the consultants and operators is that FOG negatively affects the performance of systems that use stack

or parallel plates. They thought it would be beneficial to have grease removal as part of the device, first to protect the parallel plates and second to keep FOG from accumulating in the primary clarifiers and other downstream equipment.

tpo: How does the grease removal step of the process work?

Wesselschmidt: The flow first enters a zone where we introduce fine-bubble air that floats the FOG to the surface. A skimmer system that consists of a cable-driven paddle then skims the material into a pit, from which it can be pumped to a digester or a dump container.

tpo: How does the grit removal side of the process operate?

Wesselschmidt: At the inlet, a baffle directs the flow and grit downward and gets the grit moving toward the bottom of the tank to enhance settling. In the second zone of the process, the grit crossflows through the parallel plates, making it very difficult for grit particles to find their way to the overflow without settling. Once the grit contacts the parallel plates, settling is enhanced. The grit settles to the bottom of the tank, where a time-controlled horizontal screw conveyor moves it to a pit that can be pumped out on a timed basis to a grit washer. At the end of the process there is an overflow weir where the flow leaves the system.

tpo: How would you characterize the efficiency of this system in terms of percent of grit particles removed?

Schuler: The big target is 95 percent removal of particles 75 microns and larger, but this needs to be seen in the context of the design flow range and the target grit removal rate.

Wesselschmidt: We're basically asking the customer: What are the particle sizes you want to remove? And what is your flow rate? The combina-

“The big target is 95 percent removal of particles 75 microns and larger, but this needs to be seen in the context of the design flow range and the target grit removal rate.”

SANDRA SCHULER

tion of those two factors will determine the settling surface needed. We have single-sided and double-sided configurations.

tpo: How does this system compare with other alternatives in footprint and cost?

Wesselschmidt: The width of the unit is 10 feet, and the deepest unit is only 10 feet deep.

Therefore from a construction standpoint, it will cost less to construct. It costs less to dig a shallower hole than a deeper hole. The deeper you go, the more likely you are to encounter bedrock or the water table and have to pump out the excavation. So the shallower the installation, the lower the cost to build.

tpo: What has been done to prove this technology?

Schuler: Our designers first did flow studies and then built a 1 mgd unit for pilot testing. The first pilot test was performed close to our headquarters in Germany, using different test sands to determine how much of each fraction was removed. After that, we shipped the unit to the U.S. It is now set up on South Padre Island (Texas) at the wastewater treatment plant of the Laguna Madre Water District. This product is not completely new technology, but the combination of processes is new: a crossflow lamellar separator, a screw conveyor, the combined aerated and unaerated settling zones, and a system to remove FOG. **tpo**

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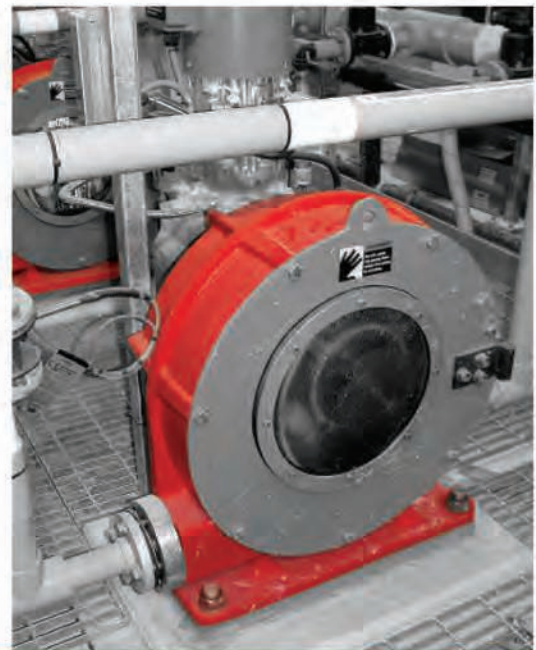
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In Love With the Career

HATFIELD AWARD WINNER STEVE WILLIAMS OVERSEES A MAJOR TREATMENT PLANT UPGRADE WHILE LOOKING TO A FUTURE OF WATER REUSE FOR HIS UTAH UTILITY DISTRICT

STORY: **Ted J. Rulseh**

PHOTOGRAPHY: **Sallie Shatz**

When Steve Williams went to work for the Magna Water and Sewer District in 1977, it was “just a job.” Not anymore.

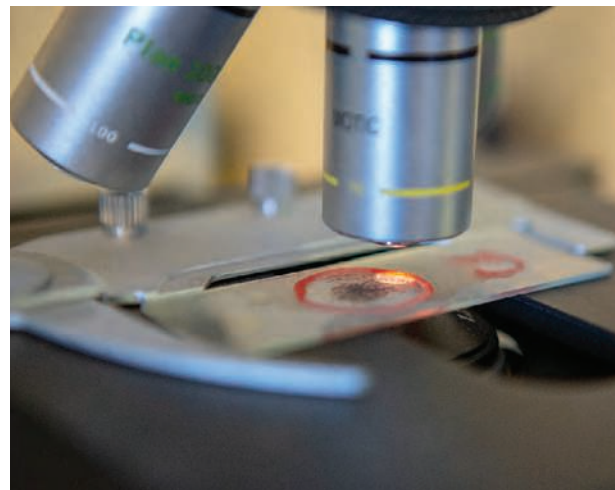
“It became a career for me,” says Williams, winner of a 2017 William D. Hatfield Award from the Water Environment Association of Utah. “I really got into the work, and I could not believe the technology. Here we are, taking this dirty water and turning it into a material that can be developed into fertilizer and clean water that we can reuse.”

And speaking of reuse, Williams aspires to build a system to produce and distribute tertiary effluent for irrigation around the district. That comes after completion of a \$22 million wastewater treatment plant upgrade, which started construction last fall.

For his success, Williams credits his team members — award winners in their own right. “I’m really proud of our team,” he says. “Just about all of them have been named Operator of the Year. Two years in a row now we’ve had the top collections system operator for facilities treating under 5 mgd. We’ve got a very nice plant here. It does a great job.”

ALL-INCLUSIVE

The Magna district serves a population of about 32,000 at the base of the Oquirrh Mountains west of Salt Lake City and next to the world’s largest open-pit copper mine, now owned by Rio Tinto. The district provides drinking water, wastewater treatment and irrigation

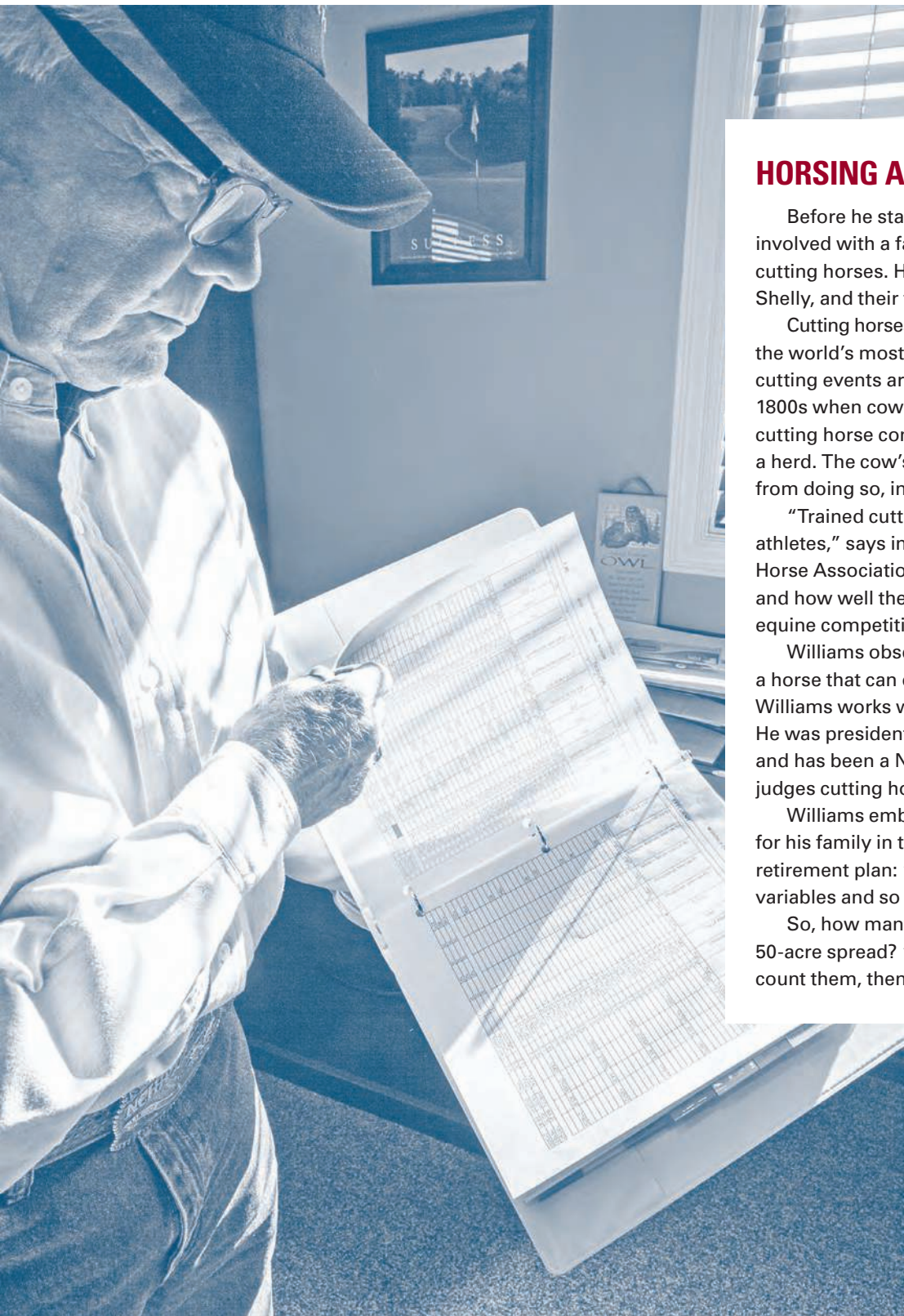


Investing in a microscope and the training to use it proved to be a big advancement for Steve Williams and his team.

water delivered from reservoirs. Williams has been wastewater operations manager for the past 15 years, responsible for collections and treatment.

The wastewater treatment plant was built in 1962 as a digester and trickling filter facility. A 1987 upgrade converted it to an oxidation ditch (Smith & Loveless) with a design capacity of 3.3 mgd. A later expansion boosted the design flow to 4.0 mgd; average flow is now 2.8 mgd.

The facility has a bar screen and a fine screen (HUBER Technology) at the headworks, along with a PISTA Grit system (Smith & Loveless).



HORSING AROUND

Before he started his wastewater career, Steve Williams was involved with a family ranch — raising, training and showing cutting horses. He’s still active in that endeavor with his wife, Shelly, and their five children.

Cutting horses take part in contests in what has long been among the world’s most popular equine sports; each year thousands of cutting events are held worldwide. The sport harks back to the 1800s when cowboys used their best horses for cutting. In today’s cutting horse contests, a rider selects and separates one cow from a herd. The cow’s instinct is to return to the herd; the horse keeps it from doing so, independent of any direction from the rider.

“Trained cutting horses are incredibly intelligent and instinctive athletes,” says information on the website of the National Cutting Horse Association. “The competition is judged based on difficulty and how well the horse anticipates and reacts. This is the only equine competition where the horse is required to think.”

Williams observes, “It’s quite an addicting sport when you ride a horse that can do that. I’ve been doing it for a lot of years.” Williams works with the horses after work hours and on weekends. He was president of the local cutting horse association for 10 years and has been a National Cutting Horse Association director; he still judges cutting horse shows. His wife is an announcer at shows.

Williams embarked on his wastewater career to gain stability for his family in the form of a reliable income, insurance and a retirement plan: “In any livestock industry, you have so many variables and so many things can happen.”

So, how many horses do he and his family have on their 50-acre spread? “We have about 30 or 40 horses. If you have to count them, then you don’t really have that many.”

Steve Williams, operations manager at the Magna Water and Sewer District wastewater treatment plant, looks over forms he uses to deliver permit compliance reports.

Biosolids from the oxidation ditch are dosed with polymer and delivered directly to a pair of Model RoS3 inclined screw presses (also HUBER Technology) that increase the solids content from 1 to 15 percent. The material is then trucked to a contractor site for composting and ultimately for sale.

The current upgrade will replace old brush aerators with surface-mounted aerators supplied by Aeration Industries International. “We hope this new equipment,

Steve Williams, Magna (Utah) Water and Sewer District

POSITION:
Wastewater operations manager

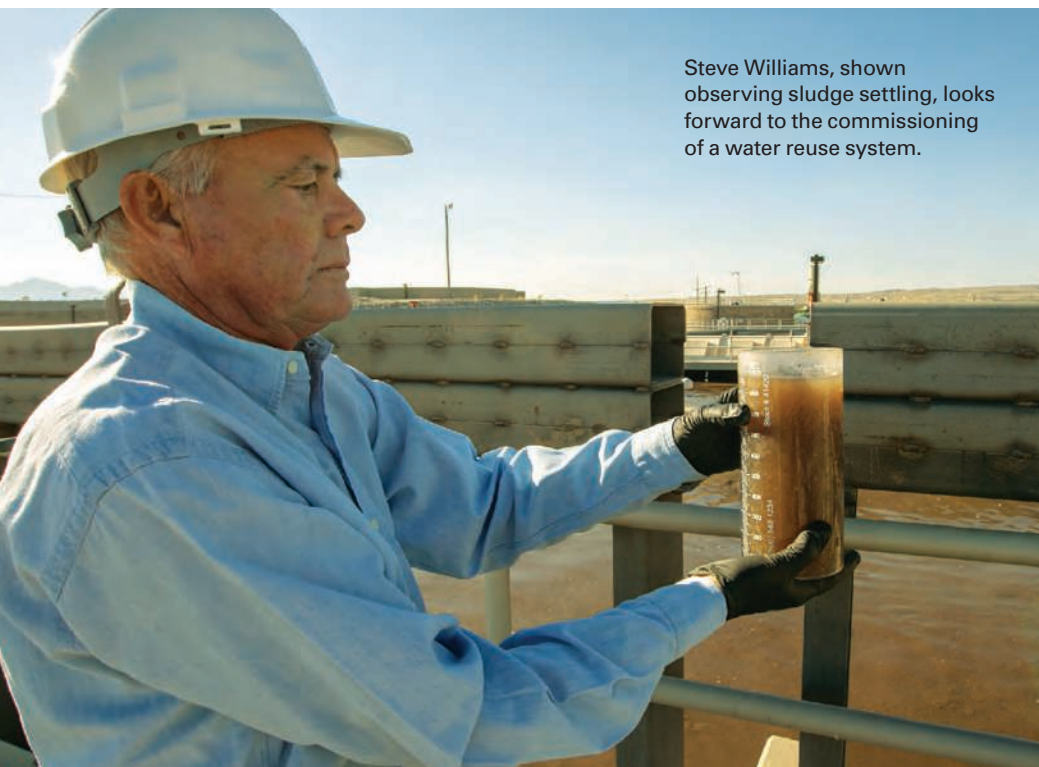
EXPERIENCE:
41 years, all with the Magna district

LICENSING:
Grade 4 (highest) wastewater operator

AWARDS:
2017 William D. Hatfield Award, Water Environment Association of Utah

GOALS:
Complete a major facility upgrade; add a water reuse system for irrigation





Steve Williams, shown observing sludge settling, looks forward to the commissioning of a water reuse system.

desire. As the older people retired, you'd move up the ladder. So my time finally came. Certain people are meant to lead, and other people are better off under leadership. You have to have great workers."

His approach to leadership is straightforward: "You need to give everyone a chance. We talk about our goals, and then I let our lead operators lead the team. We talk about what we're going to do and how we're going to do it, and then I give them the reins. I don't micromanage them at all. We do it together. That's why our lead operators have been so successful winning awards. Both our treatment and collections crews have just shined."

Their excellence had been recognized by the Water Environment Association of Utah. In 2016, Raymond Mondragon, collections lead, received an Outstanding Collections Operator Award, and Tony Peterson, wastewater lead, received an Outstanding Water Reclamation Operator Award. In 2017, Rob Jaterka, collections operator, received an Outstanding Collection Operator Award. The Magna team also includes Beau Lamper, Ed Tucker and Scott Beck, plant operators; and Clint Giles and Dallas Henline, collections operators.

SPOTLESS RECORD

That team is responsible for the facility's permit compliance record. "We have never, ever had an issue," Williams says. "We have a total clean record with the state and the EPA. We're careful with everything. We make sure we're doing it right."

"We sample our system three days a week. Everybody takes part in the process. I may be the chief but I've got all these team members out there working. They'll come to me if they have a problem, but they know how to take charge. They all can make decisions. They've all got Grade 4 certifications. They know the process. We try to fine-tune our plant. We're always working at making it better."

One of the biggest advances came just a few years ago when the plant acquired a microscope and invested in training the team to use it effectively. "We take samples almost every day and see how the bugs are doing," Williams says. "It's all about how happy the bugs are. They've got to have food



The Magna Water and Sewer District plant.

combined with our upgraded SCADA system, will provide a brain to guide the feeding of air to our system," Williams says.

The upgrade will also include phosphorus removal by addition of alum to the secondary effluent, a process designed by Carollo Engineers to meet a new state permit requirement of 1.0 mg/L total effluent phosphorus. In addition, the emergency generators and the entire electrical system will be replaced.

UP THE RANKS

To oversee it all, there's Williams, who spent his first 10 years with the district as a second-shift operator. After the 1987 upgrade, the second shift was eliminated and Williams moved to days. He became a lead operator in 1993 and stepped up to his current role in 2009.

"In the beginning, just about everybody at Magna would work up the chain," Williams recalls. "Of course you had to have the certifications to do that, and the



The team at the Magna district wastewater treatment plant includes, from left, Steve Williams, wastewater operations manager; Raymond Mondragon, collections lead; Clint Giles and Rob Jaterka, collections operators; Ed Tucker, wastewater operator; Tony Peterson, wastewater lead; and Beau Lamper and Dallas Henline, wastewater operators.

(continued)



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and air. You keep the bugs healthy and happy, you've got a great plant. There is a fine line between a great plant and a mediocre plant. A mediocre plant can still run for a long time, but if you're going to have it be great, you have to be able to fine-tune it.

"Before we had the microscope, we had to depend on our outside lab. We would provide the samples, and it was a long process before somebody looked at them and got back to us. Now we can see what's going on with those bugs daily. That has been a huge thing."

THE NEXT BIG STEP

With the treatment upgrade underway, Williams is looking toward effluent reuse. That will mean adding sand filtration after the secondary clarifiers, building out the distribution system and adding pumps for delivery.

Already the plant effluent is used on site for in-plant washing and grounds irrigation, saving about 100,000 gpd of potable water. Irrigation water is also delivered from reservoirs to some customers, but that supply is seasonal and has issues with algae blooms. "Our effluent would be much cleaner and much better as irrigation water for golf courses, schools, churches and our residents," Williams says.

The wastewater collections system flows entirely by gravity to the treatment plant. On the flip side, delivering reuse water will mean pumping the tertiary effluent up the mountainsides to the reservoirs. A share of the distribution system is already in place, since for the past 10 years the district has required all new developments to install piping for irrigation water. The district itself has laid sections of piping in conjunction with other projects when possible.

Williams envisions the reuse system greatly reducing demand for potable water, much of which is now used for irrigation. Given the community's growth, the reuse system could delay expansion of the potable water system for as long as 20 years.

The district has applied for a \$5 million-dollar grant from the federal Bureau of Reclamation to help cover the estimated \$10 million cost of the reuse system. "I think we'll proceed whether we get the grant or not, but the grant would certainly help a lot," Williams says. "I'm really hoping we can do it in the next three to five years."

BUILDING THE TEAM

Meanwhile, Williams continues to encourage close teamwork. One catalyst for that has been the Water Environment Federation's Operations Challenge. About a dozen years ago, Williams attended a state-level wastewater conference with three district trustees. There they watched Operations Challenge competitions.

"The trustees were just amazed," Williams says. "They said, 'Our guys are this good. Can't we do this?' I said, 'Absolutely.'" The district assembled a team, named Magna Flow, and enabled its members to devote time for practice.

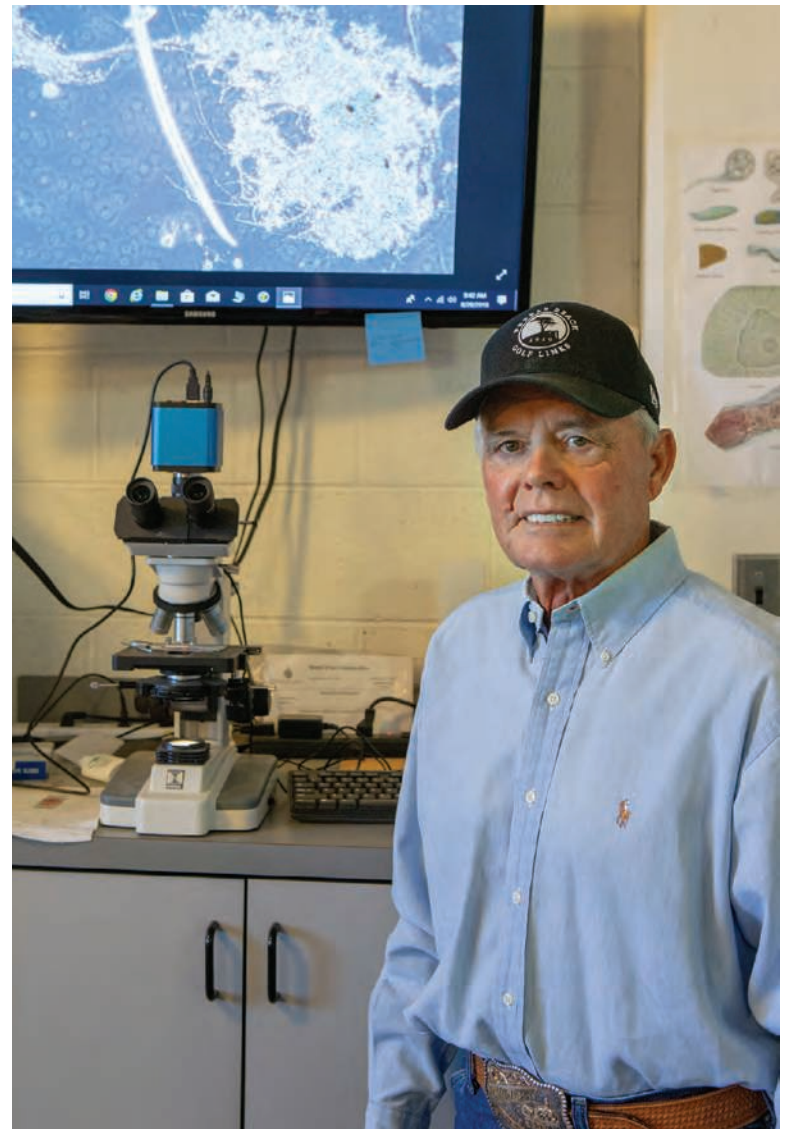
"Our people have done fantastic," Williams says. "It has turned everybody around. The camaraderie we have developed with this challenge has been outstanding." Members of the Magna Flow team have gone on to the national Operations Challenge at WEFTEC as part of a Utah team called the Wasatch All-Stars.

In 2012, Beau Lamper, wastewater operator, was a member of a Wasatch team that placed third in the collections event and fifth overall. In 2015, a collections operator was on a team that finished second in maintenance and 10th overall. In 2017, Clint Giles, collections operator; Ed Tucker, wastewater operator; and the Wasatch team place second in maintenance and 17th overall.

Reflecting on his career, Williams takes special pride in his team and facilities: "We've got a beautiful plant here. We've got it landscaped, and we

“A mediocre plant can still run for a long time, but if you're going to have it be great, you have to be able to fine-tune it.”

STEVE WILLIAMS



Williams still loves coming to work and the challenges of a career in wastewater. He takes great pride in his team and the facilities.

use our reuse water to keep it that way. We keep our operation clean and pretty. Everybody looks great. Our grounds are manicured. Our trucks are all washed. We keep everything painted and cleaned up.

"After all these years, I still love my job. I like coming to work. People say, 'Gosh, you're probably thinking about retiring.' Not me. I have no thought of retiring. At home I've got plenty to do to keep me occupied, but I still love coming to work. Wastewater is a big part of my life. I've traveled all over the country and have seen so much at many different plants. My wife, Shelly, and I always go to WEFTEC.

"I've had great support from my family, and I've had the support of my team here, too. I support them, and they support me. It's been a fantastic combination." tpo

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A DECORATIVE FENCE AT THE WATER TREATMENT PLANT IN BELLINGHAM SUCCESSFULLY MARRIES WATER SOURCE PROTECTION WITH ARTISTIC BEAUTY

By Jeff Smith

Thanks to a new 300-foot security fence at the Bellingham (Washington) Water Treatment Plant, walking-trail users at a popular community park no longer have to enter the plant grounds just to continue on their way. They can view some nifty artwork, too.

“Before the new fence and gate were relocated, people using the trail would divert on the road leading into the plant then pick up the trail again,” says Bill Evans, chief operator. “Now a new connector lets them continue on the trail in the park uninterrupted.”

It’s not just any old fence; it’s an artistic security fence designed and fabricated by Ries Niemi, a local industrial artist. Thirty panels, each 7 feet tall by 8 feet wide, repeat seven designs featuring ocean waves, a water splash, a running water faucet, symbols for molecules and Mount Baker, a watershed contributor.

POPULAR PARK

Fabricated from hot-dipped galvanized milled steel plate, the welded and flame-cut panels contrast and stand out against the greenery along the trail. Pointy raindrop-shaped hot-dipped galvanized steel toppers substitute for barbed wire.

“We moved the front gate toward Whatcom Falls Park and extended the fence to its parking lot so people can’t access the road into the plant, but will be able to stay on the trail,” Evans says. “That’s where the artwork is.”

Whatcom Falls Park is a 241-acre wooded area described as one of the state’s most beautiful parks. Nearly 4 miles of gravel-surface trails meander among four sets of waterfalls, several ponds and gardens, athletic fields,

and playground and picnic areas. A fish hatchery site in the park contains a screen house that pre-filters all the water flowing to the treatment plant. A sandstone bridge built during the 1930s Depression is a park landmark.

“The fence is protecting a water source, so we didn’t want to sacrifice on safety or aesthetics,” Evans says. “Marrying those two things was critical.”

“The fence is protecting a water source, so we didn’t want to sacrifice on safety or aesthetics. Marrying those two things was critical.”

“The fence is protecting a water source, so we didn’t want to sacrifice on safety or aesthetics. Marrying those two things was critical.”

BILL EVANS

NATIONWIDE COMPETITION

The call for artists stated that the goal of the project was to create an area of interest between the water plant and the trail by enhancing the aesthetics of the fence and gate. “It certainly has met that goal,” says Shannon Taysi, the program specialist for the Bellingham Planning and Community Development Department who managed the selection and fabrication process.

The fence and gate were relocated as part of a \$13 million project to install a dissolved air flotation system (Leopold - a Xylem Brand) for pre-treatment. Organics in the summer months had become a problem, espe-

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cially during drought. Financing for the fence and gate was provided through an ordinance that assigns 1 percent of an eligible capital project's cost to integrate artwork.

Niemi's design was selected from among 30 responses to the nationwide call for artists. "We got responses from all over the county,"

Taysi says. A five-member selection committee reviewed the concepts and selected four finalists. The committee included the president of the Whatcom Falls Neighborhood Association, a city council member, another public artist, the curator of a museum and a local sculptor. Evans and Taysi provided staff input to ensure that the artwork chosen would meet the city's goals.

The pros and cons of the finalists' models and mock-ups were reviewed for key elements, such as aesthetics and safety. The artist's ability to perform the work was a key consideration. Taysi says the committee thought Niemi's concept was different — a delicate abstract work, yet practical with its individual panel design.

"I really like the security aspect of the fence that complements our other security efforts," Evans says. "And it looks good." **tpo**

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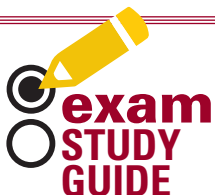
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Sustainability Runs Deep

EXTENSIVE WATER RECYCLING, A DIVERSE ENERGY SUPPLY WITH RENEWABLES AND CLEAR COMMUNICATION OF A SUSTAINABILITY VISION SET SCOTTSDALE WATER APART

By Steve Lund

The portfolio of sustainable practices at Scottsdale (Arizona) Water is wide and deep.

The utility received a 2018 Sustainable Water Utility Management Award from the Association of Metropolitan Water Agencies and a 2017 Public Education Program of the Year award from the WaterReuse Association for its Citizen Water Academy.

Scottsdale Water, serving a suburb of Phoenix, was also an inaugural winner of the Utility of the Future Today Award in 2016 from a consortium of water agencies. The utility has diversified its water and power sources and is an innovator in community partnerships to use reclaimed water for irrigation. It has practiced indirect potable reuse for 20 years and is helping to develop direct potable reuse.

“We are not an organization that rests on its laurels,” says Brian Biesemeyer, P.E., executive director. “We continue to improve. We pride ourselves on our vision: water sustainability through stewardship, innovation and people.”

MAKING THE VISION REAL

That vision statement, adopted in 2013, is constantly communicated to customers and employees. It is printed on customer notifications, business



Brian Biesemeyer, P.E., executive director of Scottsdale Water, says his agency is “not an organization that rests on its laurels.”



Scottsdale’s 20 mgd advanced water treatment includes this reverse osmosis system.

cards, presentations, letterheads, display boards and handouts. It is even painted on the side of all of the utility’s vehicles.

Last year the utility marked the 20th anniversary of the Scottsdale Water Campus, a 145-acre facility that includes a 70 mgd water treatment plant, a 20 mgd water reclamation plant and a 20 mgd advanced water treatment (AWT) plant that uses microfiltration, reverse osmosis, ozonation and UV disinfection to produce water better than drinking water standards require.

During lower-demand times of the year, Scottsdale Water recharges the aquifer with the effluent from the AWT plant. The potable water is injected into 63 wells on the Water Campus, where it trickles to the aquifer, 400-500 feet underground. “You get a secondary filtration effect by putting it back this way,” Biesemeyer says. “The indirect connection is the several hundred feet of soil the water filters through before it reaches the aquifer.”

ADDING IRRIGATION

Originally, all of the AWT water was used for aquifer recharge, but the plant was expanded from 12 to 20 mgd, to provide irrigation water for golf courses. Those courses, big factors in Scottsdale’s economy, have been partners with the utility in a Reclaimed Water Distribution System (RWDS) since the early 1990s.

The golf courses invested millions in a distribution system that originally brought them raw water from the Central Arizona Project canal. When the water reclamation plant came online in 1998, the RWDS mixed raw water

(continued)

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with reclaimed water, but over time, the golf courses became concerned that salt from the raw and reclaimed water would affect their turf.

The solution was to dilute the irrigation water with the nearly salt-free effluent from the AWT plant. The 23 golf courses that are members of the RWDS paid to expand the AWT so they could irrigation water of the quality they wanted. In winter, when irrigation demand is lower, the additional capacity of the AWT means more water for aquifer recharge.

The aquifer used to be the utility's primary water source, but now most water comes from two surface water projects: the Central Arizona Project, which draws from the Colorado River, and the Salt River Project, which draws water from the Salt and Verde rivers. Recycled water for irrigation makes up about 12 percent of the water supply.



A decorative fountain structure is a prominent feature of the Scottsdale Water Campus.

“We are not an organization that rests on its laurels. We continue to improve. We pride ourselves on our vision: water sustainability through stewardship, innovation and people.”

BRIAN BIESEMEYER, P.E.

Each year, Scottsdale Water returns about 1.7 billion gallons to the aquifer, more than it takes out, and has qualified as a safe yield utility since 2006. The entire Phoenix area is expected to reach safe yield by 2025.

DIRECT REUSE DEMO

Although Scottsdale Water has the technology for direct potable reuse, Biesemeyer doesn't see that as a viable option for the community. “In the Phoenix area, we are blessed with a huge aquifer underneath us,” he says. “As long as we have that aquifer, it makes sense for us to recharge, because it's a huge storage tank. We could never build a tank as big as that aquifer.”

However, the utility is working with the Arizona Department of Environmental Quality to develop permitting guidelines for regulating direct potable reuse and to get a permit for a direct reuse demonstration project.

“We certainly have the history with the 20 years of running this operation to be the one place in Arizona that could easily do this demonstration project,” Biesemeyer says. “We hope it will give the DEQ a road map to give to other people on how to go to direct potable reuse.”

Biesemeyer hopes to get the permit for the demonstration project sometime this year. For Scottsdale Water, the project will allow small direct potable uses to help the utility communicate important points about water quality.

“We like the ability to have this water for people to taste when they go through the plant, to show them that it is drinkable quality water,” Biesemeyer says. “We are also working with some local breweries to see if we can get some beer made from it to publicize that you can make recycled water to any quality you want. Water should be judged on its quality, not its history. We like to make that point. Working with breweries makes it fun.”

POWER DIVERSIFICATION

On the energy side, Scottsdale Water applied in 2014 for an allocation of low-cost renewable hydropower from the Hoover Dam and received the second largest municipal allocation in Arizona. The 50-year contract for hydropower represents about 3.7 percent of the water utility's annual energy use. That power became available in October 2018.

In another energy diversification strategy, the utility put out requests for proposals for a solar energy installation at the Scottsdale Water Campus. The solar array, to be developed by SolarCity, is expected to provide 10 percent of the energy demand at the campus. The project, which should be under construction in 2019, includes battery storage.

“I love the concept of cleaning water with the power of the sun,” Biesemeyer says. “We're excited about it because, with the batteries, it will be able to provide us energy at times that typically a solar array couldn't. We need to be able to meet energy demand peaks when they occur. By having those battery units, the solar panels can work and charge batteries, so when the sun goes down we can still pull electricity from the system.”

The developer will build and own the system and will provide power to the water utility through a power purchase agreement.

WATER ACADEMY

Scottsdale Water also communicates its vision through a twice-a-year Citizens Water Academy. “We give people about a three-hour block of time every Wednesday night for weeks. We introduce them to all the things we do at Scottsdale Water. It's been amazingly popular. We typically have hundreds of people applying for the 30 slots every time we offer the academy.”

To attract younger operators to the industry, the utility offers apprenticeships for water treatment, wastewater treatment operators, SCADA operators and instrument control technicians. Typically four apprentices are at work at a time, one in each area. The programs take two years, and the apprentices come out as Grade 2 operators. The utility also promotes careers in the water treatment industry by going to high school job fairs.

Scottsdale Water may have a lot of recognition recently for its sustainable practices, but the practices and the vision were in place long before the awards arrived. Biesemeyer says, “I think we've been practicing sustainability all along.” tpo

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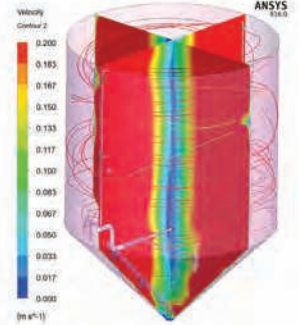
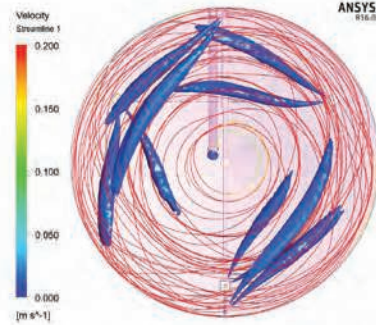
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Water All-Star

'CALM AND COLLECTED' ANDY HICKMAN HELPS A RURAL NEVADA WATER TREATMENT PLANT PRODUCE A DECADE OF VIOLATION-FREE OPERATION WHILE BUILDING AN AWARD-WINNING CAREER

STORY: **Jack Powell** | PHOTOGRAPHY: **Marcello Rostagni**



Andy Hickman, district manager,
Round Hill General Improvement District

“Knowing that we ... produce a product that sustains life at a level that keeps people, plants and animals healthy keeps me coming to work every day.”

ANDY HICKMAN

Quick: What's a synonym for “professional”? For those who live and work in the Round Hill General Improvement District near Lake Tahoe in Nevada, the answer is a snap: Andrew “Andy” Hickman.

Recently promoted to district manager after serving as chief operator at the Jeffrey Timmens Water Treatment Facility, baseball-loving Hickman has reliably delivered safe, clean drinking water to the 470 residential and 50 commercial customers in tiny Zephyr Cove (population 565), on the southeast shore of Lake Tahoe, about 60 miles south of Reno. He managed the plant with the focus of a true pro — think Los Angeles Dodgers ace Clayton Kershaw — earning him MVP status among co-workers and industry peers.

PRAISE AND AWARDS

Before retiring, Hickman's predecessor as district manager, John Fassmann, called him “reliable.” Josh Bisset, water operator, says his 48-year-old supervisor is “precise,” and Patti Page, veteran administrative assistant, labels him “unflappable.” Those are all apt descriptions of Hickman, a California native who holds Level 3 water treatment and Level 3 water distribution certifications.

In March 2018, the Nevada Rural Water Association presented Hickman with its Butch Smith Drinking Water Operator of the Year Award for Extraordinary Service and Dedication. The award is named in honor of long-time operator Frank Gordon “Butch” Smith.

Clearly moved by what he calls an “unexpected honor,” Hickman says, “I get great satisfaction providing clean water to our customers. Three years ago, Douglas County came in third in the Best Tasting Water contest put on by the NRWA, and that felt really good. But knowing that we haven't had any state or federal violation what-



Andy Hickman (center) holds a training session for Josh Bisset (left) and Adam Day, water operators, on the handheld Itron FC300 mobile meter data collection system.

soever in over 10 years and produce a product that sustains life at a level that keeps people, plants and animals healthy keeps me coming to work every day.”

CAREER FULL OF TWISTS

Like many major leaguers, Hickman has had plenty of curves and change-ups in his career. After graduating from Paramount High School near Long Beach, California, Hickman started at Cerritos Community College based in Norwalk, then moved to Long Beach State University, where he majored in business.

Hickman resumed his studies “as a more mature adult” at California Coast University in Santa Ana. Though he didn’t finish, preferring to play baseball and serve as a paramedic (his chosen career), he vows to get his degree in the next year and a half “and check off that box on my bucket list.”

Seeking new challenges, Hickman moved to Nevada in 1997 and lived for a time with his cousin in Fallon, a city of 8,600 in Churchill County, an agricultural area. Unable to latch onto a big-league job as an emergency medical

Andrew “Andy” J. Hickman, Round Hill General Improvement District Zephyr Cove, Nevada

POSITION:
District Manager

EXPERIENCE:
10 years

EDUCATION:
Business courses at Cerritos Community College, Long Beach State University and California Coast University

CERTIFICATIONS:
Level 3 water operator, Level 3 water distribution

BUDGET:
\$1 million (public services, including water and sewer)

GOALS:
Continue to provide reliable water services to customers as district manager

technician, Hickman in late 1997 moved to Gardnerville, an unincorporated town of 5,600 in Douglas County, some 20 miles west of the water treatment plant, where he lives today with his wife, Tammy, and 17-year-old son, Vance.

In January 1998 he was hired by Rite of Passage, an organization in Minden, that provides a variety of support and treatment programs (foster care, residential, educational) nationwide to improve the lives of troubled, at-risk and vulnerable youth.

When Hickman left there in November 2009, he had risen to director of training and staff development. While the position brought him rewards and challenges, he felt something was missing and sought a major career change.

The very next day, he started at the Round Hill General Improvement District; a friend had told him about an opening at the water treatment plant, and he jumped at the chance. Hickman worked at the district until August 2015, then left to become an operator for the Indian Hills General Improvement District, a residential community of 5,600 founded in 1973 that has



Andy Hickman observes operator Josh Bisset as he performs maintenance on a Stenner Classic Series peristaltic metering pump.

HUSTLE AND RELIABILITY

Despite its small size, the Round Hill keeps Hickman, Fassmann, Bisset and other employees hopping. Founded in 1964, the district serves a community of full-time residents and vacation homes with single-family houses and some condominiums. Commercial customers include the Round Hill Square shopping center in the southern part of the district, along with real-estate firms and medical, dental and accounting offices.

Clearly, Hickman has what it takes to do the job, says Fassmann, a Level 3 water operator and water distribution licensee who was named district manager in January 2018. “Andy is a very good employee and extremely reliable,” says Fassmann, who was an operator at the water treatment facility and in water distribution for eight years. “He’s one of those guys who you can give a task to and know it will be done correctly, on time and without a lot of fuss or drama. Plus, Andy is great at instructing and coaching the newer operators. That is vital to their success and ours.”

Hickman works out of the district’s headquarters in the neighborhood of Zephyr Cove, about a mile from the water treatment plant, which stands on the beach at Lake Tahoe, the 10th deepest alpine lake in the world, 1,000 feet deep on average. The plant runs just under 500,000 gpd.

water and wastewater treatment facilities. He returned to the Round Hill district in 2017 and was named chief operator shortly thereafter. He was promoted to district manager in August 2018.

“Being a water operator is a big breath of fresh air compared to what I had been doing,” Hickman says. “Although working for a company that helps rehabilitate juvenile delinquents was satisfying and at times enjoyable, I really like my job here. There’s always something new and stimulating happening.”

STARTING THE DAY

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TWO OPERATORS, SEPARATE HONORS

Andrew “Andy” Hickman is linked with two water treatment operators who contributed a great deal to their communities and received recognition for their commitment to providing clean, safe drinking water.

The water treatment facility in Zephyr Cove, Nevada, where Hickman was chief operator, is named for Jeffrey “Jeff” Timmens, who retired in November 2008 after 23 years of service. A story in the Local 39 International Union of Operating Engineers newsletter says, “Jeff is one of those unique individuals that everybody likes. He is quick with a smile and always willing to help out fellow members, management and residents of the district in which he proudly served.”

According to Patti Page, administrative assistant at the Round Hill General Improvement District and friend for more than 30 years, Timmens moved to Florida after he retired. Page calls him “very easy to work with; he just did his job, was real good at it and enjoyed it too.”

Asked what Timmens is up to today, Page answers with a laugh. “Jeff is very much alive. When he visits Lake Tahoe, he makes sure

to stop in and see all of us here. He’s an absolutely great guy — fun, funny, witty, easygoing and intelligent.”

The award Hickman received from the Nevada Rural Water Association is named for Frank Gordon “Butch” Smith, who died in April 2017 at age 74. From 2002 until 2017, Smith was the operator at the water treatment plant in Jarbidge, an unincorporated community in Elko County, about 10 miles south of the Nevada/Idaho border.

Dale Johnson, water and sewer superintendent in Elko (population 20,000), knew Smith well. He remembers that Smith kept a daily log of everything he did at the plant, from the flow characteristics of Bear Creek to the temperature outside.

“Butch was a dedicated man for the water system of his community,” Johnson says. “He also took care of the roads in town and the canyon road coming in. He was the mechanic when someone’s car broke down, fixed flat tires, repaired people’s appliances, built things for people, helped build the volunteer fire station, community center and town park, and trash facility, and gave the shirt off his back to anyone who needed it.”

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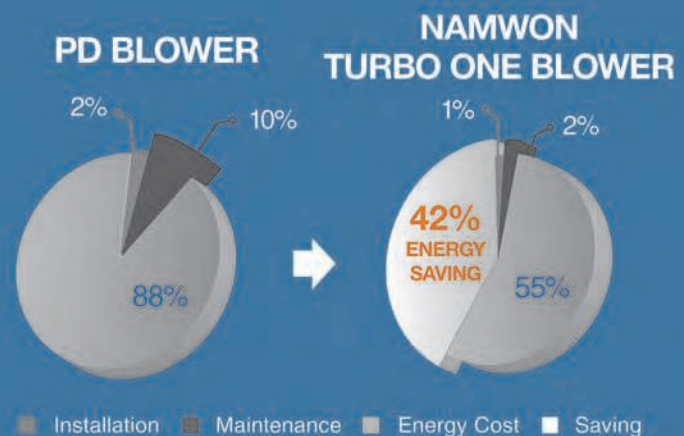
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In all, the district has 1.75 million gallons of storage. In addition, Hickman and crew maintain 7.8 miles of public waterlines, 5.4 miles of sanitary sewers and all roadways within the district.

A typical Hickman day starts with pump runs, which means physically checking pumps, recording pump hours and totaling the gallons pumped per day. This gives the operators a better handle on how the system is running. Beyond inspecting booster stations and lift stations, they evaluate maintenance issues and, when necessary, take preventive measures.

Routine maintenance includes repairing pump motors, fixing tubing that delivers chlorine to the treatment process, and in winter, cleaning filter media and clarifiers, which Hickman describes as “thousands of beanbag balls” made out of high-density polyethylene.

“So far, we’ve had no major problems with our equipment,” Hickman says. “In January 2018, we had a leak in a hydrant lateral that became an all-hands-on-deck situation and took a little less than six hours to

he does, as do the other operators. They’re efficient and they’re proud that they provide clean, safe drinking water to the residents here.”

DODGER BLUE

While his district manager job keeps him hustling, Hickman is never too busy to talk baseball. A lifelong bleed-Dodger-blue fan (“If he could be a Dodger, he would,” Page says), he recounts as if it were yesterday being an 18-year-old at the Los Angeles ballpark on the night of Oct. 15, 1988, when outfielder Kirk Gibson whacked a pinch-hit home run in the bottom of the ninth inning to give the Dodgers a 5-4 win over the Oakland Athletics in Game 1 of the World Series.



“Andy is absolutely great to work with. He’s laid-back, doesn’t let things bother him and is always willing to answer questions.”

PATTI PAGE

repair. A tree root had grown far enough down to break the pipe, and we had to dig down and cut the root out so the pipe could return to its normal position.”

A GO-TO GUY

Such activity requires a cool head and plenty of knowledge, qualities Hickman demonstrates every day. That’s according to Bisset, a Level 2 water operator who repairs pumps and filters and in winter drives the snowplow that keeps the district’s wide roads open when surrounding communities are down to one lane.

“Andy embodies professional precision,” Bisset says. “He’s my go-to guy for everything related to water treatment. He’s direct and to the point and a good teacher who tells you how things should be done. If you get off track, he’ll get you straightened out. He really motivates me to follow in his footsteps.”

Another fan is Page, who keeps the district in working order, supporting Hickman, Fassmann, Bisset and the rest of the staff and handling payroll, invoices, grant requests, budgets and more.

“Andy is absolutely great to work with,” says Page, who’s been at the district for the last 15 years and has worked closely with Hickman since he arrived in 2009. “He’s laid-back, doesn’t let things bother him and is always willing to answer questions. What’s great is that Andy takes pride in what

The team at the Round Hill district’s water plant includes, from left, Adam Day, water operator; Andy Hickman, district manager; Matt Lounsbury, water operator II; and Josh Bisset, water operator. Lake Tahoe is in the background.

“I’ve been a big baseball guy all my life,” Hickman says. “Whether it was playing Little League ball, coaching, or sitting on boards for youth baseball, I’m always ready and willing to get involved. I still play a bit of softball, and when tournaments come up, I’ll call a couple of friends and say, ‘Let’s go.’”

As for the future, Hickman wants to finish his career at the Round Hill district “because it’s a great place to work.” But, like any true professional, he plans to continue moving upward, the latest step being district manager. Right now, he’s pleased with nearly a decade of producing violation-free drinking water and being in the water treatment field.

“Water treatment is not only a good career, but it’s also a necessary career,” he says. “Water is life and one of the things we need on a daily basis. If we can’t provide safe, clean drinking water to the population we serve, we’re in a world of hurt.” **tpo**

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The Pinellas County outreach program included 80 facility tours and 26 school presentations in 2017-18.

“The teachers rely on us heavily to make the wastewater industry interesting and exciting to the students, and we do this through humor and creativity to make it memorable.”

SHEA DUNIFON

Tours and Talks

AN AWARD-WINNING OUTREACH PROGRAM IN FLORIDA'S PINELLAS COUNTY TEACHES STUDENTS ABOUT WASTEWATER TREATMENT, STEM, CAREERS AND MORE

By **Sandra Buettner**

Shea Dunifon, education coordinator for Pinellas County Utilities in Florida, tirelessly invents creative ways to teach K-12 students about wastewater.

She makes it fun for children to take plant tours and learn about the wastewater treatment process. For 2018, she received the Water Environment Federation's Public Communications and Outreach Program Award in the Individual category and the Florida Water Environment Association's Public Education Award in the Organization category.

While Pinellas County had a wastewater education program from 2002-09, the recession dimmed the lights for the next seven years, with just a few tours being offered by request. They were rebooted full time in 2017 when Dunifon was hired to bring them back. With a 5,400-square-foot education building, interactive displays and a 42-person tram like the ones at Disney World, the students in grades 6-12 tour the South Cross Bayou Water Reclamation Facility and learn about operations at the 35-acre site.

This 33 mgd South Cross Bayou facility uses recovered resources from the wastewater, including reclaimed water for irrigation, biosolids to make fertilizer pellets and biogas for renewable energy.

ALL ABOARD

The 90-minute tours start in the education building with an introduction that includes “making wastewater” using yellow-dyed water for urine, cocoa powder for poo and various unflushable items; viewing aerial photos and a 3D printed model of the facility; and learning through various interactive displays. “We’re adding more and more displays all the time, so the education building is becoming more like a museum,” Dunifon says. “The students can see and touch things before the tour begins.”

Once on board the tram, the students tour the facility, focusing on STEM (science, technology, engineering and math) with an emphasis on resource recovery, environmental stewardship and career opportunities. Students visit the control room and see the SCADA system. They also stop at the laboratory to see samples processing, quality control procedures and water testing. Along the way, they meeting the team members who help run the facility.

The students then ride the tram to the anoxic and aeration tanks, where they can see firsthand how the nitrogen-removal process works. All the tours are customized by grade and are based on science curricula written by Pinellas County School teachers.

“The teachers rely on us heavily to make the wastewater industry interesting and exciting to the students, and we do this through humor and creativity to make it memorable,” Dunifon says. “We get the conversation started, and the teachers can then continue the learning in the classroom.”



Pinellas County staff members give classroom presentations tailored to various grade levels.

BACK AT SCHOOL

In addition to the tours, staff members travel to the schools and give presentations for various grade levels. They include:

Incredible Journey. K-5 students use a spinner or dice to visit multiple stations, following the different pathways a water droplet can travel. At each station, they get a colored bead; they later use the beads to make a bracelet as a memento of their individual water journey.

Do You Know Your Local Watershed? Students receive maps that show their local water resources: rivers, bays and lakes. They then create their own watershed using a crumpled piece of paper and washable markers. Then they wet the paper to see how water flows from high to low eleva-



Facility tours show students all the major aspects of the wastewater treatment process.

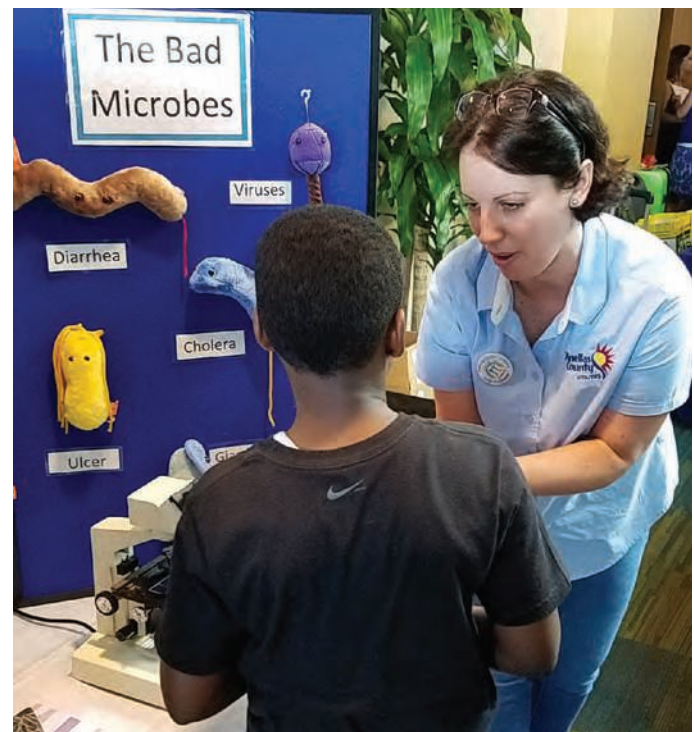
tions along the creases. (This and the Incredible Journey activity are adapted from the Project WET Curriculum and Activity Guide 2.0.)

Don't Treat Your Toilet Like a Trash Can. Using 50 mL centrifuge tubes as pipes, speakers add items that represent trash often put down toilets, like wipes, cotton swabs, small toys and sand, with some water. The students shake the tubes and see how the only item that dissolves in the water is toilet paper; the others contribute to clogging of sewer pipes.

Careers in Utilities. Created for grades K-12 because of retiring employees at the utility, this presentation informs students about the many jobs available in the industry. From coloring caricatures of different positions, to dressing up in lab coats and role playing, to a hands-on sewer camera truck demonstration, the students are exposed to potential careers.

POWER IN NUMBERS

In just two years, facility tours and presentations at schools have doubled. The 2017-18 fiscal year saw 80 tours and 26 presentations. Through additional outreach at science and career fairs and various events and expos, public and student contacts have nearly doubled, from 31,000 to more than 61,000. Those numbers are expected to keep growing as the demand from schools rises. **tpo**



An exhibit teaches kids about the harmful microbes found in wastewater and the helpful microbes that provide treatment.

Storm Survivors

THE TEAM AT A COUNTY WATER SYSTEM IN NORTH CAROLINA KEPT THE WATER TREATMENT PLANT RUNNING AND CUSTOMERS SUPPLIED DURING AND AFTER HURRICANE FLORENCE

By Ted J. Rulseh

Hurricane Florence hit the North Carolina coast on Sept. 13 as a Category 1 storm, bringing a strong storm surge and torrential rains. Water and wastewater plants throughout the Carolinas had about a week's warning that the storm was on the way. They followed disaster plans to prepare for the storm and undertake recovery afterward. Among them was the water department in Craven County, North Carolina, in the Neuse River about 15 miles inland.

There, Elliot Thomas, water treatment plant supervisor; Mindy Eddins and Nadyne Bentley, plant operators; and Samantha Robbins, lead field technician, worked together to keep water flowing to some 14,000 customers, spread across the county's rural areas and served by about 750 miles of waterlines.

Thanks to emergency generators, the water plant and the wells that feed it remained in operation throughout. The 3 mgd reverse osmosis membrane treatment plant (H₂O Innovation) used its excess capacity to help a neighboring county and town when their systems were compromised by mains that washed out from flooding and broke.

Good preparation and around-the-clock efforts after the storm made it all possible. Thomas talked about the county's experience in an interview with *Treatment Plant Operator*.

tpo: Why did Craven County build an RO water treatment plant?

Thomas: We were drawing from the Black Creek Aquifer, where all we had to do was add a little bit of chlorine for disinfection. But the Central Coastal Plains Capacity Use Area was trying to reduce the amount of water pulled out of that aquifer. Now we are in the Lower Castle Hayne Aquifer, and that water requires more treatment. It has a fairly high iron content and a little bit of manganese, and it's very hard. Membrane technology enables us to produce water of very similar quality to the Black Creek water.

tpo: What are your water plant team's responsibilities?

Thomas: We take care of the water plant and the wellfields, including the Black Creek wells, in the western part of the county around Cove City. We handle general maintenance, the daily readings, and water sampling and analysis. We also deal with pressure problems and customer complaints about taste and odor. We also have a field technician staff of five employees.



The Craven County Water Plant team maintained service to customers all through Hurricane Florence. From left are Elliot Thomas, Nadyne Bentley, Mindy Eddins and Samantha "Sam" Robbins.

“Our first priority was to make sure all our emergency generators were topped off with fuel and to make sure we had enough chemicals to last through the storm.”

ELLIOT THOMAS

tpo: How much warning did you have that the storm was approaching?

Thomas: The storm hit on Thursday, and on the previous Thursday the county administration called a meeting of department heads and supervisors to discuss emergency plans.

tpo: What did your team need to do in advance of the storm?

Thomas: Our first priority was to make sure all our emergency generators were topped off with fuel and to make sure we had enough chemicals to last through the storm. Next was to be sure that anything loose around the water plant was secured down. A composite sampler had to be moved

inside. A calcite conveyance system had to be secured, and the generator doors needed to be closed and locked so the wind couldn't blow them open and put rain on the electrical components. We also had to plan who needed to stay at the plant through the storm and what our duties would be once it passed.

tpo: What emergency generators do you have?

Thomas: At the water plant we have a 1,500 kW generator (Cummins Power Products). Each of the wells that feed the water plant has an 80 kW generator (Cummins Power Products). The three wells in Cove City have 200 to 220 kW generators (two Detroit and one Caterpillar Inc., Electric Power Division). The booster pump stations have Kohler Power Systems generators rated at 40, 50 and 60 kW.

tpo: What was the diesel fuel storage situation at the plant?

Thomas: The water plant has an 8,000-gallon fuel tank. If we're running just to feed our customers, we can get 12 days out of it. If we have to produce more water because of losses or to help another utility, that may go down to seven or eight days.

tpo: What happened while the storm made landfall and was at its most intense?

Thomas: Nadyne, Mindy and I stayed at the plant. At about 9:30 that night we lost communication to the tower that controls the pumps that push water out into the system, so we had to run those manually instead of by remote control. We never let the plant shut down. I threw the breaker to emergency power because the RO system has safeguards so that in the event of a power flicker the treatment process shuts down for 15 to 20 minutes. By going to emergency power, we avoided having a shutdown every time we got a power flicker.

tpo: How long did the intense part of storm last?

Thomas: It got bad at about 7 or 8 that Thursday night. We still had hurricane-force winds until 8 or 9 the next morning, and tropical-force winds into Saturday morning. It was a slow, slow-moving storm. We had some gusts measured at 110 to 120 mph. We got roughly 15 inches of rain here and maybe 20 to 25 inches around Cove City.

tpo: What had to be done in the immediate aftermath of the storm?

Thomas: Right after the storm, we were losing about 200 gpm from leaks. Most were in private services where trees were uprooted in people's yards and broke the pipes in two. We were fairly busy running around turning those services off so we didn't lose so much water. We did have a leak in one of our 2-inch lines from a tree uprooting where we were losing about 50 gpm. We got that fixed quickly.

tpo: How long did the system have to function on generator power?

Thomas: At the water plant, we were on the generator for one week solid. The main well sites that feed the plant were on emergency power for about five days, and the wells out in Cove City were on generators for three or four days. Those wells are in a big farming community, and there's a farmer not far from one of our wells who we have an agreement with,

where if we need fuel, he will provide it to us. Then we refuel his tanks with the amount we used.

tpo: Did down trees or other obstacles get in the way of delivering generator fuel?

Thomas: It's about 30 miles from the water plant to the wells in Cove City. The highway had probably a dozen trees across it that Friday morning, but by that afternoon, the DOT or the fire and emergency services had gotten the trees out of the way. The road to the water treatment plant had a couple of trees on it. We had a couple of chain saws here just in case, but by the time I ventured out on Friday morning, a couple of the residents had already cut the trees up, so we were able to get out without any burden.

tpo: Was flooding an issue during or after the storm?

Thomas: The storm surge was one of the highest since Hurricane Hazel

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in the 1950s. It inundated a couple of things of ours that we were no longer using or not using at the time. The water plant elevation is roughly 25 to 27 feet. We'd probably have to see a 30-foot storm surge in order to flood us. The storm surge this time was 10 to 12 feet.

tpo: What impact did the heavy rains have on local flooding?

Thomas: Two to three days after the storm is when the Neuse River here started cresting. It came close to what Hurricane Floyd did in the 1990s. We had one bridge go under and we had roads near the river that were becoming flooded, so we were not able to get to certain parts of the county but the integrity of water system was not compromised.

tpo: What kept your team busy after the storm?

Thomas: Mostly it was keeping the generators fueled and assisting customers who had leaks.

Samantha was out helping customers who had their waterlines torn out of the ground by uprooted trees. She also helped keep the generators at our wells in Cove City topped off with fuel. We had some emergencies. A dog rescue site needed a place to house animals. They decided to use an old animal hospital that had shut down a year or so ago. It didn't have any water because the service had been disconnected, so we got the water reconnected for them. It felt good to be able to help them out.

tpo: Were neighboring water systems affected by the storm?

Thomas: I received a call from Jones County where they had issues with some waterline washouts. They asked if we could support them. We have an interconnect with them, and we were able to help them restabilize their water system. The following Monday, the town of Havelock had a wash-out and called for assistance; we were able to supply half of their town.

“The water plant elevation is roughly 25 to 27 feet. We'd probably have to see a 30-foot storm surge in order to flood us. The storm surge this time was 10 to 12 feet.”

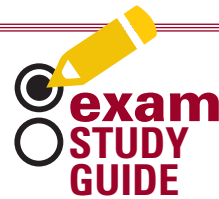
ELLIOT THOMAS

tpo: What is the history behind those water system interconnects?

Thomas: It's a good idea to have interconnects where neighboring systems have waterlines close to each other. It can work both ways. There have been times when Jones County has helped us out. Havelock has the ability to help us. We have interconnects with almost every water system that we are close to.

tpo: When did you and your team get to go home?

Thomas: I was here a week. I went home once we got utility power back to the water plant. Nadyne was here a week; Mindy was here four days continuously. **tpo**



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In this issue and at tpomag.com

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A Higher Standard

OPERATORS AT THE BAY COUNTY WATER TREATMENT PLANT ARE TRAINED TO EXPECT MORE FROM THEMSELVES. THE PERFORMANCE RESULTS ARE EVIDENT.

STORY: **Trude Witham** | PHOTOGRAPHY: **Jeff and Meggan Haller**

Bay County (Florida) Utility Services trains its operators to do more than the minimum. The utility has an in-house training program for new employees and an incentive program to encourage staffers to obtain licensing beyond what their job descriptions require.

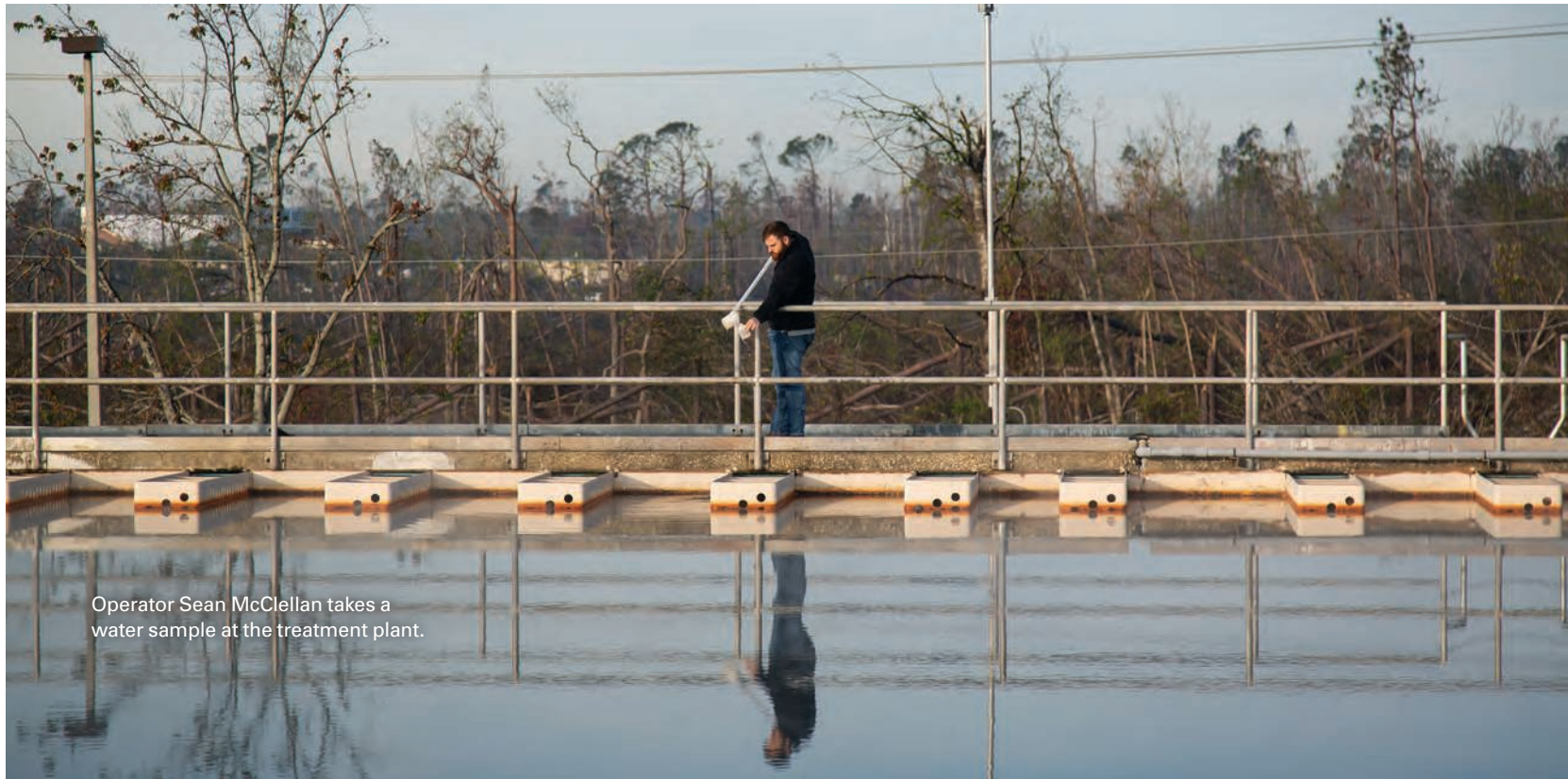
That has worked out well for the award-winning Bay County Water Treatment Plant in Panama City. Today, the plant has a well-trained, experienced staff, with minimal turnover.

The team takes a proactive approach to maintenance. Asset management software (Cartegraph) helps them keep track of equipment condition and value. The plant won the Florida Department of Environmental Protection

Plant Operations Excellence Award for large community systems each year from 2011 to 2017.

It was also one of four plants to win the 2018 American Water Works Association American/Canadian/Mexican Water Landmarks Award, recognizing a water landmark that is at least 50 years old with a “direct and significant relationship with water supply, treatment, distribution or technological development.”

Treatment challenges include significant rain events that can change source water quality within hours. Finished water quality is excellent at 0.03 to 0.08 NTU.



Operator Sean McClellan takes a water sample at the treatment plant.

The Bay County plant won the 2017 Water Plant Operations Excellence Award from the Florida Department of Environmental Protection for the sixth consecutive year.

INCREASING CAPACITY

The Bay County plant, built in 1967, was upgraded in 1985 from 10 to 50 mgd permitted capacity. In 2007, capacity was boosted to 60 mgd. Today, it serves about 150,000 customers and wholesales water to Panama City, Panama City Beach, portions of Lynn Haven, the cities of Springfield, Callaway, Parker, Mexico Beach and Tyndall Air Force Base.

Source water is supplied from two locations along the Deer Point Reservoir: one on the lower end and the other on the upper end. Depending on needs and conditions, the water can be received at the plant from either source, separately or blended.

The conventional treatment process includes 11 multimedia filters (Evoqua Water Technologies), sodium hypochlorite disinfection (Odyssey Mfg.), zinc orthophosphate addition for corrosion control, and fluoridation.

The treated water is sent to a wet well and then a clearwell, before entering two 5-million-gallon storage tanks. The water is pumped to the distribution system via eight high-service pumps (Pentair - Fairbanks Nijhuis). Sludge is dewatered with two Enviroquip belt filter presses (Ovivo USA). Green South Solutions hauls the dried cake for land application.

The 40-acre site has no offsite stormwater discharge. Backwash water is processed through the filter backwash solids handling facility before entering two retention ponds. Stormwater is directed to a 3-million-gallon reservoir. Both residual streams are pretreated and returned to the water plant headworks.

In 2018, the plant replaced its SCADA software with VTScada (Trihedral Engineering Limited). "It allows better trending," says Bobby Gibbs, water division superintendent. "Operators can select any value on the screen and track current and past treatment performance data, such as chemical dosages, residuals, tank levels and pump status. There is much greater access to historical data throughout the entire system."

MEETING THE GUIDELINES

A team of 12 operators and 10 maintenance staff members keep the plant operating smoothly. The operators' control room is equipped with benchtop lab equipment for performing minute-by-minute water-quality checks. Bacteriological testing is conducted by Bay County's state-certified lab.

Operators work 12-hour shifts with a three-day weekend off every other week. Every hour, they calculate dosages on all chemicals. They perform grab samples and jar tests as needed to maintain finished water quality. They use Area-Wide Optimization Program tools and methods to track turbidity and improve plant performance.

Bay County Water Treatment Plant

Panama City, Florida

www.co.bay.fl.us/187/utility-services

BUILT:
1967

POPULATION SERVED:
150,000

CUSTOMERS:
150,000, plus wholesale distribution

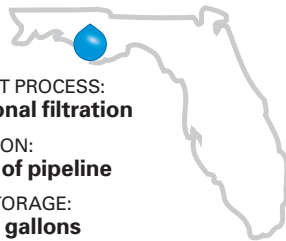
SOURCE WATER:
Deer Point Reservoir

TREATMENT PROCESS:
Conventional filtration

DISTRIBUTION:
535 miles of pipeline

SYSTEM STORAGE:
22 million gallons

KEY CHALLENGE:
Changing surface water quality



“I feel optimistic with the management team we have. Their eyes and ears are open, and any needs will be addressed.”
BOBBY GIBBS

They also give plant tours to school groups and other utilities. Gibbs says, "We've had people tour the plant who are preparing for the state licensing exam. Being able to see a surface water plant and discuss different processes with other operators makes the information they have been reading in the training manuals easier to understand."

Gibbs (Class A water certification) has 40 years in the industry, nine with Bay County. He oversees a staff of 22, including:

- Christopher Fritze, chief operator (Class A, 16 years)
- Sean Lathrop, lead operator (Class A, 7 years)
- Operators Tracy Griffin, Raymond Nolind, Darren Robinson, Kevin Maxwell, Rueben Thompson, Adrian Lewis, Casey Sebold, Chris Robinson, William Sumner and Sean McClelland.

The operators' greatest strength is their willingness to stay up to date on new rules and regulations and to do the best job they can, Gibbs says: "They want to know what's happening and where we're going. Bay County's management team encourages staff members to present their ideas



The team at the Bay County Water Treatment Plant includes, from left, Darren Robinson, Raymond Nolind, Kevin Maxwell, Sean Lathrop, Bobby Gibbs, Sean McClellan, Chris Fritze and Reuben Thompson.

SURVIVING MICHAEL

On Oct. 10 last year, Hurricane Michael made landfall on the Florida Panhandle. With top sustained winds of 155 mph, it was a force to reckon with. Just ask the staff at the Bay County Water Treatment Plant in Panama City.

Working that day were eight operators, six maintenance people, two instrumentation and electrical (I&E) technicians and six distribution technician. At 6 a.m., operators followed the Emergency Management Plan Standard Operating Procedures and switched the plant to generator power.

"By 12:30 p.m., they shut down the raw water pumps because of storm-related damage and loss of system communications," says Bobby Gibbs, water division superintendent. "A half hour later, the plant lost the ability to maintain distribution flows because of major leaks, so they turned off the high-service pumps."

Sean Lathrop, lead operator, moved the operators from the second floor control room to the lower floor for safety. By 4:30 p.m., the worst of the storm had passed, but commercial power was out and so was telemetry.

Gibbs says, "There was major roof damage to most buildings, which caused significant issues with electrical systems. Travel was all but impossible because of downed power lines and trees. Maintenance staff gathered up chain saws and went to check remote sites."

Other staff began evaluating plant and system needs and making emergency repairs. The administration and laboratory buildings sustained only minor damage, so the I&E team relocated the operators' computer to the administration building and installed temporary cables to allow SCADA control.

On Oct. 11, distribution crews began shutting down the main transmission lines leaving the plant and the more than 70 wholesale points of delivery (POD) to the wholesale systems.

Maintenance staff found significant damage to the first raw water pumping station. With help from the National Guard, they reached the second pumping station at

11 p.m. and found only minor damage. "At 11:30 p.m., only 35 hours after shutdown, the raw water pumps were restarted, and the treatment plant was receiving water again," Gibbs says. The operators began refilling plant storage tanks.

On Oct. 13, distribution crews reopened one of three main transmission lines and slowly began recharging the line. Operators restarted a finished water pump, and Bay County Utilities began providing water.

Over the next few days, distribution crews reopened other transmission mains, and once the wholesale systems completed their system assessments, Bay County began reopening the more than 70 PODs.

On Oct. 16, a portable laboratory able to process up to 500 bacteriological samples per day arrived at the plant from U.S. EPA Region 4. Finally, on Oct. 21, with help from many agencies, organizations and water professionals, the utility lifted the mandatory boil-water notice and was again providing safe drinking water to customers.

(continued)

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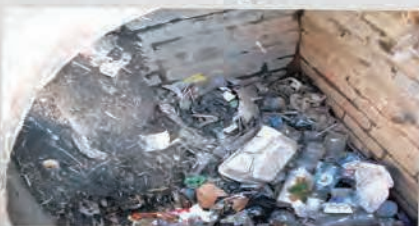
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The greatest strength of the operations team is a willingness to stay up to date on new rules and regulations and always do the best job they can.

“Since 2010, we have not had a treatment violation.”

BOBBY GIBBS

in a proposal format for team discussion and review so that we can take advantage of our team’s input.”

Gibbs says the operators’ greatest success is maintaining their level of expertise in meeting the guidelines: “Since 2010, we have not had a treatment violation.”

IMPROVING THE PROCESS

In 2016, the operations staff came up with a solution to improve an aging low-density lime system. “For the past 15 years, operators spent many hours trying to maintain and operate it,” Gibbs says. “The feed lines and chemical pumps would scale and clog, and the batch tank was making solutions that were inconsistent and unreliable.”

After reading about a high-density lime that would produce a consistent product with no clogging, the team got to work. Lathrop, Fritze, Noland and Griffin, with maintenance staff members Robert Hall and Frank Coatney, used information about a high-density lime system (MERRICK Industries) as a guide to create a system that would provide a known density. While not a high-density system, it would be better than the current inconsistent feed system.

First, they cleaned an out-of-service sodium hydroxide chemical feeder and added a mixer. This would serve as a solution tank. Then they modified the dry hydrated lime feeders so they could produce a consistent feed to the batch tanks. Next, they installed a transfer pumping system to pull from the batch tanks and fill the solution tank. Finally, they added new feed pumps to supply the product to the point of application.

The modifications took about two months and led to a consistent and more accurate solution, better pH control and reduced line clogging. This gave the operators the process control they needed. “The team really went

above and beyond to solve the problem,” Gibbs says. “For almost two years, our operators used that modified system, and we were able to validate the advantages of moving to a high-density system.”

In 2018, the plant installed a new high-density lime system (MERRICK Industries). Gibbs says the learning curve was “minimal and mainly involved understanding the operational and maintenance requirements of the batching system, the hose pump capabilities and the functionality of the system’s touch screen.”

WEATHER WORRIES

The raw water quality from Deer Point Reservoir is exceptional but can quickly change during rain events. “The quality from the reservoir’s lower pump station changes, including turbidity of 1.5-12 NTU,” Gibbs says. “Color can reach over 300 PCU. The alkalinity and pH drop and take longer to recover.”

Operators check the weather hourly, and if significant rain is forecast, the team starts preparing for treatment changes. “Our normal alkalinity is 25-45 ppm, and our process requires at least 25 ppm for our coagulant to work,” Gibbs says. “During a rain event of 2 or more inches, the alkalinity can drop to 5-10 ppm, so, the operators know they need to add lime to the raw water. At such times, the operators monitor the raw water every 15 minutes to identify changes and make needed treatment adjustments.”

The region averages 64 inches of rain a year. Hurricanes are another concern. In October 1995, Hurricane Opal hit the Florida coast as a Category 3 storm. “Opal made landfall near Fort Walton Beach, and the greatest impact was flooding from storm surge,” Gibbs recalls. “The biggest concern was the

(continued)

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Operator Sean McClellan performs a full panel of tests on water samples in a temporary trailer after the Bay County Utilities operations center was damaged during Hurricane Michael.



Bobby Gibbs,
water division
superintendent

“ I don’t have trouble sleeping at night, because these guys are great, and they also try to help each other out. They work as a team.”

BOBBY GIBBS

mistic with the management team we have. Their eyes and ears are open, and any needs will be addressed.”

The team is looking 40 to 50 years out to determine how potential growth will affect its system. “We provide water to all of Bay County with the exception of a portion of Lynn Haven, so we will need to upgrade for capacity at some point as our community continues to grow,” Gibbs observes.

Another concern is finding certified operators as current ones leave or retire. The solution is to hire people with no experience and train them. “When I started here, we tried to find licensed operators, but that was difficult,” Gibbs says. “So, we started bringing in unlicensed employees and having our experienced operators train them using our SOP books and training manuals.” The county human resources and utility services departments work with schools to promote interest in the water industry.

Gibbs says the operators’ greatest challenge is to “not become complacent. They’ve been here awhile and have the experience, so complacency can set in.” He’s not too worried, though: “I don’t have trouble sleeping at night, because these guys are great, and they also try to help each other out. They work as a team.” tpo

dam that separates North Bay from the Deer Point watershed, and the possibility of saltwater intrusion. That didn’t occur, and the plant sustained no damage during that hurricane.”

In October 2018, Hurricane Michael came ashore as a strong Category 4 storm and seriously damaged the water plant and the pumping station on the watershed’s lower end. It also damaged most of the plant’s infrastructure (see sidebar).

FUTURE CHALLENGES

The county is planning new projects for 2019-20. “We are modeling our system to see what we need and where the gaps are,” Gibbs says. “I feel opti-

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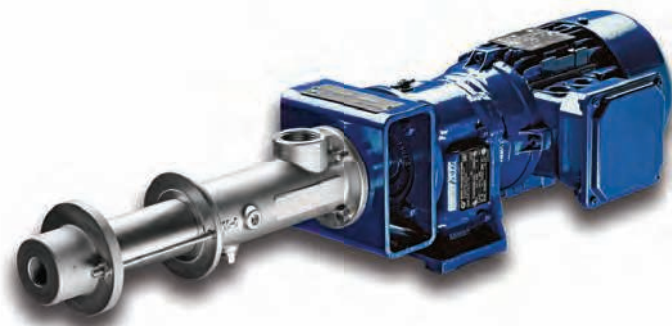
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AN ONTARIO TREATMENT PLANT FINDS A COST-EFFECTIVE DEWATERING SOLUTION THAT REDUCES ITS NATURAL GAS BILL SUBSTANTIALLY

By **Scottie Dayton**

Waste activated sludge from five wastewater treatment plants across the city arrived daily at the Greenway Wastewater Treatment Plant in London, Ontario.

After it was combined with Greenway's primary sludge in holding tanks, operators fed 2.5 percent wet sludge at 200 gpm to four 2-meter belt filter presses 325 days a year. "We average 65,000 wet tons annually," says Randy Bartholomew, supervisor.

Pumps delivered cake at 23 percent solids to a fluidized bed incinerator, but the material was too wet to ensure total combustion without cofiring 41.67 million cubic feet of natural gas per year.

"Our polymer supplier recommended different products to help dry up the cake," Bartholomew says. "The operators tried different feed rates and controlling how the belt presses ran, but they were at the limit of their capabilities regardless of the changes."

London officials, seeing an opportunity to save energy under the city's Corporate Energy Conservation and Demand Management Plan, posted a request for proposals. "Three centrifuge manufacturers ran dewatering pilots for us," Bartholomew says. "The C7E Decanter solid bowl centrifuges from

“The C7E Decanter solid bowl centrifuges from Flottweg gave us the desired 26 percent cake solids. They also were cost-effective, enabling us to maximize our asset renewal budget.”

RANDY BARTHOLOMEW

Flottweg gave us the desired 26 percent cake solids. They also were cost-effective, enabling us to maximize our asset renewal budget.”

Since startup in 2013, burning drier cake has saved the city \$184,800 a year on natural gas, and the dewatering upgrade received a \$45,000 incentive from Union Gas. The project won the 2014 Ontario Public Works Association Technical Innovation Award.

STRUCTURAL MODIFICATIONS

The 44.9 mgd (design) activated sludge plant averages 31.7 mgd from 200,000 customers, and incinerates 17,000 dry tons of biosolids annually. Ash is landfilled.

To prepare for the three centrifuges (one is on standby), a contractor removed an out-of-service multiple-hearth incinerator and built new floors in the dewatering building to support the weight of the units. There's a reinforced concrete pad on the main floor for the centrifuges and another pad on the upper floor for the odor-control system.

Flottweg Separation Technology representatives observed the installation. "Operators ran the belt presses until we took down the incinerator to complete some repairs," Bartholomew says. "At that point, we switched to our secondary dewatering system and hauled the cake to the landfill." The plant uses the Schwing Bioset alkaline stabilization/pasteurization reactor process, yielding Class A biosolids.

Startup involved turning a valve to switch from one piping system to another. "Within 15 to 20 minutes, the first cake arrived at 26 percent solids," Bartholomew says. "The centrifuge control panels had integrated seamlessly with our SCADA system."

HOW THEY WORK

Each 15.75- by 5.6- by 4.5-foot-high centrifuge weighs more than 9 tons filled and operates independently with dedicated piping. Solids enter a feed compartment in the center of the conveyor screw. Then centrifugal force at 3,000 times the intensity of gravity flings the material through distribution ports into the cylindrical bowl.

The high-speed rotation of the bowl presses the solids against its inside wall, squeezing the out liquid. Simultaneously, the conveyor, rotating at a



Easy-to-use touch controls enable operators to customize dewatering parameters.

slightly different speed, pushes the solids toward the tapered end of the bowl to fall through the discharge chute. Retention time is determined by the differential speed.

An 88 gpm piston pump (Schwing Bioset) on each centrifuge sends the cake to the incinerator via piping that feeds the fluidized bed from opposing sides. Centrate flows over weirs at the front of the bowl, collects in a chamber and discharges by gravity to the plant's treatment train.

FINE-TUNING

To optimize centrifuge efficiency, operators tested different polymer concentrations, feed rates and torque settings. The automatic control systems on the centrifuges acted as fail-safes. If the torque exceeded the optimum separation value, the system increased the differential speed to convey solids from the bowl faster. Conversely, it reduced the differential speed when the torque decreased.

Operators had fed dry polymer to the belt presses, but Flottweg Separation Technology representatives recommended liquid polymer for the cen-



To optimize centrifuge efficiency, operators tested different polymer concentrations, feed rates and torque settings.



The centrifuges deliver biosolids cake at 26 percent cake solids and operate cost-effectively.

trifuges. "The switch makes it hard to evaluate polymer savings," Bartholomew says. "All I can say is our cost for the compound hasn't changed." Depending on sludge quality, operators feed 317 to 343 gpm into two centrifuges. The polymer dose varies, as higher levels of WAS are more difficult to dewater.

The centrifuges brought advantages beyond conserving energy. "The belt presses were a hands-on operation, and their room was smelly and dirty,"



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Bartholomew says. "The centrifuge room is one-third the size of the press room, and the centrifuges' sealed construction has reduced odors and contamination dramatically."

Operators found it easy to learn Flottweg Separation Technology's Touch Controls and to customize dewatering parameters. The remote maintenance/control options let them start the centrifuges and walk away. "Now they monitor cake dryness, torque level, speed and other values on our SCADA system," Bartholomew says. "They still do inspections throughout the day, but automation has made dewatering a much easier operation." **tpo**

Share Your Ideas

TPO welcomes news about interesting methods or uses of technology at your facility for future articles in the How We Do It column.

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Gorman-Rupp Company 600 S Airport Rd., Mansfield, OH 44903 419-755-1011 grsales@gormanrupp.com www.GRpumps.com See ad page 35		YES				YES		YES	
Grundfos Pumps Corporation 3905 Enterprise Ct., Aurora, IL 60504 630-236-5500 quoterequest-wu@sales.grundfos.com http://us.grundfos.com		YES				YES		YES	YES
Hawkins Water Treatment Group 2381 Rosegate, Roseville, MN 55113 800-328-5460 612-331-6910 john.andren@hawkinsinc.com www.hawkinsinc.com/groups/equipment		YES	YES				YES		
Hydra-Tech Pumps 167 Stock St., Nesquehoning, PA 18240 570-645-3779 Fax: 570-645-4061 htpump@hydra-tech.com www.hydra-tech.com See ad page 45				YES		YES			
IWAKI America 5 Boynton Rd., Holliston, MA 01746 508-429-1440 info@iwakiamerica.com www.iwakiamerica.com	YES	YES					YES		

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

(continued)

Pumps

Directory 2019



Archimedes/ Screw	Centrifugal	Chemical Feed	Chopper	Deep Well	Dewatering/ Bypass	Diaphragm	Effluent	Grinder/Slump
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Jaeco Fluid Systems Inc.
100 Quaker Ln., Malvern, PA 19355
877-778-3456 610-407-7207 Fax: 610-240-4906
sales@jaecofs.com www.jaecofs.com

See ad page 59



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

See ad page 4



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

See ad page 67



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

See ad page 3



LMI Pumps
201 Ivyland Rd., Ivyland, PA 18974
800-564-1097 215-293-0401 Fax: 215-293-0445
info@lmipumps.com www.lmipumps.com

an Accudyne Industries brand



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

Lutz-JESCO America Corp.



Milton Roy
201 Ivyland Rd., Ivyland, PA 18974
877-786-7298 215-441-0800 Fax: 215-441-8620
infoweb@miltonroy.com www.miltonroy.com

an Accudyne Industries brand



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

See ad page 39



Philadelphia Gear - A Timken Brand
901 E 8th Ave., Ste. 100, King of Prussia, PA 19406
800-766-5120 610-265-3000 Fax: 610-337-5637
info@philagear.com www.philagear.com



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



ProMinent Fluid Controls, Inc.
136 Industry Dr., Pittsburgh, PA 15275
412-787-2484 Fax: 412-787-0704
marketing-us@prominent.com www.prominent.com



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

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

(continued)

Pumps

Directory 2019



Archimedes/ Screw	Centrifugal	Chemical Feed	Chopper	Deep Well	Dewatering/ Bypass	Diaphragm	Effluent	Grinder/Slump
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Schwing Bioset, Inc.
350 SMC Dr., Somerset, WI 54025
715-247-3433 Fax: 715-247-3438
marketing@schwingbioset.com www.schwingbioset.com



See ad page 67

ScreenC Systems
13235 Spur Rd., Genesee, ID 83832
208-790-8770
sales@screencosystems.com
www.screencosystems.com

SEEPEX.
ALL THINGS FLOW
See ad page 49

SEEPEX Inc.
511 Speedway Dr., Enon, OH 45323
937-864-7150 Fax: 937-864-7157
sales.us@seepex.com www.seepex.com



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



SRS Crisafulli, Inc.
1610 Crisafulli Dr., Glendive, MT 59330
800-442-7867 406-365-3393
srsc@crisafulli.com www.crisafullipumps.com



Stenner Pump Company
174 DeSalvo Rd., Jacksonville, FL 32246
904-642-1666 904-642-1012
sales@stenner.com www.stenner.com



See ad page 27

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



See ad page 29

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



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



See ad page 25

Wastewater Depot, LLC
4446 State Rte. 132, Batavia, OH 45103
513-732-0129 Fax: 513-735-1485
info@wastewaterdepot.com www.wastewaterdepot.com



Fluid Technology Group

See ad page 25

Watson-Marlow Fluid Technology Group
37 Upton Technology Park Rd., Wilmington, MA 01887
800-282-8823 978-658-6168 Fax: 978-658-0041
info@wmftg.us www.wmftg.com



Weir Specialty Pumps (WEMCO)
440 West 800 South, Salt Lake City, UT 84101
800-716-5050 801-359-8731
wsp@mail.weir
www.global.weir/businesses/weir-specialty-pumps

	YES				YES		YES	
			YES				YES	
	YES							
	YES				YES			
			YES					
	YES	YES		YES	YES		YES	YES
	YES	YES			YES		YES	YES
			YES					
	YES	YES					YES	YES
			YES					
YES	YES		YES		YES		YES	

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

(continued)

Blowers

Directory 2019



	CENTRIFUGAL			POSITIVE DISPLACEMENT		
	Multistage	Single Stage	High-Speed Turbo	Rotary Lobe	Hybrid	Rotary Screw
AERZEN AERZEN 108 Independence Way, Coatesville, PA 19320 610-380-0244 aerzen@aerzenusa.com www.aerzen.com/en-us See ad page 15	YES	YES	YES	YES	YES	YES
Atlas Copco Compressors 300 Technology Center Dr., Ste. 550, Rock Hill, SC 29730 866-546-3588 info@atlascopco.com www.atlascopco.com See ad page 71	YES	YES	YES	YES	YES	YES
Howden Roots, LLC 900 W. Mount St., Connersville, IN 47331 800-557-6687 765-827-9200 Fax: 765-827-9317 connersville.customer@howden.com www.howden.com/roots See ad page 49	YES	YES	YES	YES		
MILTON ROY 201 Ivyland Rd., Ivyland, PA 18974 877-786-7298 215-44-0800 Fax: 215-441-8620 infoweb@miltonroy.com www.miltonroy.com						YES
SULZER Sulzer Pumps Solutions, Inc. 140 Pond View Dr., Meriden, CT 06450 800-525-7790 203-238-2700 Fax: 203-238-0738 info.abs.usa@sulzer.com www.sulzer.com See ad page 27			YES			
Spencer The Spencer Turbine Company 600 Day Hill Rd., Windsor, CT 06095 800-232-4321 860-688-8361 www.spencerturbine.com See ad page 67	YES	YES	YES			
Wastewater Depot, LLC 4446 State Rte. 132, Batavia, OH 45103 513-732-0129 Fax: 513-735-1485 info@wastewaterdepot.com www.wastewaterdepot.com See ad page 25		YES		YES		



“Treating and distributing drinking water is a significant **responsibility** that takes dedication, training and skill. Our operators welcome the challenges our plant expansion will bring, and I know they’ll continue to excel.”

Melissa Kahoun
 Aqua Illinois
 Area Manager, Kankakee and Will Counties
 Joseph Donovan Regional Water Treatment Plant, Kankakee, Ill.



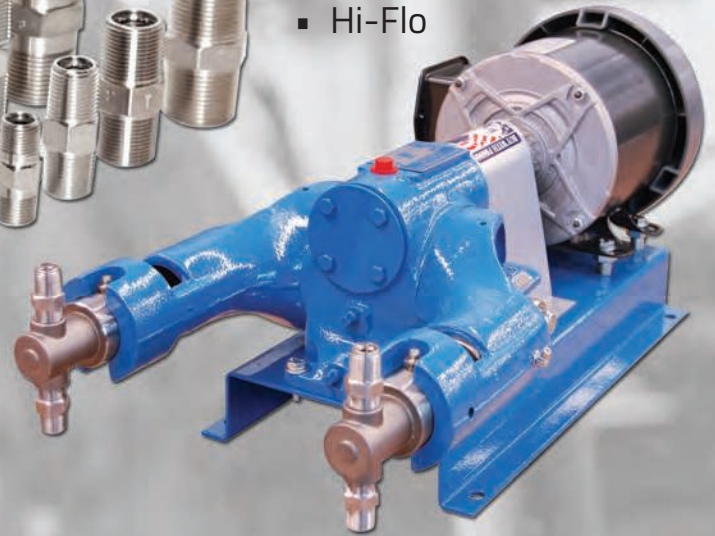
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- Diaphragm
- Plunger
- Hi-Flo



JAECO

www.jaecofs.com

Looking Sharp

WEIRTON PLANT TEAM HELPS MAKE
 A POSITIVE STATEMENT

By Ted J. Rulseh

The team at the **Weirton (West Virginia) Wastewater Treatment Plant** wanted to make a great impression on visitors pulling up to the gate. Part of that was a new sign.

“We had the sign made in 2012 by Signs Limited in Wintersville, Ohio,” says Rick Ohalek, assistant director of the Weirton Sanitary Board. “They did the design artwork and made the flat sign. Our staff did all the other work: concrete, posts, trim and lighting. In addition, we had signs with the same artwork made for all of our buildings and tanks.”

The Weirton plant (4.0 mgd design) was first built in 1956 as a primary clarifier facility. It was upgraded to secondary treatment standards in 1977. “Since then, we have gone through several upgrades, which include UV disinfection in 1998 and autothermal thermophilic aerobic digestion in 2008,” Ohalek says.

“We upgraded our main lift station and installed a 5-mile-long force main directly to the plant. We also installed a new emergency generator.



Our staff is very skilled in all aspects of construction.”

The team installed a band screen (JWC Environmental), constructed a block building to house the ATAD equipment and installed a new rotary press (Fournier Industries). “The work our employees have performed over the years has saved our customers thousands of dollars,” Ohalek says. “Our sewer rates are 18th lowest among the 319 bona fide sewer utilities in West Virginia.”

The plant serves about 10,000 customers. The collections system has about 3,400 manholes, 121 miles of sewer line and 21 lift stations. **tpo**

Pumps and Blowers

By Craig Mandli

Centrifugal Pumps

SCREENCO SYSTEMS PATZ SHAFT DRIVE PUMPS

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



Patz Shaft Drive Pumps, distributed by ScreenCo Systems



WILO USA WILO-STRATOS GIGA

Wilo USA offers an extended range of models for the Wilo-Stratos GIGA line of centrifugal pumps to include 3- and 4-inch models, bringing the total offering to 28 models. The GIGA is a class IE5 space-saving in-line circulator with ECM technology, with a motor-powerhead combination that provides optimal control over the pump, up to 9 hp. The control range is up to three times as high as conventional electronically controlled pumps, and there are multiple control modules

Wilo-Stratos GIGA line of centrifugal pumps from Wilo USA

available for integration with building management systems. With heads up to 167 feet and flows to 550 gpm, it has high corrosion protection due to its cataphoretic coating, high-efficiency EC motor, optimized hydraulic design and the ability to self-adjust to system demands. **888-945-6872; www.wilo-usa.com**

Chemical Feed Pumps

BLUE-WHITE INDUSTRIES CHEM-FEED ENGINEERED SKID SYSTEMS

CHEM-FEED Engineered Skid Systems from Blue-White Industries are efficient, durable and lightweight. Units for both single and dual metering/dosing pump configurations are offered. The complete skid systems include all necessary components in a drop-in-place design for ease of ordering, ease of facilitating installation and fast setup. They will accommodate ProSeries-M MD-3 chemical metering pumps, which



CHEM-FEED Engineered Skid Systems from Blue-White Industries

have a 2,000-1 turndown and provide smooth chemical dosing with no pulsation dampener required. With 380 strokes per minute, they provide a steady flow. They are built to provide long service life at high pressures, with no pressure regulator needed. They come equipped with a DiaFlex diaphragm constructed with PVDF. The single layer design exhibits zero breakdown or delamination. They are NSF 61 listed. **714-893-8529; www.blue-white.com**

FLOWROX LPP-D

LPP-D dosing pumps from Flowrox are designed to ensure accurate dosing in all process conditions, as the pump discharge flow does not depend on positive suction pressure. These pumps involve positive displacement pumping, which minimizes backflow. Their rolling design compresses the hose half as many times as a conventional shoe-design pump. Reducing hose compression by half creates lower operating costs by extending the hose lifetime and creates the capability to pump full time by minimizing friction and heat. They can be used with a variety of diverse slurries and are suitable for dosing a wide range of abrasive, corrosive, viscous mediums such as lime, alum, sodium hypochlorite and ferric chloride. **410-636-2250; www.flowrox.com**



LPP-D dosing pumps from Flowrox

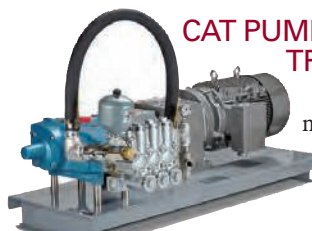
Dewatering/Bypass Pumps

BBA PUMPS BA150E TRAILER PUMP PACKAGE

The 6-inch BA150E Trailer Pump Package from BBA Pumps is a dewatering pump that provides a capacity up to 2,090 gpm. Due to the large solid passage of 3.15 inches, combined with a grinding wear plate, the pump is also suitable for sewer bypass projects. The completely galvanized trailer is equipped with a large composite fuel tank. The lifting device also serves as a protective cover for pump and engine. The height of the pintle hitch can be adjusted, and the trailer is fitted with all the necessary safety provisions. **843-849-3676; www.bbapumps.com/us**



BA150E Trailer Pump Package from BBA Pumps



CAT PUMPS STAINLESS STEEL TRIPLEX PUMPS

Cat Pumps triplex pumps

Cat Pumps stainless steel triplex pumps mounted to a gear motor can provide thousands of hours of maintenance-free slip pump service. Direct-coupling a pump to a gear motor provides many advantages, including a smaller footprint, reduced noise and increased ease of service with no belts to maintain. A 316 stainless steel manifold, paired with elastomers like NBR, FPM, EPDM and PTFE, allow for many chemical and fluid compatibility options. Performance specs range from 0.1 to 100 gpm and 100 to 10,000 psi. Custom-built power units include pump(s), motor, base, pressure regulator, safety relief valve, pulsation dampener and gauge. Custom builds typically have a three- to four-week lead time. **763-780-5440; www.catpumps.com**

GORMAN-RUPP RELIAPRIME

Designed to deliver the benefits of sound-attenuated silent pumps, the ReliaPrime emergency bypass station from Gorman-Rupp operates on natural gas. The engine-driven pump comes with autostart and level

controls that allow it to start and stop in response to the liquid level. The unit includes a 3-inch Ultra V Series pump capable of passing a 3-inch spherical solid, and it offers a soundproof, lightweight aluminum enclosure with lockable door panels that can be removed for maintenance of the pump or engine. The unit is a complete backup package ready for hookup for emergencies and power outages, primary pump repair, and additional pumping capacity. **419-755-1011; www.grpumps.com**



ReliaPrime emergency bypass station from Gorman-Rupp

Effluent Pumps



POLYLOK PL-CPE5A

The PL-CPE5A from Polylok is a submersible 1/2 hp, 115-volt, single-phase effluent pump with a 2-inch NPT vertical discharge. It has a maximum head of 48 feet and a maximum flow of 64 gpm. It is designed with a 3,450 rpm, oil-filled permanent split-capacitor motor and has an amp rating of 8.5 for 115 volts, cast iron housing, and volute equipped with a cast iron vortex impeller that passes 3/4-inch-diameter solids. The stainless steel shaft is supported by two single-row, oil-lubricated ball bearings. The shaft seal is an inboard design with a secondary exclusion V seal. Construction materials are carbon for the rotating face and ceramic for the stationary face. All elastomers are Buna-N, and the hardware is 300 Series stainless steel. It has a 20-foot UL/CSA-listed power cable that's suitable for submersible service and fitted with a three-prong plug. It is supplied with an integrated clip on its piggyback mechanical float switch for automatic operation. **877-765-9565; www.polylok.com**

PL-CPE5A effluent pump from Polylok

less steel shaft is supported by two single-row, oil-lubricated ball bearings. The shaft seal is an inboard design with a secondary exclusion V seal. Construction materials are carbon for the rotating face and ceramic for the stationary face. All elastomers are Buna-N, and the hardware is 300 Series stainless steel. It has a 20-foot UL/CSA-listed power cable that's suitable for submersible service and fitted with a three-prong plug. It is supplied with an integrated clip on its piggyback mechanical float switch for automatic operation. **877-765-9565; www.polylok.com**

VERTIFLO PUMP 1600 SERIES

The 1600 Series horizontal end suction vortex pump from Vertiflo Pump is suitable in a wide range of applications in areas like food processing solids, wastewater treatment, pollution control and waste pumping in the wine industry. It offers capacities to 1,600 gpm, heads to 170 feet TDH, temperature to 250 degrees F, and a fully recessed vortex impeller with packing or mechanical seal. Pumps are designed with back pullout construction that permits easy inspection and access for service or maintenance if needed without disturbing the piping to the pump. Standard construction is cast iron, 316 stainless steel fitted, all 316 stainless steel, alloy 20 or CD4MCu. **513-530-0888; www.vertiflopump.com**



1600 Series vortex pump from Vertiflo Pump

Metering Pumps



JAECO FLUID SYSTEMS JAECO PAK

JaecoPAK metering pumps from JAECO Fluid Systems are most commonly used for chemical metering and desalinization in multiple applications. They are available in both simplex and duplex configurations with pump capacities ranging from 0.38 to 150 gph at operating pressures up to 2,000 psi with an accuracy of plus or minus 0.5 percent.

JaecoPAK metering pumps from JAECO Fluid Systems

figurations with pump capacities ranging from 0.38 to 150 gph at operating pressures up to 2,000 psi with an accuracy of plus or minus 0.5 percent.

They are cast iron with a choice of 316 stainless steel or alloy 20 liquid ends with single ball or poppet check valves. Choose between neoprene, Viton or Teflon packing options and a single- or three-phase 12- or 24-volt electric motor, gas-powered engine or belt-driven option. They are completely serviceable. **877-778-3456; www.jaecofs.com**

NEPTUNE CHEMICAL PUMP SERIES MP7000

The Series MP7000 mechanically actuated diaphragm metering pump from Neptune Chemical Pump provides reliable and accurate dosing of a wide range of mild to aggressive chemicals, including those used in industrial and municipal water and wastewater treatment. It incorporates the ruggedness of a hydraulic diaphragm metering pump, eliminates the need for intermediate fluid or hydraulic oil to actuate the diaphragm and reduces the potential for gearbox oil to contaminate the process. It also offers a finned gearbox that dissipates the heat created during normal operation and oversized check valves that improve performance by minimizing friction losses. It offers capacities to 27 gph at operating pressures up to 235 psi. **215-699-8700; www.neptune1.com**



Series MP7000 diaphragm metering pump from Neptune Chemical Pump

PROMINENT FLUID CONTROLS GAMMA/ X

The gamma/ X solenoid diaphragm metering pump from ProMinent Fluid Controls is user-friendly and has a long service life. A solenoid control measures the back pressure and protects the system from overload. This technology makes a pressure sensor superfluous, meaning that operating safety can be significantly increased since no additional parts come into contact with the feed chemical. It is suitable for continuous micrometering from 1 mL/h thanks to the regulated solenoid drive. It has integrated pressure measurement for greater safety during commissioning and during the process. It includes an integrated seven-day timer for timed metering tasks. It can be integrated into automated processes and used in all industries and can work as a control unit with the process timer. **412-787-2484; www.prominent.us**



gamma/ X diaphragm metering pump from ProMinent Fluid Controls

PULSAFEEDER PULSATRON ELECTRONIC METERING PUMP

PULSAtron electronic metering pumps from Pulsafeeder have a guided check valve system with a seat-and-ball design that ensures reliable and accurate metering year after year. Their fin-cooled solenoid enclosure dissipates heat, ensuring that the pressure-handling capability of the pump can be maintained. The thermally protected solenoid protects the pump from seizing up in extreme heat conditions with an automatic reset feature, allowing the pump to resume operation upon cool-down. Units are tested and rated under hot conditions so flow and pressure ratings meet specifications. They offer flows up to 600 gpd and pressures up to 300 psi, with a wide range of flows and pressures. Agency approvals include CE, ETL, ETL san. and NSF 61 approval on PVDF material and degassing head models. **800-333-6677; www.pulsatron.com**



PULSAtron electronic metering pumps from Pulsafeeder

(continued)



BRAVO chemical metering systems from SEEPEX

SEEPEX BRAVO

BRAVO chemical metering systems from SEEPEX are plug-and-play, pre-engineered feed systems that improve process control with accurate and repeatable flows and lower chemical consumption. The system is an integrated, modular and scalable solution used for disinfection, pH control, flocculation, corrosion inhibition, oxygen scavenging and contaminant elimination. It is designed as single source for pumps

and controls. Systems are built from standardized panels in floor- or wall-mounted simplex, duplex or triplex options. The system incorporates NSF/ANSI 61 certified SEEPEX progressive cavity Intelligent Metering Pumps. Slip is minimized even when fluid temperature, viscosity or discharge pressure fluctuates. **937-864-7150; www.seepex.com**

Progressive Cavity Pump

NOV EZSTRIP

The EZstrip maintain-in-place progressing cavity pump from NOV has quick and safe removal of the full drivetrain including rotor, stator, shaft, rod and seal in minutes without electrical disconnection. The access covers provide 360-degree access to the coupling rod and drive shaft for easy inspection. With its smooth-profile positive torque split coupling rod, maintenance and assembly times are reduced. The tie bar-free design allows the EZstator clamps to lock the stator securely in place, further reducing stator removal time by over 50 percent and improving safety of common maintenance operations. In addition, the fixed support foot and stator clamp assembly further aids rotor and stator removal. It is available in cast iron or stainless steel with a choice of rotor and stator materials to suit individual applications. **832-424-7300; www.nov.com**



EZstrip progressing cavity pump from NOV



BLUEline Rotary Lobe Pump from Boerger

Rotary Lobe Pump

BOERGER BLUELINE ROTARY LOBE PUMP

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

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

Vertical/Lift Station Pumps

MTH PUMPS REGENERATIVE TURBINE PUMPS

High-pressure, low-flow regenerative turbine pumps from MTH Pumps can produce as little as 5 psi up to 1,000 psi and anywhere from a 1/2 to 150 gpm. They are available in rugged cast construction iron,



Turbine pumps from MTH Pumps

bronze and stainless steel materials with a variety of sealing options. Horizontal and vertical models are available with a number of drive options including AC- and DC-volt motors or pedestal mountings. Every pump is tested before it leaves the facility. **630-552-4115; www.mthpumps.com**

WILDEN PUMP & ENGINEERING V150 VELOCITY SERIES

The V150 Velocity Series pump from Wilden Pump & Engineering offers a detachable mounting foot and can easily be reoriented into a vertical or horizontal position with multiple inlet and discharge port options. It is available in 1/2- and 1/4-inch sizes and offers a bore-seal design that eliminates leaks that can result from torque decay. It delivers improved dry suction lift up to 14.2



V150 Velocity Series pump from Wilden Pump & Engineering

inches in the 1/4-inch size and 16.9 inches in the 1/2-inch size. In addition, the pumps incorporate a proven and simple air distribution system with only two moving parts that reduces the risk of downtime for long-term reliability. **909-422-1700; www.wildenpump.com**

Blowers

AERZEN TURBO G5PLUS

The Aerzen Turbo G5Plus is the most compact and efficient turbo in its class. It offers Aerzen airfoil bearings with double coating and multilevel frequency converter technology, which reduces the heat loss in the motor to a minimum and, consequently, improves the total efficiency significantly. **610-380-0244; www.aerzen.com/en-us**



Aerzen Turbo G5Plus blower

EURUS BLOWER ZG



ZG blowers from Eurus Blower

ZG tri-lobe aeration blowers for MBBR, biosolids and/or equalization tanks from Eurus Blower are rated to 15 psig and flows to 6,000 cfm. They have integral-shaft ductile iron impellers, dual-splash lubrication, oversized roller bearings, piston ring air seals, Viton lip seals, as well as low vibration and noise characteristics. Packages have an integrated intake filter/silencer with washable filter media, heavy-duty base/integrated discharge silencer, vibration dampers, OSHA guard and a V-belt

drive with auto belt tensioner. Options include motors, check valves, safety valves, flexible connectors and sound enclosures. **630-221-8282; www.eurusblower.com**

HOWDEN 827 DVJ

The 827 DVJ dry-vacuum blower from Howden is a heavy-duty unit with integral ductile iron impellers. The casing headplates, gear cover and drive-end are gray iron. Carburized and ground spur timing gears are taper-mounted on the shaft and secured with a locknut, cylindrical roller bearings, splash lubrication on both ends, and easy-to-read sight glasses for mainte-



827 DVJ dry-vacuum blower from Howden

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nance. The blower is capable of handling high inlet temperatures for rough applications. Its efficient discharge jet plenum design allows cool atmospheric air to flow into the cylinder, so the blower continues to run under blank-off conditions. It comes in a compact, lightweight package and is capable of delivering more than 5,700 cfm in an 8-inch gear diameter frame, as well as 28 inches Hg. 800-557-6687; www.howdenroots.com

KAESER COMPRESSORS HBS SERIES

HBS Series blowers from Kaeser Compressors deliver 1,412 to 5,650 cfm at pressures up to 15 psig. They are designed for wastewater aeration and other low-pressure applications where energy efficiency is critical. They include a Sigma Profile airend, zero-loss direct-drive technology and Sigma Frequency Control for energy efficiency across a wide range of flows. They arrive on site completely assembled with inlet filters, silencers and a full sound-proofing enclosure. They come with Sigma Control 2 and a full complement of sensors to provide full visibility into the operational status, protect the machine, provide maintenance indicators and increase long-term reliability. Sigma Control 2 offers broad communication capabilities, including remote monitoring and email notifications for service and alarms. Units can be seamlessly integrated into plants that are implementing Internet of Things, Industrie 4.0 or Water 4.0 strategies. 877-417-3527; www.us.kaeser.com



HBS Series blowers from Kaeser Compressors

(continued)



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NAM WON TURBO ONE

The TURBO ONE blower from Nam Won Turbo One is equipped with a high-speed permanent magnet synchronous motor, boosting its maximum efficiency of approximately 98 percent. The technology convergence between a high-speed control inverter and a precisely milled impeller through five-axis processing creates energy saving. An optimized controller runs the turbo blower and its controlling logic system, enabling it to run flexibly. Contrary to the ball bearing, the airfoil bearing used in the motor does not contact directly with the shaft and the bearing. It uses compressed air generated during high-speed rotation as a lubricant. This is why there's no need for lubricant oil or maintenance. Vibration-free and low noise driving provide a suitable and eco-friendly work environment. www.nwturbo.com



TURBO ONE blower from Nam Won Turbo One



USA Tri-Flow 825 vacuum blower from Robuschi

ROBUSCHI USA TRI-FLOW 825

The Robuschi USA Tri-Flow 825 vacuum blower is capable of continuous operation at 18 inches Hg. The open-airflow bearing housing allows more air circulation and additional cooling, which allows it to run continuously at deep vacuum. The tri-lobe design combined with helical gears allow it to run quieter, enabling use of smaller silencers and freeing up available payload and space, while keeping noise complaints to a minimum.

It offers 4,805 cfm free air capacity and the ability to hit 18 inches Hg. 866-428-4890; www.gardnerdenver.com/robuschi

WASTEWATER DEPOT PACKAGED BLOWER MOTOR UNITS

Packaged Blower Motor Units from Wastewater Depot are preassembled units, housed in a fiberglass sound-reduction enclosure with optional electrical controls. Packaged air systems are available as a standard factory package or are engineered to meet specialized requirements. The units are built using a choice of Roots, Sutorbilt or Tuthill positive displacement blowers and use a standard ODP motor or an optional TEFC motor (explosion-proof motors are also available). The discharge piping includes a pressure relief valve, pressure gauge and check valve to prevent pressure backflow from entering the blower. The vented fiberglass housing includes vibration isolation mounts to reduce both vibration and noise emitted from the system. A rubber hose connection is provided with the package for ease of installation at the project site. All packages enable simple on-site installation, whether going into a service building or outdoors. 513-732-0129; www.wastewaterdepot.com



Packaged Blower Motor Units from Wastewater Depot

Pump Controls

GREYLINE INSTRUMENTS PSL 5.0

The PSL 5.0 pump station level controller from Greyline Instruments has redundant level sensing. It includes a noncontacting ultra-

sonic sensor and can be connected to a loop-powered pressure sensor for redundant sensing in applications with foam or grease. It will continuously recalibrate the pressure sensor and automatically switch back and forth from ultrasonic to the pressure sensor as required. It is designed for lift stations, wet wells and storage tanks. Calibration and relay setpoints are easy to enter through the user-friendly keypad and menu system. An automatic pump runtime logging and reporting system helps operators to plan pump maintenance and identify lazy pumps before they fail. It includes an isolated 4-20mA output and six programmable control relays for pump control, pump alternation and level alarms. An intrinsically safe sensor and a built-in data logger are optional. 315-788-9500; www.greyline.com



PSL 5.0 pump station level controller from Greyline Instruments

PRIMEX ECO SMART STATION



Eco Smart Station control system from PRIMEX

The Eco Smart Station control system from PRIMEX provides a safe, simple, energy-efficient solution for optimum pump control in municipal lift station applications. It uses the latest technology in variable-frequency drive, microprocessor-based controller, data storage and communication capabilities available. It achieves up to 30 percent energy savings using an efficiency autotune algorithm that searches for the pump speed that will consume the least amount of energy per gallons of liquid pumped. It

is housed in a multiple-compartment Arc Armor enclosure, reducing the risk of injury resulting from electric shock and exposure to arc flash. The control and power circuitry are isolated in separate compartments, preventing unnecessary operator exposure to high-energy circuits and potential arc-flash conditions. It is available in 29 models, from 10 to 100 hp. 844-477-4639; www.primexcontrols.com

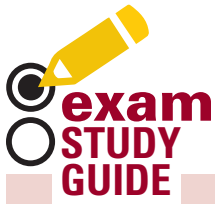
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WASTEWATER

By Rick Lallish

In a biological nutrient removal process, what is the condition where bacteria incorporate more phosphorus than needed for growth?

- A. Denitrification
- B. Endogenous respiration
- C. Luxury uptake
- D. Precipitation

ANSWER: C. Luxury uptake is the process by which bacteria cycle between anoxic or aerobic and anaerobic conditions. In that process, the bacteria tend to pick and store excess phosphorus in the anoxic or aerobic environment. With this mode, phosphorus may be removed from the treatment process when the biomass is removed from the system. The nutrient removal process has become more important to wastewater treatment in recent years, and operators should be aware of the different modes of treatment related to phosphorus and nitrogen removal.

DRINKING WATER

By Drew Hoelscher

What is the most important step an operator should take before performing maintenance on a motor or pump?

- A. Notify co-workers so they do not operate the equipment
- B. Notify the manufacturer
- C. Review and perform the lockout/tagout procedure
- D. Schedule the maintenance during low demand hours

ANSWER: C. Maintenance is typically performed on a corrective, preventive, risk or condition-based philosophy and is not always performed with advance notice. However, it is critical to follow proper lockout and tagout procedures to ensure you and your co-workers can safely perform the required tasks.

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

industry news

The Water Research Foundation names new CEO

The Water Research Foundation named Dr. Peter Grevatt as chief executive officer. He has over 30 years' experience leading the implementation of public health and environmental protection programs including significant national leadership experience in the water sector. Most recently, Grevatt served as director of the Environmental Protection Agency Office of Ground Water and Drinking Water. At OGWDW, he was responsible for ensuring the safety of the nation's drinking water supply through the development and implementation of national drinking water standards, oversight and funding of state drinking water programs, and the implementation of source water protection and underground injection control programs.

Endress+Hauser announces changes to executive board

Effective March 1, Dr. Andreas Mayr will be the chief operating officer of Endress+Hauser and will serve as deputy CEO to Matthias Altendorf. Mayr holds a doctorate in physics and joined Endress+Hauser in 1998. In his role as COO, he will be responsible for sales, production and support. And on Oct. 1, 2018, Jörg Stegert joined the board as chief human resources officer. He replaces Roland Kienzler who left the company to pursue other opportunities.

Aerzen opens new office in Atlanta

Aerzen USA celebrated the launch of its new facility with an open house for the Atlanta location. The new office is designed to provide better service to customers in the Southeastern U.S. and houses a regional sales office, rental equipment and service depot. The 24,740-square-foot building consists of a 21,000-square-foot production/warehouse area and 2,800 square feet of office space. The open house also was the official launch of Aerzen Rental in the U.S. **tpo**



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Used and rebuilt camera kits in stock: RIDGID Mini Compact, Mini Color, Standard Self-Leveling, General Gen-Eye I, II and III, Aries Seeker, and SRECO kits. The Cable Center: 800-257-7209. (CBM)

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By Craig Mandli

Blending blowers to reduce total cost of ownership

Problem

The wastewater treatment plant in Letchworth, United Kingdom, sought a blower system with a lower purchase price, superior turndown and high aeration efficiency.

Solution

A **blended blower system** from **Atlas Copco Compressors** included a ZBVSD+ high-speed turbo blower to handle the baseline aeration demand and three ZSVSD screw blowers to provide aeration trim for diurnal loading.



RESULT:

The capital cost was 28 percent lower than an all-turbo-blower system. The turndown of the blended blower system is 21-1, versus the 9-1 aeration control an all-turbo system could provide. With the efficiency of the screw blower at low flow, the blended blower system efficiency is 50 percent greater at minimum design flow. Aeration efficiency during off-peak times is about 15 percent lower than the system as designed with only turbo blowers. **866-546-3588; www.atlascopco.us**

Gearless turbo blowers selected for plant upgrade

Problem

The Carters Creek Wastewater Treatment Plant in College Station, Texas, was aerating its basins using outdated blowers that struggled to keep up with dissolved oxygen demand and operated near the blower surge point. This was inefficient and also dangerous, since a small increase in demand could push the blower into surge and damage the equipment.

Solution

The city replaced its blowers with **DT-Series gearless turbo blowers** from **Lone Star Blower**. The new blowers brought lower power consumption, a higher flow range further from surge and lower maintenance. They are controlled by an sMAC Master Control Panel to provide sequencing and accurate discharge flow control based on the dissolved oxygen level.



RESULT:

The city can now operate the aeration process continuously, safely and more efficiently while reducing operating cost. **832-532-3112; www.lonestarblower.com**

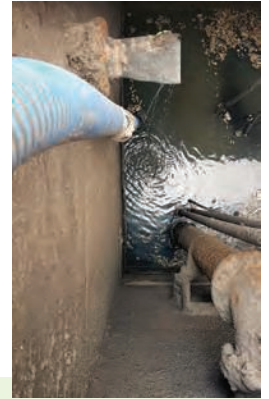
Chopper pump aids in de-ragging at plant

Problem

De-ragging at a wastewater treatment plant near Houston had become a tough, twice-weekly chore, requiring six to eight hours per week for two people. Every blockage meant unscrewing the bottom part of the pumps because the impellers would not move.

Solution

The plant installed a 24.5 hp **Landia Chopper Pump**. Landia can retrofit its pumps onto the base elbow used for the pump awaiting replacement using only four bolts.



RESULT:

Since the chopper pump was installed, there have been no blockages. Previously, site engineers had to use up a 5-gallon container of anti-greasing chemical every two weeks at an annual cost of \$4,000 to reduce the buildup of FOG. This is no longer necessary. **919-466-0603; www.landiainc.com**

Water reclamation facility revitalizes biosolids piston pump

Problem

Tres Rios Water Reclamation Facility, owned by Pima County in Tucson, Arizona, installed three truck-loading silos from Schwing Bioset in 2013. The intent was to deliver biosolids at 22 percent solids to the silos using progressive cavity pumps. However, the pumps could not pump the material. Adjusting the centrifuges and adding water to reduce the solids content to 15 percent enabled the pumps to transport the cake but created issues upstream and added cost.

Solution

A **KSP 25 piston pump** from **Schwing Bioset** had been in service until the completion of the truck loading facility. The plant staff worked with Schwing Bioset to rebuild that 15-year-old pump and replace one of the progressive cavity pumps.



RESULT:

This enabled transport of the higher-solids material to the loading silos. The remaining pumps and centrifuges are being used for thickening. **715-247-3433; www.schwingbioset.com**

Rural collections system simplifies lift station maintenance with aboveground systems

Problem

The city of Perryville, Missouri, employs a small staff to manage its lift station network. The submersible pumps were unreliable and required time-consuming confined-space entry and frequent pump replacements.

Solution

The city now operates six **Wet Well Mounted Pump Stations** from **Smith & Loveless**. All pumps, valves and controls are housed above ground and outside the wet well. "You don't have to be in the wastewater and dealing with all the hazardous situations," says Linda Chappius, maintenance technician.



RESULT:

Chappius inspects each station daily without confined-space entry, helping simplify its pump station maintenance program and extend station life. The first station, installed in 1995, is still in operation. "It's been a tremendously good lift station," Chappius says. "For where it's located and what it goes through for day-to-day use, it's an excellent piece of equipment." **800-898-9122; www.smithandloveless.com**

Chopper pump used to clear wet well of grease blanket

Problem

The Otay River Pump Station, which pumps 7 to 9 mgd of raw sewage to the South Bay Water Reclamation Facility for water recovery in San Diego had a problem in the 50-foot-long, 10-foot-wide, 30-foot-deep wet well. A floating blanket of grease and debris, sometimes as thick as 4 feet, would form regularly. The city was hiring two vacuum trucks to clean the station every three to four months at a cost of \$50,000 to \$100,000 per year.

Solution

Based on good experience with **Vaughan chopper pumps**, the city turned to that company again. The pumps are suitable for use in pump and lift stations as conditioning pumps when fitted with a nozzle to provide high-velocity mixing. They were placed in the problem wet well on a portable stand to recirculate and chop the contents. The company selected an 8-inch submersible chopper pump with a 25 hp, 1,200 rpm motor with mixing nozzle and portable stand.



RESULT:

In 18 months of use, the wet well has not required cleaning. The pump paid for itself in 2 1/2 months. **888-249-2467; www.chopperpumps.com tpo**

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Kohler Power Systems Genuine Batteries for generator

Kohler Power Systems' new Genuine Batteries are high-performance batteries specifically designed for use in residential, commercial and industrial power generators. The batteries are available in three performance levels: standard-duty, optimum-duty and heavy-duty. The standard-duty batteries are ideal for mobile generators and other smaller-sized units; the optimum-duty batteries are well-suited to critical-starting applications; and the heavy-duty batteries are designed for extreme temperatures, high vibration and frequent-use applications. All three performance levels encompass batteries within the most widely utilized BCI groups.

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Axine Water Technologies on-site pharmaceutical treatment solution

Axine Water Technologies has developed a new low-cost, waste-free solution for treating toxic organic pollutants in pharmaceutical wastewater. Based on its electrochemical oxidation technology and service model, the company's new solution is designed to treat a wide range of the most challenging contaminants including active pharmaceutical ingredients, solvents, aromatics, clean-in-place solutions and other complex organics generated by pharmaceutical manufacturing facilities.

604-336-8900; www.axinewater.com

product spotlight

water

Powerful drive in a compact package

By Ted J. Rulseh

While the technology utilized in treatment plants continues to evolve, the footprint that technology occupies often needs to remain consistent. Danfoss has recognized that trend, with its **VACON X5 HazLo AC drive** designed to give water and wastewater facilities an application solution in a compact and cost-effective unit.

The drive has a robust design with safety-yellow-colored metal covers to protect against bumps and misuse, or full stainless steel enclosures. Because there is no additional box in which to place the drive, cooling is not an issue. This allows for high mounting flexibility and affordable installation cost.

The drive is available in frame size T3 and T4 for applications from 40 to 100 hp. It is designed to keep operating in harsh environments and built from the ground up to survive tough conditions while remaining simple to use. It is certified for Division 2 hazardous locations.

It is designed for the real world — a world that is not gentle or forgiving to electronic devices. In addition to water and wastewater treatment plants, it is suitable for a variety of applications such as petroleum refineries, gasoline storage and dispensing areas, dry cleaning plants where vapors from cleaning fluids can be present, spray finishing areas, aircraft hangars and fuel servicing areas, utility gas plants, and operations involving storage and han-

VACON X5 HazLo AC drive from Danfoss



dling of liquefied petroleum gas or natural gas. Applications in Class 2 and Class 3, Division 2 locations include grain elevators; flour and feed mills; producers of plastics, medicines and fireworks; producers of starch or candies; spice-grinding plants; sugar plants and cocoa plants; coal preparation plants and other carbon handling or processing areas; textile mills, cotton gins, cotton seed mills and flax processing plants; and plants that shape, pulverize or cut wood and create sawdust.

Its robust enclosure is a UL Type 4X with environmental ratings for indoor/outdoor use. There is no derating or purging needed. Its integrated brake resistor allows it to better handle high inertial loads and warm up in cold conditions. It offers reduced installation costs and can be mounted in low temperatures. A built-in multistep sequencer can replace a small PLC in many applications. It offers reduced investment costs and flexible application programming. 800-432-6367; www.danfossdrives.com



Centrisys/CNP CS6-4 compact centrifuge

The CS6-4 dewatering centrifuge from Centrisys/CNP is designed to bridge the gap between benchtop studies and full-scale installations. It continuously treats flows from 4 to 10 gpm, providing an alternative to conventional laboratory centrifuges that process samples in batches. The CS6-4 provides scalable solid-liquid separation data to move research and development projects forward.

262-654-6006; www.centrisys.com

Komax Systems Hi-Pass sludge mixer

The Komax Systems Hi-Pass sludge mixer is designed to achieve polymer savings in excess of 25 percent by effectively mixing polymer solution into sludge flows prior to the dewatering process. It is designed to be extremely resistant to fouling or clogging. The edges of the element sets are smoothly contoured with a large radius for high-fouling duty. The basis for the mixer design is a set of right rotation elements followed by a set of left rotation elements set at 90 degrees from each other. The mixer can efficiently perform pressure sensitive applications. It is capable of handling and mixing municipal sludges with solids up to

5 percent and of passing individual solid items with a nominal major diameter up to 25 percent that of the mixer. It prevents "stapling" of stringy materials in the flow and has a relatively lower pressure drop.

800-826-0760; www.komax.com



Parkson Corp. Aqua Guard video

Parkson Corp. announced the release of the latest video, *Why We Use Plastic Elements on a Headworks*

product spotlight wastewater

Keep tabs on industrial cyanide levels

By Craig Mandli

While cyanide is rarely an issue in municipal wastewater processes, it does have a useful role in some industrial applications. Now engineers responsible for those processes can employ the **S80-T80 Cyanide Analyzer Monitoring System** from **Electro-Chemical Devices** to ensure cyanide levels in wastewater effluent are compliant with local, state and federal regulations.

While cyanide is toxic, it is widely used by a variety of industries, including the manufacture of nylon and plastics, the case hardening of steel, metal plating, the separation of gold and silver from ores and the scrubbing of stack gases from blast furnaces. According to the U.S. EPA, the lethal oral doses of cyanide compounds generally range from 50 to 200 mg. In addition, short-term exposure to cyanide above the maximum contaminant level can cause rapid breathing, tremors and other neurological effects. Long-term exposure can cause weight loss, thyroid effects and nerve damage. The EPA's National Primary Drinking Water Regulations are legally enforceable primary standards and treatment techniques that apply to public water systems. These regulations limit the level of cyanide contaminants in drinking water to 0.2 mg/L.

The S80-T80 Cyanide Analyzer Monitoring System includes an S80 Pion Cyanide Sensor and a dual-channel T80 Transmitter, which help ensure effluent is treated to U.S. EPA regulatory requirements prior to discharge. Its ion electrode is a combination electrode with a silver cyanide/silver sulfide solid-state pressed crystal sensing element and a double junction reference electrode. The ion selective electrode cartridge develops a millivolt potential proportional to the concentration of free CN ions in the measured solution. The typical output is 54mV to 60mV per decade of change in concentration.

The speed of sensor response varies from a few seconds in concentrated solutions up to a few minutes in the lower ppm ranges.



S80-T80 Cyanide Analyzer Monitoring System from Electro-Chemical Devices

The ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. This analyzer measures cyanide from 0.2 to 260 ppm and auto-ranges the display between the ppb and ppm scales.

S80 sensors come in immersion or insertion packages that are designed with a 0.75-inch MNPT compression fitting as the process connection. This design employs a variable insertion length to accommodate installation in pipe tees, flow cells or through tank walls. The retractable configuration is designed with a 1-inch MNPT ball valve, a 1-x-0.75 inch reducer and a 0.75-inch MNPT compression fitting to provide the process connection. **800-729-1333; www.ecdi.com**

Screen (Aqua Guard). The video explains why teeth on the Aqua Guard screen are effective in assisting to remove solids and, ultimately, provide a reliable screening process with the high capture rates. To learn more about the elements and screen, watch the video at <https://youtu.be/xR4wwZHL8C8>. **888-727-5766; www.parkson.com**



Endress+Hauser Liquiline Compact CM82 transmitter

The Liquiline Compact CM82 transmitter from Endress+Hauser

accepts pH, ORP, pH/ORP, conductivity, oxygen and chlorine sensor signals from Endress+Hauser's Memosens sensor platform. Although small, it is a fully developed multi-parameter transmitter, with access available via 4-20mA HART, or Bluetooth from any iOS or Android device. As a loop-powered two-wire device, the CM82 can be connected directly to a control component, such as a programmable logic controller, which also serves as the power supply, eliminating the need for a power cable. A cable for the sensor connection is also not necessary because the sensor plugs directly into the transmitter. **888-363-7377; www.us.endress.com**

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James Donison was hired as Public Works director for Lebanon, New Hampshire. He replaces **Michael Lavalla**, who retired.

Mike Prinz was hired as general manager of the Las Gallinas Valley (California) Sanitary District.

Freese and Nichols hired **Karen G. Perez** to lead its wastewater, water and stormwater expansion efforts in the metropolitan area of El Paso, Texas.

Nathan Brockman was hired as plant superintendent for the City of Eagle Grove (Iowa) Wastewater Plant.

Dennis Porter was hired as utilities director for the Boulder City, Nevada.

The Wisconsin Wastewater Operators' Association announced these scholarships and awards winners:

- Crane Engineering Scholarship: **Victoria "Tori" Vouk**
- Wisconsin Wastewater Operators' Association Scholarships: **Bradley Prust** and **Shawn Magee**
- North Central Labs Scholarship: **Bryce Maoney** and **Daniel Lefebvre**
- Regional Operator of Year Award (Southern): **Kevin Bliss**
- Regional Operator of the Year Award (North Central): **Casey Jakubek**
- Regional Operator of the Year Award (Northwest): **Jaden Ebert**
- Regional Operator of the Year Award (West Central): **Dan Burns**
- Regional Operator of the Year Award (Southeast): **Patrick J. Nolan**
- Regional Operator of the Year Award (Lake Michigan): **Craig Lawniczak**
- Newcomer of the Year: **Matt Seib**
- George Bernauer Award: **Rusty Schroedel**
- Koby Crabtree Award: **Jim Miller**
- Service Award: **Dean Faulkner**
- Membership Award: **Jeff Simpson**

The Delaware Center for the Inland Bays awarded **Sussex County government** its Friend of the Bays honor for its work over the past 40 years to promote and build centralized wastewater service to communities surrounding the Inland Bays.

The Alaska Rural Water Association announced these award recipients:

- Wastewater Operator of the Year (under 1,000 population): **Ben Eisen**, Lower Kuskokwim School District
- Wastewater Operator of the Year (over 1,000 population): **Richard Klopp**, City of Homer
- Wastewater System of the Year (under 1,000 population): **City of Klawock**
- Wastewater System of the Year (over 1,000 population): **City of Wasilla**

The **Norfolk (Nebraska) Wastewater Treatment Plant** has received these awards:

- Nebraska Water Environment Association Scott Wilbur Outstanding Facility Award (14th consecutive year)
- Nebraska Water Environment Association Gold Safety Award (14th consecutive year)
- Water Environment Federation George W. Burke Jr. Facility Safety Award.

In addition, **Todd Boling**, wastewater superintendent, received the WEF Service Award for his work as the national WEF Delegate at Large. That included chairing the House of Delegates Nominating Committee and serving on the WEF National Nominating Committee.

events

Feb. 25-March 1

Rural Water Association of Utah Annual Conference, Dixie Convention Center, St. George, Utah. Visit www.rwau.net.

March 3-5

AWWA/WEF 2019 Young Professionals Summit, Renaissance Nashville Hotel, Tennessee. Visit www.awwa.org.

March 5-8

Utility Management Conference, presented by WEF and AWWA, Renaissance Nashville Hotel. Visit www.wef.org or www.awwa.org.

March 26-28

Kansas Rural Water Association Annual Conference and Exhibition, Century II Convention Center, Wichita, Kansas. Visit www.century2.org.

March 31-April 3

AWWA Sustainable Water Management Conference, Loews Ventana Canyon Resort, Tucson, Arizona. Visit www.awwa.org.

The **City of Fremont**, Nebraska, had the Best-Tasting Treated Water at the 2018 Nebraska American Water Works Association Conference. The city also received the Silver Safety Award and the 2018 Scott Wilbur Outstanding Facility Award for its wastewater treatment plant.

The **Orange County Water District** received the Huell Howser Best in Blue Award from the Association of California Water Agencies for its Groundwater Replenishment System Bottled Water Outreach Program, aimed at increasing public acceptance of indirect potable reuse as a drinking water source.

West Virginia American Water's **Huntington Water System** received a 20-Year Director's Award from the Partnership for Safe Water.

Henry N. Wochholz, a business and community leader who served for 41 years on board of directors of the Yucaipa Valley (California) Water District, passed at age 92. He is best known for leading a 15-year battle to build a sewer system to protect Yucaipa Valley's groundwater from failing septic systems and degrading groundwater supplies.

Ed Saxon, general manager of the Beaufort-Jasper (South Carolina) Water and Sewer Authority, retired after a 30-year career. **Joe Mantua** is his successor.

The Fairfax County (Virginia) Board of Supervisors appointed **Randy Bartlett** to lead the Department of Public Works and Environmental Services to succeed **James Patteson**, who retired.

The **Hebron (Ohio) Water Treatment Plant** received a Cooperative Weather Observer Award for providing weather observations to the National Weather Service for 25 years.

The **City of Bartlesville, Oklahoma**, received a Water Fluoridation Quality Award from the U.S. Centers for Disease Control and Prevention.

Michelle De Haan, water manager in the Park City (Utah) Water Department, received an Emerald Erlenmeyer Award from the AWWA for her work in drinking water research.

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