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SEPTEMBER 2017

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Water Plant Supervisor
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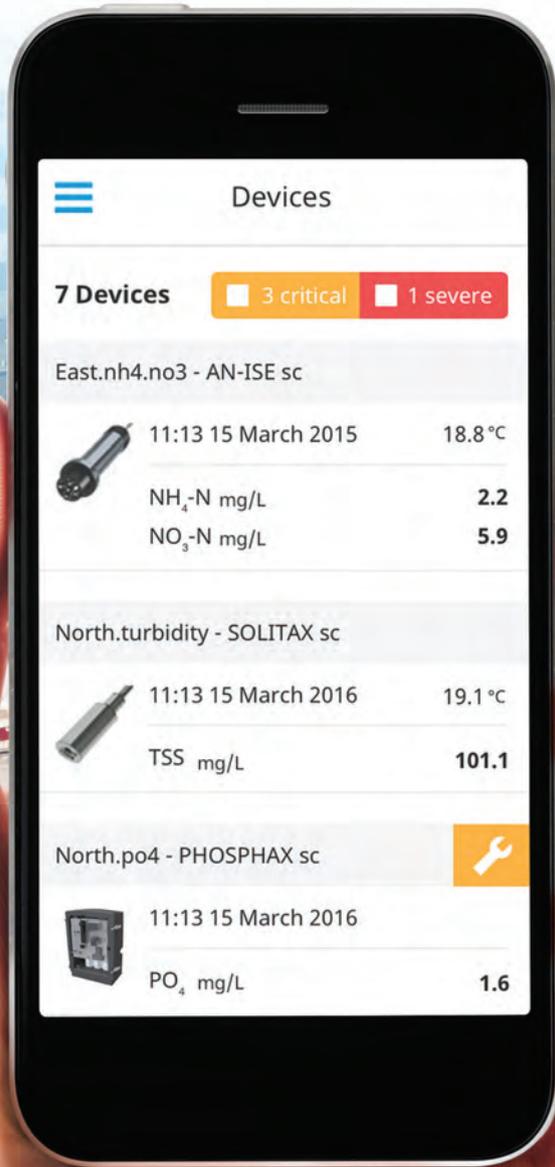
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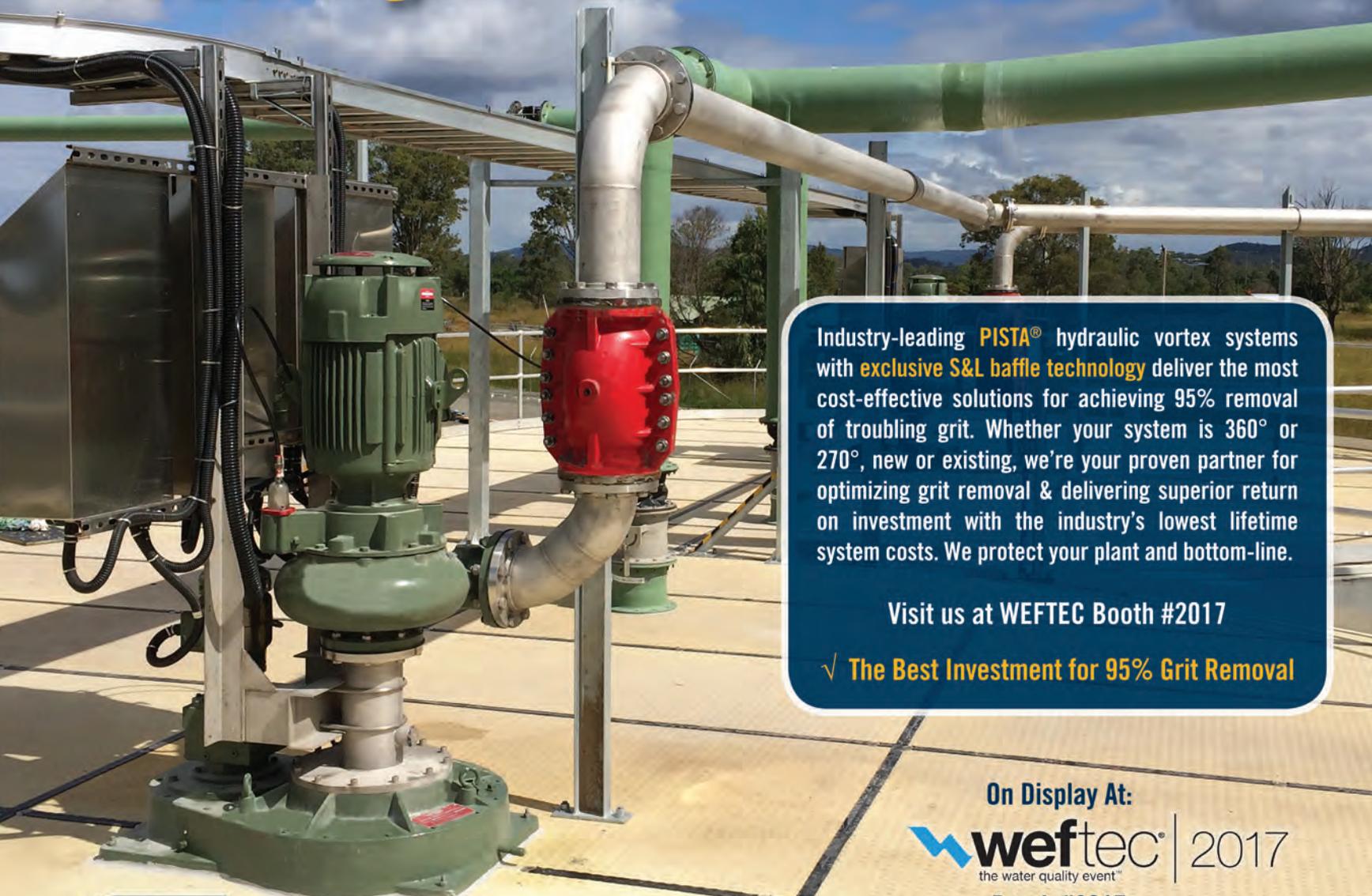
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on the cover

C. David Tuck and his team at W.R. Wise Water Treatment Plant in Greenwood, S.C., do everything possible to eliminate turbidity and have received the prestigious Partnership for Safe Water Phase IV Excellence in Water Treatment Award for 10 years running. The facility achieves about 99.9 percent removal from source water with an average turbidity of 12 NTU. Filtered water turbidity is less than 0.10 NTU 100 percent of the time. (Photography by Andrew Craft)

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By Ted J. Rulseh, Editor

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let's be clear

What We Leave Behind, What We Take Along

WHEN YOU LOOK TOWARD RETIREMENT, WHAT DO YOU SEE? HERE'S HOPING IT'S MANY YEARS OF REWARDING WORK DONE, AND MANY MORE PRODUCTIVE YEARS AHEAD.

By Ted J. Rulseh, Editor

Deep down we all want to leave a legacy — to leave behind more than a tombstone that after a number of years no one visits anymore.

I mention this knowing that many people who read this magazine are within eyeshot of retiring. What goes through a person's mind, in this profession or any other, when that cake is cut and farewells given on the very last day of the job?

To me, legacy is measured less in being remembered by others, and more in looking back and being able to say, "I did my best at something I cared about. I made a difference. My community and the world are better for my having been here." People retiring from the water treatment professions can say that in capital letters.



What's more, retirement doesn't have to mean separating oneself completely from the profession. A career

is not an all-or-nothing proposition. There are numerous ways to stay connected and keep contributing.

NOT GOING AWAY

The impetus to write these words came from operators recently featured in this magazine who, upon retirement, aren't looking forward just to gardening, golf, fishing or card games. They plan to continue serving the industry.

One example is William Grandner of New York City (profiled in August), retired but still a pillar of the New York Water Environment Association and a mentor to new as well as more seasoned operators. Another is Scott Thompson of Bend, Oregon (profiled in this issue), newly retired but planning to continue working as a consultant to treatment plant teams.

Retirement, for many people, has a different look and feel these days. By tradition, retirement meant receiving the gold watch and heading off into the sunset, to a life of leisure. But many people ultimately find that life deeply unsatisfying. Without the stimulation and challenges of work, they became bored, depressed and downright unhealthy.

In his book, *The New Retire-Mentality*, Mitch Anthony advocates retirement with a purpose. He sees retirement as a chapter of life when, if we have planned our finances properly, we have freedom to engage in work that “capitalizes on our gifts and gives expression to our deepest-felt avocational desires.”

Anthony disputes the entire idea of retirement as a finish line. “Once the finish line is removed,” he writes, “we are left to ponder our present realities and future hopes.” And, I would add, our past accomplishments and satisfactions.

BACK AND FORWARD

Even in the new conception of retirement, there comes a day when the full-time career ends. That’s a moment for reflection on what has been and what will be. As a treatment plant operator, you can certainly look back on many years of helping keep the waterways clean, or supplying households with a safe and reliable water supply.

Also, depending on the position you held, you might reflect with pride on having groomed a worthy and well-qualified successor, built a highly skilled operations team, and created an up-to-date, efficient facility that will serve customers cost-effectively for many years.

That’s what you leave behind. What do you take forward? Everything you’ve learned in your career, including not just technical skills and knowledge, but the capacity to work with and lead others and unlock their potential. All that can serve you well in post-job endeavors, whether or not they involve the water industry.

For many of us, retirement, no matter how we define it, is in large measure about giving back. It’s not that we haven’t given so over the years. It’s not that we didn’t contribute to

I believe most of us want to be of service, not out of some sense of guilt or obligation, not so someone will name an award or a scholarship or a building after us, but because, after all, we care, there’s work to be done, and at long last we’re available.

our communities. But if an important measure of our lives is whether we “moved the needle” for good, there is more still to do, and retirement is an ideal time.

To me, the key to being happy in the later years is doing things that matter, to ourselves and to others — getting out of bed in the morning with just as much conviction and sense of purpose as when we worked for a salary. I believe most of us want to be of service, not out of some sense of guilt or obligation, not so someone will name an award or a scholarship or a building after us, but because, after all, we care, there’s work to be done, and at long last we’re available.

There’s a saying attributed to Steven Grellet, a Quaker missionary: “I expect to pass through this world but once. Any good, therefore, that I can do or any kindness I can show to any fellow creature, let me do it now. Let me not defer or neglect it, for I shall not pass this away again.”

It’s worth remembering. **tpo**

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INFRASTRUCTURE INVESTMENT

Convincing Consumers

The adage “out of sight, out of mind” is common in the water and wastewater industry. It’s often used when referencing the public’s awareness — or lack thereof — about the importance of the infrastructure that lies below the ground and at treatment plants. Utilities must work to educate consumers about the manpower and expense that is required to maintain that infrastructure.

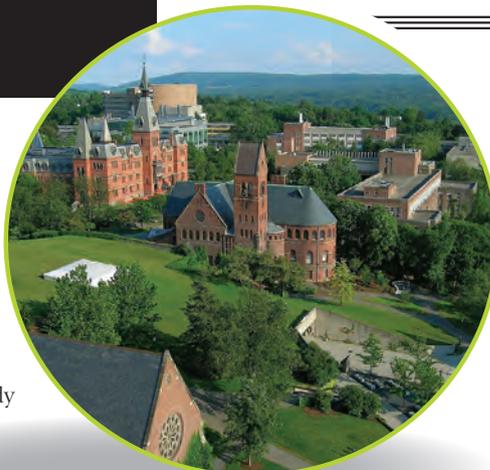
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CLEANING WASTEWATER

Nanofiber Electrodes

Materials scientists and bioelectrochemical engineers from Cornell University recently teamed up in an effort to create a new cost-effective electrode material for treating wastewater. The electro-spun carbon nanofiber electrodes are coated with a conductive polymer that could compete with carbon cloth electrodes already available to treatment plant operators.

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OVERHEARD ONLINE

“From here, we can design receptors so that they can bind selectively with pharmaceuticals in the water so they can be effectively removed.”

Scientists Find Supermolecule That Removes Pharmaceuticals From Water
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PILOT PLANT

Making Fuel

The University of Minnesota is piloting a plant capable of converting wastewater treatment byproducts into biodiesel fuel. While wastewater scum is typically treated by anaerobic digestion to make biogas or is disposed of in a landfill, the new process developed by university researchers allows plants to convert scum to biodiesel that is usable by campus utility vehicles.

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A 'Toy Store' for Operators

COMPLEX PROCESSES HOLD ABUNDANT CHALLENGES AND SATISFACTION FOR STAFF MEMBERS AT THE MILLARD H. ROBBINS JR. WATER RECLAMATION PLANT

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **James Robinson**

An experienced and cross-trained team keeps a complex treatment process operating smoothly for the Upper Occoquan Service Authority.



“We’re like Major League Baseball here. We keep statistics on everything. We do that for process control and economic reasons.”

BOB CANHAM

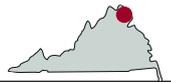
AN OPERATOR JOINING THE TEAM AT THE MILLARD

H. Robbins Jr. Water Reclamation Plant will find enough processes, learning opportunities and challenges to last a long time.

“We’re a wastewater treatment plant with a water plant bolted onto the back,” says Brian Owsenek, P.E., deputy executive director for process and maintenance for the Upper Occoquan Service Authority, the facility’s owner. From end to end, the plant’s multiple treatment steps have been tested, automated, monitored and fine-tuned. Hundreds of standard operating procedures guide operators through tasks from routine maintenance to unplanned repairs.

The operations team faces the challenge of producing water for indirect potable reuse: The facility discharges to Virginia’s Occoquan Reservoir, source of drinking water for Northern Virginia. The wastewater treatment side uses the modified Ludzack-Ettinger (MLE) secondary process. The water treatment side is built around a challenging but extremely effective high lime process, followed by multimedia filtration and carbon adsorption.

Millard H. Robbins Jr. Water Reclamation Plant, Upper Occoquan Service Authority, Centreville, Virginia



COMMISSIONED: | 1978

SERVICE AREA: | Manassas and Manassas Park; parts of Fairfax and Prince William counties

POPULATION SERVED: | 300,000

FLOWS: | 54 mgd design, 32 mgd average

TREATMENT LEVEL: | Tertiary

TREATMENT PROCESS: | Activated sludge followed by water treatment plant with high lime treatment, multimedia filters and carbon adsorption

BIOSOLIDS: | Pelletized for fertilizer

RECEIVING WATER: | Occoquan Reservoir for indirect potable reuse

ANNUAL BUDGET: | \$30.3 million (operations)

WEBSITE: | www.uosa.org

GPS COORDINATES: | Latitude: 38°48’37.19”N; longitude: 77°27’43.36”W

Final disinfected effluent consistently meets a phosphorus permit limit of 0.1 mg/L and a COD limit of 10 mg/L.

It’s all overseen by a meticulously trained and highly qualified staff. “For a process guy, working here is like being a kid in a toy store,” observes Bob Canham, director of the Treatment Process Division. “For operators, there isn’t a lot of boredom here because there’s so much to learn. We keep our folks engaged by moving them around.”

GUARDING THE RESERVOIR

The Upper Occoquan Service Authority was formed in the late 1970s as

Mentorship and diligent training help ensure that the plant's 38 operators are proficient in multiple processes.

development around Washington, D.C., began to overload 11 small package wastewater treatment plants, whose discharges were degrading the Occoquan Reservoir. The Millard H. Robbins plant was commissioned in 1978 and expanded from an initial design capacity of 15 mgd to 54 mgd.

Effluent from the plant travels about 20 miles in the reservoir before reaching the water treatment plant at Occoquan that treats and distributes water to a significant portion of northern Virginia. "During normal weather, we account for a small fraction of the flow into the reservoir," says Owsenek. "During drought, we can account for up to 90 percent, and we become the reason why northern



After primary treatment, Internalift screw pumps (Evoqua Water Technologies) deliver the flow to a biological selector process.

Virginia is not exposed to water shortages. We have allowed the safe yield of that reservoir to grow because of the water we recycle into it.

"We also recognize that the majority of water we discharge ultimately flows into Chesapeake Bay, which is a national treasure. The bay has been recovering over the years, but the major problems are nitrogen and phosphorus. From day one, our permit requirements for those nutrients have been on the bleeding edge."

Owsenek and Canham bring strong credentials to their roles, each backed by 30-plus years of industry experience. Owsenek holds bachelor's and master's degrees in mechanical engineering, while Canham holds a bachelor's in civil and a master's in environmental engineering. With John Connelly, training manager, and the shift managers and assistants, they work diligently to make sure the 38 plant operators are proficient in the plant's multiple processes and cross-trained for flexibility.

DRIVING DOWN NITROGEN

The UOSA is a wholesaler, receiving flow from Fairfax County, the Prince William County Service Authority, and the cities of Manassas and Manassas Park.

Influent enters the headworks and passes through 1/2-inch climber bar screens (SUEZ) and a four-chamber PISTA Grit system (Smith & Loveless). A chemical scrubber at the headworks uses bleach and caustic soda to remove hydrogen sulfide and other odorous compounds. "We're proud that our plant is essentially odor-free and has essentially no impact on our neighbors," says Owsenek.

The flow then passes to six 125-foot-diameter primary clarifiers with aluminum covers and an odor scrubber using activated carbon (Calgon Carbon). Next, Internalift screw pumps (Evoqua Water Technologies) deliver the flow to a biological selector process where return activated sludge is added to the primary effluent for a short detention time in a zone with a high food-to-microorganism ratio, a step designed to limit bulking.

That's followed by seven separate trains of 15-foot-deep aeration basins using the MLE process to remove ammonia, TKN and COD, while lowering nitrate to about 8 mg/L. Fine-bubble diffusers (Sanitaire, a Xylem brand) supply oxygen delivered mainly by a pair of 600 hp high-efficiency APG-Neuros turbo blowers. Several older blowers are operated alternately during summer peak flow periods. The last step on the wastewater side consists of 10 125-foot-diameter secondary clarifiers.

COMPLEX — AND EFFECTIVE

Secondary effluent enters the high lime chemical treatment process. "The high lime process was in vogue in the 1970s," says Owsenek. "Other entities that tried to use it gave up on it. Given our unique mission, and because we're stubborn cusses, we kept at it. It is the most robust process for broad-spectrum treatment of water. Our staff takes pride that we are the only ones using this expensive, difficult process."

The main purpose of the high lime process is to meet the plant's extremely low phosphorus limit, but in addition it provides a barrier against pathogens. Canham states, "We add lime slurry to the secondary effluent and rapidly raise the pH to about 11 in six rapid-mix chambers. Then we go into a slow, quiescent mixing step where we flocculate it to promote attraction between the calcium and the phosphorus."

In an automated control loop, lime slurry is added based on flow to maintain the pH setpoint.

Seven 125-foot-diameter clarifiers then allow the calcium phosphate to settle by gravity. The plant team discovered through testing that reseeded the incoming flow with the calcium phosphate sludge enhances clarifier performance.

(continued)



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The staff's focus on meticulous housekeeping is apparent in the advanced treatment plant's pipe gallery.

“The high lime process was in vogue in the 1970s. Other entities that tried to use it gave up on it. Given our unique mission, and because we're stubborn cusses, we kept at it. It is the most robust process for broad-spectrum treatment of water.”

BRIAN OWSENEK

Clarification is followed by first-stage recarbonation by injection of carbon dioxide, produced as exhaust from on-site combustion devices including a biogas-fueled engine-generator. “We drop the pH to about 10 to promote the precipitation of hardness — the calcium and magnesium carbonates,” says Canham. “Downstream from that is another set of seven clarifiers where we settle out the carbonate sludge.”

Next comes second stage recarbonation, where more carbon dioxide addition lowers the pH to about 7.5. Ten multimedia gravity-flow filters (Leopold Type S underdrains) and then 12 pressure filters use anthracite, sand and garnet media to remove remaining suspended solids. Alum is also added to precipitate more phosphorus.

The flow then passes through one-time-reactivated granular activated carbon (Calgon Carbon) for adsorption of refractory organic compounds (to reduce COD) and to remove color, taste and odor. On-site furnaces regenerate the carbon as required. The water is disinfected with sodium hypochlorite and dechlorinated with sodium bisulfite before discharge with turbidity of 0.2 NTU.

SOLIDS SIDE

Chemical sludge is dewatered in gravity thickeners (Walker Process and EIMCO/Ovivo USA) to 5 to 15 percent solids and then to 50 percent solids

in recessed-chamber filter presses before burial in an on-site landfill. The recessed-chamber presses replaced older hydraulic filter presses that yielded solids percentages in the 40s, according to Kevin Gately, solids process man-



Henry Fominyam, training lead operator, monitors various systems at the plant. *(continued)*



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A TWIST ON NITRATE REDUCTION

The Upper Occoquan Service Authority is in an unusual position related to nitrate discharges: It's required to discharge more nitrate than its neighbors to help protect the health of its receiving water, the Occoquan Reservoir.

"In northern Virginia, we're very concerned about nutrient discharges into Chesapeake Bay," observes Brian Owsenek, deputy executive director. "Most neighboring facilities have much lower effluent limits for nitrate than we do."

The Occoquan Reservoir thermally stratifies in summer — warmer, oxygen-rich water in the surface layer and colder, oxygen-poor water in the depths. As a result, anaerobic processes in the deep water release ammonia, phosphorus, manganese, hydrogen sulfide and other problematic compounds. "We are compelled to discharge more nitrate than is normal in this area in order to control

that anaerobic activity," Owsenek says. "As part of a partnership involving Fairfax Water and the Occoquan Watershed Monitoring Laboratory, we actively control the nitrate we discharge to regulate the health of the reservoir and prevent those secondary releases."

In the absence of oxygen, nitrate substitutes as a terminal electron acceptor, preventing the release of ammonia and keeping anaerobic fermentation processes from occurring in the deep water of the reservoir.

"We seasonally control the amount of nitrate we discharge," says Owsenek. "In summer we turn off our modified Ludzack-Ettinger process, and even then we sometimes struggle to get our nitrate high enough to satisfy the reservoir's needs. In winter, we run the MLE process, optimize it, and remove nitrate. Overall, we have an annual cap of 1.3 million pounds of nitrate that we're allowed to discharge, and that we have to discharge."

The leadership team at the water reclamation plant includes, from left, C.G. Goldizen, operations manager; Brian Owsenek, deputy executive director; Bob Canham, Treatment Process Division director, and Kevin Gately, solids process manager.



ager. The drier material will help extend landfill life: "If you produce wetter cake, then you either have to let it dry or add soil to it." That added soil would consume landfill space.

Wastewater treatment sludges are delivered to three 1-million-gallon anaerobic digesters that produce about 250 cfm of biogas. After treatment for hydrogen sulfide and siloxane removal, the gas feeds an 850 kW Jenbacher engine-generator (GE Energy) that in 2016 produced 6.72 million kWh, about 25 percent of the plant's electricity usage. Heat captured from the engine exhaust and jacket water warms the digesters. Cogeneration system availability exceeds 95 percent.

Biosolids from the digesters are dewatered to 22 percent solids in four centrifuges (Alfa Laval and Westfalia/GEA Group). Two natural-gas-fueled pelletizers (Andritz) yield pellets at 95 percent solids, which contractor Synagro markets and sells to farms and commercial fertilizer blenders.

The addition of the Andritz pelletizer about three years ago ended production and hauling of lime-stabilized material. "Pelletization saves us a ton of money in hauling fees," Gately says. "When we did a combination of lime stabilization and pelletizing, we were spending upwards of \$30,000 a month in hauling fees. Now our hauling fees in a given month are below \$10,000 and are usually much lower."

"Generally, we only run one pelletizer train, but especially in spring when we're trying to get our solids inventory down for the summer, we have to run both periodically. The Andritz unit is a newer technology and is more automated. The second unit is an older one and we have to make the adjustments manually."

METICULOUS CARE

At each step of the process, the UOSA team takes pride in striving for continuous improvement based on data. "We're like Major League Baseball here," says Canham. "We keep statistics on everything. We do that for process control and economic reasons."

Essential to plant performance are managers accountable for specific process areas. Juergen Roessler serves

(continued)



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as process manager responsible for the technical side and C.G. Goldizen as operations manager in charge of operations. Other key managers and their duties in addition to Gately are:

- Gary Cooper, evening shift manager and digester/cogeneration process
- Frank Hogan, assistant shift manager and advanced treatment (filters, carbon system, carbon regeneration furnaces)
- Kevin Shrewsbury, assistant shift manager, solids thickening and transfer
- Mike Clark, night shift manager, preliminary and primary treatment
- Ben Caoili Jr., day shift manager, chemical treatment and disinfection
- Nas Fahmy, assistant shift manager, recarbonation

Illustrating the strategies employed to keep the process in tight control, Owsenek describes the phosphorus removal feedback loops. “We have two processes that control phosphorus: lime addition and alum addition. Ben Caoili controls the lime setpoint to maintain the pH necessary to remove the large bulk of the phosphorus. Frank Hogan controls alum addition to regulate the phosphorus actually leaving the plant.

“They work together with extensive rules we’ve developed over the years to control the two setpoints in what we think is the most efficient way. Every day, Ben and Frank pull up our lab data sheet, check the phosphorus numbers, coordinate with each other, and set those pH and alum targets.” Control on the alum side is aided by inline phosphorus analyzers (Hach).

Strict discipline applies to process control and purchasing decisions. For the activated carbon used to scrub the air from the primary clarifiers, plant

“When we hire people, even those with a lot of experience, they go through a multiyear development program where have to pass tests in each section to demonstrate mastery and knowledge.”

BRIAN OWSENEK

leaders specified carbon not just on the basis of price per pound of material but on pounds of hydrogen sulfide removed per dollar. They explored on-site regeneration of that carbon but found it wasn’t feasible.

The team also tested polymer addition as a way to improve settling in the first set of chemical treatment clarifiers; it helped, but not enough to justify the added expense. “Sometimes we step up to bat and strike out, but we always step up to bat,” says Canham.

The high lime process itself is a challenge for operators. “Calcium carbonate scale forms all over the process,” Owsenek says. “It’s a very labor-intensive process, but it is extremely effective, and in our role as a reclaimer of water it is an essential part of our strategy. We basically have to make it work.” Several team members spend most of their time year-round descaling clarifiers, floc basins, rapid mix basins, mixers, pumps and other equipment.

TRAINED FOR THE TASKS

Given the challenges, it’s easy to understand UOSA’s emphasis on training. “As most people in the industry know, it’s very hard to find and bring in experienced operators,” Owsenek says. “Because we have so many pro-

cesses, even when we are able to find people from the outside, they come in here at close to the ground level.

“John Connelly, who used to be a shift manager, moved into the training manager role and administers our career ladder process. When we hire people, even those with a lot of experience, they go through a multiyear development program where they have to pass tests in each section to demonstrate mastery and knowledge.

“There are 14 tests available, and each one is associated with a pay adjustment — basically a promotion. That allows us to bring in people at a salary commensurate with their limited knowledge of the plant and over the course of two to five years promote them as they gain knowledge, skill and confidence. It’s a very effective way of motivating people to learn the nitty gritty of the plant.”

The curriculum encompasses theoretical training by way of the California State University, Sacramento courses, and on-the-job training side by side with experienced operators, followed by sign-off upon mastery of specific tasks. “Then we have a capstone where we encourage our people to take the Commonwealth of Virginia Class 2 Wastewater Operator certification test,” says Owsenek. “That’s one of the final steps of the career ladder.”

Electronic tools support the operators and management. Software called eLogger lets operators from each plant section enter observations, problems, work orders and other items. These are available to the entire operations and management staff. “It helps us stay up to date on what’s going on around the plant,” says Owsenek. “We have a permanent archive.”

Meanwhile, PolicyTech software (NAVEX Global) serves as a repository for standard operating procedures: “All our SOPs are legible, direct and short. We capture the knowledge as best we can. Several hundred standard procedures and policies are in the system.”

The UOSA team is by no means content with the status quo. One future project: Finding a way to recycle the 3 to 5 percent of biosolids pellets that don’t pass quality control and at present are landfilled. “There are always things to learn,” Owsenek says. “There’s always research to be done, always a higher level of quality we can provide.” **tpo**

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Sustainable Through and Through

THE DRYDEN WASTEWATER TREATMENT PLANT MAY BE THE FIRST IN NORTH AMERICA TO ACHIEVE LEED CERTIFICATION FOR THE ENTIRE FACILITY AND PROCESSES

By Steve Lund

Dean Walker appreciates the view from his workplace. Numerous windows in the Dryden Wastewater Treatment Plant overlook the Wabigoon River, the plant's receiving stream.

"You can get a view of the river from several rooms," says Walker, waterworks manager for the city of Dryden, Ontario. "In summer you can see eagles hunting over the river. In winter you can see otters playing on the ice. It's a nice place to work."

It's also easy on the environment. The plant, commissioned in January 2014, received LEED Silver certification last November from the Canada Green Building Council. LEED-certified buildings must meet high standards in sustainable site selection, water savings, energy efficiency and other factors. LEED stands for Leadership in Energy and Environmental Design.

The certification is a point of pride in Dryden, a city of 7,600 in north-west Ontario. "We are very proud as The Wilderness City to showcase a LEED-certified structure that not only includes the building, but additionally the plant and processes," says Blake Poole, manager of Public Works. "This plant meets the goals of sustainability and delivers on environmental responsibility, energy efficiency and innovative design and processes."

The plant was designed by Stantec, a global engineering and architectural company. Although other wastewater treatment plants have LEED-certified buildings, Stantec designers believe the Dryden plant is the first entire wastewater facility in North America to attain LEED status. Features that earned credit toward LEED include:

- Reusing the final effluent for plant washdown and cleaning
- Reusing heat generated by blowers
- Reusing heat in exhaust air from the ventilation system
- Minimizing light pollution by designing for lowest possible light levels while still meeting safety and security requirements
- Using high-efficiency electrical equipment, such as motors and lighting



As a LEED-certified facility, the Dryden plant had to meet high standards in sustainable site selection, water savings, energy efficiency and more.



The plant has a sustainable design from the treatment processes to the office work spaces.



The new plant includes a state-of-the-art laboratory.

- Providing bicycle storage and showers for staff to encourage alternative transportation
- Reducing water use with waterless urinals and low-flow showers, toilets and sinks
- Using nearly 60 percent regionally produced materials in construction
- Using low-VOC paints, coatings and sealants to maintain good indoor air quality

TREATMENT INDOORS

One unique aspect of the plant's design is the funneling of wastewater through a building during the entire treatment process. Heat pumps capture heat from the process effluent to heat the building and provide some areas with in-floor heating.

Keeping the treatment tanks inside also helps minimize odor in the neighborhood. Odor control begins just as the wastewater enters the building: A fan draws air off the influent and sends it through biofilters and charcoal. As a result, even with wastewater flowing under the floor, the office space is odor-free. "It smells like a normal office," says Walker. "There's no smell at all."

The windows that provide scenic views are also part of the plant's energy-efficient design. The windows admit natural light, minimizing electricity usage for lighting. Sensors vary the amount of artificial lighting according to need.

“This plant can potentially get the highest recovery, 96 percent, of any nanofiltration plant in the world.”

DR. FRED BLOETSCHER

As wastewater enters the building, it passes through a 10 mm fine screen and grit cone (both from Xylem). Then the flow is divided into two sequencing batch reactor (SBR) tanks (also Xylem) under the floor. After settling and aeration, the effluent is decanted. Solids are transferred to holding tanks and then dewatered on rotary presses (Fournier) to 13 to 18 percent solids. The plant sends about four 17-cubic-yard bins of dried material to the landfill per week.

SBR effluent is recycled through the plant for heat recovery. Before discharge, the effluent is disinfected in a UV system (Ozonix). Disinfection is required only from May through October.

RESPONSIVE PROCESS

Walker says the new plant responds relatively quickly to operational changes, such as adjustments in aeration: “It’s very easy to run. Process changes seem to happen fairly quickly.”

The UV disinfection system has four banks of bulbs and a control panel. “It’s very efficient, very easy to use,” says Walker. “We can turn on more bulbs as needed. If the flow increases, more bulbs come on. There is a lot more technology with this plant. There is a lot more monitoring.”

A SCADA system monitors plant processes and connects to the water treatment plant on the other side of the city. Both facilities can be controlled remotely. There is an alarm center at each plant, and one operator is on call 24 hours a day.

SUSTAINABLE PRACTICES

Sustainability doesn’t end with the plant’s design. Operators need to be attentive in day-to-day activities to maintain the LEED certification. “It’s ongoing, even down to the cleaning products we use, including the paper towels,” Walker says. “They all have to be green certified.”

As part of the certification process, Walker had to go to the plant at night to take photos to document the absence of light pollution. “There were quite a few hoops that I had to jump through and a lot of paperwork,” he says.



Sustainable features include automation that enables the plant to respond quickly to changes in the wastewater stream.

The plant’s design capacity is 2.6 mgd; average flow is about half that. The plant replaced an old facility that was at the end of its life and too often overwhelmed by rain events and snowmelt, leading to bypassing.

That hasn’t happened at the new plant, except on Aug. 12, 2016, when Dryden received nearly 6 inches of rain in about two hours. The deluge left standing water in parking lots and streets, and numerous homes were damaged by flooding and sewage backups. “It was more than the plant could handle,” Walker says. “We had to bypass for about eight hours. That much water in that short a time was more than anything could handle.”

The LEED designation gives Dryden bragging rights, important for a city that emphasizes its connection to the wilderness. Plant workers can appreciate that connection every day when they look out the windows. “There are always deer there and a couple of groundhogs,” says Walker. “There’s all kinds of wildlife.” **tpo**

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CHANGE MAKES IT GREAT

HATFIELD AWARD-WINNER SCOTT THOMPSON THRIVES ON THE CHALLENGES THAT GO WITH PLANT UPGRADES, NEW PROCESSES AND ADVANCING TECHNOLOGY

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Joe Kline**

SCOTT THOMPSON ADMITS THAT DAILY LIFE IN A CLEAN-WATER plant can be routine. But over many years, constant change makes for a thrilling career.

In more than 30 years at the Bend (Oregon) Water Reclamation Facility, Thompson has seen design capacity expand from 1 mgd to 6 mgd while regulations have tightened. He has helped direct a major change to the secondary treatment process and the addition of a water reuse system. And he has spurred his team to implement new technologies that improve treatment efficiency and performance.

“I love this field,” says Thompson, winner of a 2016 William D. Hatfield Award from the Pacific Northwest Clean Water Association (PNCWA). “The wastewater field is always changing. I’ve always endorsed change, and I’ve encouraged my operators to do the same. I tell them to be proud of putting out clean water to the environment 24 hours a day, every day.”

He’s especially proud of advances in the plant’s biosolids program, which includes land application of dewatered Class A material on farmland, a pilot project in mine land reclamation with the U.S. Forest Service, and plan to mix compost with biosolids to create a nutrient-rich garden mix.

ACCIDENTAL OPERATOR

Like many clean-water professionals, Thompson came to the profession by chance. After high school in The Dalles, Oregon, he studied to become a welder and joined the Iron Workers Union, building bridges and high-rises, the same career path his father chose.

“Then the economy crashed in 1980 and I found myself out of work, going fishing quite a bit,” he says. A friend told him the city of Bend had an opening for a sewer line cleaner. “I thought, well, my unemployment is about to run out. My mom’s probably getting tired of me hanging around the house. So I



Scott Thompson, program manager, Bend (Oregon) Water Reclamation Facility

took an interview with the plant manager. He hired me right on the spot.”

He earned \$6.10 an hour to start after making \$17 in construction, but when he moved to the treatment plant after a year, he found a calling: “What it took to treat wastewater fascinated me. Taking samples, taking them to the lab, running BODs, chlorine residuals, coliforms and turbidities. It was amazing, the transformation from what the water looked like coming in and what it looked like going out of the plant. It just grabbed me.”

NO STREAM DISCHARGE

The Bend plant sits on 1,600 acres of range land. Effluent discharges to evaporation/percolation ponds on the property. BOD and TSS permit limits are 20 mg/L, stricter than for typical stream discharge. Both parameters in effluent average less than 10 mg/L.

“Our groundwater is about 600 feet deep in the high desert here,” says Thompson. “We have monitoring wells up-gradient and down-gradient of the ponds. We monitor those wells quarterly to make sure we’re not having any adverse effect on the groundwater.”

For the first 15 years of Thompson’s tenure, the plant ran a conventional activated sludge process. The community grew rapidly, and by the mid-1990s was treating nearly 4 mgd. “We knew a nitrogen permit limit was coming from the Department of Environmental Quality, so we pilot-tested the modified Ludzack-Edinger (MLE) process, which includes nitrification and denitrification.

“We had good results, so we retrofitted our two aeration basins and added a third one. When we switched to MLE, our process control was greatly simplified. Before that, we would go through episodes of filamentous bulking with *Nocardia* and struggle to make permit. Nitrification really smoothed out the process. It’s much easier to control.”



“What it took to treat wastewater fascinated me. ... It was amazing, the transformation from what the water looked like coming in and what it looked like going out of the plant. It just grabbed me.” **SCOTT THOMPSON**

ABOVE: Scott Thompson encourages teamwork to help solve problems. Microscopic observations are discussed in weekly meetings. From left, Erynne Fore, George McConnell, Thompson, and Roy Bradley.



Staff members from the city of Bend’s Water Reclamation Facility include, from left, Marc Mickey, Joe Burghardt, Ethan Parent, Roy Bradley, Sam Borgognoni, Scott Thompson, Erynne Fore, Aaron Utley, George McConnell and Lance Finney.

Scott Thompson, Bend (Oregon) Water Reclamation Facility



POSITION: | **Program manager**

EXPERIENCE: | **35 years with city**

EDUCATION: | **Supervisory leadership,
Oregon State University**

CERTIFICATIONS: | **Class IV Wastewater Treatment**

AFFILIATIONS: | **WEF, PNCWA, ACWA, Northwest
Biosolids Management Association,
Oregon Association of Clean Water
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“We send our new people to short schools and work side by side with them, going through the facility standard operating procedures. It takes almost a year before they feel comfortable.”

SCOTT THOMPSON



Scott Thompson (left) talks with Tim Truax, operations manager, at the Bend Water Reclamation Facility. Truax is scheduled to replace Thompson when he retires.

LAUNCHING RECLAMATION

In 2005, the team added a water reuse facility using AquaDisc filters (Aqua-Aerobic Systems) to achieve less than 2 NTU turbidity. The city supplies reclaimed water from spring into fall to a resort and golf course for irrigation.

In 2008, the plant went through its first major equipment replacement project. The existing headworks was replaced by a screening system (JWC Environmental) with 3 mm and 6 mm punch plates and a Muffin Monster screening washer/compactor (also JWC). “It costs about \$20 a day in electricity to run that system,” says Thompson “That’s because we tapped into the hot-water loop of the anaerobic digester boiler system to heat the building and

provide hot water to clean the screens automatically through the SCADA system at 100-hour intervals.”

The fine screening helped elevate the biosolids to Class A by efficiently removing debris that otherwise passed through the process. Grit removal at the headworks isn’t necessary because with only about 10 inches of annual rainfall and deep groundwater, I&I is extremely low and very little grit is washed into the collections system. Grit settles in the primary clarifiers.

Primary and waste activated sludges are anaerobically digested, yielding about 1,300 dry tons per year. For 18 years of Thompson’s career, liquid biosolids were land-applied. Now the material is dewatered on a belt filter press (BDP Industries) and solar-dried to 90 percent solids on asphalt drying beds before land application.

At present, Thompson is working with DeSchutes Recycling to blend Class A biosolids and some recycled yard trimmings to make a compost available to the local gardening community.

LEADING THE TEAM

Now functioning as a program manager, Thompson worked his way up the ranks at the Bend plant, becoming senior operator in 2000 and operations supervisor in 2006. His team includes:

- Tim Truax, his successor as operations supervisor
- George McConnell, water reclamation operations lead, and Roy Bradley, Sam Borgognoni, Aaron Utley, Ethan Parent, Erynne Fore and Elmer Roshone, operators
- Joe Burghardt, water reclamation plant mechanic lead, and Lance Finney and Marc Mickey, mechanics

Thompson leads a staff of whom seven have five years’ or less experience in the field and two more are set to retire in the next couple of years. That makes mentoring and training essential. He created an apprenticeship program in Bend to help groom a new generation. Its first enrollee was to begin the program this past summer.

“In my career I’ve hired and trained a number of people, and after a few years they move back over to the west side of the Oregon Cascades,” Thompson says. “It’s been a little difficult to retain staff here. Some of the people were trained at small plants and private utilities, to the south of us. Our last two hires attended two-year wastewater programs at community colleges. We

NEW LIFE FOR OLD MINES

Scott Thompson sees biosolids management as the most challenging side of wastewater treatment. In his years with the city of Bend, he has worked to make the process easier, less costly, and more beneficial.

Thompson is proud of a four-year pilot project aimed at testing Bend’s Class A biosolids as a soil amendment to help reclaim land depleted by mining. The city has partnered on that project with the U.S. Forest Service and the Oregon Department of Environmental Quality.

The mine reclamation site lies along Clear Creek in northeast Oregon’s Granite Creek Watershed, which includes mostly land in the Wallowa-Whitman and Umatilla national forests. The watershed is designated high risk/high value, partly because it sends water to the lower John Day River, which supports critical salmon and steelhead habitat.

For the reclamation project, started in 2014, researchers created seven test plots that received treatment with different soil amendments and combinations: biosolids, biochar (a charcoal product made in the absence of oxygen), wood chips, biosolids and biochar mixture, biosolids and wood chips mixture, biochar and wood chips mixture, and biosolids with biochar and wood chips. An eighth (control) plot received no treatment. The plots were then planted or seeded with grasses and vegetation.

Preliminary results showed that the plot with biochar and biosolids supported much more growth of grasses and vegetation than the others. Preliminary conclusions stated that treating mined land with biosolids, biochar and wood chips create opportunities for soil restoration in the western U.S. The pilot project is continuing through 2018; the researchers recommended further research with larger test plots.

send our new people to short schools and work side by side with them, going through the facility standard operating procedures. It takes almost a year before they feel comfortable.”

Thompson benefited from a nine-month supervisory leadership program in 2000-01 at Oregon State University. As part of a class with 15 members from public entities and private industry, he practiced public speaking, teamwork, leadership, conflict resolution and other skills.

He helps motivate and train staff members by encouraging them to work as teams to solve problems: “When we have a process control challenge, we all sit down together and try to work out a solution. Should we waste more sludge? Turn the chlorine dosage up or down?” The energy-saving heat recovery process in the headworks building grew out of a team discussion.

Staff members meet weekly to make microscopic observations. The resulting information is beneficial in making process control decisions.

LOOKING AHEAD

Advising young people new to the career, Thompson stresses the importance of automation and online control: “They need to embrace new technology. When I started we didn’t have online DO control. Now we do. I see in the future being able to get BOD results from an online instrument. We currently experiment with nitrate and ammonia control in our aeration basins.

“It’s important for operators to understand what goes on in the laboratory, because that directly reflects what goes on out in the field.”

SCOTT THOMPSON

“It’s also important for operators to understand what goes on in the laboratory, because that directly reflects what goes on out in the field. For example, online instruments need to be calibrated. You have to be able to take samples from the field to the lab and validate that the instruments are in calibration, and it has to be done in a timely manner.”

The challenges for Thompson are mainly in the rearview mirror — he retired last summer but will be around as needed to help Truax through another major change in the treatment system: a conversion to the integrated fixed-film activated sludge (IFAS) process (Kruger). The process uses plastic-media discs in the aeration basins that grow a film of microorganisms; it enables more treatment capacity in the same tankage.

“It makes expansion in the future much easier. You don’t have to build more tanks. In this expansion we’re going to increase capacity to 8.5 mgd. From that point on, the city will only have to buy more plastic media to take aeration capacity all the way up to 11.9 mgd.”

In retirement, Thompson expects to work part time as a wastewater consultant, drawing on his experience with more than three decades of operations and multiple plant upgrades and construction projects. He won’t mind at all having more time to himself and with his family.

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He’ll also do some fishing for salmon in spring and fall on the Columbia River. Last spring he took his 9-year-old granddaughter on her first river drift boat fishing trip for smallmouth bass.

In an important way that brings his life full circle — getting to enjoy the kind of resources he spent his career protecting. **tpo**

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A Wastewater Treatment Division staff member helps Diana Flynt, rehabilitation supervisor for the Audubon Society Center for Birds of Prey, in releasing Mississippi kites at the Southeast Farm Wastewater Reuse Facility in Tallahassee.

Taking Wing

TALLAHASSEE'S SPRAY IRRIGATION FIELD FOR WATER REUSE PROVIDES AN IDEAL SITE FOR RELEASING RAPTORS RESCUED BY A WILDLIFE HOSPITAL

By Jeff Smith

In summer 2015, a rehabilitated bald eagle and five orphaned Mississippi kites were released to the Florida skies from the award-winning Tallahassee Wastewater Reuse Facility, known as the Southeast Farm.

The location was chosen by officials of a wildlife hospital who had helped the eagle recover from an emaciated condition and nurtured the crow-sized kites to maturity. "It was really a big deal around here, even though we didn't know about it until about a week before the release," says Joe Cheatham, manager of the Wastewater Treatment Division for Florida's capital city. "It was a big media event, and the mayor and city commission members were involved."

ROOM TO ROAM

The release site was chosen because a large number of Mississippi kites had taken up residence at the facility. It seemed like a good spot for the fledglings to learn from adult kites before the entire flock began their annual migration to South America, according to members of the local Audubon Society chapter.

The raptors were discovered by local wildlife lovers who spearheaded their treatment, care and release. The eagle had lost half its weight and was suffering from lead poisoning. The kites had fallen from their nest and had been abandoned.

"The Southeast Farm is 2,500 acres of wide-open space, and made it a natural release point for the birds," says Cheatham. The plant began operation in the early 1980s and is one of the most advanced facilities of its type in the world. Effluent from Tallahassee's 26.5 mgd Thomas P. Smith (TPS) Advanced Wastewater Treatment Plant is pumped by five 300 hp Peerless vertical turbine pumps to the Southeast Farm through 8.5 miles of 36-inch pipe.

SPRAY IRRIGATION

Sixteen center-pivot spray towers at the farm each irrigate over a 0.25-mile radius with 22 spray nozzles. More than 17 mgd of effluent is used to irrigate crops such as soybeans, corn and sorghum, grown for cattle feed by a contract farmer. Hay is also grown there and is sold for silage and for erosion control at roadside construction projects. Because of low nitrogen content of the effluent, the farmer receives payments to offset the lower crop yields.

“We have done a lot over the years to improve and use our effluent to benefit the environment.”

JOE CHEATHAM

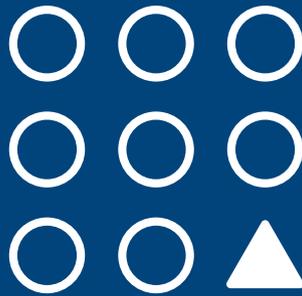
A portion of flow is diverted from the treatment plant to the recently completed Tram Road Reuse Facility, where it gets additional treatment before being used for irrigation on golf courses, roadsides and general landscaping. All of the city's effluent meets state Department of Environmental Protection beneficial reuse standards.

Positive recognition is nothing new to the Wastewater Division. Among its many awards are:

- U.S. EPA Most Effective and Innovative Reclamation Reuse Program, 1995
- Florida Water Environmental Association David W. York Reuse Award, 1997 and 2014
- FWEA Biosolids Award, 2015

The TPS facility also received the FWEA Earle B. Phelps Award as The Best Operated and Maintained Advanced Wastewater Treatment Facility.

(continued)



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Volunteers band rehabilitated Mississippi kites before their release at the Southeast Farm Wastewater Reuse Facility.

DEDICATED TEAM

The crowning achievement was the 2015 Florida Governor's Sterling Award for Excellence for achieving role model status in continuous improvement and quality. The city's environmental management system was one of the first in the nation certified under ISO 14001-2015, the latest international environmental standard.

"The recent awards definitely showcase our dedicated and highly skilled workers in the city's Under-

ground Utilities/Public Infrastructure Department," says Cheatham.

The Southeast Farm is not advertised as a bird watching destination, although for several years birders were allowed to visit. The Tallahassee International Airport is nearby, so birds are now discouraged from flight in the area. "We have done a lot over the years to improve and use our effluent to benefit the environment," says Cheatham. "Even though we don't try to attract the birds, we're still a pretty unique facility." **tpo**

The Tallahassee wastewater treatment plant leadership team includes, from left, Warren Shephard, shift supervisor; Nico Lauw, process improvement manager; Lynn Coller, assistant wastewater operations manager; Joe Cheatham, wastewater operations manager; Will Holley, shift supervisor; Chuck Ziegmont, compliance and career progression manager; and Leo Hartsfield, maintenance supervisor.



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Tough on Turbidity



THE TEAM AT THE W.R. WISE WATER TREATMENT PLANT COMBINES MANUAL AND AUTOMATED PROCESSES TO MAINTAIN HIGH WATER CLARITY AT PARTNERSHIP PHASE IV EXCELLENCE LEVELS

STORY: **Jim Force**
PHOTOGRAPHY: **Andrew Craft**

IF THE WATER TREATMENT PLANT TEAM IN GREENWOOD HAD A NICKNAME, IT might be The Turbidity Cops.

That's because they do everything possible to eliminate turbidity from their produced water.

As a result, they've received the prestigious Partnership for Safe Water Phase IV Excellence in Water Treatment Award from the American Water Works Association for 10 years running.

"Turbidity is the key," says C. David Tuck, superintendent of the W.R. Wise Water Treatment Plant in Greenwood, in northwestern South Carolina. "Typically, we're right around 99.9 percent removal." That's from source water from Lake Greenwood with an average turbidity of 12 NTU based on the last three years of data.

"Extra capacity at the plant helps," Tuck says. "Our sedimentation basins are designed for 33 mgd, and right now we're at about 9 to 10 mgd. That gives us more time for settling." The plant staff is also an important factor, springing into action with jar tests and keeping alum and caustic soda pumps operational and calibrated when the watershed gets heavy rain.

"We have good source water, a good plant and a good staff," says Tuck. "In the settled water, we're at less than 2 NTU 100 percent of the time, and less than 1 NTU more than 95 percent of the time, even during rare events of raw water turbidity over 100 NTU. Filtered water turbidity is less than 0.10 NTU 100 percent of the time."

“Turbidity is the key. Typically, we're right around 99.9 percent removal.”

C. DAVID TUCK

CONVENTIONAL PROCESS

Lake Greenwood is an 11,400-acre reservoir formed by a hydroelectric dam built across the Saluda River in the 1940s. Two intakes 35 feet deep can draw water from three levels. Normally, water is drawn from the surface lake using variable-speed and fixed-speed pumps, which transport the water to the treatment plant, a quarter-mile away.

During summer, plant production averages 11 mgd but can fall to 8 to 9 mgd in winter. "We are only at 30 to 40 percent capacity," says Tuck. "The plant was built for projected growth that never happened." Most of the

The team at W.R. Wise Water Treatment Plant includes, from left, Jack Able, Sam Abney, Benny Webber, David Crawford, C. David Tuck, Brandon Lewis and Vincent Price.



The water intake pump station on Lake Greenwood at W.R. Wise Water Treatment Plant.

W.R. Wise Water Treatment Plant, Greenwood, South Carolina



BUILT: | 1960; expanded 1967, 1980, 1994

PRODUCTION CAPACITY: | 33 mgd

SERVICE AREA: | 165 square miles

POPULATION SERVED: | 48,198

SOURCE WATER: | Lake Greenwood

TREATMENT PROCESS: | Conventional

INFRASTRUCTURE: | 628 miles of main, 2,700 fire hydrants, 6,000 valves

SYSTEM STORAGE: | 10.8 million gallons

ANNUAL BUDGET: | \$2.8 million (operations and maintenance)

WEBSITE: | www.greenwoodcpw.com

GPS COORDINATES: | Latitude: 34°15'10.61"N; longitude: 82° 2'13.75"W

city's textile mills have moved or shut down, but Tuck expects industrial development to resume: "We anticipate a new carbon fiber manufacturing facility coming online soon, and that should require 5 to 10 mgd."

At the head of the plant, powdered activated carbon (PAC) is added to improve taste and reduce odors. Then, through an on-site generation system supplied by Eka Chemicals (now part of NALCO, an ECOLAB Company), chlorine dioxide is injected into the stream as a pre-oxidant ahead of the coagulation-flocculation-sedimentation process.

The chlorine dioxide oxidizes impurities but does not react with organic material in the raw water that might otherwise produce disinfection byproducts in post-treatment chlorination. "On average, our DBPs are around 20 ppb," Tuck says. Alum is added in one two-stage flash-mix tank with a detention time of three to five minutes. Three-stage slow-mixing, horizontal paddle-style flocculators form floc that settles in a series of rectangular sedimentation basins.

DEEP-BED FILTRATION

Eleven deep-bed multimedia filters polish the settled water before dis-

infection and release into the storage and distribution system. The plant uses sand and anthracite media; some of the filter bottoms are a perforated block type supplied by Leopold - a Xylem Brand, and some use cone-type, ceramic-ball-design Wheeler bottom underdrains.

"Our filters don't use an air scour feature," says Tuck. "Instead, we use surface sweeps during the backwash. Each filter run is about 190 hours, or eight days between backwashes." The plant's excess capacity and excellent settled water quality enable such long filter runs. Some of the anthracite has been in place and functioning for 20 years and is being replaced. "It became a size issue," Tuck says. "The effective size and uniformity coefficient of the media were getting out of specifications due to years of use."

After filtration, the water is injected with aqua ammonia, which combines with free chlorine to form chloramines. Lime is added to bring finished water pH to 8.2 to 8.4 for corrosion control and optimal formation of monochloramine. Fluoride is added for dental health. Solids from the sedimentation basins and the filter backwash water flow to two sludge holding basins.

After additional settling, the solids are thickened and pumped to drying beds, where an anionic polymer facilitates dewatering. The water is decanted back to the lake under an NPDES permit. After six to eight weeks, the dried sludge is removed from the bed with a loader and transported to the local landfill for use as cover.

Until now, the plant has not had to add special chemicals for corrosion control, as its distribution system includes no lead service lines. "We have lots of ductile iron, galvanized and cast iron pipe in the system," Tuck says. "We have been in compliance with the lead and copper rules since 1992. We're not seeing any issues."

In the future, Greenwood will install new RE-MIN Process and Cal Flo feed systems (Burnett Lime Co.) to add lime and carbon dioxide. This will



Treatment residuals are dewatered on drying beds on the plant property before being hauled to a landfill for use as cover material.

(continued)

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increase calcium hardness and alkalinity, and make the water more stable and less aggressive to metal piping materials. The utility is also replacing pipes, some 120 years old, with new ductile iron lines. An automated water metering system is being deployed to track customer water usage more efficiently.

KEEPING IT CLEAR

Tuck lauds the plant's operations team members, most of whom have earned the Class A license from the state. The operators are Jack Able, Benny Webber, Eddie Brown, Jay Daniels, Shane Duncan, Darrell Green, Jimmy Nix and Neal Richard. Sam Abney and David Crawford handle maintenance, Class A-licensed chemist Charles Dunn and technician Brandon Lewis run the laboratory, and Vincent Price is the SCADA technician-electrician. Jeff Chapman is water department director and Steve Reeves is general manager.

Experience is the hallmark: Able and Webber came back to work after retirement. "In South Carolina, and as Greenwood Commissioners of Public Works allow, you can keep working after retirement," Tuck says.

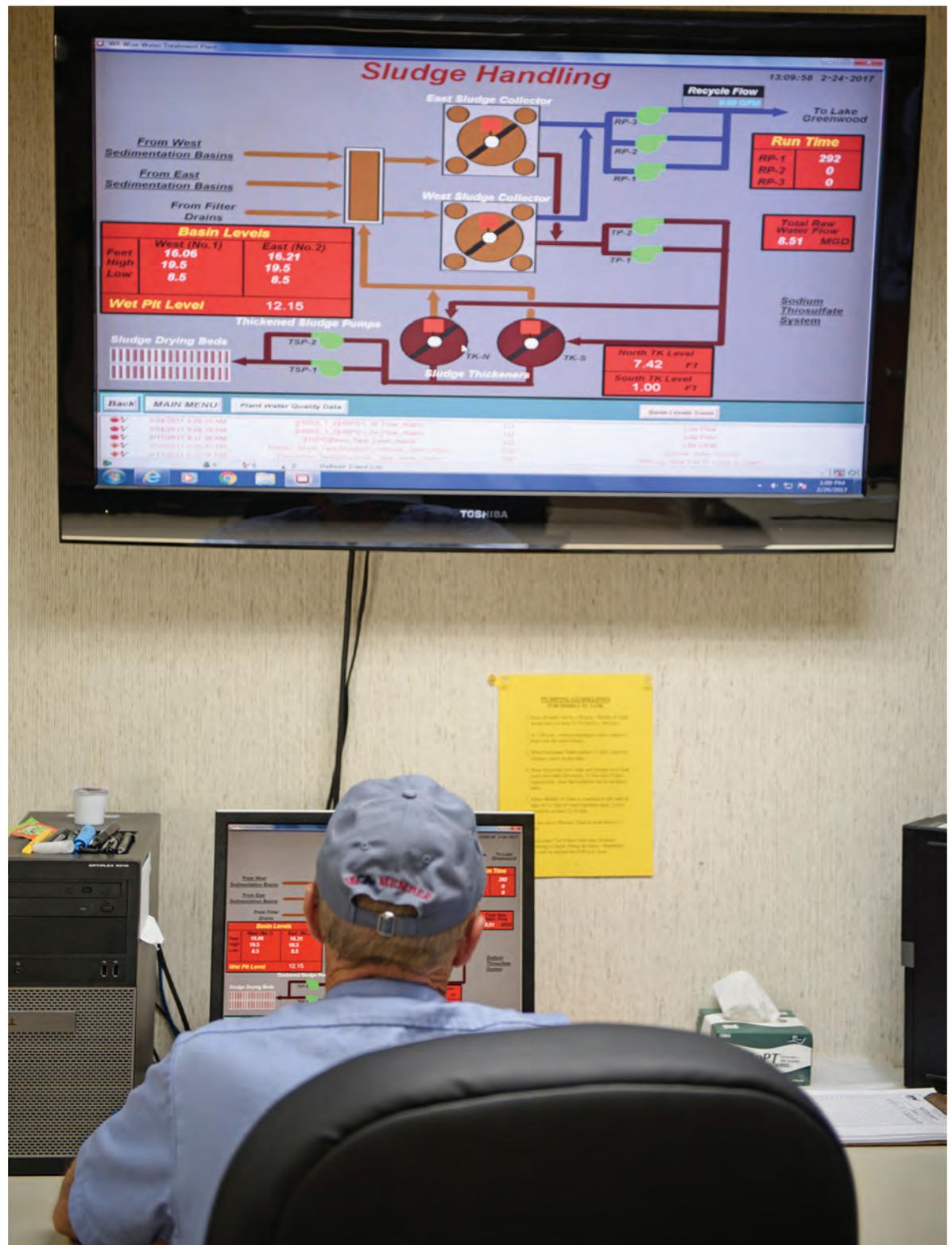
The team knows exactly what to do to protect the plant's finished water from turbidity intrusions.

In heavy rains, remote turbidimeters (Hach) upstream of the intake feed data to the SCADA system. If the data shows that turbidity is increasing, the staff goes into the turbidity prevention mode, setting up the plant to handle the load.

"We do jar testing to determine optimal coagulation pH and alum dose, and make sure the caustic soda pumps are ready to run," says Tuck. "Our alum dose is set for the optimal pH." The coagulation pH is temperature-dependent: 6.9 to 7 in winter and 6.2 in summer.

"We need to find the sweet spot," Tuck says. "When we get the coagulation optimized, it has a positive impact on our sedimentation and filtration." Operator training sessions are held monthly or quarterly to review standard operating procedures. Team members share ideas freely within and between shifts.

In the plant's state-certified lab, Dunn and Lewis handle all compliance monitoring quality control and lab training for the operators as required by the Safe Drinking Water Act and the Clean Water Act. Tuck believes some tasks should remain manual while others can be automated.



Operator Benny Webber checks tank levels using the plant SCADA system (Rockwell Automation).

“It’s important to make sure we have the alum and caustic feed right at the correct dosages and keep it under control. Our people are experts at this.”

C. DAVID TUCK

Filter backwashing has been automated since 2005. On the other hand, coagulation is not automated. "We think if it were, we might get too complacent," Tuck says. "We check zeta potential through in-stream monitoring using a Micrometrix streaming current monitor at the flash mix tank. It

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The W.R. Wise plant team takes pride in consistently low turbidity levels. Here, operator Brandon Lewis checks the SC200 turbidimeter (Hach) in the pipe gallery.

monitors the net chemical charge in the coagulated water and alarms the operator of any setpoint excursions.

“It’s important to make sure we have the alum and caustic feed right at the correct dosages and keep it under control. Our people are experts at this. It’s a diverse staff, in a good frame of mind, and they know what to be ready for. We’re all on the same page.”

DO-IT-YOURSELF APPROACH

The Greenwood team takes the hands-on approach to maintenance, as well, farming out as little maintenance as possible. “Stuff happens at night and on weekends,” Tuck says. “We do most of it ourselves, rather than hiring outside labor.” That approach extends to everything except large vertical turbine pumps, motors, specialty equipment and elevated tanks, where SUEZ Utility Services Co. handles clean-out and painting.

Plant staff members calibrate all instruments, do electrical and mechanical preventive and corrective maintenance, and practice predictive maintenance with vibration analysis on all rotating equipment. The SCADA system is by Allen-Bradley by Rockwell Automation. All the A-B Control Logix PLCs are programmed in-house, and the Ethernet communication network using fiber-optic cable is maintained within the plant. “It’s a welcome expertise to have on hand,” Tuck says. “We’re ready for just about anything that might come up.”

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“We have lots of ductile iron, galvanized and cast iron pipe in the system. We have been in compliance with the lead and copper rules since 1992. We’re not seeing any issues.”

C. DAVID TUCK

ment. “It’s the first in South Carolina, and one of only 16 water treatment plants awarded across the country,” Tuck says. “Before this, we had achieved the Phase III Directors Award and maintained it for 15 years.”

The goals of the Phase IV program are the same goals the staff shares in operating the plant:

“They’ve bought into the program. It has made us all better as operators. We are all about making excellent water for our customers, going beyond just meeting the regulations to be the best. It’s been very worthwhile.” **tpo**

PAC FOR TASTE AND ODORS

C. David Tuck recalls the day a customer called and complained that his water “tasted like dirt.”

“We have some nuisance algae in the spring, and sometimes we get an earthy and musty taste in our water,” says Tuck, Greenwood water plant superintendent. “It’s due to our warm climate and a long growing season for the algae, which produce organic compounds.”

That’s when the plant’s powdered activated carbon (PAC) system (Acrison) comes to the rescue. The carbon is added close to the raw water intakes on Lake Greenwood to improve taste and counter odors. Carbons approved for plant use include Aqua Nuchar (Ingevity), Norit and Hydrodarco B (Cabot Norit Activated Carbon) and Master-Carb (M.L. Ball Co.).

“PAC has a high adsorption rate because of large surface area,” says Tuck. “We get around a 60 percent reduction in taste- and odor-causing compounds. It reduces the concentrations to sub-threshold levels of 10 µg/L, a beginning level that can be detected by humans. Additionally, our finished water has less than 2 mg/L total organic carbon, which is attributable to the use of PAC and optimized coagulation.”

The PAC system generally operates from March through October: “We can pretty much predict when the problem will begin, based on historical data and warming water temperature. We start up the PAC system in advance of that.”



The plant uses Aqua Nuchar (Ingevity) carbons in its powdered activated carbon system (Acrison).



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TECHNOLOGY THAT FEEDS OXYGEN AND OZONE INTO FORCE MAINS AND LIFT STATIONS PROVIDES A FAST-PAYBACK ANTIDOTE TO ODOR AND CORROSION FOR A COLLECTIONS SYSTEM TEAM IN TENNESSEE

By Ted J. Rulseh

Brandon Ambrose and his maintenance team have enough to do maintaining 230 miles of gravity sewers, 19 miles of force main and 31 pump stations. The last thing they need is to spend time dealing with odor complaints.

And yet, over the years, the team in Mt. Juliet, Tennessee, fought a battle against hydrogen sulfide odor from wastewater in force mains. They controlled the odor with chemicals, but city leaders wanted a more cost-effective and sustainable way to deal with H₂S.

Ambrose, lead maintenance technician for the city's pump stations, found it in a technology installed at pump stations that generates pure oxygen and ozone, and injects it into the wastewater. First used in a successful pilot test at one pump station, the unit has been deployed permanently at four stations, and three more will be added in the next year. It has reduced H₂S levels at pumping discharge points from spikes of more than 400 ppm to less than 10 ppm. Payback on the equipment from chemical savings is estimated at 1.5 to three years.



Brandon Ambrose, lead maintenance technician in Mt. Juliet.

HIGH-VOLUME PUMPING

Mt. Juliet has no wastewater treatment plant, instead sending an average of 3.5 mgd to Metro Water Services in Nashville about 17 miles west. In-house team members handle the vast majority of collections system and pump station maintenance, including pump rebuilds, seal replacements, pipelaying and electrical work. They also service about 3,000 Myers 2 hp residential grinder pumps (Pentair).

The city's population has roughly doubled in the past 10 years, to 28,000, mainly with residents who commute to jobs in Nashville. The collections system is expanding rapidly to keep up with the growth. "We send a lot of water through force mains, some of them up to 15,000 feet long," says Ambrose, who holds a Collection Systems 2 operator's license. "Anytime you keep sewage in a line for a long time, that's a bad thing."

H₂S odor issues became so severe at some pump stations that a calcium nitrate solution was being dosed at 70 to 100 gpd. The chemical is effective and the team still uses it as needed, mainly at the city's smaller pump stations.

Through an industry contact, he learned about the FORSe 5 oxygen and ozone injection system from Anue Water Technologies. In 2010, the company deployed a trailer-based demonstration unit to test the technology at the



The FORSe 5 oxygen and ozone injection system is used to prevent hydrogen sulfide odors at lift stations in Mt. Juliet.

city's Nonaville Road lift station, discharge point for a 7,900-foot-long, 10-inch force main with an average flow of 175,000 gpd.

After tapping the line to inject the oxygen and ozone, the city team, with help from Anue technical service representatives, made adjustments to optimize the feed rates. Once that was accomplished, average H₂S levels at the discharge point dropped from 80-120 ppm to 20-30 ppm within three days, based on ozone feed at 20 grams per hour and oxygen feed at 60 liters per minute.

MAKING IT PERMANENT

Satisfied with the outcome, Ambrose and Martin Keel, P.E., then public works director, secured funding from the city board of commissioners for a permanent installation at the Royal Oaks lift station, which sends 250,000 gpd to the Nonaville Road site. The installation was completed in 2013 through remodeling of an existing building on the site.

The FORSe 5 system is designed for force mains up to 10 miles long with pressures to 200 psi and flows up to 30 mgd. Its main components include:

- A high-volume air compressor
- An oxygen concentrator that takes in ambient air and produces a dry and purified stream of oxygen with purity greater than 90 percent by weight
- An ozone generator that receives the purified oxygen and produces ozone at an average concentration of 5 percent by weight

A control system with a touch-screen interface enables users to adjust the flows of oxygen and ozone. "From my desktop computer, from a laptop, or from an iPhone or iPad, I can go in and change the percentages of O₂ or ozone at any given moment," says Ambrose.

An Anue technician observes system component status remotely using the FORSe 5 digital telemetry technology.

“From my desktop computer, from a laptop, or from an iPhone or iPad, I can go in and change the percentages of O₂ or ozone at any given moment.”

BRANDON AMBROSE

Before the FORSe 5 system installation, H₂S levels at the Royal Oaks station discharge routinely exceeded the maximum meter reading of 400 ppm. Afterward, the level dropped to a consistent 10 to 12 ppm. Two years later, the city installed a system at Nonaville Road in a prefabricated building. Feed rates at those sites are about 40 liters per minute O₂ and 10 grams per hour ozone.

In 2016, additional systems went online at the Cedar Creek station (2.9 mgd capacity), which sends the flow on its way to Nashville, and at the Central Pike station (4.5 mgd capacity). Ambrose expects to install three more FORSe 5 units to go online within the next year: “With the urban growth this community is having, there is no end in sight. We’ll probably end up with 10 to 12 systems and maybe as many as 15 in the next 10 years.” The target sites will be larger lift stations, especially those near residential areas.

STANDARD PRACTICE

As the community expands, the city will either install an oxygen/ozone system at new large pumping stations or require the developers of large subdivisions to do the installations. The FORSe 5 systems’ large capacity gives the city room to accommodate growth at each site.

During droughts and hot weather, when H₂S production in the lines can be extreme, the systems are supplemented with the addition of liquid calcium nitrate, especially in force mains. “We can’t take the chemical out of the equation, but instead of feeding perhaps 100 gpd, we can get away with 20 gpd,” says Ambrose. “The cost-effectiveness of these systems for us is mainly about reducing the chemical feed.”

Besides reducing odor from H₂S, the Anue systems limit its corrosive effects. The ozone also helps break up fats, oils and grease (FOG) in wet wells. “We have wet well washers that come with the FORSe5,” says Ambrose. “Once we start putting ozone into a wet well, we knock the FOG buildup down to near zero.”

Ambrose expressed satisfaction with the equipment and with the service the city received from Anue Water Technologies: “I’m always eager to see big-



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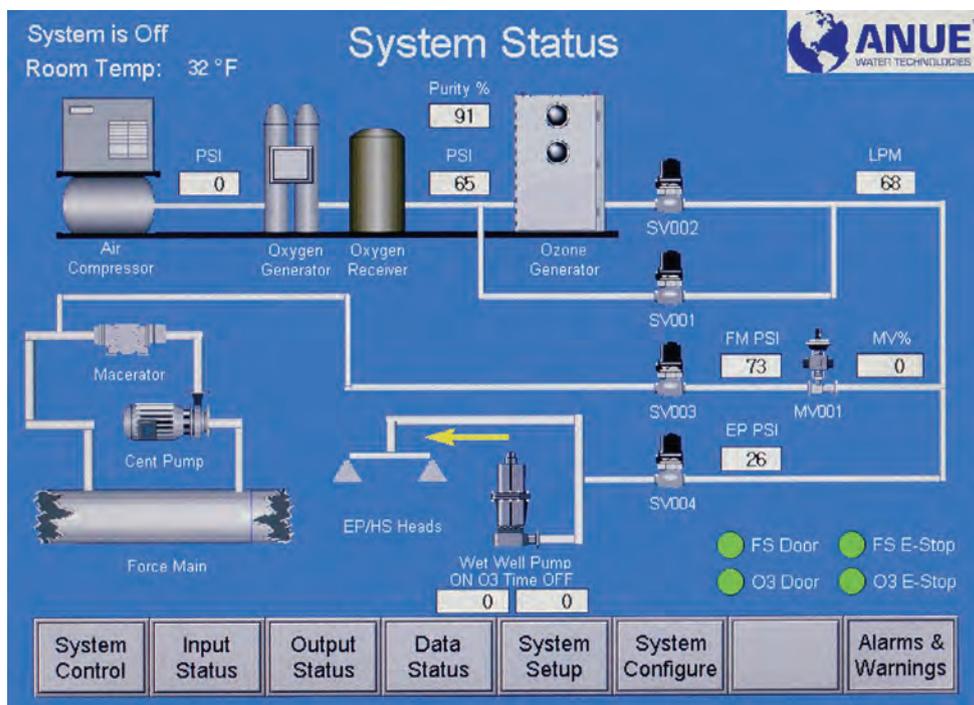


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The digital telemetry measures water purity and pressure remotely so that an operator can view operating conditions from a desktop computer, laptop or mobile device and change the oxygen and ozone levels as needed.

ger, better and more user-friendly products. If you call Anue about issues with odor or corrosion, they will come out and check the site and demo one of their products if you want,” says Ambrose. “That’s what they’ve done for me.” **tpo**

DEVOTED TO SERVICE

BRIAN STEGLITZ HAS PROSPERED IN HIS CAREER THROUGH ADVANCED EDUCATION, INDUSTRY CONTRIBUTIONS AND DEDICATION TO QUALITY SERVICE AT AFFORDABLE RATES

STORY: **Steve Frank** | PHOTOGRAPHY: **Amy Voigt**

WHEN BRIAN STEGLITZ GRADUATED FROM YALE UNIVERSITY, he joined an environmental consulting firm developing regulations for the U.S. EPA.

The snail's pace of work life there didn't suit him well. Today, as manager of the Water Treatment Services unit for the city of Ann Arbor, Michigan, he finds much more satisfaction. In 20 years with the city, he has served as the sole water treatment engineer, laid the groundwork for a major upgrade of the plant infrastructure, and helped introduce people of all ages to the water industry through annual plant tours.

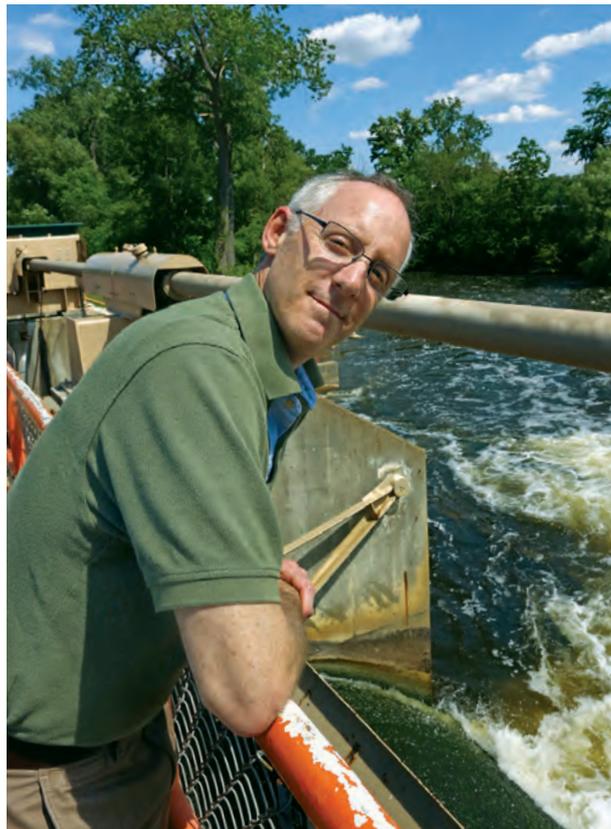
One constant in his career has been service — to his team, the community and the industry.

For his nearly 35 years of distinguished contributions to the water sector, he received a 2016 George W. Fuller Award from the Michigan Section AWWA.

FINDING A FOCUS

Steglitz joined an engineering firm in Washington, D.C., in 1990 after graduating from Yale University with a degree in economics and political science. "You could be working on the same regulation for your entire career at the pace they moved," he says. He worked on Superfund, hazardous waste and other issues, gaining exposure to engineering.

"I really liked the more hands-on, real-time work where I could see the rewards for my investment," he recalls. With that experience, he went back to school in the evenings and ultimately attended Stanford University, where



Brian Steglitz, Water Treatment Services manager, Ann Arbor, Michigan

he earned bachelor's and master's degrees in civil and environmental engineering, ending in 1994.

While at Stanford, he worked for the Palo Alto Regional Water Quality Control Plant, which sponsored his master's thesis on ways to discourage small businesses from discharging pollutant metals to the plant. New degrees in hand, he joined CH2M HILL as a project manager in Herndon, Virginia, and soon became resident engineer on a nine-month project in New York City, overseeing construction of three small industrial wastewater treatment plants he had helped design for ConEd, the city's electric utility.

MOVE TO MICHIGAN

A little thing called romance brought Steglitz to Michigan. His future wife was admitted to graduate school at the University of Michigan in Ann Arbor, and CH2M HILL transferred Steglitz to the Detroit office. He soon tired of the travel the job involved and wanted to see what engineering life was like "on the owner side of the business."

"I interviewed for a job at the Ann Arbor water treatment plant. I was thinking, 'Why are they asking me all these questions about

drinking water?' I thought I was at the wastewater treatment plant." Nevertheless, he was hired as the sole engineer on a water plant staff of 30.

"I was helping them replace capital equipment, but they're the ones who had to live with it on a daily basis. So I saw them as my customers, doing the best I could to make their lives easier. I became a better engineer by having



Steglitz (left) and David Fish stand above the Barton Dam, operated by the Ann Arbor Water Treatment Services unit.

Brian Steglitz, Ann Arbor, Michigan



POSITION: | **Water treatment services manager**

EXPERIENCE: | **20 years with city of Ann Arbor**

EDUCATION: | **Bachelor's and master's degrees, civil and environmental engineering, Yale and Stanford universities**

CERTIFICATIONS: | **Licensed professional engineer; F-1 drinking water treatment and S-3 water distribution licenses**

RECENT AWARDS: | **AWWA George W. Fuller Award**

GOALS: | **Complete a major water plant capital improvement project**

GPS COORDINATES: | **Latitude: 42°17'50.95"N;
Longitude: 83°45'45.74"W**



Brian Steglitz and John Danielson, environmental lab analyst IV, discuss the results of a fecal coliform bacteria test.

ACTIVE LIFE

There's more to Brian Steglitz than running the Ann Arbor water plant. He's also a runner, mountain biker and swimmer. He has run the New York City Marathon twice and the Philadelphia Marathon once; he completes a half-marathon in Ann Arbor every year.

Steglitz was a collegiate soccer player and likes to watch his two daughters play, one in high school and the other soon to join her there. "I now live vicariously through their performances on the field," he says. He looks forward to seeing them play together.

For aspiring water professionals, Steglitz advises getting some hands-on field experience early in the career, and learning humility. He recalls trying to collect pump performance data during his first month at the Ann Arbor plant. He pumped into a pipe header that was valved shut.

"The pressure generated rotated the header because the joints were not restrained, and we had to hire a contractor to correct the problem," he says. "Six of our 26 filters were out of service until this was corrected. Oops! That is a mistake I will never forget, but I clearly learned some valuable lessons." That's when it helps to know how to be humble.

to live with the things I designed. Working for an owner versus consulting really helps you understand the operations and maintenance side of the business. I liked working with the staff, solving problems. That was my goal as the engineer."

Over time, Steglitz expanded his horizons, and being active in AWWA helped broaden his viewpoint and improve his management skills. "Ever

“I became a better engineer by having to live with the things I designed. Working for an owner versus consulting really helps you understand the operations and maintenance side of the business.”

BRIAN STEGLITZ

since I started working here in 1997, I got more and more involved in AWWA," he says. "I went through the chairs in the Michigan Section. I was elected vice president as a director from Michigan, and I recently finished my vice presidential term."

He now encourages his team members to get involved and to bring what they learn back to their jobs. "As you move up in the organization, you get exposure to public speaking and communication. You're coming out of the weeds a little bit, maybe looking at things more from the 5,000- and 10,000-foot view."

PREPARED FOR TRANSITION

The AWWA experience helped prepare him for the move up to manager three years ago. In that role, he works more on the customer service and education sides of the business. As he looked at the bigger picture, he saw challenges, chiefly the need to update infrastructure in a facility built in 1938. That means keeping the older equipment running while winning customers' support for investment in new systems.

"We've made a lot of effort to engage our customers," Steglitz says. "If they can understand the tools we use to treat their water and the age of some of those tools, and if they can understand the effort we put into meeting regulatory requirements and meeting their service delivery expectations, they're

much more willing to support those investment needs in the future.”

The facility will embark on an \$80-\$90 million capital improvement program in the next three to five years that ranks with the largest in the water system’s history. Steglitz and his team are now doing studies, gathering data and demonstrating the need in order to win support for the necessary rate increases.

“We hope to bond for the capital improvements while maintaining annual rate increases below 7 percent for the foreseeable future,” Steglitz says. “We’ve done some rate comparisons with utilities of comparable size and age, and we’re quite competitive. We intend to maintain that competitiveness for our customers.”

Tours play a part in getting customers on board. As one example, all of the city’s fourth-graders go through the water treatment plant as part of their school curriculum. Operations staff members conduct the tours. “There are 17,000 kids in the public school system in Ann Arbor,” Steglitz says. “They all go through the tour as part of their education. We also hold annual open houses and provide tours on request. We usually get a couple thousand people through the plant each year as part of our public engagement plan.”

EMBRACING LEADERSHIP

While adapting to management, Steglitz largely had to leave behind his long-cherished role as an engineer. “I had gone through a leadership training program earlier, and the instructor said, ‘It’s hard to let go of what you’re famous for,’” he recalls. “I spent 17 years doing engineering in this facility. I have an intimate knowledge of it, so it wasn’t easy to give up that role. On the flip side, I was ready for a new challenge.”

Steglitz tries to be a resource for people but not get in their way: “It took me some time to learn that this person may be doing the work differently, but I need to give them time to learn and make mistakes. I had that opportunity and I gained a lot from it. There are times I want to say something, but I’m biting my tongue and holding back.”

In 2016, Michigan Gov. Rick Snyder appointed Steglitz to the 21st Century Infrastructure Commission, whose job is to develop an infrastructure vision and road map for the state covering all areas: water, sewer, transportation, storm management, energy, telecommunications, ports and airports.

“It was quite an interesting experience to be part of that cross-functional team,” he says. “That was concluded and a report was delivered to the governor earlier this year. Now we’re trying to implement some of the recommendations. I’m on an advisory board appointed by the governor to oversee the development of an asset management pilot that will be used in certain areas of the state and then will be broadcast throughout the state after the bugs are worked out.”

STILL GROWING

More recently, Steglitz began a three-year term on the board of the Water Research Foundation.

“The foundation plays a central role in advancing the science of water and developing solutions for utilities to use as they face future challenges,” Steg-

“ I spent 17 years doing engineering in this facility. I have an intimate knowledge of it, so it wasn’t easy to give up that role. On the flip side, I was ready for a new challenge.”

BRIAN STEGLITZ

litz says. “It’s going to be an exciting few years. I’m fortunate to work for a utility that allows me these opportunities and understands the value of contributing to the water field.”

As for the future holds, “My job continues to be interesting and challenging. I’m constantly being pushed to get involved in something new. When one door closes, another seems to open. And each one is something that keeps me driven and motivated. Until that goes away, I’m going to continue to find the next open door.” **tpo**



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It's Time to Speak Up

WEF'S NEW COMMUNICATIONS AND OUTREACH DIRECTOR SAYS WATER PROFESSIONALS NEED TO MAKE THE CASE FOR THE VALUE OF THE RESOURCE AND HIGHLIGHT THE EXCELLENT WORK THEY DO

By Ted J. Rulseh

These are critical times for the water sector. Infrastructure investment is lagging. The public has been shaken awake by issues like drought and the contamination of municipal water supplies. Seldom has the value of water been more apparent, and seldom has the need to communicate that value been greater.

Enter Travis Loop, appointed in March as senior director of communications and public outreach for the Water Environment Federation. His responsibilities are broad, but a major priority will be helping WEF members — individuals, utilities and associations — deliver critical messages to their communities about the importance of water.

Communication matters because in the end, consumers and businesses will need to support water infrastructure investments with their tax and rate dollars. The better they know the importance of what they're paying for, the more willing they'll be to contribute. There's also the matter of seeing that people in the water professions are properly appreciated for the roles they play.

Loop comes to his position with diverse and solid experience in journalism and in communications in the government and nonprofit sectors. He talked about his role and the challenges ahead in an interview with *Treatment Plant Operator*.

tpo: What is your experience in communication as it relates to the water professions?

Loop: I started out with seven years as a newspaper reporter and editor with environment and water issues as one of my regular beats. Then I worked in the communications office of the governor of Hawaii, where water issues are big. Next, I became communications director for the Chesapeake Bay Program, which is a partnership of six states, Washington, D.C., and a number of federal agencies working to restore the bay. After a couple of years there I spent six years as director of communications for the Office of Water at U.S. EPA headquarters.

tpo: What motivated WEF to institute this new position?

Loop: There is an ever-increasing need for communications and public outreach in the water sector. It's more important than ever for the water sector to raise its profile, call attention to its needs, and educate the public. Engaging in those activities has been a priority for WEF. One of our top five objectives is to increase public awareness around the value of water. That's why this position was created.

tpo: How would you describe your role and the areas where you'll be focusing?

Loop: WEF is an organization with 34,000 members — plant operators, utility managers, scientists, engineers and researchers. My main focus is to highlight the work all those people are doing across the water sector and provide resources so they can do their own communication about water issues.

I also want to represent water issues as a whole on the national stage.

tpo: What do you see being involved in your work at the national level?

Loop: WEF is involved in a number of national initiatives around public awareness. For example, we have the Value of Water campaign, Imagine a Day Without Water, World Toilet Day, World Water Day and the Stockholm Junior Water Prize. So one thing I'll be doing is working to expand and elevate our role



Travis Loop

“It's more important than ever for the water sector to raise its profile, call attention to its needs, and educate the public. Engaging in those activities has been a priority for WEF.”

TRAVIS LOOP

in those initiatives and make them even more effective in getting public attention around water issues.

tpo: Does that include communication about the need for more investment in water infrastructure?

Loop: Yes. There is a tremendous need for increased infrastructure funding, and a number of reports document that. EPA projects a need over \$600 billion in the near term; others have cited even higher amounts. WEF was recently part of releasing a report through the Value of Water Campaign, *The Economic Benefits of Investing in Water Infrastructure*. It showed that closing the gap in infrastructure investment would create 1.3 million jobs and generate \$220 billion in economic activity.

tpo: Will you also be addressing the need to attract more people to water careers?

Loop: The workforce is another important issue. It's well documented that there are shortfalls in the workforce now in terms of numbers. Because of pending retirements there is a need to get more young people into careers at treatment plants on the drinking water and wastewater sides.

tpo: What do you observe about ways to reach young people and encourage them to look at water-related careers?

Loop: We need to focus our communications on young people specifically and reach them on the platforms where they communicate. It might not be traditional job fairs. It might mean doing more on Instagram and other social media. We have to meet them where they prefer to be talked to and let them know about the opportunities the water professions offer.

tpo: Does your role tie into WEF's emphasis on water resource recovery?

Loop: Yes. An exciting shift continues to happen in moving from waste-water facilities to resource recovery facilities — water reuse, biosolids, energy generation and nutrient capture. We want to communicate about the innovation that's happening and highlight specific examples around the country where we see utilities being leaders in those areas. We also need to call the public's attention to stormwater, why it's a problem that needs to be addressed, and the benefits of addressing it. Approaches like green infrastructure can bring great multidimensional benefits.

tpo: How would you assess the current state of public interest and engagement around water issues?

Loop: As a communicator I see a strong appetite and awareness in the public around our issues. In a Gallup poll about a year ago, people ranked pollution of rivers, lakes and reservoirs as their top environmental concern, above issues like climate change and loss of rain forests. Water issues have come to the front of people's minds with events like the drought in California and the situation in Flint, Michigan. People realize more and more how important water is.

tpo: What recommendation would you give to members, WEF Member Associations and utility agencies to help them communicate effectively?

Loop: I would encourage them to be very active advocates: holding tours of their facilities, inviting the media to visit, inviting students, elected officials and other decision-makers, and using those encounters to talk with them face to face, so they can see how the water sector serves the community and what the challenges are. There is great value in direct communication at the local level.

tpo: What tools does WEF offer to support such efforts?

Loop: We have a Water Advocates program that provides training to help water professionals get in front of elected officials and the public. We've also produced a package of fact sheets and infographics that can be used to talk about why water infrastructure and treatment are so important, and the value of investing in them. We just worked with AWWA to produce a *Communicating the Value of Water* toolkit that looks at infrastructure issues nationally and by geographic regions of the country.

tpo: Is there a need for water professionals and organizations to look beyond traditional media for communication channels?

Loop: Social media continues to grow as a way to share information in our society. A lot of people who hear about Facebook and Twitter tend to roll their eyes and think that's just for personal information. But when you look at the numbers around Facebook and Twitter, and compare that to the traffic at CNN and other news sites, the reach of social media is massive. So it's good for people in the water sector to get engaged on social media, share information, and create more digital buzz. That's why we launched our #mywaterlegacy campaign — so people in the water sector could tell about what they do and why it's important.

tpo: How do you respond to the comments from many in the water sector that they prefer to simply do a good job quietly, or that they can't find time or money for communication?

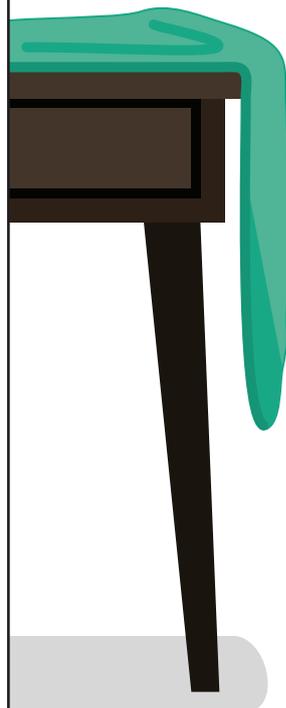
Loop: Those are two very understandable challenges. Thousands of people in the water sector are just hardworking folks who go about their business with dedication and aren't doing it for attention or glory. But being an advocate isn't about seeking individual accolades. It's simply about calling attention to the value of water and helping the sector get the resources it needs. Finding time is a challenge for everyone. Rather than making a big list of ways to be an advocate, I'd suggest picking one or two places to start and seeing where that goes.

tpo: What directions will you take in developing communication resources for water sector participants?

Loop: One priority is to expand on the materials we provide around

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current public awareness efforts. That includes making sure, for our national initiatives, that we provide toolkits for people and possibly hold conference calls or webinars beforehand to walk people through what's happening and suggest what they can do. Another priority is to provide more materials around the key issues so people can be prepared to address them. I also believe there are tremendous opportunities to secure coverage for success stories in local media. We'd like to hold webinars or other trainings on how to work with the media to get attention for local projects and issues.

tpo: If you could leave operators with one essential message that needs to be communicated, what would that be?

Loop: Water is essential to our health, our communities and our economy, and it's water professionals who ensure clean and reliable water supplies every day. We need to be more vocal about the value of water and the incredible work we all do to provide and protect it. **tpo**



ABOVE: Middle school students cut out and decorate their own embossed aluminum droplets as part of the One Water collaborative project. UPPER RIGHT: Artist Carrie Ziegler gives a presentation of One Water to a middle school class. RIGHT: Grand opening attendees admire the finished “One Water: The Infinite Journey” project on Earth Day 2016.

One Water

A PROJECT IN WASHINGTON BRINGS TOGETHER SOME 1,200 STUDENTS TO CREATE AN ARTWORK THAT DEPICTS THE WATER CYCLE AND THE IMPORTANCE OF WATER RESOURCES

By Craig Mandli

One drop of water may seem insignificant, but if you trace the path it follows during its infinite lifetime, you see how important it is. From that idea came the “One Water: The Infinite Journey” art and education project, a spring 2016 collaboration between the LOTT Clean Water Alliance of Olympia, Washington, and artist Carrie Ziegler. The project brought more than 1,200 Thurston County middle and high school students together to create a piece that isn’t just an art installation — it’s a story of water.

“The LOTT Clean Water Alliance is committed not only to STEM education, but STEAM, which adds art to science, technology, engineering and math,” says Amber Smith, education program manager with alliance’s WET Science Center. “Carrie had been involved with a few other collaborative art projects, so this just made a lot of sense as a way to further engage middle school students from the three school districts in our service area.”

It wasn’t Ziegler’s first foray into using art as an environmental outreach tool. As part of the county’s 2013 outreach on disposal of plastic bags, Ziegler and some 800 students from 18 schools built a 35-foot-long gray whale out of 9,000 plastic grocery bags. It was showcased in a special Earth Day parade.

“Her whale project was a huge success, and we knew she specialized in environmental education,” says Smith. “We loved the idea of working with an artist who incorporates education into collaborative art projects for the community. Conservation is something she cares passionately about.”

GROUP EFFORT

To kick off the One Water project, Ziegler made more than 45 presentations to students, mostly in middle schools but including high school students and adults. These covered water conservation, the natural and urban water cycles, and clean water appreciation. “The main idea was how water is so important — how it touches everything we do,” says Smith. “The water cycle is continuous; we share and manage one water.”

After the presentation, students created embossed aluminum water drops and fish, reflecting on what they learned. “They were asked to illustrate how each of their lives are connected to water,” says Smith. “Some of them drew a picture with a conservation theme, some focused on interesting water facts, and others illustrated ways they interact with water. All of their unique designs had a connection to water.”

Ziegler incorporated these pieces into an artwork to hang in the front
(continued)

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windows of the WET Science Center, an environmental education outreach facility. The full piece depicts an infinity symbol, showing the cycle of water from the urban environment to Puget Sound. Like the water cycle itself, the symbol has no beginning and no end. The piece made its debut on Earth Day in 2016.

LASTING LESSON

“We had a huge grand opening event to coincide with Olympia’s Arts Walk Festival on Earth Day, and hundreds of people came out to see the piece,” says Smith. “We were very pleased with the number of teachers, students and their families that came to see the finished mural.” The “One Water” mural now serves as a teaching tool and as a jumping-off point into the alliance’s education programs and tours. It’s also a conversation piece

“The main idea was how water is so important — how it touches everything we do. The water cycle is continuous; we share and manage one water.”

AMBER SMITH

for visitors to the WET Science Center and makes an impact on the contributing students and teachers, who bring their families and friends in to show what they were a part of.

“We still get students who come in with their families and try to find their drops,” says Smith. “So many of these families weren’t even aware of the WET Science Center. Their kids were just so proud to be a part of this project; they couldn’t help but take notice.”

AN INSPIRATION

Smith was quick to praise Ziegler, who jumped into the project wholeheartedly with the support of alliance staff: “Carrie met with us, talked through our key messages and goals, and created sketches based on what we were all thinking” she says. “Her ability to blend environmental education and art is inspiring. We believe the result will inspire people to become stewards of our most precious resource.”

Several utilities have already reached out for more information, hoping to mimic the success of “One Water.” The key to success is finding the right artist. “You want someone with experience leading collaborative community art projects, who works well with kids, and believes in the message,” says Smith. “They need to have a good plan and a solid vision. When you work with a lot of students, it’s easy to let the project get off track. The artist is truly the one who brings the vision to life.”

Smith believes that the more people involved, the better the result. “We have so many great exhibits and art pieces at the science center, but when 1,200 kids can participate in making one, it creates a new layer of impact,” Smith says.

Others have taken note: The project won the 2016 Sustainability Award from the Pacific Northwest Clean Water Association. “It is very nice to receive recognition for what we’re doing, because in the end, it’s about educating our future ratepayers,” says Smith. “The more young people we can reach, the better. That’s one way we measure success.” **tpo**

What’s Your Story?

TPO welcomes news about your public education and community outreach efforts for future articles in the Hearts and Minds column. Send your ideas to editor@tpo.com or call 877/953-3301.

Artist Carrie Ziegler puts the finishing touches on “One Water: The Infinite Journey” art project.



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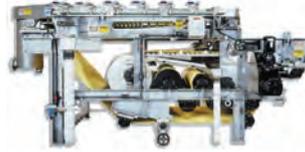
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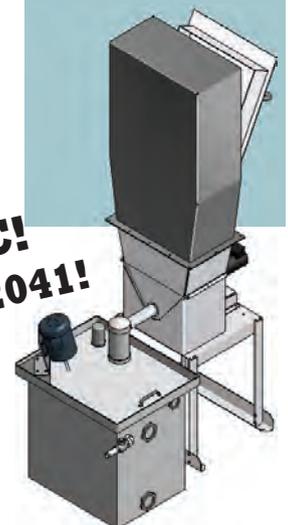
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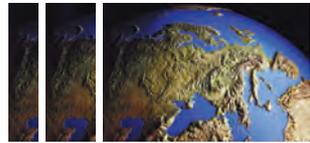


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INJECTING MOLECULAR OXYGEN INTO WASTEWATER OR BIOSOLIDS AERATION GREATLY INCREASES OXYGEN TRANSFER EFFICIENCY AND DRIVES DOWN ENERGY COSTS

By Ted J. Rulseh

Aeration is the most energy-intensive and costly process in wastewater treatment plants. Engineers and operators constantly look for ways to make it more efficient.

One advance was the replacement of coarse-bubble aerators with fine-bubble units. More bubbles mean more surface area through which oxygen can enter the wastewater. Now, Greener Planet Systems offers a new approach that comes close to the ultimate in aeration efficiency.

Instead of using bubbles, which ultimately float to the surface and disperse into the air, the PrO2 unit introduces oxygen mostly in molecular form. This means nearly all of the oxygen remains in the water to help bacteria do the work of breaking down waste. As a result, aeration requires significantly less energy than in conventional treatment systems.

The unit is produced by Blissfield Manufacturing; Greener Planet Systems is the master distributor for the technology. Glen Burkhardt, P.E., provides process engineering and technical input on applications of the product. He talked about the technology in an interview with *Treatment Plant Operator*, along with Chip Tokar, representing Natural Resources Management, a registered dealer also involved in scientific evaluations of the product.

tpo: Where did this technology originate?

Tokar: It was originally developed for medical applications to deliver blood super-saturated with oxygen for heart and organ transplants and other major medical procedures. Blissfield, as the manufacturer, took on

“We have found that with the PrO2, we can achieve comparable treatment performance with only 20 percent of the oxygen delivered by fine-bubble air diffusion.”

GLEN BURKHARDT

licensing for nonmedical applications and contracted with Greener Planet Systems as the master distributor. We’re just starting to introduce the PrO2 to the wastewater treatment market.

tpo: What is the rationale for offering this product to wastewater treatment facilities?

Tokar: We’ve taken the old aeration technology using bubbles and exponentially increased efficiency by delivering the oxygen in a molecular state, without bubbles. That reduces energy consumption by delivering oxygen at a much smaller horsepower than what it takes with a standard fine-bubble diffuser.

Burkhardt: We have found that with the PrO2, we can achieve comparable treatment performance with only 20 percent of the oxygen delivered by fine-bubble air diffusion. The efficiency of oxygen transfer into the water is almost 100 percent because it is in the molecular state and not in bubbles.

With conventional aeration you're trying to strip some oxygen out of the bubbles while they are rising and ultimately escaping at the surface.

tpo: What are the basic components of this technology?

Tokar: Four things needed. One of course is the PrO2 unit itself. In order for the unit to operate, we need an oxygen source, which typically is a liquid oxygen tank or an oxygen generator. Then we need electricity. Our smaller machines can operate on 110 volts, and we can scale them up to where they require 220 volts. We also need a slipstream source, typically clean water, although it can be the wastewater we're treating, in which case we need to add a filter to clean the water of suspended solids before it enters the machine.

“The slipstream enters the machine, and the oxygen from the tank or generator is injected into it. The oxygen essentially saturates the slipstream at approximately an 80 percent molecular level. The remaining 20 percent of the oxygen is in very tiny bubbles.”

CHIP TOKAR

tpo: Once all that is in place, how does the unit do its work?

Tokar: The slipstream enters the machine, and the oxygen from the tank or generator is injected into it. The oxygen essentially saturates the slipstream at approximately an 80 percent molecular level. The remaining 20 percent of the oxygen is in very tiny bubbles — what we call nanobubbles. Then the slipstream runs through piping into the target area, which is an aeration basin or an aerobic digester.

tpo: Which type of application is more common?

Tokar: At this time, we are more effective treating sludge, injecting oxygen onto a digester. However, in a test installation in Genesee County, Michigan, we injected into the aeration basin because we wanted to generate efficiency numbers.

tpo: What makes it possible to introduce the oxygen in molecular form?

Burkhardt: We inject the oxygen under pressure. Henry's Law of physics says that increasing the pressure increases the ability of a liquid to dissolve oxygen. We operate at about 300 psi, and that enables us to introduce nearly all of the oxygen in the molecular state.

tpo: Is there a sweet spot in terms of the type or size of facility where this technology is the most applicable?

Burkhardt: It could apply to nearly any-size facility. On the sludge processing side, it probably has wider application because we're able to achieve higher volatile solids reduction and a better recycle stream quality, and we can substantially reduce the volume of material that needs to be handled. On the aeration side, it has the most potential where a new plant or an addition to a plant is being constructed. However, where a community is looking to expand capacity, we learned at Genesee County that we could process 25 to 30 percent more wastewater through the same aeration tank volume by using the PrO2, as opposed to fine-bubble aeration.

tpo: Can you provide an example of how this technology has been deployed in a digester aeration application?

Burkhardt: A 4.5 mgd facility in Apopka, Florida, is using the technology in a 350,000-gallon sludge tank. They are adding oxygen from the PrO2 subsurface without providing any mechanical mixing of the solids. They're finding that the molecular oxygen diffuses itself throughout the

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tank. It's a unique approach to aerobic digestion because it's not necessary to mix the tank contents to increase the biological activity that consumes the volatile solids. They used to haul seven loads of biosolids per week; they are down to two loads since they started using the PrO2. It's a very low-energy application. They have 3 hp connected, whereas a tank that size using fine-bubble aeration would probably require 75 hp.

tpo: What has been the response to this technology in the marketplace?

Tokar: The challenge is to explain the difference between introducing molecular oxygen versus fine-bubble aeration. Once operators see it in operation, the benefits it can offer become very obvious. It's about "show me" in this business. **tpo**

New Technology Slated for WEFTEC 2017

By Craig Mandli

WEFTEC, the Water Environment Federation's annual technical exhibition and conference, offers water and wastewater professionals from around the world exposure to the newest products, along with water-quality education and training. This year's event, slated for Sept. 30 to Oct. 4 in Chicago, promises to show off some of the finest new products on the market for municipal and industrial water and wastewater professionals. Below is a preview of some of the newest products that will be highlighted at this year's show.

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The **FLEXFLO A-100N** polymer metering pump from **Blue-White Industries** is designed to efficiently and accurately meter the high viscosity polymers used in wastewater treatment. It comes equipped with built-in Tube Failure Detection System Plus. If the system senses tube failure, the pump will automatically shut off and energize a relay or switch. This permits communication with external equipment, such as a backup pump or alarm. The pump will not resume operation until the problem is resolved. This eliminates costly polymer spills and downtime for cleanup, with no false triggering.

714/893-8529; www.blue-white.com; Booth 3425



Bright Technologies 0.6-Meter Skid-Mounted Belt Filter Press

The compact 0.6-meter skid-mounted **belt filter press** from **Bright Technologies** has stainless steel frame and roller construction, and radius wedge zone and wing roller for sludge dewatering. Components include a sludge pump, polymer system and wash-water booster pump. Options include a sludge flowmeter, air compressor and discharge conveyors. The compact walk-around skid design can be utilized in as little as a 20- by 10-foot floor area. The Boerger rotary lobe sludge pump has a maintain-in-place design offering ease of maintenance. Cake solids of up to 35 percent can be achieved. Rates of 25 to 50 gpm make it ideal for small applications or when a processor has outgrown dewatering containers.

800/253-0532; www.brightbeltpress.com; Booth 514



Centrisys THK Series Thickening Centrifuge

The **THK Series Thickening Centrifuge** from **Centrisys** is engineered to achieve high-performance thickening of biosolids. The nonconical design results in greater G-volume, allowing for the highest capacity of flow to the centrifuge. It improves upon existing technologies using fundamental principles of the centrifuge, gravity belt thickener, dissolved air flotation and the rotary drum thickener. The hydropneumatic design has proven that no polymer is required under normal conditions.

262/654-6006; www.centrisys.com; Booth 7708



CNP - Technology Water and Biosolids Corp. PONDUS

The **PONDUS** thermochemical hydrolysis process from **CNP - Technology Water and Biosolids Corp.** optimizes the biosolids treatment process so a plant can move toward energy independence. It drastically minimizes the overall carbon footprint by decreasing the solids production, while enabling useful repurposing of biosolids as a fertilizer and carbon source and methane gas outputs as renewable energy. It reduces the viscosity of thickened waste-activated sludge up to 80 percent, reduces anaerobic digestion volume up to 50 percent, increases the dewatered dry cake solids up



to 5 percent and increases biogas production up to 30 percent.

262/764-3651; www.cnp-tec.com;
Booth 7711

Enviro-Care SPECO

SPECO combined pretreatment plants from **Enviro-Care** are a complete, above-ground headworks with minimal space requirements and no civil works. They can be the only pretreatment for a small treatment plant or supplemental pretreatment to increase capacity in any size plant. The standard design uses a screw screen. However, other screen designs may be more suitable, depending on the application. The modular design allows it to be configured for standard wastewater applications or specialized applications such as septage receiving.

815/636-8306; www.enviro-care.com;
Booth 1342



Flo Pro Products Base Elbow Rail System

The specially engineered line of **Base Elbow Rail Systems** from **Flo Pro Products** can adapt to nearly all pumps in the industry. Cast from ductile iron and powder coated for corrosion resistance, the base elbows and accessories are designed for any new or retrofit wastewater application.

567/455-3114; www.floproproducts.com;
Booth 5617



Gorman-Rupp 6500 Series

The **6500 Series** from **Gorman-Rupp** is a horizontal end suction centrifugal pump line consisting of solids and clean liquid-handling pumps. Sizes are available from 3 to 16 inches, with flows to 15,000 gpm, total dynamic head to 530 feet and solids-handling capabilities up to 4 inches. They provide high levels of performance and efficiency for applications in wastewater treatment plants and industrial facilities. They come standard with oversized bearings, an atmospheric vent, side access inspection port (on solids-handling models), and indexable Smart Scroll discharge locator.

419/755-1011; www.grpumps.com;
Booth 2225



Grundfos Pumps SMART Digital XL DDA

SMART Digital XL DDA

digital diaphragm dosing pumps from **Grundfos Pumps** provide accurate dosing of virtually all chemicals up to 52.8 gph and 145 psi in a way that is flexible and user friendly.

They integrate easily into typical dosing applications, providing precise dosing of chemicals. The pumps can dose concentrated chemicals, even in small quantities. This saves chemicals, reduces transportation costs, and allows for smaller dosing tanks. Dosing is almost pulsation-free, and no additional accessories are needed. They prevent overdose, which improves health and environmental protection.

630/236-5500; us.grundfos.com;
Booth 1626



Hach Claros

The **Hach Claros** partners trusted instrumentation with software for increased precision to water measurement and plant operations. The portfolio of products includes mobile sensor management, which allows operators to read data from a mobile device, calibrate and verify instruments, all while prioritizing issues for greatest efficiency and allowing the probe to stay in the process. Analysis and reporting tools aggregate data in one spot, making regulatory reporting a snap, and real-time optimization tools complete process adjustments to maintain compliance while maximizing cost reductions and providing measurement alignment. These elements come together to provide actionable insights and a simplified workflow.

800/227-4224; www.hach.com;
Booth 1308



Huber Technology RoFAS Septage Receiving Station

The **RoFAS Septage Receiving Station** from **Huber Technology** is designed to handle harsh environments that may cause standard receiving stations to fail. It easily handles large rocks and debris, protecting headworks from unpredictable septage.

Its large-capacity center-feed drum allows for rapid off-loading of tanker trucks. It provides the option for a fully automatic hauler station with keycard access, quick connect and data logging. It can help create revenue opportunity for a quick return on investment.

704/949-1010; www.huberforum.net;
Booth 3635, 3935



JDV Equipment Level Loder

The **Level Loder** from **JDV Equipment**

provides a means to dispose of processed waste and material with increased odor control and reduced risk of personnel being unnecessarily exposed to processed material. It helps contain odor by covering standard dumpsters used for hauling processed material, allowing for even distribution of material while increasing the fill percentage of the dumpster without the need for personnel to manually even out the waste material. It allows for outdoor installation with enhanced pest control measures without exposing material to the environment, freeing indoor square footage for other needs and allowing for a decrease in capital expenses for design, engineering and installation for new construction/upgrade projects.

973/366-6556; www.jdvequipment.com;
Booth 3840



JWC Environmental Wipes Ready Technology

Wipes Ready Technology for Muffin Monster and Channel Monster Grinders from **JWC Environmental** protects wastewater pumps from flushed rags and wipes. This sewage grinder technology is designed to address the needs of today's wastewater collections systems. Unlike other two-shafted grinders, the cutting systems on a Wipes Ready Muffin Monster will slice wipes into small pieces that will not reform into large rag balls. This allows the sewage to remain pumpable and prevents de-ragging and pump maintenance. The technology has been recognized by the Water and Environment Federation for a 2017 Innovative Technology award.

800/331-2277; www.jwce.com; Booth 1312



Keller America LEO 3

The **LEO 3** from **Keller America** combines a digital pressure transmitter and local, dual-purpose display into a single compact housing. This externally powered instrument provides a local display for measured pressure on the upper display, while the 4-20mA output signal for connection to PLCs, process meters and SCADA systems is displayed on the lower display. It is available in pressure ranges up to 15,000 psi and the choice of 1/4-inch NPT or G1/4-inch pressure connections. Interface converters are available to connect it to a PC and



Keller's CCS30 software for output scaling, configuration and logging functions.

**877/253-5537; www.kelleramerica.com;
Booth 639**

Komline-Sanderson Biosolids Drying System

Biosolids Drying Systems

from **Komline-Sanderson** are capable of handling in excess of 1,000 tons of wet cake per day. Excess heat from combustion engines or turbines can be used to heat thermal fluid or produce steam. The dryer's shaft, hollow paddles and trough are all heated. The robust design and low speed with minimal rotating parts results in reduced maintenance costs. Indirect drying using the airtight dryer results in minimal off-gas volume, which allows simplified odor control systems and safe operation resulting in reduced disposal costs for the beneficial reuse of biosolids as fertilizer and green fuel.

**800/225-5457; www.komline.com;
Booth 3431**



Myron L Company 900 Series Monitor/Controller

The 900 Series Monitor/Controller

from **Myron L Company** combines flexibility, accuracy and reliability. Its 3.5-inch resistive touchscreen and intuitive graphical user interface make it simple to use. Measurement capabilities include conductivity, resistivity, salinity, TDS, pH, ORP, temperature, mV, flow, and percent rejection. It includes a 4-20 mA input and a variety of outputs, including 0-10-volt DC recorder output, relay output, alarm output, and optional outputs for 4-20 mA, RS-485, two additional relays, and an additional alarm output.

**760/438-2021; www.myronl.com;
Booth 8305**



Neptune Chemical Pump Series MP7000

The **Series MP7000** mechanically actuated diaphragm metering pump from **Neptune Chemical Pump** eliminates the use of contour plates on the liquid side of the diaphragm, while the simple, straight-through valve and head design allows for improved flow characteristics. It is self-priming, provides superior performance, and a maximum capacity range up to 27 gph at 235 psi.

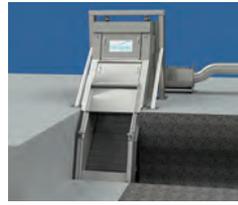
**215/699-8700; www.neptune1.com;
Booth 4423**



Parkson Aqua Rhino

The **Aqua Rhino** in-channel escalating screen from **Parkson** is made of stainless steel. This durable step screen includes thick lifting blades and frames. Its robust design and advanced drive system provide high performance and durability in a cost-efficient package. A redesigned screen bottom and optional spray bar washout system significantly reduce machine wear due to grit buildup. It is available in three installation angles and designed to fit channel widths from 20 to 84 inches.

**888/727-5766; www.parkson.com;
Booth 4457**



Praxair In-Situ Oxygenation (I-SO) System

The **In-Situ Oxygenation (I-SO) System** from **Praxair** offers the benefits needed

to overcome many wastewater treatment challenges. The system is a mechanical oxygenator that can dissolve as much as 82 percent high-purity oxygen into water. When a facility aerates with the system, it can increase biotreatment capacity, significantly lowering VOC emissions, reducing foam formation, reducing electrical power usage, and allowing for greater variations in oxygen demand.

**800/772-9247; www.praxair.com/wastewater;
Booth 651**



Peabody Engineering ProChem LS - Ultrasonic

The **ProChem LS - Ultrasonic** ultrasonic level sensor from **Peabody Engineering** makes monitoring tank levels a lot easier. It is intuitively designed, is compact and user friendly. It provides accurate and reliable noncontact measurement of chemicals, oil, wastewater and water, and operates on either an internal battery or 24-volt DC operation with 4-20mA output for process control functionality. The easy-to-read display is menu driven and easy to calibrate. Gemini and ProChem tanks are preprogrammed to the sensor, and other tanks are easily calibrated in a few simple steps.

**800/473-2263; www.4peabody.com;
Booth 6136**



Penn Valley Pump Double Disc Pump

The **Double Disc Pump** by **Penn Valley**

Pump provides a low life cycle cost. Its design eliminates the friction wear associated with progressive cavity and rotary lobe pump styles. The pump can run dry without damage and incorporates a one-of-a-kind sealing trunnion that requires no maintenance, no seal water, no packing, no lubrication and does not leak. A free "Swap Your Pump" trial program provides the opportunity to try the pump in an application risk free.

**800/311-3311; www.pennvalleypump.com;
Booth 4431**



Proco Products ProFlex 790

The **ProFlex 790** low-headloss in-line rubber duckbill check valve from **Proco Products** can be used for municipalities, airport runway runoffs, railway washouts, highway flood damage prevention and odor control. Its design provides rapid dispersion of head pressures, and with low cracking pressure prevents upstream flooding. The foldaway design of the inner sleeve allows for a near full port flow, allowing for quick drainage. The design makes it a fit for combined sewer overflows, sanitary sewer overflows and outfalls.

**209/943-6088; www.procoproducts.com;
Booth 4327**



Red Valve CheckMate UltraFlex

The **CheckMate UltraFlex** valve from **Red Valve**, with its "Arc Notch" and optimized construction, opens quickly, allowing the pipeline and entire collection system to drain faster. Because it snaps open with far less head pressure, pipeline capacity is significantly increased, allowing a free flow of water during weather events and minimizing the chance for standing water to collect upstream.

**412/279-0044; www.tideflex.com;
Booth 2908**



SAF-T-FLO SAF-T-Seal

The **SAF-T-Seal** elastomeric duckbill tip from **SAF-T-FLO** can be a time saver when added to injection quills dosing sodium hypochlorite or ammonia. These chemicals are prone to forming deposits, which eventually lead to a clogged injection quill. The tip can be added to any 3/8- or



1/2-inch injection quill to help reduce tip clogging, extending maintenance intervals.

**800/957-2383; www.saffflo.com;
Booth 4819**

Singer Valve 2SC-PCO

The **Model 2SC-PCO** from **Singer Valve** is designed for use with an MCP Multi-Process Control Panel or EPC Single-Process Control Panel.



The flow into and out of the upper operating chamber is controlled by the two pilot solenoids. The electronic control determines whether the opening solenoid or the closing solenoid is operated. Virtually any hydraulic function can be achieved using the open-close output from the SCADA controller to the valve. This precision control valve is good for remote locations, requiring minimal power with manual controls for emergencies and the ability to service in-line.

**888/764-7858; www.singervalve.com;
Booth 4451**

Smith & Loveless PISTA

PISTA forced-vortex grit removal systems from **Smith & Loveless** use advanced hydraulic control technology to provide fine grit removal across all flows, including 95-percent removal efficiency for grit particle sizes down to 100 microns. They combine specially



designed inlet and outlet flumes, circular flat-floor chambers and integrated flow control baffles to create a forced hydraulic action that maximizes grit capture. They do not rely primarily on settling or gravity. Retrofit systems offer improved grit removal performance for existing 270-degree chambers (flat floor, sloped and cone-shaped) for less total investment than new systems.

**800/898-9122; www.smithandloveless.com;
Booth 2017**

Sulzer HST Turbocompressor

The **HST Turbocompressor** from **Sulzer** has an advanced design with proven magnetic bearing technology and a high-speed motor driven through a built-in frequency converter. It has no mechanical wearing parts or lubricants requiring minimal maintenance. This is made possible by electronically controlled magnetic bearing technology, which levitates the integrated rotor/shaft/impeller single-piece assembly. The result



is a compressor with no performance deterioration over time and no need for scheduled maintenance.

**203/238-2700; www.sulzer.com;
Booth 2012**

Vaughan Company Conditioning Pump

The **Conditioning Pump** from **Vaughan Company** is a Vaughan Submersible Chopper Pump mounted on a portable stand, fitted with a high-velocity mixing nozzle. It recirculates the contents of the wet well, chopping and mixing to produce a homogeneous mixture that is more easily pumped out. Floating mats are removed and solids accumulated on the floor are resuspended. The pump is mounted on a portable stand, and can easily be used in multiple applications at a single job site, facility or municipality. In one project, the Vaughan Chopper Pump paid for itself in 2.5 months.



**888/249-2467; www.chopperpumps.com;
Booth 2348**

Walker Process Equipment

Walker Process Equipment began producing spur gear drives for pier-supported collectors in the mid-1950s. Many of those early installations are still in operation after over 50 years' continuous operation. Since development of the first **drive assemblies**, the design has been continuously updated to improve all aspects of the design and to comply with all current ANSI/AGMA design criteria. The latest feature includes a high-accuracy torque monitoring system that uses a load cell to provide a local digital display output that can also be transmitted with a 4-20 ma signal.



**630/892-7921; www.walker-process.com;
Booth 626**

Watson-Marlow Fluid Technology Group Bredel

Bredel hose pumps from **Watson-Marlow Fluid Technology Group** reliably handle a variety of harsh materials, including abrasive sewage, making them ideal for feeding primary or thickened sludge to digesters or filter presses. Unlike other pump types, the highly abrasive nature of grit-filled biosolids does not effect peristaltic hose pump life. With operating pressures



to 232 psi and flow rates to 475 gpm, they eliminate ancillary equipment such as run-dry protection, seal water flush systems and inline check valves, and are virtually maintenance-free.

**800/282-8823; www.wmftg.com/water-waste;
Booth 3116**

WorldWide Electric Corporation

WorldWide Electric Corporation offers open drip proof (ODP), vertical hollow shaft (VHS) and totally enclosed fan cooled (TEFC) motors. Control products include variable frequency drives and WorldStart soft starters.



**800/808-2131; www.worldwideelectric.net;
Booth 7927 tpo**



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**Nate Tillis
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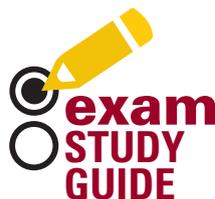


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By Ron Trygar

WASTEWATER: *Understanding hydrogen sulfide*

Which statement about hydrogen sulfide is correct?

- Hydrogen sulfide causes corrosion due to the development of high pH conditions.
- The lower the pH of the sewage, the higher the potential for hydrogen sulfide to be present.
- Using acidic chemicals in lift stations is a way to prevent hydrogen sulfide formation.
- Hydrogen sulfide is lighter than air and will accumulate in the upper parts of manholes.

ANSWER: B. Hydrogen sulfide (H₂S) is a deadly gas commonly found in sewage collection systems, manholes, vaults, wastewater influent treatment structures, empty treatment tanks that contain decomposing organic matter, and other confined spaces. H₂S is about 2.5 times heavier than air and can usually be found near the bottoms of the spaces listed. This colorless gas has a rotten egg odor and in high enough concentrations can deaden a person's sense of smell, giving a false sense of safety. Methods of controlling H₂S in wastewater include adjusting the liquid pH with a basic chemical like sodium hydroxide, magnesium hydroxide or sodium hypochlorite (bleach). The lower the pH of the sewage, the more likely H₂S will be present. H₂S gas in moist environments like manholes and lift stations creates sulfuric acid, which is very corrosive to metal and concrete structures.

WATER: *Where's that pink color coming from?*

The operator of the permanganate-greensand-filter water treatment plant sees a light pink color in the water leaving the filters. What could cause the pink water and what can be used to remove it?

- An overdose of chlorine is the cause, and sulfur dioxide can remove the color.
- An under-dose of potassium permanganate is the cause, and soda ash can remove the color.
- An overdose of chlorine is the cause, and sodium bisulfate will remove the color.
- An overdose of potassium permanganate is the cause, and powdered activated carbon can remove the color.

ANSWER: D. Potassium permanganate is a strong oxidizing agent used to convert soluble iron and manganese to an insoluble particulate form that can be caught on filter media and removed from the water. When overdosed, potassium permanganate can turn the water a slight pink color, and if dosed too high it can turn the water purple or brown-purple. Powdered activated carbon (PAC) can be used to remove the pink color, but could in itself turn the water a dark color. Dark-colored water containing PAC must be returned to the plant for retreatment and filtration. Some operators may believe the pink water is due to chlorine overdose, since the reagent used for chlorine residual (DPD) also creates a pink color. However, this is a false answer.

ABOUT THE AUTHOR

Ron Trygar, a certified environmental trainer, is the senior training specialist for water and wastewater programs at the University of Florida's TREEO Center. He has worked in the wastewater industry for more than 30 years in a variety of locations and positions. He holds a Florida Class A wastewater treatment operator license and a Florida Class B drinking water operator license. **tpo**

HYUNDAI CROWN TRITON™ MOTORS

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1 CONSERVATIVE DESIGN PHILOSOPHY

Hyundai has very **conservative** engineering and **design philosophies**, they do not accept the 'Nominal Approach' of making motors. Every motor, not just the average of a group of motors, must meet or exceed the target requirements such as temperature rise, efficiency, noise and vibration.

The Nominal Approach: NEMA or other specifications may require that a motor have a max temperature rise of 80°C at the rated load. The Nominal Approach allows that the average of the entire lot not exceed 80°C, meaning that some motors may exceed the requirement. All that matters is that the average of all motors does not exceed the required value.

Summary - The Hyundai Approach: Hyundai requires that every single motor produced does not exceed 80°C so they set their internal target at 7-8% less. This assures that **every motor** produced meets the requirement. Hyundai uses this same philosophy for many other critical attributes such as efficiency, noise level, vibration, full load speed, locked rotor and breakdown torques.

2 LOW OPERATING TEMPERATURES COUPLED WITH A PREMIER INSULATION SYSTEM

Heat is the largest factor leading to premature insulation failure - the larger the buffer between the actual motor temperature and the temperature rating of the insulation system is, the longer the insulation life will be.

Hyundai's approach for a reliable insulation system is to use **Class N varnish**, which is **rated for 200°C** and limits the temperature rise to ~74°C. This results in a larger buffer between the actual temperature and what the insulation system can handle without breaking down. With a 40°C ambient and a motor running at the nameplate load this buffer for an HHI motor is a whopping 86°C (200-74-40 = 86). Compare this to a typical motor with an 80°C rise and Class F insulation, the buffer is only 35°C (155-80-40=35). Remember the old adage, for every 10°C cooler electrical products run, the life expectancy of the insulation system doubles. An 86°C buffer is a big deal if you want a motor that will last a long time.

Summary - Hyundai motors run cooler and provide a larger buffer of protection for the insulation system which results in long life. An additional benefit of this design allows you to apply a stock motor in higher ambient conditions and still provide a good buffer.

3 LOW VIBRATION

Vibration leads to premature bearing failure and can damage the coupled equipment.

Hyundai's approach to a low vibration motor ... Shoot for less than half of the NEMA requirement, don't cut cost with lighter weight end bells, machine all motors with a precise foot flatness and use only the best bearings.

NEMA requires a finished motor to have a vibration level that does not exceed **.15 inch/second peak**. **Hyundai's conservative approach** sets the target at **~.07 inch/second peak**. All motors are precision balanced, feet are machined to a flatness of ~0.005", end bells are heavily ribbed and only premium bearings such as NSK, SKF or FAG are used.

Summary - heavy cast iron frames, precision balance rotors and precise foot flatness leads to lower vibration and thus longer bearing life and less damage to other equipment.

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HIGH-EFFICIENCY AERATION AND AUTOMATED DO CONTROL BRING SIGNIFICANT ENERGY SAVINGS AND REDUCE OPERATORS' LABOR AT A CALIFORNIA RECLAMATION PLANT

By Madan Arora and Satish Kamath

Aeration was inefficient and dissolved oxygen control time-consuming at a major wastewater treatment plant in the Coachella Valley Water District.

The aeration system used old blowers that were noisy and consumed excessive energy. Operators were uncomfortable inside a too-warm blower building and had to make continual manual adjustments to optimize DO levels in the aeration basins.

Looking to reduce energy costs and free operators for more productive tasks, the district leadership contracted with the Parsons engineering firm for a major plant upgrade. New high-efficiency turbo blowers and a fine-bubble diffuser system have yielded substantial energy savings while automating DO control.

THREE PLANTS IN ONE

The Coachella Valley district, about 100 miles east of Los Angeles, owns and operates five wastewater treatment facilities. The upgrade focused on Water Reclamation Plant No. 10 (WRP-10) in Palm Desert.

WRP-10 is comprised of three plants at the same site with a combined annual average treatment capacity of 18 mgd (Plant A — 2 mgd and Plants B and C — 8 mgd each). The plants were built about 10 years apart to meet a growing population. Plant C, the newest, was built in the early 1990s.

The district serves a resort community visited by numerous tourists from December through February, boosting the plant flow from about 10 mgd to 12 mgd. The district projects future flows at 24 mgd, some 6 mgd more than the current combined three-plant capacity. The increase will be treated by expanding Plant A to 8 mgd when needed.

The WRP-10 discharge permit requires only secondary treatment and no nitrogen removal, although a total inorganic nitrogen limit of 8 to 10 mg/L is expected in the future, in line with the permits at the plants in nearby communities.

UNCOMFORTABLE CONDITIONS

All three WRP-10 plants are served by a common headworks (screening and grit removal), after which the flow splits. There is no primary treatment; after activated sludge treatment with diffused aeration, the plant effluents combine. A large portion of the secondary effluent receives tertiary treatment with continuous backwash filters.

The majority of tertiary effluent is used for irrigation; the rest along with the secondary effluent is percolated to groundwater. The biosolids from all three plants are combined, thickened with dissolved air flotation and dewatered on belt presses. A private contractor hauls the dewatered material away for beneficial use.

WRP-10 had three 500 hp and three 400 hp positive displacement blowers that were low-efficiency and at the end of useful life. They operated in a large building with no air conditioning or other temperature control. Temperatures inside typically exceeded 100 degrees F, uncomfortable for the operators. The building doors were kept open to make the environment more tolerable, but the noise level remained high, and the operators had to wear ear protection.

AERATION ISSUES

The operators faced several issues in seeking to optimize plant operations. First, each plant had different aeration diffusers, although served by



The blower building houses six high-efficiency 500 hp turbo blowers (ABS Sulzer).

(continued)

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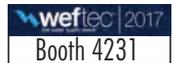


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the same set of blowers. Plant A had lift-out air headers arranged in spiral-flow configuration with tubular membrane fine-bubble diffusers. Plant B had swing-type air headers arranged in spiral roll configuration with tubular fine-bubble diffusers. Plant C used a full-floor-coverage, fixed-grid aeration system, evenly spaced, with EPDM fine-bubble diffusers.

In addition to different diffuser types, the submergence of diffusers varied between plants from 13 feet to more than 14 feet due to different aeration basins depths. The Plant A basins were the shallowest and the Plant C basins were the deepest.

Compounding the difficulty of optimizing airflow among the plants, the distribution was accomplished manually by throttling valves in the air headers feeding each plant and manually adjusting the blowers' inlet gates. As a result, power consumption was more than would be required in a well-designed and automated system. The aeration system was both inefficient and difficult to operate.

The three plants share a few common features. Each plant has multi-pass aeration basins arranged in a serpentine configuration. Plant A has one basin with four passes and Plants B and C have two basins, each with three passes. Flexibility existed to use a serpentine mode of flow (preferred by the operators) or to use each pass with a straight-through flow by operating suitably located isolation gates. Straight-through operation was used during emergencies when the diffusers in any pass of the basins needed repair.



The fine-bubble diffusers were tested before full-scale operation began.

Another common feature among the plants was the even distribution of diffusers in each pass with no provision for tapered aeration (that is, providing more diffusers at the inlet end of the basins and decreasing the numbers somewhat uniformly along the basin lengths). This technique is commonly used in well-designed plants to optimize efficiency and energy consumption.

MULTIPLE IMPROVEMENTS

The district contracted with Parsons to upgrade the aeration system with efficient high-speed turbo blowers, new state-of-the-art fine-bubble diffusers, and automatic controls to minimize energy consumption. As the project evolved, the project scope was expanded to include:

- Seismic retrofits to the blower building
- A 1,500 kW standby generator
- Replacement of three main air headers feeding the three plants (they were corroded or showed signs of imminent corrosion)
- Improvements to electrical wiring
- Installation of four 15 hp evaporator coolers for temperature control in the blower building
- Providing Schedule 10 stainless steel in-tank piping rather than the Schedule 40 PVC used at most plants (largely due to high wastewater temperature at the plants)

After construction, WRP-10 has new 9-inch-diameter EPDM diffusers (EDI) in all three plants with full-floor coverage, laid in a tapered configuration. This allows more air up front where air demand is highest, gradually decreasing downstream. Air distribution is now automatic based on preselected DO setpoints at strategic locations in each aeration basin. The system automatically throttles the control valves at each air sub-header feeding a particular segment of basins.

REGULATING DO

If DO falls below a setpoint, local control valves open automatically,

allowing more air into the affected basin segment. The reverse happens when the DO rises above the setpoint. During design, plant operators expressed concern that the DO control strategy might reduce the airflow in some areas of the basins so much that mixing would become an issue and the biomass in the mixed liquor might begin to settle.

To address this concern, the control strategy was enhanced so that the air quantity would not go below a preset level at any point in the basins, even if the DO control strategy dictated a reduction in airflow. Air required for mixing was calculated and preset based on providing 0.12 scfm of air per square foot of the basins' areas of concern.

In addition, if the online blowers could not meet the demand dictated by one or more DO or mixing criteria setpoints in different parts of the basins, additional blowers would come online to meet the increased demand. If the reverse happens and DO rises at one or more setpoints, one or more blowers would go offline or run at lower speed.

Control of the blowers is triggered by a drop or rise in the discharge pressure measured in the main header downstream of the blowers. All setpoints are preselectable by the operators with a touch of corresponding buttons on the control panel.

ATTRACTIVE RETURN

WRP-10 now has six high-efficiency 500 hp turbo blowers (ABS Sulzer). Although the entire project cost \$12.7 million, it would have been about \$5.2 million without the additions listed above. The district received a rebate of \$227,000 from Southern California Edison for the energy-saving measures included in the design, reducing the net project cost to \$12.47 million (\$4.97 million after deducting the cost of extra items).

The district's power bill is about \$24,000 per month less than before the project for essentially the same flow and influent characteristics. This is based

The district's power bill is about \$24,000 per month less than before the project for essentially the same flow and influent characteristics. This is based on actual savings of 2.3 million kWh per year, translated to savings of \$288,000 per year.

on actual savings of 2.3 million kWh per year, translated to savings of \$288,000 per year and a simple payback period of about 17 years.

It should be noted that the current flow to the plant is only 10 mgd versus the design flow of 24 mgd. The aeration system is designed to achieve full nitrification, and some denitrification, to meet the future nitrogen discharge requirement. The savings would more than double at design capacity and with anticipated nitrogen requirements, reducing the payback to less than half — about 7.2 years. With the current flow and effluent requirements, two blowers are sufficient. A third blower operating a few hours per day will likely be needed during winter.

Besides saving money, the new aeration system gives operators a comfortable work environment in the blower building at about 80 degrees F (adjustable) year-round, and with very little noise. In addition, they no longer have to juggle their regular duties around manually adjusting the blowers and throttling valves on the air headers to maintain the desired DO levels in the aeration basins.

Finally, the blower building is now seismically safe, important in California earthquake country. District officials are proud of the project, which they considered long overdue.

ABOUT THE AUTHOR

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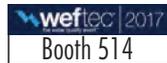
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Digital Technology

By Craig Mandli

Communication Equipment

PHOENIX CONTACT SERIAL DEVICE SERVERS AND GATEWAYS

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DEZURIK WATER CONTROLS ECB-CP

The ECB-CP pump and control valve interface for solenoid-controlled valves from DeZURIK Water Controls is designed to provide control between the pump and pump control valve to minimize pressure surges in the fluid-handling system when the pump starts and stops. The preprogrammed controller properly sequences and controls the pump and pump control valve startup and shutdown procedure, protecting the pumping system from damage due to mechanical, hydraulic or power failure. It includes local control buttons mounted on the door of the electric control box interface, visual indication of system status throughout all modes of operation, configurable timers to control sequencing and automatic pump shutdown in emergency situations. It is designed to be used with all DeZURIK pump control valves, and is suitable for booster pump and deep well applications. **320/259-2000; www.dezurik.com**



ECB-CP interface for solenoid-controlled valves from DeZURIK Water Controls



ARCA -JIC Series from FIBOX Enclosures

FIBOX ENCLOSURES ARCA -JIC SERIES

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The Integrinex line of lift station controls from Gorman-Rupp is designed to ensure system performance through precise matching of controls to pumps and motors. Customers have four choices in liquid level controls when they select a Gorman-Rupp ReliaSource solids-handling pump package. Basic offers simple, reliable plug-and-play performance and is designed for accurate start/stop operation in a duplex alternation pump system. Standard includes duplex and triplex alternation, level sensors, pump delay and alarms. Advanced control systems include soft starters and variable frequency drives to manage electric inrush, hydraulic shock, and matching starting and stopping torque-based management and monitoring. Remote View includes all the functionality of the advanced system with remote tablet-based management and monitoring. **419/755-1011; www.grpumps.com**



Integrinex lift station controls from Gorman-Rupp

PHILADELPHIA GEAR MARK VII SERIES

The Mark VII Series electronic controller from Philadelphia Gear controls variable-speed and soft-start hydroviscous drives. To maintain a desired clutch output condition, whether it be speed, torque (load), flow or pressure, it works as a closed-loop feedback device using the clutch output shaft controlled parameter as feedback. The input command signal is automatically and continually compared to the output shaft controlled parameter, an error signal is generated, and the clutch clamping pressure continually self-adjusts to maintain input command signal. Output parameter regulation is accurate within plus or minus 0.1 percent, and can monitor low oil pressure, high oil temperature, as well as programmed acceleration and deceleration rates. Interactive control of multiple clutches or clutch-brake combinations is another programmed capability. It is user-friendly and no on-site software programming is necessary. **800/766-5120; www.philagear.com**



Mark VII Series electronic controller from Philadelphia Gear



Type ABS PC 441 pump controller from Sulzer Pumps Solutions

SULZER PUMPS SOLUTIONS TYPE ABS PC 441

The Type ABS PC 441 pump controller from Sulzer Pumps Solutions provides advanced but easy-to-use functions that can reduce service visits and increase station effectiveness, with benefits for the entire collection network. It enables operators to make energy-efficient changes, controlling and monitoring

from one to four submersible pumps. It can also be used as a stand-alone monitoring unit. It provides complete surveillance of pumps and stations, with unique control functions that reduce energy consumption and servicing. Greater functionality can help increase pump, station and network efficiency. It is future-proof technology, easily accessed remotely via ABS AquaProg. **203/238-2700; www.sulzer.com**

Flow Monitoring

BLUE-WHITE INDUSTRIES BW DIGI-METER F-2000

The BW DIGI-METER F-2000 electronic insertion-style flowmeter from Blue-White Industries has a clamp-on saddle fitting and insertion sensor that are quickly installed on IPS (ASTM-D-1785) pipe sizes from 1 1/2 through 12 inches. The electronic display and communication enclosure can be mounted directly to the sensor or remotely located. Standard models display flow rate and accumulated flow, and include an NPN open collector output for communication with data loggers, SCADA systems and other external devices. Optional 4-20mA / 0-10 volts DC plug-in circuitry can be added for additional communication. Optional batch processing plug-in circuitry includes an 8-amp relay board for manual or automatic batch processing capability, or a high/low flow rate alarm output. Electronics can be battery operated with AA batteries or AC powered using a 15- to 24-volts DC plug-in transformer. It has a weather-resistant ABS enclosure rated NEMA 4X. Units are factory programmed and include a calibration certificate. Custom calibration is available. **714/893-8529; www.blue-white.com**



BW DIGI-METER F-2000 flowmeter from Blue-White Industries

ENDRESS+HAUSER PROMAG 400

The Promag 400 magnetic flowmeter from Endress+Hauser has built-in Heartbeat Technology that provides self-monitoring, device verifications and diagnostics per ISO 9001 for long-term operation. It means there's no need for dismantling the device and interrupting operations for unnecessary flowmeter calibrations. It provides inspection reports via web servers or asset management systems, complete documentation of a device's performance, and saves verification results directly in the device. Models are available for pipe sizes from 1 to 90 inches. All models have corrosion protection and polyurethane, hard rubber or polyamide liners that have drinking water approvals. They have 4-20mA HART, Ethernet/IP, Profibus and Modbus RS485 communications, and current and pulse/frequency outputs. **888/363-7377; www.us.endress.com**



Promag 400 magnetic flowmeter from Endress+Hauser



MT100 flowmeters from Fluid Components International

FLUID COMPONENTS INTERNATIONAL MT100

MT100 multipoint thermal mass flowmeters from Fluid Components International provide temperature-compensated direct mass flow measurement of air and gases with low maintenance requirements in large-diameter pipes, stacks and rectangular duct installations. The meters are available with two to eight flow rate-sensing points, inserted at various depths within a pipe or duct. Their outputs are multiplexed and averaged to produce the flow rate within the process line. There are no moving parts or glass windows to foul or clog. They can measure air and gas processes operating at up to 850 degrees F. **800/854-1993; www.fluidcomponents.com**

Monitors

ASA ANALYTICS CHEMSCAN MINI LOWAM

The ChemScan mini LowAm analyzer from ASA Analytics provides accurate and precise analysis of ammonia in wastewater. This device has been designed from the ground up to reduce maintenance requirements, includes large I.D. sample tubing to minimize plugging, and only needs quarterly reagent changeout. Unlike probes that require frequent calibration, operators can trust data with the unit, resulting in energy savings and meeting discharge requirements. **262/717-9500, www.asaanalytics.com**



ChemScan mini LowAm analyzer from ASA Analytics

CHEMETRICS V-3000

The hand-held V-3000 multi-analyte photometer from ChemMetrics can be used as a portable or bench-top water analyzer pre-programmed to test for over 40 calibrations using Vacu-vials self-filling reagent ampoules. The simple menu-driven operation guides an analyst through all measuring tasks with a large, easy-to-read graphics display. Its flexible design accepts 13, 16 and 28 mm cell sizes. Operator safety is ensured because there's no sample preparation, mixing or chemical contact. It stores up to 100 data points with date/

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V-3000 multi-analyte photometer from CHEMetrics

FORCE FLOW SPILLSAFE LX DRUM SCALE



SpillSafe LX Drum Scale from Force Flow

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The Model DFS 5.1 Doppler Flow Switch from Greyline Instruments measures liquid flow with a noncontacting ultrasonic sensor mounted on the outside of 1/2-inch-diameter or larger pipes. It installs in minutes, no pipe drilling or cutting is required and there is no maintenance. It is designed for pump protection, valve control and flow/no-flow alarms, and is ideal to control wastewater, slurries, caustics, acids and difficult liquids. The watertight NEMA 4X switch enclosure includes a 5-amp DPDT control relay with adjustable on and off setpoint controls, adjustable time delay, flow rate bar graph and relay status LEDs. A sensor-mounting kit is included with each switch and the sensor cable can be extended up to 492 feet. **888/473-9546; www.greyline.com**



Model DFS 5.1 Doppler Flow Switch from Greyline Instruments

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Uniflow LE AireStream Fume Hood from HEMCO Corporation

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Preciseline transmitter from Keller America

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Suspended Solids Density Meter from Markland Specialty Engineering

MYRON L COMPANY 900 SERIES

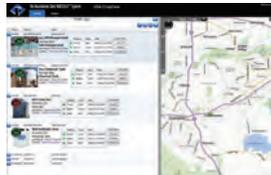
The 900 Series industrial monitor/controller from Myron L Company combines flexibility, accuracy and reliability. Its measurement capabilities include conductivity, resistivity, salinity, TDS, pH, ORP, temperature, millivolts DC, flow and percent rejection. It includes a 4-20mA input. Standard outputs are a 0- to 10-volts DC recorder output and a relay output. Optional outputs include a 4-20mA, an RS-485 output, as well as two additional relays. The instrument's display can show up to four measurements simultaneously. Sensor setup allows the user to eliminate error due to cable length and enter custom cell constants for conductivity sensors. Calibration is electronic. Its 3.5-inch touch screen and intuitive GUI make it simple to set up, use and adapt to your specific needs. **760/438-2021; www.myronl.com**



900 Series industrial monitor/controller from Myron L Company

PEABODY ENGINEERING TANK WATCH-IT

Peabody Engineering's web-based tank alert system, Tank WATCH-IT, allows subscribers to access their tank information 24/7 from anywhere in the world. It is an all-in-one package for wireless web-based level measuring technology. It includes sensors for tanks of all kinds, tiered web access from any device, and technical support. This customizable system provides access to check tank status from anywhere and to set up automatic alerts, there is no software or custom app, and all data is encrypted and includes multiple reports for review. **800/473-2263; www.etanks.com**



Tank WATCH-IT tank alert system from Peabody Engineering

PMC ENGINEERING MTM3000 SERIES



The MTM3000 Series miniature submersible transmitter from PMC Engineering is designed for depth and level measurements of groundwater, wastewater and seawater where space is limited. Pressure ranges from 0–10 to 0–500 psi. Operating temperature is 25 to 125 degrees F. The 0.39-inch titanium housing offers high performance in very small areas, such as 1/2-inch monitoring wells, stand pipes and bore holes. The highly developed piezoresistive sensing technology provides high accuracy of 0.1 percent and long-term stability of better than 0.1 percent per year. The technology also provides a high overpressure of at least three times the rated range without any degradation of sensor performance. When used with the MP11 moisture protection option, the user can expect maintenance-free operation for an extended period of time, typically more than 10 years. **203/792-8686;**

www.pmc1.com

MTM3000 Series submersible transmitter from PMC Engineering

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The GX-6000 from RKI Instruments simultaneously monitors up to six gases, including combustibles, oxygen, carbon monoxide and hydrogen sulfide. Two additional smart channels accept PID, IR or other toxic gas sensors. It has an internal sample pump, man-down and panic alarm, LED flashlight and large auto-rotating LCD display. It operates as a single-gas PID unit or a multifunctional tool utilizing all six channels. The PID sensor comes equipped with a library of over 600 VOC gases and can personalize a favorites list of 30 commonly used VOCs, as well as a list of eight of the most recently used VOCs. **800/754-5165; www.rkiinstruments.com**



GX-6000 monitor from RKI Instruments

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The Sentinel PRO cloud-based system from Sensaphone provides remote monitoring of equipment and environmental conditions in water and wastewater applications. The system monitors, delivers alarms and data-logs input/output points from third-party Modbus sensors, transducers and programmable logic controllers. It supports Modbus RTU/485 and Modbus TCP. Only one unit is required to monitor up to 64 Modbus registers and 12



Sentinel PRO monitoring system from Sensaphone

different digital or analog status conditions including pump status, tank level, flow rate, pressure, temperature, humidity, water leaks and power failure. The system sends alerts via phone, email or text. Users can view data values in real time via sensaphone.net or an iPhone/Android app. All sensor readings are saved in the cloud, which protects against data loss and provides unlimited information storage. The standard system is Ethernet based, but is also available with a cellular option. **877/373-2700; www.sensaphone.com**

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Flo Spec Control Software from Anue Water Technologies

ANUE WATER TECHNOLOGIES FLO SPEC CONTROL SOFTWARE

Flo Spec Control Software from Anue Water Technologies is a fully SCADA-compliant program that allows for bidirectional monitoring and control of each system with access to Wi-Fi or satellite/local Cat5 internet connectivity. It is manufactured in a NEMA 4 cabinet, and is standard with all three basic platforms, including

Phantom I and II for point source odor control, FORSe 2 oxygen generation systems for force main corrosion control, and FORSe 5 combination ozone and oxygen systems for larger odor and corrosion control applications. The efficiency of immediate data access and system control has allowed municipalities and industrial wastewater operations to reduce costs. The design allows stand-alone remote system monitoring as well as SCADA interface as a standard product offering. Options include specific alarm alerts that can be sent to any computer or smartphone to identify and correct problems quickly. **760/727-2683; www.anuewater.com**

BINMASTER LEVEL CONTROLS BINVIEW

BinView from BinMaster Level Controls is an internet-based application for remote inventory monitoring of solids or liquids contained in tanks, bins or silos. It is compatible with many of BinMaster's sensors as well as other sensors that have a 4-20mA analog output or Modbus RTU. It can be used to manage multiple vessels at multiple locations, and is accessible from any device with a connection to the internet.



BinView from BinMaster Level Controls

Real-time inventory management and automated alerts can be accessed from a smartphone, tablet or PC. It offers both security and control over assets and users of the application. Super users can have the ability to set up and manage locations, gateways and vessels, while other users may have view-only or receive alerts-only privileges. The system can be set up so that some users have access to all sites, while others may only be able to access data for a single location. **800/278-4241; www.binmaster.com**



EnviroSuite odor risk management platform

ENVIROSUITE

EnviroSuite is a platform for predictive odor risk management. It translates complex raw odor data into information that the treatment plant operator can use, simply and on demand. The platform enables facilities to

more efficiently manage environmental issues by forecasting and providing early warning of high odor risk periods using a modeling module. It provides real-time analysis of odor impacts, and alerting and diagnosis of process upsets using a monitoring module. Instant diagnosis of the source of a complaint and efficient management of the complaint data is provided using an incident intelligence module. **424/335-1331; www.envirosuite.com**

GE WATER & PROCESS TECHNOLOGIES INSIGHT

InSight from GE Water & Process Technologies is a next-generation asset performance management solution that combines advanced data and analytics to help water treatment professionals optimize asset reliability and availability, enhance productivity and maximize profitability. It uses multiple sources of data — from manual data entry to automatic data



InSight from GE Water & Process Technologies

collection through wireless sensors and integrated control systems — to provide a complete digital picture of an operation. Once the data is captured, operators can visualize, diagnose, alert and report on a wide array of information at a site level, or across an entire enterprise. Integrations with critical business systems, like ERP and service management software, help further streamline and automate plant operations. Users can benefit from enhanced visibility of assets and interdependencies, deeper insights into key performance indicators, lowered maintenance costs and extended equipment life, and reduced unplanned downtime. **866/439-2837; www.gewater.com**

KING LEE TECHNOLOGIES iWATERPRO

The iWaterPRO app from King Lee Technologies streamlines reverse osmosis system management with unbiased diagnostics, normalization, automated recommendations and alert notifications all on interactive trend graphs. It diagnoses system health via a user-friendly dashboard view and enables secure access and management of multiple systems from one centralized location anytime, anywhere via the internet or mobile phone. Individual health gauges interpret data for each train and provide instant feedback and recommendations. The app makes it easy to predict the optimal time to clean, which lengthens membrane life by avoiding both excessive fouling and cleaning. Its interactive and customizable long-term graphs allow users to establish performance baselines. Users can compare impacts on performance from operational changes and base decisions on real-time data of what works best for a system long-term. **800/800-9019; www.kingleetech.com**



iWaterPRO app from King Lee Technologies

Process Control Systems

ABB ABILITY ELECTRICAL DISTRIBUTION CONTROL SYSTEM

The ABB Ability Electrical Distribution Control System is a cloud-based energy management, remote supervision and diagnostics system that connects a facility's electrical equipment with the Internet of Things. It uses circuit breakers with built-in sensing and connectivity to provide information and control functions that reduce total operating costs by up to 30 percent. It has a cloud-based platform that processes data from the site's electrical equipment to deliver analysis and make recommendations to optimize the performance of the electrical system. It enables the remote monitoring of plants, their energy consumption and costs at a glance to make it easier and faster to implement energy management strategies. With alerts, immediate access to documentation and the remote diagnosis of devices, it enables corrective action to be taken in a matter of minutes. **800/435-7365; www.abb.com**



Ability Electrical Distribution Control System from ABB

ANALYTICAL TECHNOLOGY METRINET

MetriNet from Analytical Technology is a unified system for monitoring water quality at remote sites, and then transmitting the data for web-based storage or directly to a customer site. Derived

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from Network Metrics, the system enables users to assemble monitoring units that fit their individual site requirement. The data is then stored in a standard CSV file format for easy manipulation with Excel or other programs. Individual M-Node smart sensors take the measurements. These devices are a complete sensor and monitor in one miniaturized package. The sensors are available for a variety of water-quality parameters such as free chlorine, total chlorine, turbidity, pH, conductivity and ORP. Each sensor is inserted in its own flow chamber and individual chambers clip together to form a flow system of the size required. Simple quick-release collars provide easy assembly and disassembly. **800/959-0299; www.analyticaltechnology.com**



MetriNet monitoring system from Analytical Technology



CLA-VAL VC-22D

The VC-22D electronic valve controller from Cla-Val turns a standard electronic control valve into an all-knowing, all-seeing smart valve. Working in conjunction with a SCADA system, it is a simple, easily deployed means to optimize waterworks system performance. It is supplied with preloaded ValveApps for most common valve functions, and can enable a single valve to perform multiple functions. It acts as a hub for controlling valve functions and

VC-22D electronic valve controller from Cla-Val

communication between SCADA and a suite of complementary components such as electronic pilots, flowmeters, position transmitters and other electronic devices. It provides remote or local setpoint control for valves in a variety of fluid applications, with accurate and stable valve control, an IP68 submersible enclosure, and monitoring and display of multiple processes with accurate retransmission of parameters to SCADA systems. **800/942-6326; www.cla-val.com**

DE NORA WATER TECHNOLOGIES CAPITAL CONTROLS MICROCHEM3

The Capital Controls MicroChem3 multiparameter water analysis system from De Nora Water Technologies offers measurement and control of chlorine-based compounds and other critical elements in one versatile instrument that can be specifically tailored to individual applications. Features include a color touch-screen display, menu-driven software for seamless setup and operation, and a USB interface for software updates and data log downloads. The analyzer and controller can be used in conjunction with the company's range of wet ends to measure and control any combination of chlorine, chlorine dioxide, pH, ORP and conductivity. **215/997-4000; www.denora.com**



Capital Controls MicroChem3 water analysis system from De Nora Water Technologies

HACH MOBILE SENSOR MANAGEMENT

Mobile Sensor Management from Hach provides easy access to crucial information, helping to manage the process and be proactive in maintenance. It helps operators focus on their highest priorities and avoid unexpected downtime with actionable information. The suite of software and connected instruments allows the user to analyze data from a wide array of plant operations. Web-based software and secure

connections allow real-time situational awareness so the user can optimize their response for greater control over plant outcomes. Status information provides an overview of the performance of each analytical instrument; maintenance procedures can be started easily from the dashboard. Interactive step-by-step instructions allow for quick and accurate maintenance execution, keeping downtime to a minimum. **800/227-4224; www.hach.com**



Mobile Sensor Management from Hach

HOWDEN ROOTS SG TURBO BLOWER



SG Turbo Blowers from Howden Roots

SG Turbo Blowers from Howden Roots are designed to provide plant operators with efficiency across the actual operating range. Exceptional turndown capability is built in as standard to ensure that when plants are operating at low load, the efficiency of the aeration system is unaffected. They are available in a choice of 15 frame sizes with a capacity flow of up to 80,000 cfm. With achievable efficiency levels exceeding 87 percent, the blowers maintain effectiveness

through the full flow range, including the key 60 to 80 percent window and dropping to as low as 40 percent capacity when required. **800/557-6687; www.howdenroots.com**

KSB SES SYSTEM EFFICIENCY SERVICE

SES System Efficiency Service from KSB can show operators ways to increase the energy efficiency of pump systems and prolong their service lives. Whatever the application is in energy, industry, water or wastewater, by recording extensive measurement data it is possible to evaluate the operation of a system and identify potential savings, as well as any causes of damage. Regardless of the installation type and manufacturer, the service assesses the operating range of pumps from ratings of 30 kW. It offers recording of process variables and vibration levels through on-site measurements, including pressure, rotational frequency, fluid and bearing temperature, analog signals to 0/4-20mA, and vibration. It helps determine the effective power, performs frequency analyses to identify causes of damage, and reports and presents findings, including an action plan and profitability analysis. **804/222-1818; www.ksbusa.com**



SES System Efficiency Service from KSB

VEOLIA WATER TECHNOLOGIES CONTROL SYSTEM

The cloud-based advanced control system from Veolia Water Technologies captures data on water quality and flow, using it in real time to make adjustments in the treatment conditions and chemistry. As a result, the operational cost of water treatment can be reduced significantly, using less energy and minimizing the use of water treatment chemicals. It incorporates predictive management tools, which optimize plant performance even more in order to handle off-spec situations and automatically make the adjustments needed. The predictive programs reduce capital and operational expenditure by increasing the capacity of existing assets, minimizing downtime, streamlining maintenance activities and increasing reliability of the treatment systems. **919/677-8310; www.veoliawatertech.com**



Advanced control system from Veolia Water Technologies

VERDER VERDERFLEX VANTAGE 5000 MODBUS

The Verderflex Vantage 5000 peristaltic pump with the Modbus RTU option from Verder can be integrated into a sophisticated, remotely operated pumping network. Modbus RTU is a globally used, industry standard, open-data communications protocol that allows a single master controller, such as a PLC, to easily interface with over 240 uniquely addressed, daisy-chained Verderflex Vantage 5000 pumps, becoming a digitally controlled, networked, high-resolution dosing or metering system. Each pump can be easily set up using its intuitive touch-screen user interface and data rates can be as high as 921600 baud. All pumps combine the accuracy of a 4,000-1 turndown ratio with high discharge pressure, a real-time event clock, a USB backup port and can have seven digital inputs and four digital status outputs. **877/476-3569; www.verder-us.com**



Verderflex Vantage 5000 peristaltic pump with Modbus from Verderflex

SCADA Systems

FLYGT - A XYLEM BRAND, CLOUD-BASED SCADA

Cloud-based SCADA from Flygt - a Xylem Brand offers a cost-effective software as a service solution. Its SCADA capabilities are simple to use, with no up-front costs and a low monthly fee. Systems are built on years of customer feedback. Not only does the system inform operators of issues to be addressed quickly, it alerts them to future situations that enable them to take preventative action, saving time and money. **855/995-4261; www.xylem.com tpo**



Cloud-based SCADA from Flygt - a Xylem Brand

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- DeZURIK Water Controls ECB-CP interface for solenoid-controlled valves
- FIBOX Enclosures ARCA –JIC Series
- Gorman-Rupp Integrinex lift station controls
- Philadelphia Gear Mark VII Series electronic controller
- Sulzer Pumps Solutions Type ABS PC 441 pump controller

Flow Monitoring

- Blue-White Industries BW DIGI-METER F-2000 flowmeter
- Endress+Hauser Promag 400 flowmeter
- Fluid Components International MT100 flowmeters

Monitors

- ASA Analytics ChemScan mini LowAm analyzer
- CHEMetrics V-3000 multi-analyte photometer
- Force Flow SpillSafe LX Drum Scale
- Greyline Instruments Model DFS 5.1 Doppler Flow Switch
- HEMCO Corporation Uniflow LE AireStream Fume Hood
- Keller America Preciseline transmitter
- KROHNE OPTIWAVE level measurement products
- Markland Specialty Engineering Suspended Solids Density Meter
- Myron L Company 900 Series industrial monitor/controller
- Peabody Engineering Tank WATCH-IT
- PMC Engineering MTM3000 Series submersible transmitter
- PRIMEX Submersible Level Transmitter (PSLT)
- Red Meters RM Series density measurement meters

- RKI Instruments GX-6000 monitor
- Sensaphone Sentinel PRO monitoring system

Operations/Maintenance/Process Control Software

- Activated Carbon Services Performance Evaluation Software
- Anue Water Technologies Flo Spec Control Software
- BinMaster Level Controls BinView
- EnviroSuite odor risk management platform
- GE Water & Process Technologies InSight
- King Lee Technologies iWaterPRO app

Process Control Systems

- ABB Ability Electrical Distribution Control System
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- De Nora Water Technologies Capital Controls MicroChem3 water analysis system
- Hach Mobile Sensor Management
- Howden Roots SG Turbo Blower
- KSB SES System Efficiency Service
- Veolia Water Technologies advanced control system
- Verderflex Vantage 5000 peristaltic pump with Modbus

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By Craig Mandli

Software allows for full-featured SCADA at small utility

Problem

The water and wastewater utility in Jack, Alabama, faced pressure to reduce costs while providing safe and reliable service. The community could not afford a SCADA system such as large municipalities use.

Solution

JMJ Automation used the no-cost **VTScadaLIGHT license** from **Trihedral** to develop a full-featured SCADA application. “Many utilities only need to monitor one well and one tank,” says JMJ president Jason Bell. “VTScadaLIGHT allows us to reach out to small customers who, without it, would not be able to afford SCADA at all.” Operators visit the well and tank once a day per state requirements. Now they can check levels and manage alarms anytime from their Windows 10 workstation or mobile devices.



RESULT

The program includes a development and runtime interface for applications up to 50 I/O. It provides a mobile connection, alarms, trends, reports, security, redundancy, open connectivity and drag-and-drop screen development. “They can get alarms right away and use historical data to do things like check if a pump is running more now than it has been,” says Bell. **800/463-2783; www.trihedral.com**

Portability of electromagnetic flowmeter enables city to track multiple valves

Problem

A Colorado city needed to measure flow through three valve chambers to determine whether the water load was shared equally. The operator can use the flow data to decide whether to adjust the pressure setpoints on the pressure-reducing valves in each vault. The city needed a portable meter that could be shared between three valves in separate chambers.

Solution

The city chose **Singer Valve’s SPI-MV** for its single-point insertion probe that can be inserted into the valve and then moved to a different valve. The flowmeter was combined with a data logger and 12-volt DC lithium battery to allow it to remain in the vault for a month to acquire and save data, which is then transferred via USB.



RESULT

The flowmeter is accurate to 2 percent of reading throughout the specified velocity range. This lets operators confidently monitor the flow and compare loads to ensure equal flow. **888/764-7858; www.singervalve.com**

Using variable frequency drives reduces annual energy costs

Problem

The City of Cedarburg Wastewater Treatment Facility in Wisconsin was running its aeration system in a costly and inefficient manner. The system had been using soft starters to control six motors (75 and 50 hp). One of the aerators would kick on every 15 minutes at 100 percent and run for a period of 15 to 60 minutes, depending on the dissolved oxygen in the third channel of the ditch. A second aerator would come on for 15 minutes every hour and run at 100 percent. An average of three to four aerators ran at a time.

Solution

The existing motor control centers would be retrofitted using **ABB variable-frequency drives (VFD)**. JMB & Associates conducted a review of the existing motors for full load amps, running amps, motor lead lengths, conduit runs, and motor construction for VFD compatibility. It was determined the VFDs would provide motor speed, motor load, VFD temp, individual fault ID, fault reset, kWh, run status and speed command information to the interface.



RESULT

Floc size and settling rates increased, less chemical supplementation was needed, and energy bills were lowered. Operators also observed reduction of mechanical stresses on equipment linkage points owing to precise motor acceleration and deceleration. Ultimately, the city reduced their annual energy cost by 30 percent. **800/752-0696; www.abb.com/drives**

Heater and control unit prevent freezing in wastewater tanks

Problem

Filtration membranes in two wastewater treatment tanks at an Iowa ethanol producer were susceptible to freeze damage. Each membrane is valued at \$1 million, and freezing could mean full replacement and loss of production. The tanks are part of a closed-loop system that holds thousands of gallons of water used in ethanol production.

Solution

A modified **Chromalox TLI L-shaped metal heater** was installed in each tank. Each 480-volt heater holds two tiers of three elements and is controlled by a 4468 Contactor Panel. The systems maintain the water at 40 to 50 degrees F. The company also purchased a third heater/contacter as a backup.



RESULT

The system prevents membrane freezing and ensures that the facility remains in production. It also provides energy savings. **800/443-2640; www.chromalox.com tpo**

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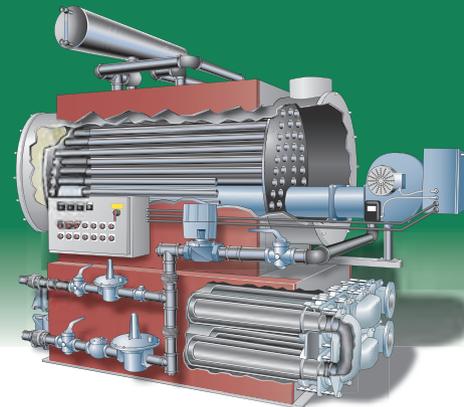


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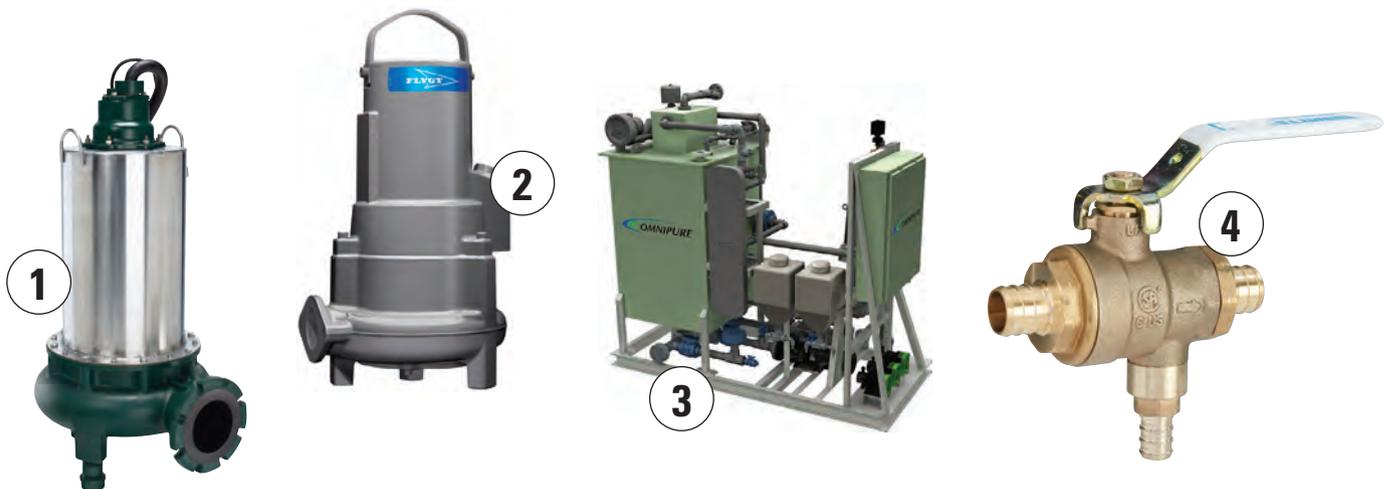
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1. ZOELLER 64 HD SERIES SOLIDS-HANDLING PUMP

The 64 HD Series pump from Zoeller Engineered Products is for commercial, municipal and industrial applications. Its motor is designed with finned castings for heat dissipation, and oil-filled housings and non-overloading windings enable the motor to maintain a low operating temperature when facing harsh conditions. The pump is available in 25 to 60 bhp, with 4- and 6-inch discharge units, and 3 1/8- or 4-inch spherical passing capability. An inverter duty motor is offered as an option. **800/928-7867; www.zoellerengprod.com**

2. XYLEM FLYGT 3069 WASTEWATER TREATMENT PUMP

The Flygt 3069 wastewater treatment pump from Xylem uses Adaptive N technology and can be used in commercial buildings and municipal sewage applications. The hydraulic design is offered with three different materials: hard iron, grey iron and stainless steel. It is available with vortex and grinder hydraulic options and can be configured to be installed four different ways to suit application needs. **704/409-9700; www.xylem.com**

3. DE NORA OMNIPURE SERIES 64 MARINE SEWAGE TREATMENT SYSTEM

The OMNIPURE Series 64 marine sewage treatment system from De Nora is compliant with International Maritime Organization standards and ranges in treatment capacities up to 13,200 gpd in a single system. Units can be combined for increased capacity. The system uses a catalytic coating technology to ensure a smaller footprint and minimized maintenance. The electrolytic processes in the system impose physical and chemical changes to the wastewater stream as it passes through, resulting in effluent quality below the required specifications. **215/997-4000; www.denora.com**

4. WATTS ALL-IN-ONE BALL VALVE AND RELIEF VALVE

The Series LFBVM1 all-in-one ball and relief valve from Watts is designed for use as a water heater shut-off that also provides protection against excess water pressure caused by thermal expansion. It features nine end connection options and can be installed in any orientation. The design incorporates tighter pressure release tolerances for greater accuracy in compliance with the latest IAPMO and CSA standards. The valve also includes a forged body construction, blowout-proof stem and a white handle for lead-free identification. **978/688-1811; www.watts.com**

pipe routing and fabrication features. Included are new, preloaded content and templates; additions to Pipe Tools that enable users to automatically tag pipe according to multiple parameters; and a Pipe Type Import Tool that reduces file size, removes duplication of families and ensures customized project types do not get overwritten. It also has further developed custom tagging so users can renumber or sequentially tag sections of pipe and Victaulic products. **610/559-3300; www.victaulic.com**

SCHNEIDER ELECTRIC ALTIVAR 680 AFE DRIVE

The Altivar 680 compact low harmonic drive from Schneider Electric is an active front-end drive that has a three-level input switching stage, which reduces common mode voltage. Designed for water and wastewater applications, it brings flexibility with its ability to mitigate harmonics while performing efficiently at various speeds in a compact design. It has internal application functions including anti-jam, multipump control and asset protection via pipe fill. **888/778-2733; www.schneider-electric.us tpo**

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- 2. Xylem Flygt 3069 wastewater treatment pump
- 3. De Nora OMNIPURE Series 64 marine sewage treatment system
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water: product spotlight

Butterfly valve designed for easy adjustment, long life

By Craig Mandli

Water system operators don't have the luxury of worrying about the valves on their piping systems. They need to have confidence that the infrastructure can be installed and forgotten about. **American-BFV butterfly valves** from **Val-Matic** are designed to instill that confidence.

American-BFV butterfly valves are highly engineered to provide long life and trouble-free performance. Available in a wide range of pressure classes, the American-BFV is a versatile valve that can be installed in municipal, industrial and power applications. Continuous uninterrupted seating and the Tri-Loc Seat Retention System ensures seat integrity and allows for field adjustment/replacement without the need for special tools or epoxies.

"The Tri-Loc system ensures seat integrity by securing the seat through three different mechanical methods to ensure long-term dependable service," says Alissa Kantola, marketing project coordinator for Val-Matic. "Provided in all sizes, the Tri-Loc provides ease of adjustment or replacement without special tools or removing the valve from the line."

A ductile iron disc adds strength, allowing the disc to have a smaller cross section, providing improved headloss characteristics. The valves are offered in 150B and 250B AWWA classes with flanged end connections in 3- to 144-inch sizes, and mechanical joint end connections in 4 to 48 inches. According to Kantola, the valve is a fit for a variety of applications.

"It is good for municipal, industrial and power applications such as shut-off service, modulating service, buried/plant service, pump control and isolation," she says. "Media applications include raw water, potable water and treated wastewater."

Wafer-style butterfly valves are designed with ANSI 125 flanges or ISO PN10 and PN16 flanges in 4- to 24-inch sizes. The valve fully complies with AWWA C504 and C516, certified NSF/ANSI 61 for drinking water and NSF/ANSI 372 Certified Lead-Free. Val-Matic has manufactured butterfly valves since 1999, making several improvements over the following years.

"Our research and design efforts have enhanced the seat design, improved the structure of the disc and expanded the size range up to 144 inches," says John Ballun, Val-Matic's president and CEO. "AWWA Proof of Design tests have been conducted on valves and actuators up to 96 inches and 250 psi design."

Ballun says that of all the valve's features, customers find the easy adjustment the most beneficial. "Customers have found the easily adjustable feature for all sizes a real plus," he says. **630/941-7600; www.valmatic.com**



American-BFV
from Val-Matic

wastewater: product spotlight

Alerts in an instant

By Craig Mandli

No operator likes an unexpected early morning wake-up call. But when millions of dollars worth of infrastructure is on the line, they're sure to appreciate it.

The **Express II system** from **Sensaphone** remotely monitors water and wastewater facilities to identify changes in environmental or equipment conditions. When the system identifies a potential problem, it immediately alerts up to 48 people with custom phone calls. This instant notification of condition changes allows personnel to take fast corrective action and address a potentially costly situation.

"We have customers who bought an Express II over 10 years ago that call for technical support and tell us that the device has become an integral part of their operation," says Dave Breisacher, marketing and creative director for Sensaphone. "It's saved them from disaster on multiple occasions. They don't look forward to getting woken up by the Sensaphone at 3 a.m., but they appreciate when they do."

The system easily integrates with existing floats, pump alarm outputs and level transducers. Facility operators can use the system to monitor the status of pumps, tank levels, indoor and outdoor temperature, humidity, ventilation, carbon dioxide and power. The system can be used in operations that require many monitoring points or are considering future growth, because it is expandable to include up to 40 channels.

"It comes standard with the ability to accept eight inputs and one output, but additional input cards can be purchased that will expand the accepted inputs to 32 and outputs to eight," says Breisacher. "With the ability to have so many input and relay outputs, the device may be programmed to switch outputs automatically on alarm or manually via keyboard or phone."

The internal rechargeable battery backup provides 12 hours of continuous monitoring and alerts in the event of a power outage. Each unit is sealed in an enclosure to protect it from moisture, dirt and chemicals commonly found in water treatment environments. The LCD window displays continuous status information and provides keypad programming instructions for easy setup. According to Breisacher, the device's reliability has made it a favorite among operators.

"It's very popular in water/wastewater applications because it is reliable, offers the ability to monitor so many inputs for the price, and the NEMA 4X enclosure allows it to be placed in environments that are often unfriendly to electronics that are so common in these applications," he says. "They're reliable and they just keep working." **877/373-2700, www.sensaphone.com**



Express II from
Sensaphone

people/awards

Thomas Herholdt, who retired from Tidewater Utilities in February, received the Allen J. Williams Lifetime Achievement Award from Delaware Technical and Community College for more than 40 years of service to the water and wastewater industry.

The **Coeburn-Norton-Wise Regional Wastewater Treatment Authority** received the Virginia Rural Water Association's 2017 Wastewater System of the Year award.

The wastewater treatment facilities in **Bemidji, Blackduck** and **Jordan** received certificates of commendation from the Minnesota Pollution Control Agency for perfect permit compliance.

The **Shoal Creek Water Reclamation Facility** received the Georgia Association of Water Professionals' 2017 Wastewater Plant of the Year award in the category for Advanced Treatment, 3 to 5.9 mgd. **Herlon Fayard**, Shoal Creek plant supervisor, received the association's Top Wastewater Operator award.

A ribbon-cutting and dedication was held for the \$12 million upgrade completed at the **Clarksburg (West Virginia) Wastewater Treatment Plant**. Capacity increased from 12 mgd to 18 mgd.

The **W.B. Casey Water Resource Recovery Facility's** Pelletizing Operation received the Georgia Association of Water Professionals' 2017 Biosol-

ids/Residuals Program of Excellence Award in the category for large operating system greater than 5 dry tons per day.

Robert Pugsley, wastewater treatment plant operator for Buffalo National River, received the 2017 Wastewater Outstanding Achievement Award from the Arkansas Water Works and Water Environment Association in the category for utilities serving fewer than 5,000 people. Pugsley, with 42 years of operator experience and a six-year veteran of the National Park Service, operates the Buffalo Point treatment facility and oversees maintenance and management of the water and wastewater operations throughout the park.

Greg Morgan retired as managing director of utilities and Public Works after 24 years with the city of Tyler, Texas.

Missouri American Water completed its acquisition of the Wardsville wastewater and water systems (just south of Jefferson City) for \$2.75 million.

The Illinois Association of Water Pollution Control Operators issued these awards:

- Plant of the Year Group 1: Illinois American Water, **Oak Valley Wastewater Treatment Plant**
- Plant of the Year Group 2: U.S. Federal Penitentiary, **Marion Wastewater Treatment Plant**
- Plant of the Year Group 3: Lost Lake Utility, **Dixon Wastewater Treatment Plant**
- Plant of the Year Group 4: **Goodfield Wastewater Treatment Plant**
- Industrial Plant of the Year: Prairie State Generating Company, **Marissa Wastewater Treatment Plant**
- Operator of the Year: **Larry Stahl**, Hanover Park Wastewater Treatment Plant

events

Aug. 29-Sept. 1

AWWA-Chesapeake Section Tri-Association Conference, Roland E. Powell Ocean City (Maryland) Convention Center. Visit www.csawwa.org.

Sept. 6

Illinois Water Environment Association Nutrient Removal & Recovery Workshop, Medinah Shriners Banquet Facility, Addison. Visit www.iweasite.org.

Sept. 10-13

Rocky Mountain Water Environment Association and Rocky Mountain Section AWWA Joint Annual Conference, Embassy Suites, Loveland, Colorado. Visit www.rmwea.org.

Sept. 10-13

WaterReuse Symposium, Renaissance Phoenix (Arizona) Downtown. Visit www.watereuse.org.

Sept. 10-13

Rocky Mountain Section AWWA Annual Conference, Embassy Suites, Loveland, Colorado. Visit www.rmsawwa.org.

Sept. 11-14

WaterJAM 2017, Virginia Section AWWA Annual Conference, Hampton Roads Convention Center. Visit www.vaawwa.org.

Sept. 12-15

Michigan Section AWWA Annual Conference, Shanty Creek Resort, Bellaire. Visit www.mi-water.org.

Sept. 13

New England Water Environment Association Industrial Wastewater Conference, Cataqua Public House, Portsmouth, New Hampshire. Visit www.newea.org.

Sept. 13-15

Minnesota Section AWWA Annual Conference, Duluth Entertainment and Convention Center. Visit www.mnawwa.org.

Sept. 13-15

South Dakota Section AWWA Annual Conference, Huron Crossroads. Visit www.sdawwa.org.

Sept. 14

Southwest Florida Water and Wastewater Exposition, Charlotte Harbor Event and Conference Center, Punta Gorda. Visit www.fwea.org.

Sept. 17-20

New England Section AWWA Annual Conference, Ocean Edge Resort, Brewster, Massachusetts. Visit www.newwa.org.

Sept. 19-22

Western Canada Section AWWA Annual Conference, Saskatoon, Saskatchewan. Visit www.wcawwa.net.

Sept. 20-22

Wisconsin Section AWWA Annual Conference, Kalahari Resort and Conference Center, Wisconsin Dells. Visit www.wiawwa.org.

Sept. 21-22

AWWA Effective Utility Management Seminar, Orange County Utilities, Orlando, Florida. Visit www.awwa.org.

Sept. 26-28

Tri-State Seminar presented by the Nevada Water Environment Association, California Water Environment Association and Arizona Water Association, South Point Hotel and Casino, Las Vegas. Visit www.tristateseminar.com.

Sept. 26-29

Ohio Section AWWA Annual Conference, SeaGate Convention Center, Toledo. Visit www.oawwa.org.

Sept. 27-28

Kentucky Water and Wastewater Operators Association Fall Waste-water Conference, Barren River State Park, Lucas. Visit www.kwwoa.org.

Sept. 30-Oct. 4

Water Environment Federation WEFTEC 2917, McCormick Place, Chicago. Visit www.weftec.org.

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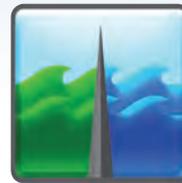
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- **Kassen Outstanding Service Award: Robert Mosher**, Illinois EPA (retired), who assisted operators in working through EPA regulations.

The **San Jacinto River Authority** Groundwater Reduction Plan Division has earned the Best Tasting Water Award for Texas from the AWWA.

The **Salida (Colorado) Wastewater Plant** attained Gold Award status for 20 years of earning the AWWA/Rocky Mountain Water Environment Association Joint Committee of Emergency Preparedness Safety Award.

Water and wastewater professionals received 2016 awards sponsored by the Delaware Technical Community College; the Delaware Rural Water Association; the Delaware Onsite Wastewater Recycling Association, the Water and Wastewater Operators Association, Eastern Shore Chapter; and the Delaware Division of Public Health, Office of Drinking Water; Department of Natural Resources and Environmental Control; and Division of Water Resources:

- Tidewater utilities compliance manager **Alexis Virdin-Gede**, of Smyrna, Water Professional of the Year.
- Veolia North America chief laboratory analyst **Mary Sidell**, of Wilmington, Wastewater Professional of the Year.
- **Glenn F. Davis**, program manager, Department of Natural Resources and Environmental Control Surface Water Discharge Section, Allen J. Williams Lifetime Achievement Award.
- Tidewater Utilities Northern District team of **James Craig, Jim Faulkner, Purnell Potter, Mike Vonville, Daniel Wakefield, Regan Cummings, Mike Evans, Mike Funk** and **Al Miller**, Water/Wastewater Professionals Team Award.

The **Quantico Marine Corps Base Mainside Water Treatment Plant** received the Bronze Water Treatment Plant Performance Award for Excel-

lence in Granular Media Filtration from the Commonwealth of Virginia Department of Health Office of Drinking Water.

The staff at the **Kannapolis Water Treatment Plant** earned the North Carolina Area-Wide Optimization Program Award for turbidity levels below federal and state limits.

The **Newton (North Carolina) Water Treatment Plant** received its 14th consecutive Area-Wide Optimization Program Award from the U.S. EPA.

Greeley, Colorado, was honored by the AWWA for the best-tasting water in the nation at ACEI17. The city beat 33 other regional winners and became the first to win the national competition and People's Choice Award.

Stuart Krasner of the Metropolitan Water District of Southern California received the 2017 Dr. Pankaj Parekh Research Innovation Award from the Water Research Foundation. The city of **Calgary** and the **Tarrant Regional Water District** received Outstanding Subscriber Award for Applied Research.

The water filtration building in **Evanston, Illinois**, was renamed to honor former Mayor Elizabeth Tisdahl.

The **Coeburn-Norton-Wise Regional Waste Water Treatment Authority** was named the Virginia Rural Water Association 2017 Wastewater System of the Year.

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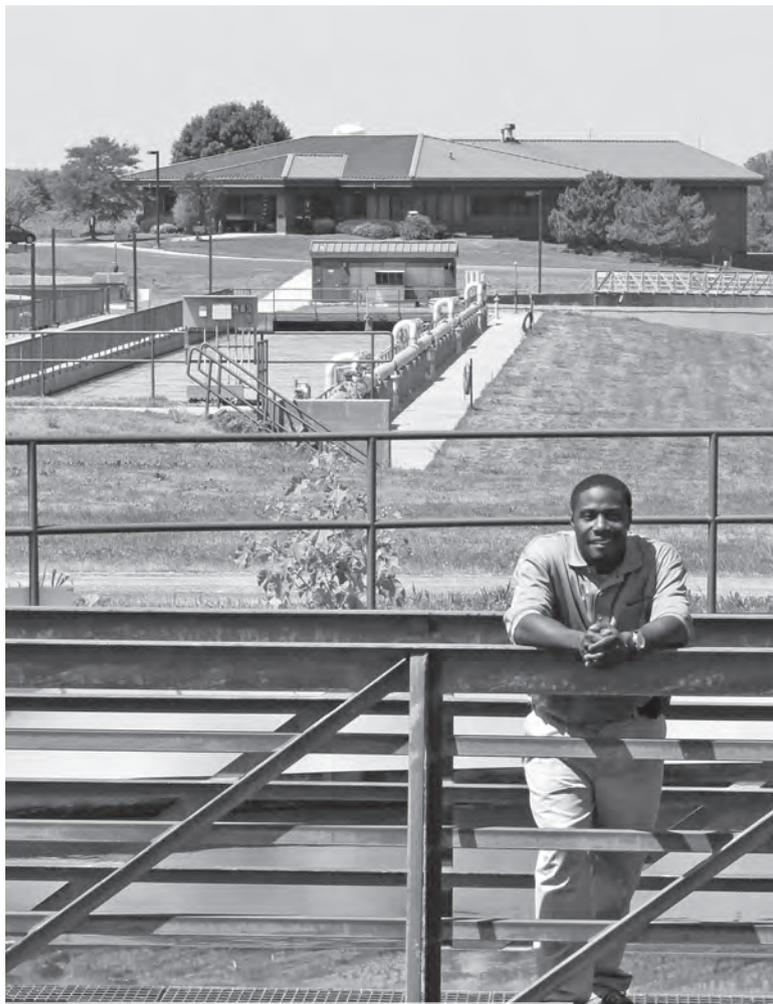
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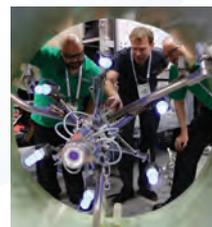
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