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Deputy Director for  
Operations and Maintenance  
Wylie, Texas

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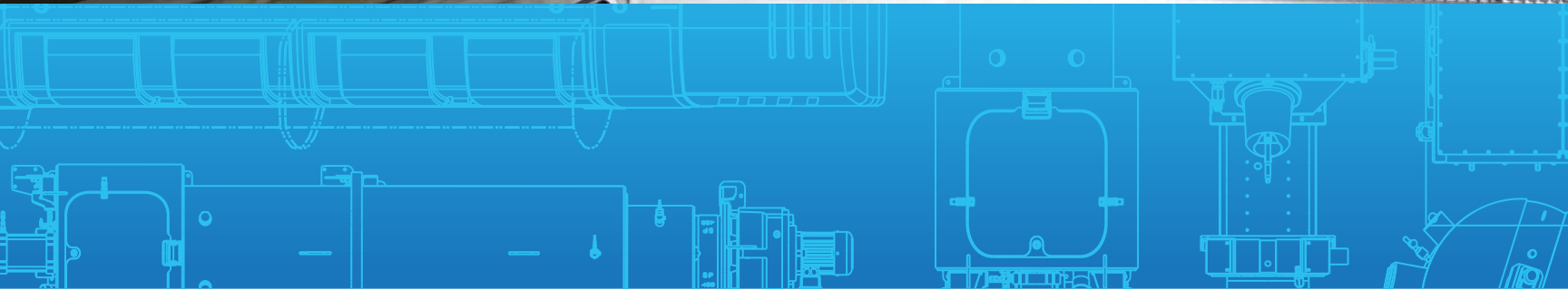
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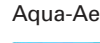
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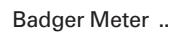


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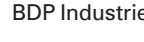


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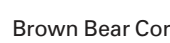


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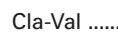
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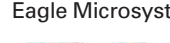


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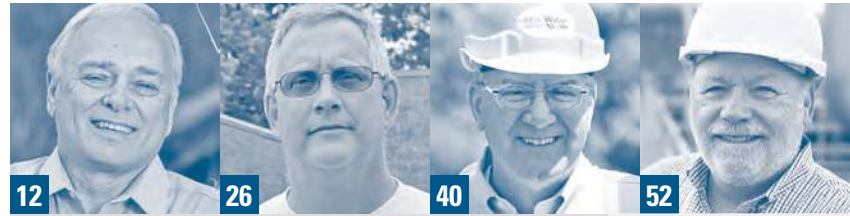


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let's be clear

## Are You Ingenious?

FOR THE OPERATIONS COMMUNITY, THE WEF OPERATOR INGENUITY AWARDS ARE AS IMPORTANT A PART OF THE WEFTEC LANDSCAPE AS THE OPERATIONS CHALLENGE

By Ted J. Rulseh, Editor



One problem treatment plant operators rarely, if ever, face is surplus money to deal with the everyday issues they face.

Therefore, perhaps by necessity, operators have become adept at solving problems on their own, at minimal expense, with simple tools and tricks. We hear the stories often: An engineering firm proposed a \$100,000 fix; the operations team resolved it for one-tenth as much, or less.

The Water Environment Federation's annual Operator Ingenuity Awards recognize that brand of inventiveness. They're presented each year during WEFTEC — this year, that's Sept. 21-25 in Chicago. If you plan to attend, be sure to take in the ceremony — it will be listed in the conference program.

### EARNED RECOGNITION

The contest recognizes measures that water professionals take to make their work easier and safer and to make their plants run better and more efficiently. The judges consider solution safety, resourcefulness and transferability — how easily other plants could replicate the solution. The competition is open to clever ideas related to any aspect of the operation, from equipment maintenance to emergency response to process optimization.

I've attended the awards presentation a couple of times, and I must say that the WEF team makes it fun. There are no prosaic names for awards like Best in Safety or Laboratory Excellence. No, the award names are clever, and winning operators get to show pictures and talk about their innovations. Here are a few of the awards given during the first seven years of the event:

**Trough Toaster Award.** Aaron Dressel, Chris Wize, Kelly Wolfe and Dan Danhauer from York, Nebraska, won this honor for inventing a way to keep the scum trough on a sludge thickener from freezing to the skimmer arm. To do this, they affixed a heat lamp above the trough and shielded it from the weather with a hood fixture they designed. It worked: They got through the winter without a single freeze-up.

**Vacuum Virtuoso Award.** Andy Loudermilk of the Bigfork (Montana) Water & Sewer District took this honor home for inventing a scum sucker. He reconfigured an old rotary lobe positive displacement blower into a vacuum to clear scum from atop the plant's membrane bioreactor tanks. The device sends the material straight to the facility's solids holding pit.

**Chemical Capture Chief Award.** On the safety front, Mark Cataldo from SUEZ Water Technologies & Solutions and the Killingly Water Pollution Control Plant in Danielson, Connecticut, installed a trough to capture spills during deliveries of sodium hypochlorite disinfectant.



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**Beaker Peeker Award.** Gregory Williams from Good Harbour Laboratories in Mississauga, Ontario, decided to use the graduations on a plain old lab beaker to measure scum depth from the top of an open tank: “He simply dons gloves and lowers a large beaker (2-liter size) into the scum. The markings on the beaker can be recorded and the distance between them measured later to give a relatively accurate thickness.”

The competition is open to clever ideas related to any aspect of the operation, from equipment maintenance to emergency response to process optimization.

**Ice Breaker Award.** James Spielvogel from Ellwood City, Pennsylvania, crafted a method for easily and safely lifting a clarifier skimmer in the winter to keep it from freezing to the grease box. “Using this invention, one operator can stand on a clarifier bridge with a hooking pole and lift the skimmer onto an arched hook,” a WEF report says.

**Explainer in Chief Award.** Walton J. Summers II of Jacksonville, Arkansas, created “a Christmas parade float that shows the wastewater treatment process and a tabletop display that shows the consequences of misusing sewers as trash cans.”

The Operator Ingenuity Awards are open ideas related to treatment processes, maintenance, safety, collection systems, lab practices, stormwater, administration, human resources and anything associated with the water sector. To date, the contest has recognized nearly 40 ingenious fixes.

Watch for information about this year’s winners, and plan to enter next year. You can get details at [www.wef.org](http://www.wef.org). **tpo**

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*American Society of Civil Engineers to Grade Stormwater for First Time*  
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## TREATMENT SUCCESS

### An Optimization Mindset

When the wastewater treatment plant crew in North Cary, North Carolina, set its sights on the Partnership for Clean Water Director’s Award, it didn’t start by gathering a high-level leadership team. It started with the operators — the ground-floor workers who knew the ins and outs of the treatment plant.

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## NEW RESEARCH

### Mapping Freshwater Aquifer

In a new survey of the sub-seafloor off the U.S. Northeast coast, scientists have made a surprising discovery: a gigantic aquifer of relatively fresh water trapped in porous sediments lying below the salty ocean.

It appears to be the largest such formation yet found in the world. The aquifer stretches from the shore at least from

Massachusetts to New Jersey, extending more or less continuously out about 50 miles to the edge of the continental shelf.

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## BUYING TIME

### The Colorado River Drought Plan

As Midwest states struggled with record spring flooding this year, the Southwest was wrestling with the opposite problem — not enough water. In May, federal officials and leaders from seven states signed the Colorado River Drought Contingency Plan, a sweeping new water management agreement for this arid region. Read about it in this online exclusive article.

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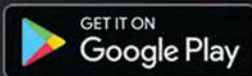
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# Natural Treatment

MILLIONS OF NATIVE WETLAND PLANTS DO THE WORK OF CREATING 91 MGD OF RELIABLE SOURCE WATER FOR THE NORTH TEXAS MUNICIPAL WATER DISTRICT

STORY: **Pete Litterski** | PHOTOGRAPHY: **Olivia Ogren-Hrejsa**



“It is drought-proof.  
It kind of puts a wide  
spot in the line for us.”

MIKE RICKMAN

Mike Rickman, left, North Texas Municipal Water District deputy director for operations and maintenance, and Mark Law, wetlands supervisor, on the boardwalk at the John Bunker Sands Wetland Center.

Operators at the North Texas Municipal Water District oversee six water treatment plants with the capacity to deliver 840 mgd to some 1.7 million people in 80 communities north and east of Dallas, from booming suburbs to bucolic rural enclaves.

Meanwhile, five operators oversee the work of more than 1.3 million water-treating plants — plants rooted in one of the largest man-made water treatment wetlands in the United States. The East Fork Water Reuse Project sits on 2,535 acres of former ranchland along the East Fork of the Trinity River, 43 miles south of the district’s main facilities.

The water treated at the East Fork project passes through settling ponds to clear suspended solids and then through the wetland cells to reduce its nutrient load before it is piped north to the district’s original surface water resource, Lake Lavon.

The polished water produced by the wetlands adds the equivalent of up to 91 mgd to the district’s raw-water capacity, roughly equivalent to the yield of a new reservoir the district recently received state permission to build. And Mike Rickman, the district’s deputy director for operations and maintenance, says the wetlands will be able to nearly double production with

## North Texas Municipal Water District

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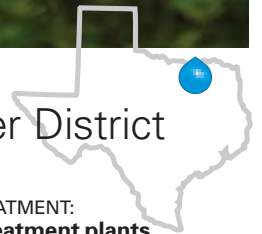
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**Lake Lavon, Lake Texoma, Jim  
Chapman Lake, Lake Tawakoni,  
East Fork Water Reuse Project**



a new pipeline from the main branch of the Trinity River that was to come online this summer.

### DEALING WITH DROUGHT

Leaders at the regional utility district have long faced the challenge of supplying enough water to support a rapidly growing area that is expected

to more than double in population by 2050, just a few years shy of the 100th anniversary of the state law that established the district. At its inception, the district included 10 cities with a combined 30,000 population. The membership now stands at 13 cities, many among the state's and even the nation's fastest-growing cities.

In Texas, where long droughts are a fact of life and surface water resources are precious, large utilities are forced to look far and wide for water rights. They often tap into distant reservoirs built after battles over land rights, water rights, environmental issues and politics. It can take decades to secure permits to build such reservoirs, and the arduous process deters many projects.

Rickman, who retired after 33 years at Dallas Water Utilities, continued his career by joining the leadership team at the North Texas district 16 years ago and brought with him an idea on how to bolster the district's water resources without building a lake. It was a concept already being studied by the Tarrant Regional Water District, which provides water and flood control to more than 2.1 million people in the Fort Worth metro area just west of Dallas.

When Rickman joined the North Texas district, the Tarrant utility was in the second stage of testing the feasibility of an engineered wetland project on 2,022 acres of state-owned land just north of the Richland Chambers Reservoir. That project, which opened shortly after the East Fork project, was the first of its kind proposed in the U.S. Both projects were designed and built by the Alan Plummer Associates environmental engineering firm.

Rickman, who lives just a few miles from the East Fork project, used to drive past the site on his daily commute. When the possibility of tackling a

comprised much of the ranchland. So when talks began with the water district, the ranch had already established some wetlands on a much smaller scale.

## BOOSTING RELIABILITY

Both the North Texas and Tarrant wetland projects use gravity, sunlight and nutrient-hungry native plants to polish close to 100 mgd of murky water from separate branches of the Trinity River. Both the East Fork and the West Fork of the Trinity are comprised mostly of treated wastewater discharged upstream. Since the flows depend so heavily on wastewater — rather than rainfall — the projects are considered more reliable sources than reservoirs, which can be drawn down well below optimum intake levels during serious droughts.

"It is drought-proof," Rickman says. "It kind of puts a wide spot in the line for us."

Rickman oversees the operation of all North Texas district facilities from the raw water intakes on four basins to the effluent outlets at 14 wastewater treatment plants. He calls the East Fork wetlands a water treatment facility because river water is its source. "The wetlands is totally different from the water treatment plant process. You're more into agriculture and farming than you are into treating the water. In a traditional plant, you're using filters, mechanical treatment and chemical treatment. At the wetlands, you're giving nature the time to do the work."

The reuse part of the project's name stems from the complicated calculations that allow the district to take more water from the river than its permits allowed before the project was built. The amount of water diverted to the wetlands is directly tied to the volume of water from other basins that the district's wastewater plants discharge to the East Fork basin.

The additional capacity of the wetlands is coming into play with the completion of the district's Main Stem Pump Station project, which can convey up to 100 mgd from the main fork of the Trinity River north to the intake structure at the East Fork Wetlands.

The new, 17-mile, 72-inch pipeline connecting the Main Stem facility to the wetlands was scheduled to open this summer. The water will be treated effluent purchased from the Trinity River Authority, the state-established agency that governs water usage in the full Trinity River basin from its origins in North Texas to its mouth at the Gulf of Mexico.

Even if the East Fork project produces more polished water than is needed now, the extra capacity will be welcome. Levels at Lake Lavon have generally run well below capacity. "If Lavon has the capacity to store it, we'll supply it," Rickman says. So far, the wetlands water has

not affected lake levels, largely due to the district's need for raw water. As fast as the wetlands put water into the lake at one end, it is drawn out at the other end for treatment.

About half of the original ranch outside the wetlands plot is still owned and operated by Rosewood Ranches. The family trust also remains a partner in a project that uses the wetlands as a teaching tool for students and adults. Rosewood and the North Texas district partnered to create the John Bunker Sands Wetland Center, which includes an education building and a boardwalk into the heart of the wetlands, giving visitors a close-up look at the water treatment process.

*(continued)*



Garney Construction workers install two pumps (Odessa Pumps) for the conveyance station.

wetland project arose, he approached the manager of the 5,000-plus-acre ranch that is one of five large Texas ranches owned by the Caroline Hunt Trust Estate. "That's when I learned that they wanted to do a wetlands project, too," he says.

During talks that led to the construction of the East Fork project, Rickman learned that John Bunker Sands, the son of Caroline Rose Hunt and Loyd Bowmer Sands, had begun working on restoring wetlands and creating new ones on three of the family's ranches. At the Seagoville ranch, Sands had overseen the construction of a series of levees to retain water and promote the return of plant life and wildlife native to the river bottoms area that

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## FIRST STAGE: SETTLING

The major mechanical infrastructure at the East Fork project involves two pump stations, one at the diversion station that lifts water out of the river and one at the end of the wetlands where the water is turned around and pumped north to Lake Lavon.



Bobby Reeves, maintenance worker and facility safety representative, collects a water sample from a wetland cell. Samples are collected weekly and sent to the Wylie Water Treatment Plant for testing.

The diversion station has four Pentair - Fairbanks Nijhuis pumps, all powered by GE motors. Two pumps have 250 hp motors and are rated at 16,810 gpm at 40 feet of head. Two more pumps have 500 hp motors and are rated at 33,620 gpm at 40 feet of head. A fifth submersible pump can be used during low-flow periods to move enough water — 9,000 gpm — to keep plants alive during severe conditions.

All four of the main pumps can run at once, but at present, based on permitted volume, three operate and one is held in reserve. Although the pumps can move up to 91 mgd on an annual average, the wetlands are designed to treat and supply up to 150 mgd to the lake.

The diversion station lifts incoming water to the level of three sedimentation basins, each able to handle 50 mgd in the first polishing stage. Water entering the basins is generally the color of chocolate milk, but it looks crystal clear by the time it moves on. During regular operations, one sedimentation basin is operating, one is drying and one is held in reserve.

The sedimentation process is thorough, but the operators and engineers are not concerned about the basins filling too quickly with sediment. “We



ABOVE: The John Bunker Sands Wetland Center. RIGHT: A blue dasher dragonfly rests on the foliage along the boardwalk.



## IT'S NOT MAINTENANCE-FREE

Although the East Fork Water Reuse Project includes far less mechanical equipment than a conventional water treatment plant, it still requires upkeep, according to Mike Rickman, North Texas Municipal Water District deputy director for operations and maintenance.

In fact, maintenance is a never-ending chore for the North Texas district operators. Besides testing the water at various stages of its leisurely seven- to 10-day flow through the 3-mile wetlands, the operators work almost like farmers in tending to more than a million plants that do the work of treatment.

During construction, the district operated a pair of nurseries totaling 28 acres to cultivate the wetland plants. Now, if the opera-

tors need to replenish plants in part of the wetland, they usually take them from other cells where plants are thriving.

One problem that can necessitate replanting is damage caused by two invasive wildlife species. Wild hogs, bane of many Southwestern ranchers and farmers, sometimes wreak havoc, uprooting large swaths of rushes and other plants they love to eat.

Although smaller than hogs, nutria can be just as destructive. These rodents, native to South America, eat the plants and damage them with their burrowing. In Louisiana, where nutria thrive in swamps and bayous, the state has established a bounty on them. The North Texas district has arranged hunts to rid the East Fork project of destructive invaders.

*(continued)*





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A Hydratrek semi-aquatic vehicle is used to access the wetlands.



The conveyance station is equipped with three Goulds Water Technology, a Xylem brand, pumps powered by 3,500 hp GE motors to send the wetlands product north to Lake Lavon via a 104-inch pipeline. The pumps are each rated at 25,463 gpm at a head of 380 feet.

Although the clearwater is not ready for drinking when it leaves the wetlands, it is considered polished and at least as clean as the water it joins in Lake Lavon. Rickman says the predominance of the discharged wastewater that supplies the wetlands does not concern him because of the tight controls on the quality of effluent from wastewater treatment plants.

On top of that, he notes, "Lavon is already the most tested and most monitored lake in Texas." And the testing data shows no decrease in the quality of the lake's water in the decade since the wetland project was put online. The polished water enters the lake at its northern end and spends about a year in the reservoir before it reaches the district's intake structure at the south end.

From there, the water is directed to the Wylie Water Treatment Plant, the district's main facility, comprised of four plants built at different stages since 1956. The

“In a traditional plant, you're using filters, mechanical treatment and chemical treatment. At the wetlands, you're giving nature the time to do the work.”

MIKE RICKMAN

believe we will only need to clean them every 15 to 20 years," Rickman says. When it's time clean the ponds, Rickman expects no problems disposing of the sediment because the wetlands treat "nothing more than river water that meets state standards."

### FINAL TREATMENT

Once most suspended solids are settled, operators use sluice gates and gravity to direct water to the final treatment stage, a series of shallow wetlands cells. Twenty-one native plant species are there, including bulrushes that dominate the landscape and submerged aquatic plants. They consume phosphorus, nitrogen and other nutrients in the river water.

Arranged in essentially a grid formation, the 24 wetlands cells are separated by earthen berms and connected by gated channels. The gates allow operators to direct the flow in order to manage and maintain individual cells. The average water depth in the cells is 18 inches, but there are deeper strips to give the plants room to grow and allow the sun's ultraviolet rays to add their cleansing assistance.

The cells range from about 9 to 156 acres. The median-size cell is 64.45 acres and the median volume is 35.5 million gallons. Six distribution/collection channels run through the grid, covering a total of 45 acres. Overall, more than 1,800 acres of the 2,535-acre East Fork project site are covered in water.

### LONG JOURNEY

It takes water seven to 10 days to travel the 3.5 miles from the inlet to the end of the wetlands. By the time the water reaches the conveyance pump station, more than 90% of the sediment, 80% of the nitrogen and 65% of the phosphorus are gone.

newest facility, Plant IV, was built in 2008, but a recent upgrade has added 70 mgd to its original 140 mgd capacity. The expansion will make it the third largest of the plants on the Wylie site; Plant II and Plant III each can produce 280 mgd.

### TIMELY COMPLETION

Construction of the East Fork project began in 2004, and Rickman notes that its completion in 2009 was timely: It was coming online just as access to 28% of the district's raw water supply was being suspended.

The loss came after the Texas/Oklahoma state line passing through Lake Texoma was adjusted in 2000, effectively moving the district's intake structure into Oklahoma. When zebra mussels were discovered in Lake Texoma in 2009, the district fell under federal laws that restrict the interstate transfer of water from sources infested by the mussels.

The district was unable to tap its rights to Lake Texoma water for nearly five years until it completed a \$300 million, 46-mile pipeline carrying the lake's water directly to the Wylie Water Treatment Plant, where it must be cleared of any mussels before it is mingled with water from other basins. That new pipeline and treatment facility cost \$300 million, more than the \$246 million the district invested in the East Fork project.

Meanwhile, the district's newly permitted Bois d'Arc Lake reservoir project will cost \$1.6 billion and yield 108 mgd, about the same volume of raw water as the East Fork project. Bois d'Arc Lake, the first new Texas reservoir to get a permit in 31 years, will cover 16,641 acres and take up another 17,000 acres for mitigation.

That's substantially more land than the East Fork wetlands required, and for a similar amount of capacity. It's further testimony to the value of the wetlands project. **tpo**

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# A New Approach to Career Education

THE OHIO STATE UNIVERSITY LAUNCHES A UNIQUE ASSOCIATE DEGREE PROGRAM THAT COMBINES INSTRUCTION IN WATER AND WASTEWATER TREATMENT AND BIOENERGY

By Ted J. Rulseh

There's always a need for education to help bring new professionals into the water and wastewater field. The Ohio State University has stepped up with an associate degree program that breaks new ground in water career education.

The applied science program in bioenergy and water treatment management is offered by the university's Agricultural Technical Institute (ATI) in Wooster. The university says it's the first degree program in the U.S. that weaves together instruction in water treatment, wastewater treatment and bioenergy.

Students can graduate from the program prepared for careers in water and wastewater facilities as well as biogas, bioethanol and biodiesel production plants. Coursework covers topics that include resource economics, building science, electricity and lighting, microbiology, bioenergy and biological waste management, wastewater technologies, feedstock evaluation and analysis, sustainable waste management and environmental science.

Leading the program is Victor Ujor, Ph.D., an assistant professor in the ATI Division of Arts, Science and Business. He holds a bachelor's degree in applied microbiology and brewing from Enugu State University of Science and Technology in Nigeria and master's and doctorate degrees in applied microbiology and biotechnology from the University of Westminster in London. He spoke about the program in an interview with *Treatment Plant Operator*.

**tpo:** What was the inspiration for offering this associate degree program?

**Ujor:** Previously we had a renewable energy program that included wind, solar and bioenergy. As time went on, we found out that more of our students were interested in bioenergy, and we also observed that there was a close relationship between water and wastewater treatment and bioenergy, especially on the wastewater treatment side.

**tpo:** Why does it make sense to combine bioenergy, water treatment and wastewater treatment in a single degree program?

**Ujor:** Most wastewater treatment plants today want to take biosolids and convert it to energy. The plant here in Wooster runs a huge biogas facility where they save about a million dollars every year by converting biosolids and solids from other sources into methane and ultimately electricity. Here on our campus, about 25% of the electricity we use comes from biogas. If that is the future of the industry, it's important for our students to learn about it. If they are studying biogas production, we need to expose them as well to bioethanol and other fuels in the bioenergy sector. The combination gives them more options when they graduate.

**tpo:** Why is this program beneficial for the industry?

**Ujor:** About 45% to 50% of the workforce in the water treatment industry is due for retirement in the next 10 years, according to the American Water Works Association. We saw that as a great opportunity to help generate the next wave of the workforce, especially here in Ohio.

**tpo:** How would you describe the ATI and the campus in Wooster?

**Ujor:** The campus here has about 800 students. Most of our degrees are Associate of Science or Associate of Applied Science. For associate of science degrees, students spend two years here and then usually go off to the Columbus campus and finish four-year degrees. The Associate of Applied Science degrees are for those geared toward going to work right away. We have about 30 faculty members, and we're adjacent to the Ohio Agricultural Research and Development Center, which is part of the Ohio State University. The research going on there complements what we do.

**tpo:** What is the basic structure of the water and bioenergy program?

**Ujor:** It is a two-year Associate of Applied Sciences degree. Specifically, we are getting graduates ready to go out and work. A number of courses in the program can transfer to the main campus of Ohio State, or to other universities across the state, for those who decide to study further. However, our primary goal is to get students ready to work and pass the state licensing tests once they start working.

“Most wastewater treatment plants today want to take biosolids and convert it to energy. ... If that is the future of the industry, it's important for our students to learn about it.”

VICTOR UJOR, PH.D.

**tpo:** When did the newly configured program begin?

**Ujor:** We made the change from renewable energy to bioenergy and water treatment in fall of 2017. So far, we have graduated eight students who have gone to work in the industry, and we have eight more students registered in the program.

**tpo:** How is this offering being promoted?

**Ujor:** Our admissions department markets our programs, this one included. But I also go out myself to events that high schools organize, including FFA and 4-H meetings. I work with agriculture and science teachers in the area and talk to students about the opportunities.

**tpo: How do you promote careers in water, wastewater and bioenergy?**

**Ujor:** I try to make them understand that here's a wonderful area where they can apply themselves. Water is something we will always use, and wastewater is something we will always treat. The skills are transferrable across state lines; they can move from plant to plant and they will always find work, because there is a shortage of operators. These are stable and well-paid positions.

**tpo: Why did you choose such a wide diversity of course offerings?**

**Ujor:** We want to expose the students to all the things that can help them get a job. Some start off being interested in bioenergy but end up working in water or wastewater treatment. So we give them exposure to both. We make sure they get enough basic chemistry to know what it takes to convert corn into bioethanol, and enough biology to understand conversion of biosolids to biogas. We expose them as well to environmental science, because when we treat water, we send it back to the environment, where it has positive or negative effects depending on how well we do our job. We also give them a good basis in math and engineering and a little bit in plant design and construction.

“Those who have been through the program have enjoyed it a great deal. They find that they get jobs easily. They have been very highly employable.”

VICTOR UJOR, PH.D.

**tpo: What kind of feedback do you have from graduates so far?**

**Ujor:** Those who have been through the program have enjoyed it a great deal. They find that they get jobs easily. They have been very highly employable. The program has an internship component as well. Plants are usually eager to hire our students as interns, and they often get hired before they graduate.

**tpo: How would you describe the response from employers?**

**Ujor:** It has worked out very well. A plant in Columbus has taken most of my students from around that area. The wastewater plant here in Wooster is constantly looking for our students to come and work with them. Quasar energy group, a biomass-to-energy firm, is a place where our students do most of their bioenergy-related work. We have very good relationships with these plants, and they are always willing to come back and take our students.

**tpo: What kinds of backgrounds are you looking for in students?**

**Ujor:** We have had some with extensive science background and some with little or none. We are an open-enrollment institute, which means that if students have a high school diploma, we can accept them here irrespective of their ACT scores. That means we have to work harder to bring those without previous exposure to the sciences up to the level where they need to be when they graduate. We also target people who are changing fields. We tell them this is a field that is very important and is always going to be around; they don't have to worry about losing their job because their plant shut down.

**tpo: Do former military people make good candidates for this program?**

**Ujor:** We've had one or two go through here. They are highly motivated. They have discipline and complete their assignments on time. They have the desire to graduate on time and go work, because some are already married and have families.

**tpo: How would you assess future prospects for this degree program?**

**Ujor:** It's an up-and-coming program. It has a lot of potential. Water is essential and is becoming even more so as regulations tighten and populations increase and put more pressure on water resources. Everyone is conscious today about the environment, climate change and resources running out. This is a field that is definitely going to grow heading into the future. **tpo**

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# Simply Effective

INTEGRALLY GEARED TURBO BLOWERS PROVIDE AN EFFICIENT AND LOW-MAINTENANCE SOLUTION FOR WASTEWATER TREATMENT PLANT AERATION

By Ted J. Rulseh

Aeration for secondary treatment is typically the largest source of electric power demand in clean-water plants, accounting for roughly half the total energy usage.

Turbo blowers of different types have increased aeration energy efficiency by up to 40%, driving down electric bills significantly. In recent years, Inovair has offered a different twist on turbo blower technology to the wastewater treatment market.

The company's IM, IE and IO Series blowers are integrally geared and use noncontact oil-film bearings. The IO Series offers the company's lowest cost per unit volume of air and the most compact footprint. The IE provides the same benefits except in a weatherproof package, while the IM Series provides a direct-coupled modular design.

All three can fulfill a wide range of airflow demands and are designed for a broad turndown range to fit variable aeration requirements. Glen Roderique, a sales engineer, talked about the technology in an interview with *Treatment Plant Operator*.

**tpo:** Why did Inovair decide to bring this blower to the wastewater treatment market?

**Roderique:** Our main focus was to offer energy savings over existing technologies such as positive displacement and multistage blowers. We had our first installation in the wastewater industry in 2013.

**tpo:** In what applications was this technology proven before it entered the wastewater sector?

**Roderique:** In 2008 we built similar blower packages with different

controls for the pneumatic conveying market in facilities such as flour mills. They used the same gearbox and head unit that we now use in our wastewater products. The same gearbox is used in aircraft ground support equipment for the U.S. military F-35 strike fighter. Our compressor blows air into the cockpit when the aircraft are being serviced. As part of certification for that, we performed startups at 40 degrees below zero. We have also used our compressor in industrial drying applications where we brought air into the compressor at about 325 degrees F. It has proven very durable over a wide temperature range.

**tpo:** How does an integrally geared design differ from the design of other turbo blowers?

**Roderique:** It uses a gearbox to step up the speed of a standard 1,800 or 3,600 rpm motor to the operating speed of the impeller. Other turbo blowers use a high-speed permanent magnet motor that actually runs at 25,000 to 30,000 rpm, which use airfoil or magnetic bearings.

**tpo:** What do you see as the benefit of the integrally geared configuration?

**Roderique:** We are able to use off-the-shelf components such as standard motors and standard variable-frequency drives. Mechanics at treatment plants typically understand gearboxes and these standard components.

**tpo:** How do oil-film bearings work, and what are their benefits?

**Roderique:** On the high-speed shaft, we use floating-ring oil-film bearings. The oil film creates a hydrodynamic wedge so that the bearing never

*(continued)*

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contacts the shaft. It's the same technology used in turbochargers on cars for the last 40 to 50 years. This design makes for a very stiff bearing that tolerates challenging conditions and can operate down to relatively low speeds.

#### **tpo:** What is the advantage of lower-speed operating capability?

**Roderique:** Generally we operate in the range of 25,000 to 45,000 rpm, even though the gearbox is designed to operate at up to 60,000 rpm in continuous duty. For applications like aerobic digesters and sequencing batch reactors, we can operate over an extremely wide range of liquid levels. We can turn down the airflow significantly at lower pressures, and that helps save energy.

#### **tpo:** Can the integrally geared blower tolerate frequent start-stop cycles?

**Roderique:** Yes. With the oil-film bearing, we have an oil pump mechanically attached to our input shaft. Anytime the shaft is rotating — on startup or shutdown, on ramp-up or coast-down — lubrication is being provided to the bearings. The oil is cooled, and the internal hydrodynamic wedge keeps the shaft centered in the bearings. There is no issue with stop-start conditions or with operating in a dusty environment, such as near a construction site.

#### **tpo:** What is involved in maintenance for this technology?

**Roderique:** We require annual oil changes after a year of continuous duty. A plant that cycles blowers on and off can go up to two years between oil changes as long as the operational hours don't exceed 9,000. Also, we try to make the units as serviceable as possible. With every sale, we provide a small electric service pump. The units themselves have quick-disconnect fittings on the oil service lines. The oil-change procedure is simple and typically takes about 30 to 45 minutes.

**tpo:** How does the use of off-the-shelf components help facility operators?

**Roderique:** We use off-the-shelf Allen-Bradley PLCs (Rockwell Automation) and drives from ABB and others. With those industry standard components, if something happens at the plant, such as if a lightning strike disables a PLC or a VFD, the operators can simply go to their local supply house and buy a replacement. It makes for easy maintenance and service.

#### **tpo:** What size facilities can this technology accommodate?

**Roderique:** Traditionally, geared units were basically for plants that needed motors 500 hp and larger. What we've done is bring that technology down to smaller plants that haven't been cost-effectively served by high-efficiency turbo blowers. We focus on facilities that require 400 to 2,000 cfm, which means plants treating roughly 0.5 mgd to 10 mgd.

#### **tpo:** What do your blower control packages include?

**Roderique:** As a vertically integrated company, we do as much manufacturing in-house as possible, and that includes designing and manufacturing of our control panels. We can be very cost-effective for smaller plants that don't have automated dissolved-oxygen control or all they can do is start and stop a blower. We can provide a DO feedback system with a master control panel. That makes us essentially a one-stop shop.

**tpo:** Can you give an example of a successful installation of your blowers?

**Roderique:** The 10 mgd Sni-A-Bar Wastewater Treatment Plant serves the cities of Blue Springs and Grain Valley, Missouri, and is part of the greater Kansas City metro area. The plant uses a nitrification-denitrification cycle. Replacement of two of the four original rotary-lobe blowers with integrally geared turbo blowers reduced energy usage by more than 35% and improved process control. A second phase replaced the remaining old blowers and led to more than 40% energy savings. Those savings were independently verified by a third-party. **tpo**



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John Amorose, Eagle River Wastewater Treatment Plant operator, shares duties in the facility's award-winning lab.

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STORY: **Jared Raney** | PHOTOGRAPHY: **Cory Dellenbach**

Daryl Rutkowski, left, and John Amorose display an award plaque presented to the plant by the Wisconsin Department of Natural Resources for the utility's lab work.



It took only three years for the new leadership at Eagle River Wastewater Treatment Plant to earn the Laboratory of the Year award from the Wisconsin Department of Natural Resources.

Labs are nominated by five auditors who travel to 196 registered labs every three years. After taking over lab operations three years ago, shortly before that round of audits reached their utility, Daryl Rutkowski and John Amorose sought the help of their DNR auditor, Brandy Maker-Munich, to begin improvements.

“When I first got here, she did the audit the next year, and we had a few errors. But then this year she came and we were down to basically nothing,” says Rutkowski, treatment plant supervisor. “She had scheduled a whole morning for us, and we were done in about 2 1/2 hours. We got quite a bit of help from our lab auditor on getting our lab straightened around.”

“Daryl and John took over and brought with them a change in culture. They bring a proactive approach to problem-solving.”

**STEVE GEIS**

In making the award presentation, Steve Geis, DNR chief of certification services, observes, “This year’s award could be called a most improved lab award. Daryl and John took over and brought with them a change in culture. They bring a proactive approach to problem-solving. They reached out to others for advice. It’s that sort of ‘we’re in this together’

attitude that the Lab Certification Program is trying to nurture. Hopefully Daryl and John will have an opportunity to pay it forward to the next lab seeking advice.”

That wasn’t the only help they sought: They also reached out to the Wisconsin Rural Water Association and the neighboring Rhinelander utility, which had received the lab excellence award two years before.

In making the award presentation, Steve Geis, DNR chief of certification services, observes, “This year’s award could be called a most improved lab award. Daryl and John took over and brought with them a change in culture. They bring a proactive approach to problem-solving. They reached out to others for advice. It’s that sort of ‘we’re in this together’

## Eagle River (Wisconsin) Wastewater Treatment Plant laboratory

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**BUILT:**  
1930s, updated 1995

**POPULATION SERVED:**  
1,500

**FLOWS:**  
0.62 mgd design, 0.25 mgd average

**RECEIVING WATER:**  
Eagle River Chain of Lakes

**TREATMENT LEVEL:**  
Secondary

**TREATMENT PROCESS:**  
Oxidation ditch with selector tanks

**ANNUAL BUDGET:**  
\$621,000 (treatment plant and collections system operations)



attitude that the Lab Certification Program is trying to nurture. Hopefully Daryl and John will have an opportunity to pay it forward to the next lab seeking advice.”

### MAKING CHANGES

The changes at Eagle River brought more than organizational benefits. The treatment plant had been taking in leachate from a landfill; the large volume of leachate tinted the effluent, making UV disinfection less effective. Careful monitoring enabled the plant to optimize the volume of leachate while keeping coliform in check. It’s a win-win, helping the landfill maintain operations while providing revenue for the treatment plant.

Eagle River is a small community (population 1,500), but it’s not without challenges. The city sees an influx of summer tourists, making reliable lab results paramount. Permit levels aren’t dramatic (BOD and TSS at 30 mg/L, phosphorus of 1.0 mg/L and coliform at 400 CFUs per 100 mL).



A fluoride meter (Oakton) is used to test water.

“In summer, we usually run single-digit numbers for BOD and TSS,” Rutkowski says. “Our influent varies. Right now, we’ve been getting so much rain, but I’d say the average influent is probably around 280 to 300 mg/L.” The plant’s design capacity is 0.62 mgd; average flow is 0.25 mgd. The challenge has been to maintain consistency in the effluent.

“The lab has been the same for the last 20 years, since I’ve been here,” Rutkowski says. “We changed a lot of the ways we did the lab work. It’s more of a major reorganization in the recordkeeping and standard operating procedures: We rewrote all of them, changed them and just kept better records, better detail.”

### STARTING FROM SCRATCH

After the lead analyst retired, the Eagle River team struggled with outdated BOD testing methods and unreliable phosphorus removal. Working with the DNR auditor, Rutkowski and Amorose made quick strides. They established new SOPs and quality control best practices, ultimately leading to the excellence award.

“It just wasn’t clearly written, and some of the procedures were outdated and never updated,” Rutkowski says. “None of the protocols were set up. Some items, like seed preparation and how to prepare the dilution water, were never really spelled out.” The new SOPs were retrofitted from a DNR template the auditor recommended. Changes to the BOD test procedure, cleaning procedures and phosphorus equipment calibrations were among the top changes.

Before the change in management, phosphorus calibration was a daily procedure. The team has moved instead to a more comprehensive seven-point (versus three-point) calibration about every 10 months. “It was a lot of work,” Rutkowski says. “If the calibration were wrong, then we had to start all over and redo it. So we got rid of that, and it was a huge thing. It was a money



Daryl Rutkowski stands outside of his truck at city hall where the Eagle River Light & Water main office is located.

(continued)

## KEEPING IT PRISTINE

Wastewater treatment is often considered a factor in economic stability. For Eagle River, Wisconsin, an area heavily reliant on summer tourism, it’s especially important.

“It’s just a part of being up in the North Woods,” says Daryl Rutkowski, treatment plan supervisor. “People come here to get back to nature, so we try to keep it pristine. Because of the pressure that it gets, from the boating and recreation, it’s important to make sure that everything’s going good.”

The updated standard operating procedures in the Eagle River lab help the operators stay ahead of water-quality issues. “We discharge right into the Eagle River Chain of Lakes, which is a very busy place in summer,” Rutkowski says. “We have a lot of tourists — people swimming in it, fishing in it. We don’t want to be part of the problem. We want to be part of the solution.”



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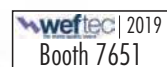
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One of the two samplers at the Eagle River Wastewater Treatment Plant in Eagle River, Wisconsin. Daryl Rutkowski is turning on and checking over the sampler.

saver, too, because it gets expensive when you're using more chemicals for those calibrations."

Fully digitizing the bench sheet was another major step in standardizing the recordkeeping. They added several new categories, including pH and temperature. "We were missing quite a bit of information on what the control limits were, such as minimum and maximum depletion," Rutkowski says. "We have results we can trace back now. Some of our results were not that traceable before. It helps us see how the plant is running and get more reliable results quicker. It helps us control things."

Another important, yet simple step was a new cleaning cycle on the sample collection carboys. Now they are cleaned daily, and the effluent containers are rinsed with hydrochloric acid for good measure. "We strive for consistency and repeatability," Rutkowski says. "It's a lot of little things. It seems difficult at first, but once you get used to doing them every day, it becomes part of the routine. We try to get everything in a good routine, so it's done the same all the time, no matter what operator is here. That has really helped us."

### THE RIGHT HELP

Another boon to the lab's rebirth was the experience of Rutkowski's lab partner, operator Amorose. Before Eagle River, Amorose worked at a cheese plant wastewater facility in southern Wisconsin. The strict requirements of commercial treatment left him well prepared to steer the Eagle River lab in

the right direction. "They did lab work seven days a week, so he came with a lot of hands-on experience, and he helped tremendously," Rutkowski says.

The DNR award is meant to highlight labs that produce high-quality data and improvement over time. Perhaps more important, it shows the

“We have results we can trace back now. ... It helps us see how the plant is running and get more reliable results quicker. It helps us control things.”

**DARYL RUTKOWSKI**

importance of operational excellence. "I'm always interested in the added value that labs bring to the treatment plant," observes Geis from the DNR. "Each year we lose a handful of wastewater labs due to tight municipal budgets, or retirements. We know these labs, with the right leadership, do more than run their compliance samples."

A note from Austin Griesbach, the DNR's local basin engineer who worked with Rutkowski and Amorose, summed up Eagle River's award: "The staff of the Eagle River Wastewater Treatment Plant consistently provides reliable laboratory data that helps to ensure the dependable operation of their facility. Through their work, the Wisconsin River is protected even from its headwaters. I would like to thank them for their commitment to protecting the waters of the state." tpo



Bottom of the 9<sup>th</sup>. Bases are loaded.  
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Pelicans are frequently seen at the Tres Rios Wetlands.

# Circle Unbroken

A RENEWABLE NATURAL GAS PLANT IS THE LAST PIECE OF THE PUZZLE IN COMPLETE WASTEWATER RESOURCE UTILIZATION IN THE PHOENIX AREA

By Steve Lund

**A** renewable natural gas plant at the 91st Avenue Wastewater Treatment Plant in Phoenix completes the circle of reusable byproducts for Arizona's largest clean-water facility.

The 145 mgd average (230 mgd design) plant has long claimed beneficial uses for 100% of its effluent and biosolids. All that goes to the landfill is grit and headworks screenings. The effluent is used for irrigation, supplying the Tres Rios Wetland, and for cooling the nuclear reactors at the Palo Verde Generating Station. Anaerobically digested and dried biosolids are land-applied to crops such as hay and cotton.

Only the biogas remained as an unrecovered resource. For years, a small portion of the gas had been used for boiler fuel, but most had been flared. That changed with the opening last April of a renewable natural gas facility on the plant site. It will clean the biogas to natural gas pipeline standards.

## MAJOR GAS PRODUCER

The renewable natural gas plant, expected to produce 600 MMBtu of natural gas annually, is owned and operated by Ameresco, an independent provider of services and infrastructure upgrades for energy efficiency, renewable energy and asset sustainability.

The wastewater treatment plant, along with three major sanitary sewer interceptors, is owned by a partnership known as the Sub-Regional Operating Group, or SROG, which consists of the cities of Phoenix, Scottsdale, Tempe, Mesa and Glendale. That partnership was created in 1979. Phoenix



A renewable natural gas plant operated by Ameresco is on the site of the 91st Avenue Wastewater Treatment Plant in Phoenix.

operates the wastewater treatment plant, built in 1957 and upgraded several times. It serves about 2 million people in the five cities.

Digested solids from the activated sludge process are dewatered in centrifuges and further dewatered on drying beds before being land-applied.



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The 91st Avenue plant is the largest in Arizona.

### COST-BENEFIT ANALYSIS

The treatment plant operations team considered a variety of uses for the biogas, including electricity generation, says Patty Kennedy, deputy director of wastewater engineering in Phoenix. “When we looked at the cost-benefit analysis, it made more sense to put it into the pipeline,” Kennedy says. “By entering this partnership, we were able to stick with our core business, which is treating wastewater. Ameresco came in focusing on its core business, which is renewable energy.”

The cities in the SROG partnership send some or all of their wastewater to the 91st Avenue plant, which has two acid-phase digesters and 14 methane-phase digesters. Since the renewable natural gas plant began operating,

all of the biogas goes to Ameresco. The plant, the largest of its kind in the country according to Ameresco, treats only biogas from the wastewater treatment plant.

“We sell the raw gas from our digesters to Ameresco,” Kennedy says. “They are in charge of treating it to pipeline quality. They are in charge of their relationship with Kinder Morgan, who is the taker of the gas, and they are also in charge of figuring out off-takers — users downstream.” The gas is expected to be sold to the transportation market through the natural gas pipeline grid.

“By entering this partnership, we were able to stick with our core business, which is treating wastewater. Ameresco came in focusing on its core business, which is renewable energy.”

PATTY KENNEDY

### ENVIRONMENTALLY BENEFICIAL

Warren Tenney, executive director of the Arizona Municipal Water Users Association, describes the project as a winner for the cities and the environment. In an op-ed in a local newspaper, Tenney says the project ensures the availability of renewable energy, provides income to the SROG member cities and reduces the treatment plant’s carbon footprint.

In a press release, Ameresco estimates that not flaring the biogas from the wastewater treatment plant would reduce the carbon emissions by 45 tons per year, equivalent to taking 70,000 cars off the road or planting 87,000 acres of trees every year. Revenue from the sale of biogas to Ameresco is estimated at \$1.2 million per year.

(continued)

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An aerial view of the 91st Avenue Wastewater Treatment Plant



An aerial view of the Tres Rios Wetlands, fed by effluent from the 91st Avenue Wastewater Treatment Plant

The revenue is significant, but Phoenix officials are encouraged that they finally can beneficially use the last significant resource from wastewater treatment. “That’s what makes this project so exciting,” Kennedy says. “All our water is reused, and so are the solids. The third product is gas. Now we are able to capture and reuse it.”

### **WETLAND IN THE DESERT**

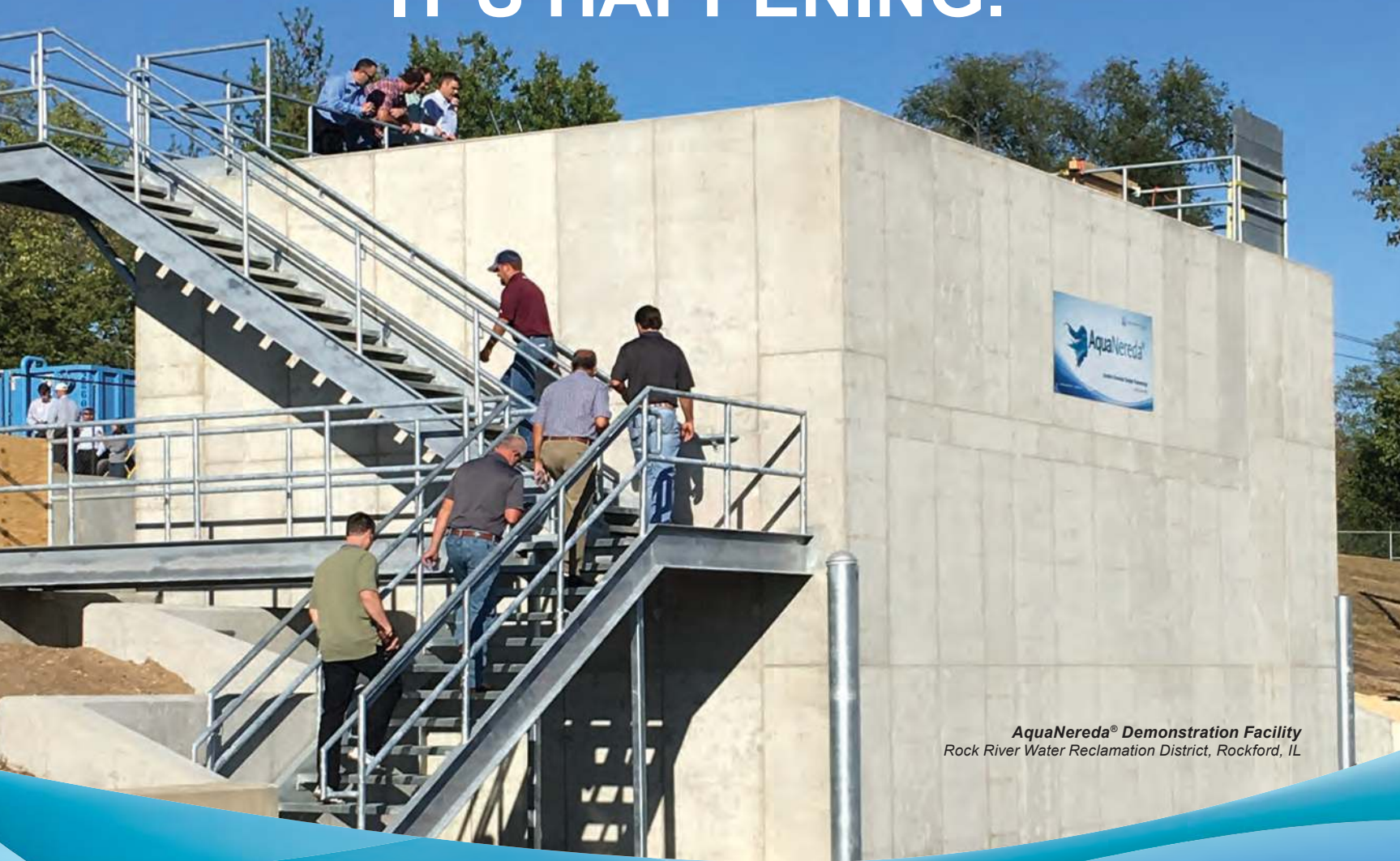
The 91st Avenue Plant is on a 670-acre site about 16 miles southwest of central Phoenix and close to the Salt River. Almost next door is one of the more visible users of the plant’s effluent: the 700-acre Tres Rios Wetlands.

The wetland, built on former farm fields, is a result of a partnership between the Army Corps of Engineers, the City of Phoenix, the SROG and the Flood Control District of Maricopa County. Construction took place from 2007 through 2012.

The wetland is intended to restore the riparian habitat along the Salt River to early 1800s condition. A 300 mgd pump at the treatment plant sends effluent to the area. The plants and animals in the Tres Rios take what they need, and the rest flows into the Salt River, which at that point is a dry riverbed most of the time.

“We built a wetland in the desert,” Kennedy says. “We’ve got all kinds of wildlife in the area. We even have pelicans.” The Tres Rios Wetlands is home to 150 species of birds, as well as muskrats, beavers, coyotes, bobcats and other mammals. It’s a destination for bird-watchers from all over the world. **tpo**

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Visitors to the Logan Green Trout Pond at the Queen Street Water Treatment Plant enjoy its catch-and-release venue.

## A Vision Made Real

A TROUT POND WITH CATCH-AND-RELEASE FISHING IS THE CENTERPIECE OF A BACKWASH TREATMENT SYSTEM OF PONDS AND WETLANDS IN A SASKATCHEWAN CITY

By Jeff Smith

The Queen Street Water Treatment Plant in the Saskatchewan city of Yorkton is far from ordinary. It's an integral part of a large urban park called Logan Green, with hiking and biking trails, sports fields, day-use areas, natural grasslands, a tree nursery, community garden and well-stocked trout pond.

Operating since 2012, the Logan Green Water Management System polishes about 260,000 gpd of the plant's filter backwash for reuse. The water passes through two settling ponds, three wetland ponds and finally the 10-foot deep trout pond with a meandering shoreline, before making its way to a recharge area and eventually back into the aquifer.

### ACTIVE FISHERY

"We were one of the first communities in Canada to use settlement ponds and wetlands to treat process backwash," says Glenda Holmes, waterworks manager. It's an alternative to sending the filtered backwash to the city's wastewater treatment plant.

The system is more than static ponds. In 2014, the Saskatchewan Wildlife Federation stocked one pond with 750 rainbow trout fingerlings and flathead minnows. The pond is restocked nearly every year since, and a few broodstock trout have been added.

The Logan Green Trout Pond is a catch-and-release venue, requires no license and attracts people almost every day. "Not many days go by that we don't see fishermen enjoying themselves," Holmes says.

### WILDLIFE HAVEN

Two backwash-water settling ponds, each 5 feet deep and nearly 250 feet square, receive flow from a filter backwash pit at the 5.8 mgd water plant. It moves downstream through a wetland of natural vegetation that provides habitat for deer, raccoons, otters and other wildlife. Coots, grebes and plovers nest in the wetland, and Canada geese, magpies and ducks are commonly seen.

Overburden from excavating a 4-million-gallon reservoir and the ponds at the water plant was used to create six multiuse athletic fields, which are popular with the Yorkton Soccer Association. A 34,000-square-foot community garden includes 20 plots leased by residents.

“The goal was to produce advanced water treatment at one environmental area supported by our residents and not increase the load on our wastewater plant. And it sure looks like we did it.”

GLEND A HOLMES

A Memorial Tree Park near the city cemetery provides a space for families and friends to commemorate a loved one. A tree can be planted or a small plaque installed on a pedestal at the park entrance. With contributions from the Rotary Club of Yorkton, shrubs have been planted and seating installed.

*(continued)*

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The environmental services team at the Logan Green Trout Pond includes, from left, Jake Perpeluk, Andrew Thurston, Glenda Holmes, Aron Hershmilller, Val Fatteicher, Luke Konkel and Connor Hunt.

More than 30 varieties of trees and shrubs thrive in the 210-acre Logan Green Park. They include pine, spruce, elm, olive, willow, walnut, ash and birch. Some of differing sizes are managed and transplanted to sustain the tree population throughout the city.

## SCENIC TRAIL

A 5-foot-wide pathway with an improved surface winds for 3 miles through the park. Benches and garbage containers are placed along the corridor. The path is part of the Great Trail, a 15,000-mile cross-Canada link of waterways, roadways and greenways reaching from the Atlantic to the Pacific oceans.

Planning for the award-winning Logan Green Water Management System was a collaboration of entities such as the Yorkton Wildlife Association, the Yorkton Soccer Association, Ducks Unlimited, the provincial Ministry of the Environment, the Centre for Sustainable Research, professional engineering firms and representatives of numerous city departments.

The concept was to use a single plant to receive all raw water, rather than divert flow to three older plants, which have since been decommissioned. Michael Buchholzer, Yorkton's director of environmental services, spearheaded a series of public meetings and got input from residents about the proposed water plant and pond system.

It was Buchholzer whose vision of natural water treatment included the stocked trout pond for the public's enjoyment. "The goal was to produce advanced water treatment at one environmental area supported by our residents and not increase the load on our wastewater plant," Holmes says. "And it sure looks like we did it." **tpo**

## Share Your Ideas

**TPO welcomes news** about interesting features of your facility's grounds, signage or buildings for future articles in the PlantScapes column. **Send your ideas to editor** [@tpomag.com](mailto:tpomag.com) or call 877-953-3301.

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NEW Water

From left, Matt Schmidt, operations trainer; Corbin Magnin, treatment operator; and Tom Sigmund, executive director, shown with one of the two 100-foot-tall digesters (DN Tanks) at NEW Water's R2E2 facility.

# Far Beyond the Fence

HATFIELD AWARD WINNER TOM SIGMUND LEADS NEW WATER'S INITIATIVES TO BOLSTER RESOURCE RECOVERY AND CURB PHOSPHORUS IN ITS WATERSHED

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Cory Dellenbach**



“ I look at our staff here, and they are incredibly skilled, dedicated and inquisitive. ... Our job is protecting public health, and they take that very seriously.”

**TOM SIGMUND, P.E.**



Tom Sigmund (right) consults with Bryan Thompson, an electrical and instrumentation technician. Sigmund likes to stay in close personal contact with members of the treatment plant team.

Rising in the ranks as an engineer and designer of clean-water plants, Tom Sigmund, P.E., likely never dreamed that someday he'd be dealing with soil conservation practices on farms.

But today that's part of his job as executive director of NEW Water, the clean-water utility serving Green Bay and 14 other Wisconsin communities in a 285-square-mile service area. Sigmund, winner of a 2018 William D. Hatfield Award for excellence in plant operations from the Central States Water Environment Association, has led NEW Water's transition to a focus on resource recovery and on a watershed approach to reducing phosphorus inputs to the Lower Fox River and the bay of Green Bay, an arm of Lake Michigan.

The phosphorus campaign, being executed under an adaptive management provision in state regulations, represents a cost-effective alternative to a \$100 million upgrade at the 49 mgd (design) NEW Water treatment plant in Green Bay. On the resource side, the utility has built a Resource Recovery and Electrical Energy facility that captures energy from biogas and struvite fertilizer from the solids stream.

“When I came here 12 years ago, we were really good at treating wastewater,” Sigmund says. “We were in our fifth year of 100% permit compliance, and that has continued. We were focused on optimizing what we did inside the fence, and there's nothing wrong with that. But when we looked at the future and our place in the environment, we saw that where we were going to have the most impact was outside the fence. We started looking out toward the watershed, and we've been doing that ever since.”

### BACKGROUND IN DESIGN

Sigmund started his career in 1982 after earning bachelor's and master's degrees in civil and environmental engineering from the University of Wisconsin–Madison.

## Tom Sigmund, P.E., NEW Water Green Bay, Wisconsin

POSITION:  
**Executive director**

EXPERIENCE:  
**37 years in the industry, 12 years in present role**

DUTIES:  
**Lead wholesale provider of wastewater services to 15 municipal customers**

EDUCATION:  
**Bachelor's and master's degrees in civil and environmental**



engineering, University of Wisconsin–Madison

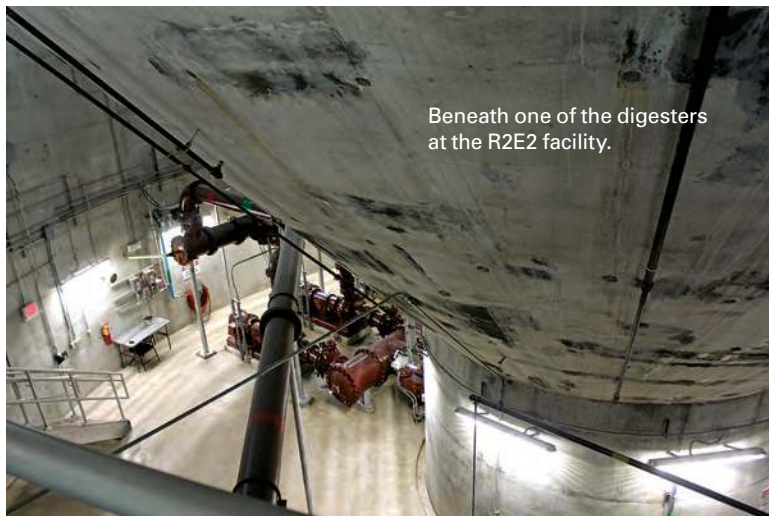
CERTIFICATION:  
**Registered Professional Engineer**

AWARDS:  
**2018 William D. Hatfield Award**

GOALS:  
**Continue meeting challenges facing NEW Water and the industry**

He began with a small engineering firm in Wisconsin, writing operations and maintenance manuals and doing some troubleshooting for new wastewater treatment plants. After a year there, he went to work for the CH2M Hill consulting firm (since purchased by JACOBS) and stayed there for most of the next 24 years, mainly doing designs for municipal treatment facilities.

Among memorable projects, he lists a plant rehabilitation project in Muscatine, Iowa; a new regional facility in Beloit in southern Wisconsin; a variety of water and wastewater projects in New Mexico and Texas; and a major facility upgrade for the Little Blue Valley Sewer District near Kansas City, Missouri. He worked as a consultant to the Green Bay Metropolitan Sewer-



Beneath one of the digesters at the R2E2 facility.



As executive director for NEW Water, Tom Sigmund has led a program of extensive outreach to the district's member communities and to the region's watershed.

## R2E2 (NO, IT'S NOT A 'STAR WARS' DROID)

NEW Water completed its Resource Recovery and Electrical Energy (R2E2) facility in 2018. It uses biogas to generate heat and electricity for plant purposes and extracts struvite fertilizer from the solids stream. The solids are burned in a fluidized bed incinerator (SUEZ Water Technologies & Solutions) that replaced an old multiple-hearth furnace.

"Our solids handling facilities for the most part were built in the mid-1970s," says Tom Sigmund, P.E., executive director. "Our staff takes excellent care of what we have, but at some point, it just wears out. We also had some regulatory challenges."

An advisory committee of utility staff and external stakeholders analyzed solids processes to identify technology that would be feasible, reliable, safe, environmentally friendly and cost-effective.

"We looked at all the technologies available to deal with solids," Sigmund recalls. "There is so much dairy waste in this area that land application of biosolids is hard to do. Landfilling doesn't make any sense. We looked at producing dried pellets, but that's a big investment and there's not much of a market for the product. We knew how to do incineration, and so our challenge was to figure out how to recover and reuse as much energy as possible."

The R2E2 facility includes two anaerobic digesters (DN Tanks) that produce biogas, which is burned in a pair of 20-cylinder, 2-MW engine-generators (Caterpillar). The electricity and heat they produce is projected to cut energy costs by half and save more than \$2 million per year. Heat from the engine exhaust and jacket water, along with heat from the incinerator, is captured by way of heat exchangers in a hot-oil loop.

The hot oil keeps the digesters at the optimum temperature, provides building heating and feeds a disc dryer (Haarslev Industries) that raises the solids content of centrifuged sludges from 22%-23% to 39%-42% before it is fed to the incinerator. The three dewatering centrifuges were supplied by Centrisys/CNP.

The struvite recovery system, supplied by Multiform Harvest (since purchased by Ostara Nutrient Recovery Technologies), yields struvite granules that Ostara will purchase under an off-take agreement and process for sale as a slow-release fertilizer.

Sigmund observes, "I look at us as a factory. We take raw materials in, and we try to extract as much as we can out of them to recover those resources."

age District (since branded as NEW Water) for about a decade before being hired as executive director.

Along the way, during facility design, construction and startup projects, Sigmund developed an appreciation for plant operators: "I look at our staff here, and they are incredibly skilled, dedicated and inquisitive. They're always trying to figure things out. When something isn't working quite the way they think it should, they're digging into it.

"Our job is protecting public health, and they take that very seriously. Whether they're treatment operators, electrical instrumentation specialists, mechanics or field service technicians, they put in a lot of time to make sure we do it right. They've done what's needed to achieve 16 years of continuous 100% permit compliance, and that is not easy to do."

Sigmund notes that most new hires come with two-year degrees from Northeast Wisconsin Technical College or Fox Valley Technical College, or with four-year environmental science degrees from UW-Green Bay or UW-Stevens Point. Jake Becken, a treatment lead, holds a master's degree in sustainability from UW-Green Bay.

## EXPANDING THE MISSION

A key issue facing Sigmund and the team is the need to reduce phosphorus discharges to Green Bay, which during summer develops a hypoxic zone (dissolved oxygen below 2.0 ppm). The Department of Natural Resources is set to impose a phosphorus discharge limit on NEW Water of 0.1 or 0.2 mg/L, well below the current permit limit of 1.0 mg/L.

"We looked at the expense of meeting that by upgrading this facility," Sigmund says. "Then we worked with the DNR, other large utilities in the state and some nongovernment organizations and asked, 'Is there a better, cheaper way to do it?' The answer was yes. And so for us, it's going to be adaptive management."

That means focusing outside the fence and working throughout the watershed. To further that activity, Sigmund created the director of environmental programs position, first held by Bill Hafs, who has retired, and now by Jeff Smudde. Another logical step was to rebrand the utility, whose legal name is the Green Bay Metropolitan Sewerage District.

“We knew we would have to build to relationships with people, some of them not even our customers,” Sigmund says. “We asked, ‘How will we facilitate the conversations? How will we introduce ourselves?’ To say, ‘I’m from the Green Bay Metro Sewerage District,’ that’s not the best opener, and it doesn’t represent what we do. People don’t want to talk about wastewater

“ People don’t want to talk about wastewater treatment or sewage. We determined that what they want to talk about is water.”

**TOM SIGMUND, P.E.**

treatment or sewage. We determined that what they want to talk about is water.” And so in 2013 the utility adopted the NEW Water brand. The NEW connotes renewal and a transformational approach; it’s also a commonly used acronym for northeast Wisconsin and reflects the utility’s regional service area.

### REACHING OUT

Tricia Garrison, public affairs and education manager, reports positive reactions to the branding: “People get a sense of pride when they feel like they’re helping to protect our water resources. With everything we do at our facilities, we try to tie it to the water resources in our backyard and to the Great Lakes. Once we change the conversation, it opens doors for us as an organization.”

The brand’s good reception has helped in outreach to the watershed, largely to farmers of whom NEW Water can only ask for voluntary cooperation. The work began five years ago with a pilot called the Silver Creek Project, covering about 4,800 acres in a subwatershed.

The highly successful project had a long list of partner organizations and about 15 cooperating landowners and farmers who deployed best management practices including grassed waterways, streamside buffer strips, and no-till and other innovative farming practices, all serving to keep soil and nutrients in place instead of running off into the stream. The work also included wetland restorations.

A significant cropping innovation was interseeding, which involves planting a cover crop between corn rows after the corn has sprouted. As the corn grows, it shades the cover crop, which goes dormant. After harvest, the cover crop resumes growing and helps hold the soil through the winter.

“In the Silver Creek Project area, typically about 30% of the land had something growing on it during the winter — wheat, alfalfa or another cover crop,” Sigmund says. “In the last two years, through our project, we had 80% to 90% of that land in cover crops.”

The next step is a more comprehensive adaptive management plan covering an area on the west side of the bay of Green Bay. “We have submitted a draft plan, and we’re working with the DNR to get that approved so we can work with farmers in the area,” Sigmund says. “We’re at the very front end of watershed work that will last for 20 years, if not longer.”

### STAYING CONNECTED

Meanwhile, Sigmund and the team keep NEW Water looking ahead to new challenges. To stay close to the team, Sigmund spends significant time outside his office: “I try to understand what it is they’re doing. Probably three times a week, I’m out in the control room or in the facility.”

He interacts more often than that with Bruce Bartel, treatment manager; Pat Wescott, director of operations; and Pat Smits, maintenance manager. Other key team members include Adam Butry, health, safety and security coordinator; and Nate Qualls, director of technical services.

As another way to stay plugged in with the staff, Sigmund three years ago instituted monthly Lunch with Tom sessions. “I realized that with about 100 employees here, I wasn’t seeing as many people as I wanted to on a regular enough basis,” he says. “We invite somebody from

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Sara Georgel, left, pretreatment coordinator, with Tom Sigmund at the new high-strength waste receiving station at the R2E2 facility. (PortALogic septage receiving station from EleMech.)

each of the divisions, and we have lunch with five or six people. It's a small group, and it's very informal. It helps me and everybody in the room understand what others are doing."

Outside the walls of NEW Water, Sigmund serves on the board of the National Association of Clean Water Agencies, and he chaired the Water Resources Utility of the Future Task Force organized by NACWA and the Water Environment Federation.

### FACING THE FUTURE

There's plenty of work on the horizon for NEW Water. Emerging contaminants are gaining attention; they include pharmaceuticals and per- and polyfluorinated substances (also known as PFAS), ubiquitous chemicals used in products ranging from flame retardant fabrics to nonstick cookware to fabric softeners.

Like most clean-water utilities, NEW Water and its customer municipalities struggle with wipes and other nondisintegrating materials that people improperly flush. Most of the items get trapped in headworks screens, "But some still gets through and causes significant maintenance problems for our pumps and other equipment," Sigmund says.

"Another big concern is inflow and infiltration. Our facility's typical flow is about 30 mgd, but when it rains hard and the groundwater table is high, we've seen upward of 120 mgd. Some of the leakage starts with the homeowners, some of it is in the streets, and some of it is in our interceptor pipes.

"About two years ago, we completed a pretty comprehensive interceptor master plan that identified areas where we have too much flow. The pipes may need repair or replacement, and some may need bigger capacity.

"We have no shortage of things to be working on." **tpo**



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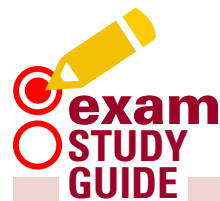
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## WASTEWATER

By Rick Lallish

**What type of settled sludge digests the most efficiently in an anaerobic digester?**

- A. Grit and manually removed screenings
- B. Primary clarifier settled sludge
- C. Scum and mechanical screenings
- D. Secondary clarifier settled sludge

**ANSWER:** B. Anaerobic digesters are more efficient with predominately sludge removed from a primary clarifier. They may be supplemented with secondary clarifier sludge. Primary sludge has a much higher organic composition and is better able to combine with acid-forming bacteria to form organic acids, one of the two types of bacteria to achieve anaerobic digestion (the other being methane-forming bacteria). Aerobic digesters use almost exclusively secondary clarifier sludge. More information can be found in the Office of Water Programs, California State University, Sacramento textbook: *Operation of Wastewater Treatment Plants, Volume 1*.

## DRINKING WATER

By Drew Hoelscher

**At a surface water treatment plant, what point in the treatment process would NaOH be introduced for corrosion-control purposes?**

- A. At the beginning to prevent corrosion on treatment plant equipment
- B. Toward the end after all other treatment has been accomplished
- C. In the distribution system where water has aged
- D. At any point where the pH of the water is below 7

**ANSWER:** B. In regard to quality, water sources are not equal. The appropriate level of treatment and the chemical feed point are specific to each source. A surface water source containing particulate matter will most likely require conventional treatment followed by disinfection. The coagulation and disinfection processes are typically more successful at lower pH levels. That means applying chemicals to raise the pH for corrosion-control purposes is more beneficial after all other treatment processes are complete.

### ABOUT THE AUTHORS

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

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# Putting Biogas to Work

FOUR COLORADO COMMUNITIES REAP ECONOMIC AND SUSTAINABILITY BENEFITS  
BY CAPTURING DIGESTER METHANE AND PRODUCING COMPRESSED NATURAL GAS FOR VEHICLES

By Neil Kolwey

**F**our Colorado clean-water plants are implementing projects to recover and reuse biogas from anaerobic digestion. Most wastewater treatment facilities use some biogas (a mixture of mainly methane and carbon dioxide) to fuel boilers that heat the anaerobic digester, and most of the biogas is flared. Instead of flaring the excess gas, the Colorado facilities are recovering, treating and using the biogas as alternative transportation fuel — as fuel for the cities’ fleet vehicles or through pipeline sales to other organizations.

The facilities are owned by Grand Junction, Longmont, Littleton/Englewood (now called the South Platte Water Renewal Partners), and Boulder. All four projects include a system to remove gas impurities (mainly hydrogen sulfide, siloxanes, VOCs, carbon dioxide and water). Each also produces compressed natural gas, or CNG.

Grand Junction and Longmont will use the biogas for the cities’ own CNG vehicles. In Grand Junction’s case, the project includes building a new gas pipeline from the wastewater treatment facility to the city’s fueling station. Boulder and South Platte will inject the biogas into a pipeline to sell to other customers as a transportation fuel.

## GETTING CREDITS

A key to the winning economics for these projects is the sale of the credits for the fuel, called renewable identification numbers. For the RINs to be sold, the biogas must be used as a transportation fuel. The RINs are purchased by oil producers, which are required to produce a certain percentage of renewable fuel (or purchase RINs), under the federal Renewable Fuel Standard.

One RIN is a gallon of ethanol equivalent, or equivalent to 84,000 Btu

“Compared to the CHP system, the operation and maintenance of the biogas treatment and compressor system will be very simple.”

CHRIS DOUVILLE

(the heating value of that gallon). As of May, each RIN was worth about \$2, which works out to about \$26/MMBtu of biogas. However, the price of RINs may decline somewhat over the next five years as more treatment facilities and landfills take advantage of them.

Table 1 below summarizes the initial investment and the annual costs and revenues for the biogas recovery/reuse projects. The simple payback periods are four to nine years, a reasonable investment for a city or treatment facility. Grand Junction’s initial costs included \$1.3 million for a 5-mile gas pipeline extension, lengthening the project payback.

## BEING SUSTAINABLE

Aside from the favorable economics, the inspiration for the projects was sustainability: reduced CO<sub>2</sub> and methane emissions from flaring, and the recovery and reuse of a valuable fuel resource. In addition, Grand Junction and Longmont reduced CO<sub>2</sub> emissions by burning biogas rather than diesel in their trucks.

A gallon equivalent of CNG (or biogas) generates 30% lower CO<sub>2</sub> emissions than a gallon of diesel. Table 2 (on following page) shows the emission reduction benefits and completion dates for the four projects.

Table 1 – BIOGAS RECOVERY COSTS AND REVENUES

|   | Initial Costs | Annual Maintenance Costs | Annual RIN Revenue | Annual Fuel Revenue (or reduced diesel costs) | Simple Payback (years) |
|---|---------------|--------------------------|--------------------|---|------------------------|
| <b>Boulder</b>                            | \$4,300,000   | \$251,750                | \$877,000          | \$198,750                                     | 5.2                    |
| <b>Grand Junction</b>                     | \$4,300,000   | \$90,180                 | \$314,200          | \$237,325                                     | 9.3                    |
| <b>Longmont</b>                           | \$3,600,000*  | \$95,000                 | \$331,000          | \$250,000                                     | 7.4                    |
| <b>South Platte (Littleton/Englewood)</b> | \$8,000,000   | \$624,150                | \$2,174,400        | \$492,750                                     | 3.9                    |

\*Longmont received a \$1 million grant from the Colorado Department of Local Affairs, reducing the net initial costs to the city.



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Table 2 – BIOGAS PROJECT EMISSION REDUCTIONS AND STARTUP DATES

|                       | Emission Reductions From Flaring (metric tons CO <sub>2</sub> e/yr)* | Emission Reductions From Fleet Vehicles (metric tons CO <sub>2</sub> /yr) | Biogas Recovery Startup Date |
|-----------------------|--|---|------------------------------|
| <b>Boulder</b>        | 2,955  | 0   | April 2020                   |
| <b>Grand Junction</b> | 1,059  | 276   | April 2015                   |
| <b>Longmont</b>       | 1,115  | 291   | Dec. 2019                    |
| <b>South Platte</b>   | 7,327  | 0   | Aug. 2019                    |

\* Emissions from flaring include both CO<sub>2</sub> and methane; methane accounts for about 36% of the total CO<sub>2</sub>-equivalent emissions.

## ON SITE OR SALE?

A key choice for a biogas recovery project is whether the city should use gas in its own vehicles or sell it. In the latter case, to obtain the RIN revenue, the city may need to hire a broker to sell the gas for use as a vehicle fuel, and to sell the RINs to one or more obligated oil companies.

Use of the biogas on site offers two advantages. First, the gas is worth more in annual revenues if replacing diesel at \$2.50 to \$3 per gallon than if sold as natural gas at \$5.50/MMBtu (or about 75 cents/diesel gallon equivalent). Second, if the biogas is used on site, the city also reduces its fleet CO<sub>2</sub> emissions.

On the other hand, using the fuel on site requires some coordination with the city's fueling operations. Longmont navigated that challenge by locating its CNG vehicle fueling station at the wastewater treatment plant site.

John Gage, project manager for Longmont's biogas project, observes, "We

“We solved the logistical problem of where to locate the fueling station and avoided having to build a gas pipeline extension.”

JOHN GAGE

solved the logistical problem of where to locate the fueling station and avoided having to build a gas pipeline extension.” Grand Junction pipes the biogas to its vehicle fueling station, about 5 miles from the treatment plant.

## COMPARING TO CHP

Using the biogas in a combined heat and power, or CHP, system is an option some of the four cities considered. Boulder evaluated replacing the CHP system at its Water Resource Recovery Facility, which was at the end of its useful life, and compared that option with biogas recovery and sale. The sale option had lower initial costs and a shorter payback. *(continued)*



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The City of Grand Junction, Colorado, uses the biogas from the wastewater treatment facility to fuel its fleet of compressed-natural-gas vehicles.

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It is also much simpler to maintain and operate the biogas treatment and compressor system than a CHP system. “Compared to the CHP system, the operation and maintenance of the biogas treatment and compressor system will be very simple,” notes Chris Douville, wastewater treatment manager in Boulder. “That will allow our team to focus on our core mission of returning high-quality final effluent to Boulder Creek.”

Biogas recovery may seem like an unnecessary added expense to a wastewater treatment facility. As such, gaining approval from the facility’s managers and the city council may present a challenge. The approval process for some of the four Colorado biogas projects took more than a year, but now all are on schedule to begin operating by the end of 2019.

For cities with sustainability and climate goals, projects of this kind make sense. Once the initial investment is paid off, the facility continues to earn substantial revenues from the sales of RINs and fuel, with low maintenance costs.

Wastewater treatment facilities that implement biogas recovery and reuse projects sooner rather than later will take advantage of a favorable RIN market, reducing financial risks and making the projects even more compelling.

#### ABOUT THE AUTHOR

Neil Kolwey ([nkolwey@swenergy.org](mailto:nkolwey@swenergy.org)) is industrial program director at the Southwest Energy Efficiency Project (SWEEP). **tpo**

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# Leaping the Hurdles

CHALLENGES DON'T BOTHER HATFIELD AWARD WINNER STEVE HOAMBRECKER. HE AND HIS TEAM CONSISTENTLY AND DILIGENTLY BREAK DOWN AND SOLVE PROBLEMS.

STORY: **Jim Force**

PHOTOGRAPHY: **Mark Hirsch**

**P**ride. Patience. Persistence. Professionalism. All describe Steve Hoambrecker, waste management services director for Waterloo, Iowa.

He's proud of his 40 years in the clean-water profession and doubly proud of his family: his wife of over 43 years (DeAnn), three children and five grandchildren. He's also a patient and persistent problem-solver for the organizations and communities he has served since college.

Hoambrecker treats each project like a hurdler negotiating barriers on the way to the finish line. Sometimes he'll use the track-and-field analogy to illustrate a point to employees, city councils or the general public.

"I put up a picture of hurdles," he says. "And I show that we've overcome some, but there are more hurdles ahead in order to finish the race." His challenges at Waterloo have required such an approach. They include a consent decree to reduce sanitary sewer overflows, a waste stream with significant industrial content, a need for nutrient reduction in effluent, and winter issues with filamentous growth.

Still, Hoambrecker, winner of the 2018 William D. Hatfield Award from the Iowa Water Environment Association, continues working toward success and is excited about the potential for biogas production and regionalization at his plant.

Steve Hoambrecker, director of waste management services in Waterloo, Iowa.

“It's important to communicate with employees as much as possible and have them be part of the solution — to enable them to see what needs to be done.”

STEVE HOAMBRECKER



Hoambrecker is excited about the potential for biogas production at his plant.

“Steve is a lifelong learner,” says colleague Scott Wienands, president of Nutri-Ject Systems, who’s known and worked with Hoambrecker for 30 years. “He’s inquisitive and never resistant to change. And he’s good at swaying people’s minds about new technology. The guy’s a thinker.”

### ALL MIDWESTERN

Hoambrecker studied at the University of Iowa in Iowa City, earning a bachelor’s degree in civil engineering in 1974 and a master’s degree in environmental engineering in 1986. He began his career as a student operator at the university’s lime softening water plant and as a substitute lab analyst at the city’s wastewater plant.

Out of college, he was an environmental engineer inspecting water and wastewater plants for the Iowa Department of Natural Resources. His municipal career started in Sioux City, where he supervised the solid waste department and water and wastewater treatment operations. Water treatment was city-operated, while the wastewater plant was contracted to what is now Veolia Water Technologies.

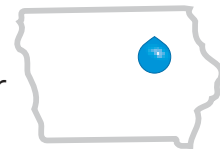
He then entered the private sector as a business development director with Stanley Consultants of Muscatine and as a product engineer with Griffin Pipe Products in Council Bluffs. In a private-public partnership with Veolia Water Technologies in Junction City, Kansas, he oversaw the Public Works Department, water treatment plant and two wastewater treatment facilities. He moved back to Iowa as Public Works director in Burlington, and in June 2016 he joined the team at Waterloo.

### OVERCOMING HURDLES

Along the way, Hoambrecker has encountered and cleared a number of barriers. A good example was the yard waste issue he faced in Sioux City:

## Steve Hoambrecker

Waterloo, Iowa



**POSITION:**  
Waste management services  
director

**EXPERIENCE:**  
40 years in the industry

**DUTIES:**  
Oversee wastewater treatment  
plant and collections system

**EDUCATION:**  
Bachelor’s degree in civil engineer-  
ing, master’s in environmental  
engineering, University of Iowa

**CERTIFICATION:**  
Professional Engineer; Grade IV

**water treatment, water distribution,  
wastewater treatment and sewer  
collection**

**AWARDS:**  
2018 William D. Hatfield Award,  
Iowa Water Environment  
Association

**GOALS:**  
Continue to improve treatment  
and collections systems; realize  
potential for natural gas production  
and regionalization of wastewater  
treatment

“They were collecting garbage curbside twice a week, but curbside collection of yard waste was a new concept they weren’t ready for.” Rather than give up, he helped form a citizens’ advisory council to provide third-party input, and when the time was right, the city implemented the new practice.

Even bigger challenges loomed at Waterloo. His first task was to make sure the city met all requirements of a consent decree with the U.S. EPA and the DNR on sanitary sewer overflows. “That September, we saw the second-highest river levels in the city’s history,” he says. “That indoctrinated me about the specifics of our storm and sanitary sewer system, and minimizing SSOs and sewer backups during high groundwater and rising river levels.”

The next winter, the treatment plant experienced very poor settling and related effluent violations. The plant, an activated sludge facility with UV disinfection (TrojanUV) and thermophilic-mesophilic anaerobic digestion of biosolids, accepts significant industrial flow from a hog processing operation and a tannery, as well as other industrial dischargers.

## SEPARATE PROCESSES

The plant has two biological treatment trains: one for domestic wastewater (12.7 mgd design) and the other for industrial (5.3 mgd design). “However, for economical and operational purposes, the influents are now combined and treated in the domestic aeration basin,” Hoambrecker says. “With that mode of operation, we are pushing the design limits of the biological system.”

The plant has been consistently in compliance during summer, but there have been challenges with filamentous growth (*Microthrix*) in winter. The DNR had issues with the arrangement, especially pushing the capacity of the in-use biological unit while having effluent violations in the winter.



Steve Hoambrecker (right), shown with operator Tim Troyer, solves problems with good communication and consensus building.

But parts of the out-of-service train were not 100% operational, and the annual chemical cost to provide the alkalinity needed to deal with the industrial stream was estimated at \$600,000. At the same time, the plant’s discharge monitoring permit was changed to BOD from CBOD.

During colder months, sludge age and nitrifiers were reduced, causing increased levels of ammonia, leading to increased effluent BOD. “Not only did we have BOD violations, we had TSS violations because of poor settling due to the *Microthrix*,” Hoambrecker says. “The real question was how to prepare ourselves to be in a more predictive situation for the next winter and keep the plant in compliance with effluent limitations.”

## THE RIGHT DIRECTION

Waterloo purchased a phase contrast microscope to better classify and chart microorganisms and provided on-site training for lab personnel. “Our NPDES permit also required us to perform a nutrient reduction assessment,” Hoambrecker says. “We hired Strand Associates to perform the evaluation in conjunction with an overall facility plan. A minor portion of that contract also involved treatment assistance to develop an operational spreadsheet combining various operational monitoring components, which could be used as a predictive tool.”

In one move, aeration basin settling rates were plotted versus the number of clarifiers in use and the associated flow. “That helped us predict an acceptable flow through the plant and avoid excessive solids loading to the final clarifiers,” Hoambrecker says. “It also enabled us to divert excessive flows to the equalization basin. From the spreadsheet, we can also track other parameters and predict and regulate waste activated sludge and the sludge age.”

To prepare for the next winter’s operational mode, the Waterloo team prepared the second biological unit to operate if necessary. Of course Mother Nature entered the picture with a heavy rainfall on frozen ground, causing high flows that hydraulically flushed solids and lowered the influent temperature. The *Microthrix* flourished again. Ice in the piping system of the industrial biological unit made it impossible to operate it.

“We were able to maintain compliance, in part by using the operational tools and microscope, but mostly because overall flows were 3 to 4 mgd lower than the past winter,” Hoambrecker says.

Further work with Strand Associates reviewed the possibility of operating the aeration basin in a sequencing batch reactor mode to reduce solids load-

ings to the final clarifier. That review also looked at the use of polyaluminum chloride during winter instead of putting the industrial side of the plant in operation. The city secured DNR approval of the chemical (Brenfloc from Brenntag North America), and it has been beneficial.

“Steve is a lifelong learner. He’s inquisitive and never resistant to change. And he’s good at s waying people’s minds about new technology.”

SCOTT WIENANDS

## COMMUNICATION AND BUY-IN

No leader can solve problems without good communication and the ability to build consensus. Hoambrecker works hard to develop a team approach to confronting chal-

lenges. Key team members include Brian Bowman, assistant director and operations supervisor; Brad Manahl, operations foreman; Jesse Gaherty, maintenance foreman; and Al Bainbridge, senior operator.

“It’s important to communicate with employees as much as possible and have them be part of the solution — to enable them to see what needs to be done,” Hoambrecker says. “Your team members need to buy in and support what you’re doing. If that doesn’t happen, you need to back off and find another way around the issue at hand.”

At various points in his career, he has held brief meetings with his team every morning. At other times, it’s been weekly briefings. “Figure out what works and what doesn’t,” he says. “Think about how you can make the group more cohesive and work together better. Everyone needs to know what’s going on and be able to see the future.”

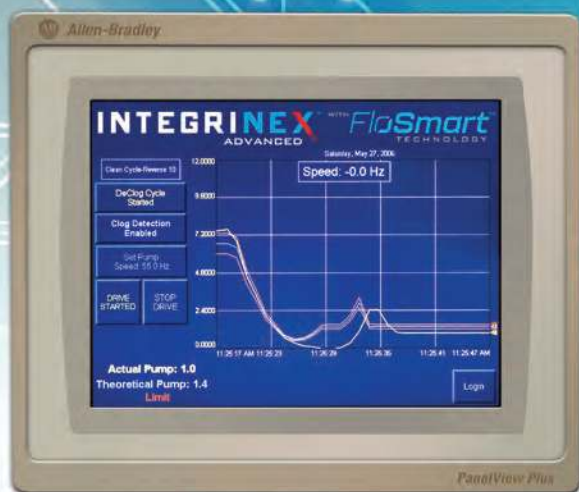
He also works with his city council; he likes to use graphics to illustrate problems and solutions instead of just trying to explain them verbally:

(continued)

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Hoambrecker takes pride in his induction into the Select Society of Sanitary Sludge Shovelers and the William D. Hatfield Award.

“Just a picture of what you’re talking about can help.”

### THE ROAD AHEAD

Communication skills will be important at Waterloo in the days ahead, as the wastewater utility faces new challenges and opportunities. “While ensuring plant compliance, we have two very exciting potential improvements,” Hoambrecker says. “One possibility involves converting biogas into pipeline-quality natural gas.

“Both our industrial anaerobic lagoon and the wastewater plant anaerobic digesters are producing biogas that could be a very rewarding venture for the city. Similar cities across the United States use either selective membranes or pressure-swing absorption units to remove hydrogen sulfide, carbon dioxide and other impurities to achieve pipeline quality.

“It’s a high-risk, high-reward potential project,” Hoambrecker says. “But we need to get people on board and move forward if we can. It’s a story yet to be written, as we’re wasting an energy source.”

A second challenge is converting Waterloo’s plant into a regional treatment facility: “A study has been completed, and the project is feasible. We have the necessary land, and it’s the right thing to do. All the communities need to make system improvements.” The need now, he says, is to present the concept so that it makes sense to everybody.

### PROUD PROFESSIONAL

Hoambrecker has ably served the profession and has received his share of honors in his four decades in the clean-water profession. Active in both the Water Environment Federation and American Water Works Association, he has been involved with operator certification, awards and conferences, and nominations. He’s a graduate of the Sioux City Leadership and the American Public Works Association’s Public Works Leadership Fellow program.

At Sioux City, his plant won the EPA Region 7 Beneficial Use of Biosolids Award. He received an award from the Iowa Section of the American Society of Civil Engineers for tree planting he did at a landfill to absorb pollutants from leachate. His yard waste and composting project at Sioux City received a Special Collection Excellence Award from the Solid Waste Association of North America.

He’s most proud of his induction into the Select Society of Sanitary Sludge Shovelers and the Hatfield Award. “My wife knew I was going to receive the Hatfield Award, but I didn’t,” he says. “She made arrangements for my three kids to be at the awards ceremony, along with two of my grandkids.

“It was a very special moment. There is no greater honor than being recognized by your peers.” **tpo**



### EARLY START

Steve Hoambrecker would advise any college student to decide on a course of study and then do everything at the university level to gain hands-on experience. That’s what he did at the University of Iowa.

“For me, success began by pursuing a career with an expected solid future — engineering,” he says. “At the university, engineering students had an option to obtain a job working at the university’s lime softening water treatment plant. I was fortunate to be one of those selected, and that further compelled me to enter the master’s program in environmental engineering.

“At that time, Iowa City also hired students to perform laboratory tests. With my background, I became a part-time lab technician as well.” That, along with his engineering studies, helped him obtain his Professional Engineer credential and Iowa and Kansas Grade IV licenses in water and wastewater.

His studies also had something to do with his marriage. His master’s thesis was about anaerobic digestion of hog manure, which is plentiful in Iowa. “I needed to go down to the farm and collect manure and then concentrate it to feed the digester,” he says. He and his wife-to-be were dating at the time, and she would go along to help with the stinky task: “I guess she really loved me if she was willing to do that.”

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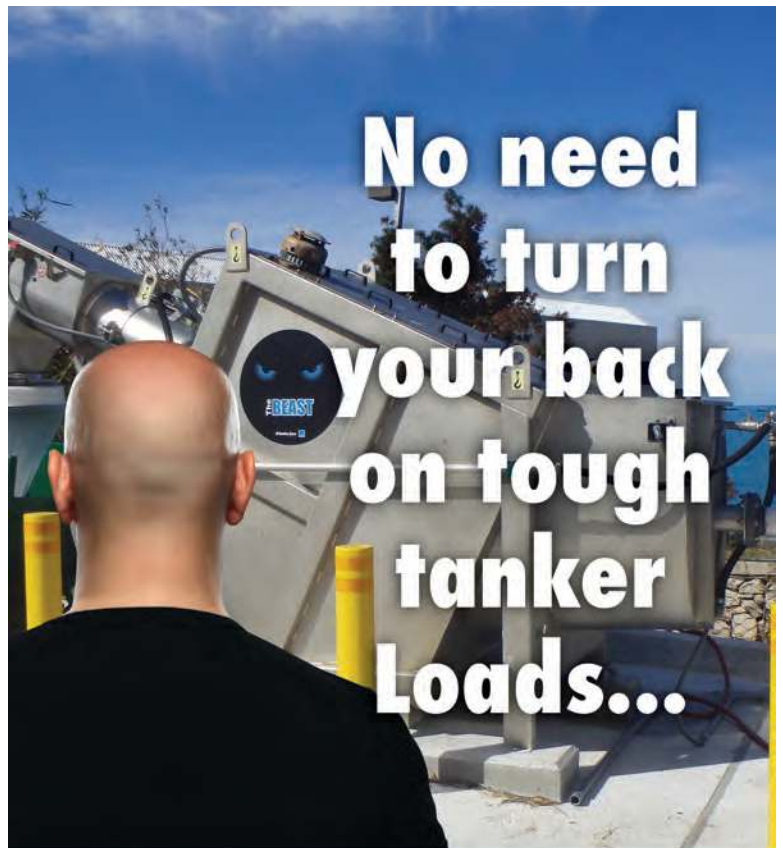


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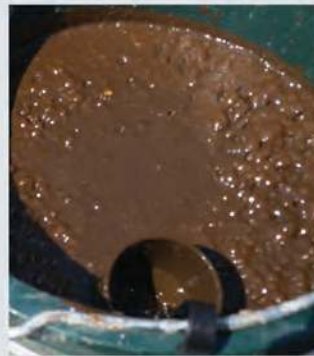


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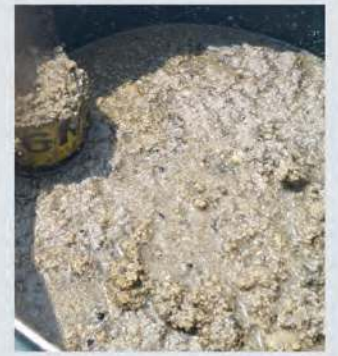
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# Online Outreach

A WEBSITE CREATED BY METROPOLITAN COUNCIL ENVIRONMENTAL SERVICES DELIVERS PUBLIC INFORMATION THAT HAS HELPED ENGAGE RESIDENTS AND REDUCE I&I

By Sandra Buettner

Metropolitan Council Environmental Services, the regional wastewater utility in Minnesota's Twin Cities metropolitan area, uses a website ([www.metrocouncil.org/iandi](http://www.metrocouncil.org/iandi)) as part of its public outreach to educate residents on the cause and effect of inflow and infiltration and the property owner's role in mitigation.

I&I has become a critical issue as sewer pipes age and the population grows. Although MCES has had an I&I reduction program in place since 2006, its communities asked for help in educating property owners on the issue. The website was born out of a task force of community leaders that included representatives from public works, local wastewater utilities, finance and city management in the region.

The task force requested financial and technical help from MCES, which serves 109 communities in the seven-county Minneapolis-St. Paul area. The region includes 2.6 million residents and more than 800 industrial customers connected to the regional sanitary sewers. Average daily wastewater flow is about 250 mgd.

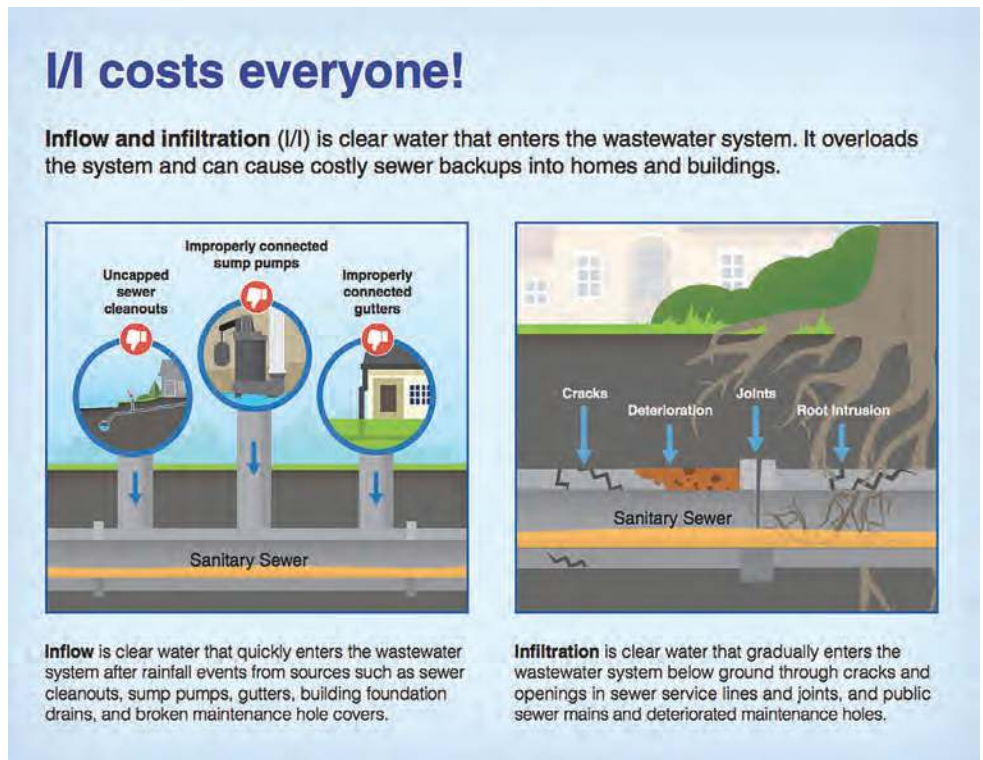
## WEBSITE CREATED

The task force told MCES that residents lacked knowledge about I&I and the responsibility property owners have for their sewer laterals. Acting on the request for help, MCES created the website and rolled it out in July 2018.

“It was a big goal of ours to make sure the information was accessible and user-friendly to everyone, no matter what level of knowledge they had on I&I.”

MARCUS BUSH

The site encourages residents to hire a contractor to check their sewer laterals for leaks and to make sure sump pumps, downspouts and foundation drains are not connected to the sanitary sewer system. It includes three short videos to show how these measures can help alleviate I&I, reduce costs, protect water quality and help with public health.



A screenshot of a public service announcement on the MCES website shows common sources of I&I. Inflow is shown from sump pumps, rain leaders and service laterals. Infiltration is shown from cracks, deterioration, joints and roots in a pipe belowground.

The site also contains graphics, printable handouts, photos, newsletter articles and case studies on I&I that cities can share with property owners. The material is generic so that each city can add its own logo when sending the information out to its citizens.

“It was a big goal of ours to make sure it was accessible and user-friendly to everyone, no matter what level of knowledge they had on I&I,” says Marcus Bush, principal engineer for the MCES Engineering Programs group. “We created different levels of content on the site from something as basic as ‘What is I&I, and what can I do to help?’ to deeper detail about the issue to empower residents to take action.”

## MORE OUTREACH

MCES uses forms of outreach beyond the website to educate the com-



munities on I&I, according to Anna Bessel, assistant manager for Engineering Programs. These include:

- One-page flyers with graphics that break down I&I in simple terms for communities to use and share with residents.
- Workshops in which city staff members learn more about how to educate their property owners about I&I.
- Outreach to schools to educate students about I&I and give them take-home materials for their parents.
- Exhibits at trade shows and career fairs.
- Social media and targeted advertising to reach a broader audience with I&I information.

### EARLY SUCCESS

A case study from the website tells how the city of West St. Paul created a grant program for property owners to help them reduce sewer lateral repair costs. The city also provided inspections at no cost to property owners. The community response was very positive: In one area of 900 homes, about 800 owners received inspections. Forty percent found they needed repairs and took care of them. This has already greatly reduced clear water entering the system.



A video on the website shows a plumber inserting a liner into an old steel pipe while a collections system worker looks on and asks questions about the installation.



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An analysis in 2018 showed that peak I&I was reduced by one-third in the largest metershed in the community. The balanced approach to I&I mitigation with a focus on sewer laterals yielded a higher return-on-investment for the community and its residents.

Since its launch, the website has been accessed on average more than 200 times per month. “It was always our intent to make the website usable for other localities, as this is not only an issue in the Twin Cities area, but across many communities,” Bush says. “There is a lot of great content out there on I&I. It’s just a matter of sharing it between cities.”

While the website has been live for only a year, it is already being shared and used by other cities across the U.S. and from as far away as New Zealand. **tpo**

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A screenshot of the [www.metrocouncil.org/iandi](http://www.metrocouncil.org/iandi) webpage with links to videos on home sewer repair, home sewer inspection, and why they matter.

### 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 ideas to [editor@tpomag.com](mailto:editor@tpomag.com) or call 877-953-3301.**

# New Technology Slated for WEFTEC 2019

By Craig Mandli

**W**EFTEC, 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, from Sept. 21 to 25 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.

## AdEdge Water Technologies ADIN CO2

The **ADIN CO2** injection system from **AdEdge Water Technologies** is an alternative to other methods of alkalinity control and pH reduction. It's ideal for the reduction of alkalinity prior to primary treatment components for optimizing contaminant removal. The system uses carbon dioxide gas, which when released in water forms carbonic acid — a weak acid that immediately reacts with alkalis to reduce pH. With the use of the included monitoring equipment and injector, the control panel can be used in several different configurations to reduce pH. The automatic systems use a pH probe downstream of the system to regulate the amount of carbon dioxide being injected into the water.

**866-823-3343; www.adedgetech.com; Booth 1458**



## ADS Environmental Services Blockage PREDICT

The **Blockage PREDICT** app, part of the cloud-based PRISM software from **ADS Environmental Services**, enables operators to see a developing sewer blockage weeks before it becomes an issue. The ECHO level monitor provides continuous remote-site data. Communicating through the high reliability LTE CAT-M1 network to PRISM, it analyzes and recommends action. Operators benefit using actual, real time site conditions to drive, schedule and reduce cleaning up to 80% while gaining 24/7 safeguards against SSOs. ECHO is a second-generation level monitor packed with advancements.

**800-633-7246; www.adsenv.com; Booth 2025**



## Aerzen Rental

**Aerzen Rental** specializes in temporary oil-free **blower and compressor solutions** under 50 psig, providing a more efficient solution than

renting plant air compressors. The company specializes in emergency response and long-term capital avoidance. It provides packages engineered for aggressive rental environments with onboard variable-frequency drives, remote monitoring, and outdoor builds with sound-attenuating enclosures as standard. Rental units are available for immediate deployment in the event of a production failure or shortfall to operational leasing and contracting.

**844-400-2379; www.aerzenrentalusa.com; Booth 862**



## AllMax Software

**AllMax Software** combines **software and service offerings** to provide operations and maintenance solutions that

make data management and reporting tasks easier and less time-consuming. Operator10 and Antero have been developed according to client requests and the requirements of the industry. A comprehensive offering of technical services is offered in support of the software products. Software setup, data conversions and training are available, as well as custom report development. Annual technical support contracts offer users the ability to get help with troubleshooting and usage questions. Technical specialists are trained in water and wastewater concepts and to focus on client satisfaction.

**800-670-1867; www.allmaxsoftware.com; Booth 841**



## Analytical Technology Entech EchoSmart

**Entech EchoSmart** sludge blanket monitors from **Analytical Technology** take the guesswork out of

blanket measurements in clarifiers, thickeners and anywhere an underwater interface measurement is needed. Smart sensor technology allows for wire-



less networks with up to 16 sensors, reducing the per-tank price. In addition, the ability to remotely monitor the system via a cellular modem ensures support for even the most challenging processes. **800-959-0299; www.analyticaltechnology.com; Booth 3848**

## Applied Felts hybrid liners

**Applied Felts hybrid liners** combine fiberglass reinforcement with traditional felt liner material to provide strong, robust liners. These hybrid liners perform and install in the same manner as nonreinforced liners with the benefit of reduced thickness, delivering significant resin savings and ensuring a close fit and faster install. AquaCure RP, PS and PW fiberglass-reinforced liners provide physical and mechanical properties that meet or exceed ASTM and NSF 61 testing standards. Additionally, traditional felt liners come in a variety of coating options for polyurethane, polypropylene or polyethylene. **276-656-1904; www.appliedfelts.com; Booth 2902**



## Atlas Copco ZB 5-6 VSD+

**ZB 5-6 VSD+** blowers from **Atlas Copco** help drastically reduce the electricity bill by implementing two important principles — maintaining the air-intake temperature to a minimum and ensuring minimal resistance to the air passing through each component. The big advantage of using magnetic bearing turbo technology is that no air is used from the system to operate the machine, making the machine independent from downstream conditions. The magnetic bearing design is a very strong, efficient technology that ensures safe, continuous operation, no matter the conditions. **866-546-3588; www.atlascopco.com; Booth 2816**



### BDP Industries rotary drum thickener

The **rotary drum thickener** from **BDP Industries**



has a long track record as a preferred way to thicken at water and wastewater treatment facilities. From the first drum in 1978, the company has been improving and refining the construction and performance of the product line. Internally baffled thickening zones lead to higher solids capture and higher throughput capability, all with reduced polymer usage. A full stainless steel construction with all bearings located outside of the enclosure makes operations and maintenance activities simple and easy.

**518-796-1440; www.bdpindustries.com; Booth 4434**

### Blue-White Industries ProSeries-M MS-6 chemical feed flowmeter

The **ProSeries-M MS-6** chemical feed flowmeter from **Blue-White Industries** accurately measures output from a chemical metering and dosing pump. The design provides a wide flow range from 0.158 to 158.5 gph and has a low-pressure drop of less than 1 psi. The sensor can handle harsh and corrosive chemicals with wetted components constructed out of polyvinylidene difluoride and polyether ether ketone. In-line pipe fittings allow quick and easy installation.



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

### Boerger BLUEline Rotary Lobe Pump

**Boerger BLUEline Rotary Lobe Pumps**

are a self-priming, valveless, positive displacement pumps used for the conveyance of viscous and abrasive materials. They are resistant to wear and provide pulsation-free operation. Operation is fully reversible, they have dry run capability and flow rates up to an impressive 7,500 gpm. They are constructed with a maintenance-in-place design, allowing for all wetted parts to be easily replaced through the front cover without the removal of pipe or drive systems. The pump is suitable for difficult applications including biosolids, grease, sewage, scum, lime slurry, alum sludge, permeate and polymers.



**612-435-7300; www.boerger.com; Booth 1014**

### Bright Technologies, Division of Sebright Products Inc., belt filter press

**Bright Technologies, Division of Sebright Products Inc.**, offers **belt filter presses** that provide high performance in a compact, high-value package. Complete belt filter press dewatering systems are skid or trailer mounted. The company designs and manufactures the skid equipment package for high throughput, low maintenance, superior cake solids and ease of operation.



**800-253-0532; www.brightbeltpress.com; Booth 959**

### CCI Pipeline Systems WrapidSeal Manhole Encapsulation System

The **WrapidSeal Manhole Encapsulation System** from **CCI Pipeline Systems** consists of an engineered primer and a wraparound heat-shrinkable sleeve designed specifically to seal joints and prevent groundwater from entering a collections system. It is supplied in bulk rolls and consists of a cross-linked polyolefin backing, coated with an aggressive heat-activated adhesive. It can be utilized on both new construction and for rehabilitation of existing manholes. The chimney section of the manhole is where it performs particularly well, due to its ability to conform, seal, accommodate movement and provide structural integrity.



**800-867-2772; www.ccipipe.com; Booth 512**

### Centrisys/CNP CalPrex

**CalPrex** from **Centrisys/CNP** has a high rate of total phosphorus recovery from municipal biosolids. It alleviates more phosphorus-related issues and creates a greater quantity of fertilizer. In 2018, a pilot project demonstrated how efficiently it removed and recovered predigestion phosphorus at Nine Springs Treatment Plant in Madison, Wisconsin. The Water Research Foundation oversaw the project and had additional participation from 10 organizations that reviewed and confirmed the project results. The pilot resulted in an 89% soluble phosphorus reduction. The recovered phosphorus, as brushite, was harvested and dried on site for a fertilizer study funded by the U.S. Dept. of Agriculture.



**262-654-6006; centrisys-cnp.com; Booths 7708, 7711**

### Crete Specialty Products LSS Internal Manhole Chimney Seal

**LSS Internal Manhole Chimney Seal** from **Crete Specialty Products** is a mechanical seal installed on the frame and grade ring sections of new or existing sanitary sewer manholes. During wet weather, clear-water inflow enters manholes through deteriorated and broken frame chimney joints in manholes. These seals eliminate and prevent manhole inflow, which has been proven to be a significant source of leakage in the collections system. It has a 50-year design life and is available in four widths, allowing complete chimney coverage of up to 24 vertical inches with a single seal.



**800-345-3764; www.cretexseals.com; Booth 521**

### CUES QZIII

The **QZIII** lightweight, portable, high-definition wireless video inspection pole camera from **CUES** can be operated by one person using any tablet. It is designed to provide safe viewing in industrial or environmental areas with no-man entry. Perform swift inspections and surveys of pipelines, wet wells, manholes, sewer treatment plants, steam generators, tanks, vessels and other areas that are difficult to reach. It can also be used to locate lateral services or to identify blockages at manholes, access ports or other entry points without entering the line or structure.



**800-327-7791; www.cuesinc.com; Booth 612**

### Duke's Root Control

**Duke's Root Control** has **sewer root control** down to a science. Tree root infiltration is preventable, but without the proper maintenance steps, it will destroy a collections system. Duke's prevents sanitary sewer overflows before they cause major havoc to systems and communities. Using Razorooter II — a diquat-based herbicide registered by the EPA for controlling roots in sewer systems — Duke's guarantees to kill all the roots in every sewer treated and to eliminate mainline stoppages caused by live tree roots.



**800-447-6687; www.dukes.com; Booth 2605**

(continued)

## Eagle Microsystems VF-100 Dry Chemical Feeder

The **Eagle Microsystems VF-100 Dry Chemical Feeder** is constructed of stainless steel and uses a rugged direct drive to ensure optimum performance and durability in harsh chemical feed environments. It can be optimized for any dry feed application with options like dust collectors, wetting cones, solution tanks, flow-pacing control, extension hoppers and a wide range of feed rates. With no external gears, pulleys, chains, belts or lubrications required, the unit is user-friendly and low maintenance.

**610-323-2250; www.eaglemicrosystems.com; Booth 1835**



## Enviro-Care SAVI GVS Multi-Rake Perforated Plate Screen

The **SAVI GVS Multi-Rake Perforated Plate Screen** from **Enviro-Care** is a unique multirake design where the bars have been replaced by a stainless steel perforated plate to achieve higher debris capture. Multiple wipers remove the debris from the perforated plate and transport the screened material to discharge. Independent testing has proven that perforated plate screens have higher capture rates, which can be as high as 85% depending on design. It can be mounted in traditional channels at 75 degrees, or at 90 degrees for deep, narrow channels and wet wells. The low-maintenance design makes it a suitable choice for remote locations.

**815-636-8306; www.enviro-care.com; Booth 1417**



## Environetics Defender Cover System

The **Defender Cover System** from **Environetics** stops algae growth. Clear span aluminum frames are covered with a reinforced geomembrane that blocks 100% of UV light so algae can't grow. The filter tanks at the Eldorado Hills Wastewater Treatment Plant grew an enormous amount of algae, requiring constant cleaning and backwashing. Operations staff spent 6 hours a day, four days a week, cleaning algae from the filters. After installing the cover system, the algae stopped growing and the money saved paid for the cover system in less than two years.

**815-838-8331; www.environeticsinc.com; Booth 1838**



## Envirosight Jetscan HD

The first-generation **Jetscan HD** video nozzle from **Envirosight** transformed sewer cleaning work, providing operators a simple way to assess pipe condition and document cleaning success. Now the nozzle is completely wireless and capable of streaming HD video footage straight to a tablet upon removal from a manhole via Wi-Fi or a USB connection. This second generation provides new features for greater ease-of-use and efficiency, including tool-free sleds, wireless charging and an app-based tablet interface, making it easy to view and annotate footage and then upload it to WinCan Web. It is affordable enough to put on every cleaning truck, yet captures valuable HD video with a self-leveling, illuminated camera.

**866-936-8476; www.envirosight.com; Booth 2352**



## Flottweg Separation Technology Xelletor Series

The key to the performance of the **Flottweg Separation Technology Xelletor Series** decanter centrifuge is inside, in the heart of the machine, where the rotor and scroll have a unique design. Consumption of polymer flocculant is significantly reduced because of an entirely new intake configuration. The results of numerous tests indicate that it can increase throughput by up to 15%, reduce the volume of biosolids by as much as 10% and save up to 20% in energy and polymer consumption.

**859-448-2300; www.flottweg.com; Booth 3622**



## Force Flow Drumm-Scale

The **Drumm-Scale** from **Force Flow** is a simple and reliable way to accurately monitor the amount of polymer fed from a day tank, and it enables accurate compliance with government-required documentation of chemical use. It helps maximize solids yield with minimal polymer use. The low-profile Tuf-Coat steel platform permits easy on- and off-loading of tanks without the need to pit-mount the scale. The unit is available with any of the company's indicators, including the economical SOLO G2, the advanced multichannel Wizard 4000 and the rugged Century hydraulic dial.

**800-893-6723; www.forceflowscales.com; Booth 2621**



## Franklin Miller DIMMINUTOR

The **DIMMINUTOR** from **Franklin Miller** provides automatic screening and grinding of liquid-borne solids with a straight-through open channel design. This unit reduces plastics, wood, vegetable matter, disposables and other oversized items to a fine particulate. It is designed for reliable operation and easy maintenance. With its cantilevered design, it needs no seals or bearings near the gritty channel floor. The unit's screen is stationary so it never wears against bottom grit. Each cutter is interchangeable and cutters can be removed or adjusted independently. The unit's seals and bearings are immersed in an oil bath for long life and low maintenance.

**800-932-0599; www.franklinmiller.com; Booth 2602**



## Gardner Denver CycloBlower VHX

The **CycloBlower VHX** from **Gardner Denver** offers pressures up to 20 psi and flows up to 750 cfm. Its design integrates a variable-helix pitch to its screw design, increasing efficiency by generating faster internal compression. This allows the achievement of energy savings up to 35% when compared to comparable-sized blower technologies.

**866-428-4890; www.gardnerdenver.com; Booth 2048**



## Gorman-Rupp Integrinex Advanced

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

**419-755-1011; www.grpumps.com; Booth 1231**



## Hach Claros Water Intelligence System

The **Claros Water Intelligence System** from **Hach** helps plant operators deal with changing regulations, unpredictable influent levels and

instrument downtime. Without a clear picture of their water or data, operators face uncertainty about efficiency and compliance. Imagine the timesavings, cost reductions and peace of mind that a complete "water intelligence system" could provide. This system focuses on instrument, data and process management to help reduce uncertainty and increase operational confidence.



**800-227-4224; www.hach.com/claros; Booth 1408**

### Industrial & Environmental Concepts Clarifier Launder Cover

**Clarifier Launder Covers** from **Industrial & Environmental Concepts** are custom designed to work on most tank launders. They are designed to be economical and give operators access to the launder channel, and include a tensioning system that provides versatility to tank imperfections. The design is effective in keeping sunlight out and controlling algae. They also keep airborne debris such as leaves and dust from entering the channel. They can help reduce daily clarifier cleaning requirements.



**952-829-0731; www.ieccovers.com; Booth 5448**

### JDV Equipment Nozzle Mix System

The dual-zone **Nozzle Mix System** from **JDV Equipment** provides uniform mixing patterns that produce even distribution and a stable environment. It optimizes solids suspension and contact to promote efficiency in a wide range of applications. The system is designed with pumps installed outside the tanks and are typically chopper pumps or pumps incorporating in-line grinders. The high-velocity nozzles mounted inside the tank completely mix the tank contents. Applications include anaerobic digestion, biosolids storage, blending tanks, excess flow tanks, septage or leachate, anoxic zones, combined sewer overflow handling, aerobic digestion, secondary treatment, and biosolids holding ponds.



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

### Keller America Acculevel

The **Acculevel** from **Keller America** carries NSF 61 and 37 approvals for use in drinking-water applications. It provides 0.25% standard or

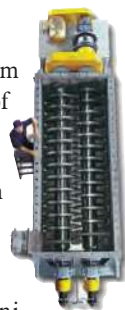
0.1% optional total error band accuracy, custom ranges up to 900 feet of water, custom cable lengths, dual outputs (one analog and one digital) and guaranteed lightning protection on 4-20mA models. It is manufactured in the U.S. with a typical lead time of three business days or less.



**877-253-5537; www.kelleramerica.com; Booth 8306**

### 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 result 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 2231**

### Lovibond Tintometer PTV Series process turbidimeters

The **PTV Series** from **Lovibond Tintometer** is optimized for monitoring turbidity of filter effluent in a regulatory environment. The instruments focus on simplifying an operators' workflow without reducing accuracy. The user interface eliminates the need for a traditional controller and delivers meaningful data directly to the operators. The bubble exclusion system delivers ultra-stable measurements without creating a receptacle for catching sediment. Without using desiccants, the optical design has eliminated the chance for condensation. With an optimal flow rate of 40 to 120 mL per minute, over 1 million gallons of water is saved over the life of the instrument.



**941-756-6410; www.lovibond.com; Booth 5212**

### MaxLiner USA felt liners

**MaxLiner USA's felt liners** are specifically developed for optimal results in a variety of

applications and pipe configurations. Max FLEX 4D provides ease of inversion and a close fit in 4- to 6-inch transitions (while maintaining a thickness of 3 mm) and a specifically designed stitched seam and taped seam is capable of negotiating bends up to 90 degrees with minimal wrinkling. It is a nonwoven needle-punched polyethylene felt liner with an impermeable polyurethane coating. Max CalTube - HF is an ultraflexible calibration tube joined by a high-frequency welded overlap seam that, once pressurized inside the liner, inverts and presses tight against the host pipe during installation and cure.



**877-426-5948; www.maxlinerusa.com; Booth 2902**

### Myron L Co. 900 Series Monitor/Controller

The **900 Series Monitor/Controller** from **Myron L Co.** 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 % 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 8327**

### Penn Valley Pump Double Disc Pumps

A noncaptive, free-disc design in **Penn Valley Pump's Double Disc Pumps** minimizes friction, reduces repairs and makes clogs almost nonexistent. The sealless, oilless and glandless pumps mean less wear for longer life. They combine the performance features of a positive displacement pump and the principle of induced flow to provide superior versatility in fluids handling. The pump uses a principle of operation where the discs perform the duties of both diaphragm and valve, providing a double-acting, nonclogging pumping action. The pumps handle viscous and abrasive materials, run dry without damage and can be maintained in place.



**215-343-8750; www.pennvalleypump.com; Booth 4631**

(continued)

## REXA Electraulic Actuators

**REXA Electraulic Actuators** are custom-designed to eliminate problems related to controlling valve and gate applications. They offer superior modulating control for prolonged periods of time without needing maintenance, reducing cost of ownership significantly. With no design limitations and customized solutions, they can help handle your most demanding applications in the worst environments. Free up your valuable time, effort and capital with a retrofit of those valve or gate applications that continuously require attention.



508-584-1199; [www.rexa.com](http://www.rexa.com); Booth 4137

## Robuschi USA Robox Screw blower package

The **Robuschi USA Robox Screw** blower package offers pressures up to 36 psi and flows up to 5,625 cfm. The efficient rotary screw blower offers energy savings of up to 30% when compared to previous blower technologies. The package offers the widest efficient turndown capability in flow to save energy. All enclosed packages come standard with the AirSmart G2 controller. This offers 24-hour monitoring and provides flexible data output via Ethernet or RS232 port.



866-428-4890; [www.gardnerdenver.com](http://www.gardnerdenver.com); Booth 2048

## Schwing Bioset Struvite and Phosphorus Recovery Technology

At plants utilizing anaerobic digestion, struvite commonly forms and creates issues with pipes clogging and equipment being damaged as a result of scaling. Tanks also accumulate struvite, which require periodic removal and additional expenses. **Schwing Bioset's nutrient-removal system** recovers orthophosphate and ammonia nitrogen from wastewater while offering benefits to the treatment plant. This controlled struvite formation significantly reduces phosphorus loads within the plant and also prevents unwanted scaling and accumulations while creating a valuable end product. The phosphorus forms struvite that can be marketed/sold for beneficial reuse, thus keeping excess phosphorus out of the local waterways.



715-247-3433; [www.schwingbioset.com](http://www.schwingbioset.com); Booth 2307

## SUEZ Water Technologies & Solutions LEAPmbr

The **LEAPmbr** membrane bioreactor from **SUEZ Water Technologies & Solutions** uses a ZeeWeed membrane while incorporating significant innovations to meet your wastewater treatment challenges. The ZeeWeed membrane is tested to boost productivity 15%, while the unit's flexible design reduces the membrane bioreactor footprint by 20%, saving on construction costs. It simplifies the design by reducing membrane aeration equipment and controls by 50% and helps reduce operating costs with a 30% energy savings.



[www.suezwatertechnologies.com](http://www.suezwatertechnologies.com); Booth 2302

## Sulzer Pumps Solutions HST turbocompressor

The **HST turbocompressor** from **Sulzer Pumps Solutions** has an advanced design with digitally controlled magnetic bearing technology and an efficient 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 an electronically controlled magnetic bearing technology, which levitates the integrated rotor/shaft/impeller single-piece assembly along the self-diagnostic features of the active magnetic bearing controller. The result is a compressor with no performance deterioration over time and no need for scheduled maintenance. They are widely used in wastewater treatment plants and in low-pressure industrial processes.



203-238-2700; [www.sulzer.com](http://www.sulzer.com); Booth 2012

## Superior Signal smoke generators

**Smoke generators** from **Superior Signal** provide the most cost-effective method to find sources of surface inflow causing wet-weather sanitary sewer overflows. Classic Smoke Candles, Smoke Fluid Systems and Smoke Blowers are engineered specifically for smoke testing. Smoke Candles generate the most visible smoke to detect more faults at a longer distance available in sizes to meet any need, from 30 to 500,000 cubic feet. Smoke Fluid Systems have an insulated heating chamber with



an injector to maximize dry smoke output producing quality, liquid-based smoke.

800-945-8378; [www.superiorsignal.com](http://www.superiorsignal.com); Booth 2631

## Vaughan Chopper Pumps

**Vaughan Chopper Pumps** deliver performance in the toughest applications. With flushable wipes clogging sewer systems across the country, the pumps easily handle difficult solids like disposable pads, wipes, duster cloths and diapers. The Conditioning Pump and self-priming Chopper Pump can help keep the water moving.



888-249-2467; [www.chopperpumps.com](http://www.chopperpumps.com); Booth 1017

## VEGA Americas VEGAPULS WL S 61

The **VEGAPULS WL S 61** from **VEGA Americas** is a suitable sensor for level measurement in water processing, in pump stations and overflow basins. Its flood-proof IP68 housing ensures a maintenance-free continuous operation. It includes integrated Bluetooth for wireless communication via smartphone, tablet or personal computer. Live demonstrations will showcase just how flexible the company's radar sensors are, including a weir demonstration, common in combined sewer overflows.



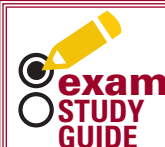
800-367-5383; [www.vega.com](http://www.vega.com); Booth 8543

## YSI, a Xylem brand, Alyza P04

The **Alyza P04** wet-chemistry analyzer for wastewater process monitoring and control from **YSI, a Xylem brand**, continuously measures orthophosphate, is available as a single or dual channel and features the MultiPort, a mixing valve that significantly reduces reagent consumption and maintenance requirements — lowering the overall cost of reliable data.



937-767-7241; [www.ysi.com](http://www.ysi.com); Booth 1248 tpo



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In this issue and at [tpomag.com](http://tpomag.com)

# Lovibond® Water Testing

Tintometer® Group

## Process Turbidity Measurement Simplified

### Smart Interface

- Intuitive Mobile App & Local Display
- Superior Data Management

### Low Maintenance

- Stable Light Source
- Easy to Clean
- Rapid Fluidics Connections

### Innovative Design

- Low Volume Flow Body
- Simple Installation
- Optimized for Grab Samples
- Integrated Flow Indication



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Odors gone.  
Corrosion gone.  
Naturally.

Handles highly variable concentrations

○ Removes >99% H<sub>2</sub>S

○ Uses recycled seashells

○ Requires no polishing stage

Treats without chemical or nutrient additives

○ Runs without oversight

○ Financing through Anua



 **ANUA**  
**Airashell**  
Biohybrid Filter

Come see us at WEFTEC in Booth 4118

336.547.9338 ■ [anuainternational.com](http://anuainternational.com)



# Digital Technology

By Craig Mandli

## Analytical Instrumentation

### HACH EZ SERIES ANALYZER

The Hach EZ Series analyzer covers a unique range of parameters on a single analyzer platform. Five measurement technologies (colorimetry, titration, ion-selective electrode, voltammetry and chemiluminescence) allow for a wide selection of measuring ranges and applications. It comes in a rugged mainframe with a compact footprint. The user interface is easy to use and keeps training efforts low. Administrator access and activated/deactivated menu keys provide security. Various analog and digital communication outputs support easy integration into systems. Online analysis at programmable intervals ensures low reagent consumption and eliminates cross contamination. **800-227-4224; www.hach.com**



**EZ Series analyzer from Hach**



**SES System from KSB**

### KSB SES SYSTEM

The SES System from KSB can show an operator ways to increase the energy efficiency of pump systems and prolong their service. By recording extensive measurement data, it is possible to evaluate the system operation and identify potential savings and any causes of damage. The operating range can be assessed regardless of the installation type or manufacturer.

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

## Control/Electrical Panels

### ADEGE WATER TECHNOLOGIES INGENIUS

InGenius control panels from AdEdge Water Technologies are custom-engineered programmable logic control panels designed to meet site specifications for monitoring and integrating treatment systems with auxiliary equipment and controls for water systems. The panels integrate the process in one place for safety, monitoring, ease of service and installation. They are NEMA 1-4, 4X, 12 and 13 certified and constructed from thermoplastic, stainless steel, painted steel and fiberglass. They have a hand on/off selector, backwash indicator, LED lamps, a security key latch and probe-mounted displays for flow, pH, chlorine, TDS and turbidity. They include level and relay controls, auxiliary power supplies, power converter (110- to 24-volt or 12-volt and



**InGenius control panels from AdEdge Water Technologies**

AC to DC), surge protection, Ethernet networking, audible/visual alarm indicators and a SCADA interface. **866-823-3343; www.adedgetech.com**

### DELTA TREATMENT SYSTEMS CP20/40/50 SERIES

CP20/40/50 Series control panels from Delta Treatment Systems provide intelligent monitoring and alarm functions for residential, commercial and industrial wastewater treatment systems. They are easy to install and operate and are available in several models engineered for use with advanced wastewater treatment systems and custom packaged plants. Customized control panels are also available, and all panels can be supplied with UL and/or Canadian UL 508A listings upon request. They monitor air pumps and effluent pumps on the Delta Whitewater treatment system. Additional options include the Series CP22, which monitors the air blower on Delta ECOPOD systems with options for controlling and monitoring UV lights for disinfection after treatment. Series CP8000/9000 control the Delta ECODRIP Pre-Engineered Disposal Systems' headworks filter system and effluent dosing pump using a PLC for time-dosing drip disposal fields. **800-219-9183; www.deltatreatment.com**



**CP20/40/50 Series control panels from Delta Treatment Systems**



**4-in-1 Controller from Orenco Systems**

### ORENCO SYSTEMS 4-IN-1 CONTROLLER

The 4-in-1 Controller from Orenco Systems supports numerous electrical configurations and dosing schedules within a single panel. Both Simplex (MVP-S2DM) and Duplex (MVP-DAX2DM) models are available and can be configured in the field for timed or demand dosing. While the control circuit operates on 120-volt power, the pump circuit is dual-rated for both 120- or 240-volt power, meaning installers and service providers can reduce their panel inventories for new installations and repairs. It includes a programmable logic unit with multiple timing intervals for changing flow conditions, and a built-in elapsed-time meter and counter. It also displays float position and has a float error indicator. Each panel includes a reference chart to assist with troubleshooting during installation and testing, as well as wiring diagrams. It is completely touch-safe. **877-257-8712; www.orencocom**

### PULSAFEEDER MICROVISION EX

The MicroVision EX cooling tower controller with PULSAlink communications from Pulsafeeder comes with a Toroidal conductivity sensor, multiple level security codes, up to 10 digital inputs, dry contact alarm output, battery backup, USB data logging capability, and optional PULSAlink communications and 4-20mA analog outputs. PULSAlink allows the user to safely communicate with the controller from anywhere on a laptop, phone or tablet. Users can receive live readings, alarm notifications, and even change and customize the controller and settings over an encrypted cloud-based site. MicroVision EX and PULSAlink is also eServiceReport and Modbus compatible. It is available mounted on a fabricated panel system with pump mounts designed to provide complete and easy-to-install solutions for cooling tower applications. **800-333-6677; www.pulsatron.com**



**MicroVision EX cooling tower controller from Pulsafeeder**



## Drives

### ABB ALL-COMPATIBLE DRIVES

All-compatible drives from ABB provide mobile freedom by allowing users to use a Bluetooth-enabled assistant control panel. There's no longer a need for a ladder for those difficult-to-reach work areas, as users can access drive information from ground level. Because the drive registers within 250 feet of the smartphone or tablet, users can skip all the extra steps and protect personnel by allowing them to stay out of hazardous (arc flash) or loud areas when commissioning and tuning drives. Bluetooth compatibility works on any Android or iOS smartphone or tablet. **800-752-0696; [www.abb.com/drives](http://www.abb.com/drives)**



All-compatible drives from ABB



Altivar Process drives from Schneider Electric

### SCHNEIDER ELECTRIC ALTIVAR PROCESS

Altivar Process drives from Schneider Electric deliver added value services to enable business and process optimization through improved life-cycle asset management and optimized energy consumption. The variable-speed drives are aimed at improving overall process performance and enabling full information and operational technology convergence. In the event of the diagnostic functions detecting abnormal conditions, the dynamic QR codes provide a fast troubleshooting method resulting in minimal downtime.

The drives are focused on fluid and gas handling applications and are available with a UL Type 12 rating for installation in more demanding environments. They are available for 240-, 480-, 575- and 690-volt three-phase and 240- and 480-volt single-phase applications. **800-788-1704; [www.schneider-electric.us](http://www.schneider-electric.us)**

## Flow Control and Software

### ALLMAX SOFTWARE OPERATOR10

Operator10 operations data management software from AllMax Software is designed to centralize operational data into one database. Whether from plant rounds, SCADA and Historians, LIMS or other sources, the database can store operational data for easy review later. Calculations, reports, trending and review of data from any time period make it quick and easy to make sense of plant operation and efficiency. Technical support, program setup and training all combine to make it a trusted and reliable software solution in the water and wastewater industry. **800-670-1867; [www.allmaxsoftware.com](http://www.allmaxsoftware.com)**



Operator10 operations data management software from AllMax Software



Force Main Sync from Smith & Loveless

### SMITH & LOVELESS FORCE MAIN SYNC

Force Main Sync from Smith & Loveless can assist industrial and municipal end users and water companies when faced with problems installing multiple wastewater pump stations on a common force main. Force main pressures vary, and without accounting for the variable conditions, reduced service life and a multitude of issues arise. These phenomena result in

impeller and volute erosion, reduced bearing and seal life, excessive pump noise and vibration. The program monitors hydraulics in the common force main to keep pumping at the required flow rate. Utilizing a PLC touch-screen human-machine-interface controller, a variable-frequency drive and a force main sensor, the PLC constantly senses force main pressure and automatically adjusts the VFD to maintain a constant flow rate no matter how many stations are online. **800-898-9122; [www.smithandloveless.com](http://www.smithandloveless.com)**

## Flow Monitoring



Dynasonics TFX-500w flowmeter from Badger Meter

### BADGER METER DYNASONICS TFX-500W

The Dynasonics TFX-500w transit time ultrasonic flowmeter from Badger Meter measures volumetric flow of clean water. It is suited for building automation, water distribution and wastewater collection in new and retrofit applications. In addition to having lower installation costs

than an in-line flowmeter, by clamping on the outside of the pipe, it can be installed while the system continues to operate. It has a large, easy-to-read display, provides Modbus RTU and BACnet MS/TP connectivity, and integrates with BEACON and AquaCUE Advanced Metering Analytics cloud-based software suites. Users can program the meter through the front panel or USB cable using SoloCUE configuration software. It is available in sizes of 1/2 to 10 inches and handles flow ranges of 0.1 to 9,800 gpm and temperature ranges of 40 degrees below zero to 250 degrees F. **877-243-1010; [www.badgermeter.com](http://www.badgermeter.com)**

### FCI - FLUID COMPONENTS INTERNATIONAL ST80 SERIES THERMAL MASS FLOWMETER

Designed with wastewater treatment aeration and digester systems in mind, the next-gen ST80 Series thermal mass flowmeter from FCI - Fluid Components International has Adaptive Sensing Technology that combines the advantages of thermal dispersion constant power and constant temperature technologies into one precision-accuracy, rugged meter with the industry's most extensive selection of application-matched flow sensors available. Its versatile transmitter outputs are compatible with DCS, PLC, SCADA, recorder or alarm systems. They include traditional 4-20mA analog or digital bus communications such as HART, Foundation Fieldbus, PROFIBUS or Modbus. The meter's intuitive, easy-to-read local display is a graphical, backlit LCD that shows what's happening in the pipe by providing flow rate, totalized flow and temperature data, which are continuously displayed in a digital and bar graph presentation.



ST80 Series thermal mass flowmeter from FCI - Fluid Components International

Alarms and/or diagnostic messages are displayed as needed to alert operators. **760-744-6950; [www.fluidcomponents.com](http://www.fluidcomponents.com)**

### GREYLINE INSTRUMENTS PDFM 5.1 PORTABLE DOPPLER FLOWMETER

The PDFM 5.1 Portable Doppler flowmeter from Greyline Instruments can be mounted on the outside of a pipe to show flow rate instantly. Use it for flow troubleshooting, spot checks or balancing

flow. Simply enter pipe diameter with the five-button keypad and it will display, totalize and data log in the choice of gallons, liters or any engineering units. This compact, hand-held flowmeter includes 4-20mA output and 300,000-point data logger with USB output and Windows software. A rechargeable NiMH battery powers the unit and push-button sleep mode extends battery life for long periods of operation. It employs the latest technology in Doppler signal processing with an improved ability to filter out noise and produce flow measurement accuracy far greater than previously possible. **888-473-9546; www.greyline.com**



**PDFM 5.1 Portable Doppler flowmeter from Greyline Instruments**

## Gas/Odor/Leak Detection Equipment



**Chlor-Scale and Halogen Eclipse from Force Flow**

### FORCE FLOW CHLOR-SCALE AND HALOGEN ECLIPSE

To protect chlorination systems from dangerous leaks, the Halogen Eclipse emergency valve shut-off system instantly closes the container valve when a signal is received from a leak detector, panic button or SCADA. The actuator quickly installs on the tank without the use of any tools and allows manual operation of the valve while in place. During an emergency shutdown event,

the system measures the actual torque applied to the valve to ensure that the valve is closed to Chlorine Institute recommended standards and provides remote confirmation that the emergency close operation successfully closed the valve. The Chlor-Scale from Force Flow safely cradles a chlorine ton container while providing critical feed and chemical inventory information. Know in real time exactly how much chlorine has been fed and how much remains in the tank. It can warn of excessive or insufficient feed rates and can be remotely monitored from a PLC or SCADA system. **925-893-6723; www.forceflow.com**

## Meter

### AMETEK DREXELBROOK DRX500 SERIES

The DRX500 Series from AMETEK Drexelbrook is a set of 80 GHz radar transmitters that covers applications with liquids, slurries and solids for both hygienic and nonhygienic requirements. All 80 GHz radar transmitters are especially beneficial for level measurements in narrow tanks with internal obstructions due to their small beam angle.

The transmitters, with their flush-mounted polyether ether ketone lens antenna and wide process connection options, are suitable for hygienic liquids. They include a large, backlit LCD screen with a four-button keypad that can be accessed with a bar magnet without opening the housing cover. Each uses software that has a quick setup assistant for easy installation. Each conforms to NAMUR recommendations NE 21, NE 43 and NE 53 and can measure fast-moving processes. The transmitters are available with aluminum or stainless steel housings. **215-674-1234; www.drexelbrook.com**



**DRX500 Series transmitters from AMETEK Drexelbrook**

## Monitors

### KELLER AMERICA LEVELRAT

The LevelRat from Keller America proves that wastewater level transmitters don't need to be bulky, nonstick diaphragms don't need to be large and fragile, lead times can be short and transmitters can be protected from lightning. It offers 0.5% FS TEB accuracy and dual outputs — analog and RS485 digital. Models equipped with a 4-20mA analog output include lightning protection carrying a lifetime guarantee against damage from electrical surge. **877-253-5537; www.kelleramerica.com**



**LevelRat from Keller America**

### SEALEVEL SYSTEMS SEACONNECT 370W



**SeaConnect 370W from Sealevel Systems**

The SeaConnect 370W from Sealevel Systems is an Industrial Internet of Things edge device that remotely monitors and controls the status of real-world I/O processes. The module features a powerful, integrated event engine that is configured using an intuitive web-based interface to send alerts and trigger actions when specific conditions are met. The 370W is designed to work with the Sealevel SeaCloud IIoT platform. It features a TI SimpleLink CC3200 ARM Cortex-M4 microcontroller unit with a certified Wi-Fi interface and WPA2 encryption for a secure connection to your wireless network. The module includes

a variety of I/O interfaces and two 12-bit A/D converters. An optional QuickStart module is available for demonstration and testing purposes. **864-843-4343; www.sealevel.com**

## Operations/Maintenance/Process Control Software

### PRIMEX ICONTROL

The iconcontrol system from PRIMEX is a suitable solution for operators seeking all the benefits of a full automation and control system without the expense and hassle of owning and maintaining these technologies. The cloud-based solution provides full SCADA functionality with secure remote access to an existing control infrastructure through our managed data center. There is no SCADA-related hardware, software or licensing to buy, manage or maintain. It interfaces to an existing local PLC control and telemetry network, offering accessibility, full SCADA/HMI, process control, monitoring and alarming, data and reporting, and asset management. Process information is transferred via secure data connection (cellular, broadband, satellite, etc.) to a data center. Each client then has secure access to its individual system from nearly any internet-enabled device. **844-477-4639; www.primexcontrols.com**



**iconcontrol system from PRIMEX**

## Process Control Systems/Equipment

### ACTIVATED CARBON SERVICES - PACS REMAINING CARBON SERVICE TESTING

Remaining Carbon Service Testing from Activated Carbon Services - PACS provides an estimate to every activated carbon user as to how much longer their carbon beds will last. Carbon beds are expensive and

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require operational changeout and planning. The testing compares starting activated carbons against used activated carbon. Starting activated carbon is important, as most clients do not save a sample to put in their adsorbers. Three ASTM tests are performed, including received and dry apparent densities, iodine activity, and number and heat of immersion. Each of the tests provides specific information. Test results are then provided to each client. 412-334-0459;

[www.pacslabs.com](http://www.pacslabs.com)



Remaining Carbon Service Testing from Activated Carbon Services - PACS



Integrinex Advanced lift station controls from Gorman-Rupp

### GORMAN-RUPP INTEGRINEX ADVANCED

Integrinex Advanced lift station controls from Gorman-Rupp are custom-engineered to meet unique system requirements. When equipped with FloSmart technology, the control system can detect

a pump obstruction and run a cleaning cycle until the debris clears. Upon detection, the device initiates a cleaning operation without interfering with the operation of the pump station. When the cycle is complete, the pump is ready to return to normal operation. If the clog remains, the cleaning sequence repeats until the blockage is cleared. FloSmart helps maximize uptime while reducing maintenance costs. 419-755-1011; [www.grpumps.com](http://www.grpumps.com)

### MARKLAND SPECIALTY ENGINEERING DUCKBILL AUTOMATIC COMPOSITE SAMPLING SYSTEM

The Duckbill Automatic Composite Sampling System from Markland Specialty Engineering automates composite sampling of tanks, nonpressurized pipes, sumps, open channels and sewers, and it facilitates monitoring of effluent for environmental regulatory compliance. Inherently explosion-proof and self-cleaning, it uses compressed air (no pumps; no vacuum system) to move samples up high lifts (79-plus feet vertically) and over long runs (98-plus feet horizontally), even in freezing temperatures. The controller



Duckbill Automatic Composite Sampling System from Markland Specialty Engineering

can be located far from the sampling site and can collect from multiple sites simultaneously. Lines are blown clear and dry after each sample. Users program the system to sample based on time or by a flowmeter. Manual samples can be called in at any time without affecting the normal sampling interval. The sampler can be customized for each application. For example, the sampler head is available in aluminum, stainless steel and PVC to accommodate specific pH levels. A compressor is supplied, if unavailable at the site. 855-873-7791; [www.sludgecontrols.com](http://www.sludgecontrols.com)

(continued)

### POLLARDWATER GRUNDFOS SMART DIGITAL

Grundfos SMART Digital dosing pumps, distributed by Pollardwater, ensure safe and economical chemical dosing in a variety of applications, from the disinfection of drinking water to the treatment of industrial waterlines. The cost-effective, entry-level DDE series is equipped with a manual output control and a maximum turndown ratio of 1,000-1. The DDA series can be used for more complex projects, offering multiple control functions and an anti-deaeration mode for optimal chemical injections. **800-437-1146; www.pollardwater.com**



**Grundfos SMART Digital dosing pumps, distributed by Pollardwater**

### SIEMENS PROCESS INSTRUMENTATION SIMATIC PCS NEO



**SIMATIC PCS neo from Siemens Process Instrumentation**

SIMATIC PCS neo from Siemens Process Instrumentation is a distributed control system, or DCS, that brings benefits to engineers and operators in the form of mobility, usability and collaboration. By leveraging web-based technologies, users can access the control system from any device such as

laptops, tablets or mobile phones without installing local DCS software and licenses. The system opens up new opportunities in engineering by allowing multiple users to work on the same project at the same time from any location. The intuitive user interface has one common workbench for all DCS applications to facilitate efficient engineering for both new users and experts. The system's object-oriented data model streamlines the process for making updates to the automation project. When a change is made in one area of the project, it is automatically reflected everywhere. Its flexible plant architecture scales to support applications of all sizes, from small processes to large-scale plants. **800-365-8766; www.usa.siemens.com**

### THERMAL EDGE AIR CONDITIONERS

Thermal Edge manufactures enclosure air conditioners suited to the environmental conditions of a wastewater treatment facility. Not only are the enclosure air conditioners fully equipped with standard features that protect valuable electrical equipment from corrosive-prone environments, but they can also be customized based on cooling capacity and sizing requirements and more. The 2-inch Louvered Security or Sliding Filter Frames are two options that utilize stainless steel filters to help the enclosure withstand chlorine exposure. **972-580-0200; www.thermal-edge.com**



**Air conditioners from Thermal Edge**

## SCADA System

### TRIHEDRAL ENGINEERING VTSCADA HISTORIAN

VTScada Historian from Trihedral Engineering eliminates the complexity and cost of third-party historical databases for systems of any size. Small single-server applications include advanced history with an

integrated suite of trending, reporting and alarm management tools. Massive multiserver systems take advantage of the system's powerful redundancy and synchronization features. Easily configure each server to be an up-to-the-second backup of your process history. Set the order of failover to ensure only one machine polls the I/O at any time. When offline servers are replaced or repaired, all missing history is bidirectionally synchronized automatically without choking your network. Servers that are geographically distributed across a WAN provide complete offsite disaster backups of an entire application. This approach can reduce computer hardware while increasing levels of redundancy for the whole system. **800-463-2783; www.vtscada.com**



**VTScada Historian from Trihedral Engineering**

## Sensors

### MASSA MASSASONIC FLATPACK SENSORS

MassaSonic FlatPack sensors from Massa are built for durability and versatility with sensing capabilities for close ranges and uneven surfaces. The housing has a slender design, only 1.06 inches thick for the short-range model and 1.25 inches thick for the midrange model, slim enough to fit in virtually any pipe, drain, tank or tight area. These noncontact sensors provide continuous distance measurement while under harsh environmental conditions. The sensing technology enables high accuracy when reading measurements of turbulent/uneven surfaces of water, chemicals or solids. The short-range FlatPack 160 kHz sensor detects distances from 1 inch to 5 feet, while the midrange FlatPack 95 kHz sensor detects distances ranging from 4 inches to 13 feet. The plug-and-play setup, coupled with the customer-friendly interface, makes the user's experience simple and easy. Customer service and consultation is available to ensure sensor selection is optimized for each application. **781-740-6117; www.massa.com**



**MassaSonic FlatPack sensors from Massa**

### PMC ENGINEERING THERM-ALERT

The Therm-Alert from PMC Engineering is a flexible and highly customizable alarm system intended to warn employees when temperature or dew point in either an industrial or domestic working area reaches dangerous levels. The system is comprised of a high-performance capacitive humidity sensor with temperature element, coupled to a display with one or more switch outputs to control functions such as single or stackable warning lights and/or audible alarms. The system displays and annunciates temperature, dew point, relative humidity or any combination. Setpoints are customer programmable. Operating range is from 40 degrees below zero to 140 degrees F. The display is mounted in a NEMA 1 enclosure for indoors or NEMA 4 for outdoors. The sensors can be installed within the main enclosure or in separate remote enclosures with or without a secondary display. **203-792-8686; www.pmc1.com**



**Therm-Alert alarm system from PMC Engineering**

### SENSAPHONE SENSORS

Monitoring sensors from Sensaphone indicate when conditions fall outside of a safe range. They are compatible with most Sensaphone remote monitoring systems, which provide alerting and data logging function-



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Monitoring sensors from Sensaphone

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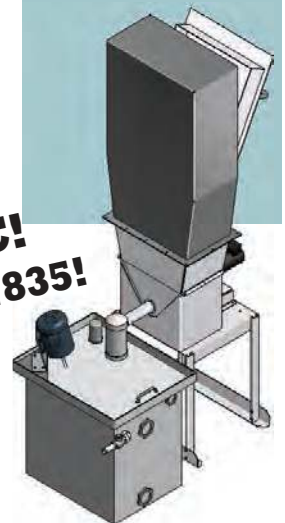
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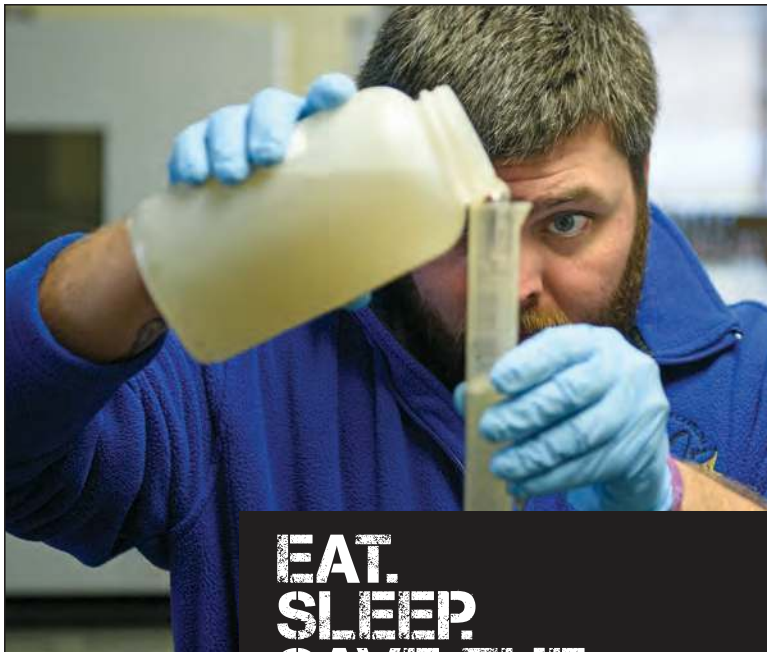
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## Online process monitoring improves nitrification

### Problem

With already high ammonium levels and new compliance limits, the Meander Water Resource Recovery Facility in Mahoning County, Ohio, needed a more reliable solution than once- or twice-weekly grab sample measurements — specifically a new instrumentation and monitoring system with real-time data for ammonium, nitrate and pH — to improve the nitrification process.

### Solution

The facility chose the **IQ SensorNet** from **YSI, a Xylem brand**. The monitoring system includes an IQSN 2020 controller and VARiON 700 probes with ammonium, nitrate and potassium electrodes, wired into a junction box (MIQ/JB) at the first- and second-stage clarifiers. In addition, a SensoLyt probe with a pH electrode was installed in the second-stage clarifier. The measurements are continuously communicated to the IQSN 2020 in the control building via a wireless module. Control over the nitrification process is easily maintained with real-time data.



**RESULT:** The facility has stayed in permit compliance and reduced maintenance time and cost. The IQSN system provides accurate, reliable data without the need to calibrate for weeks or even months. The operators can address issues faster, more effectively and more efficiently. 800-765-4974; [www.ysi.com](http://www.ysi.com) tpo

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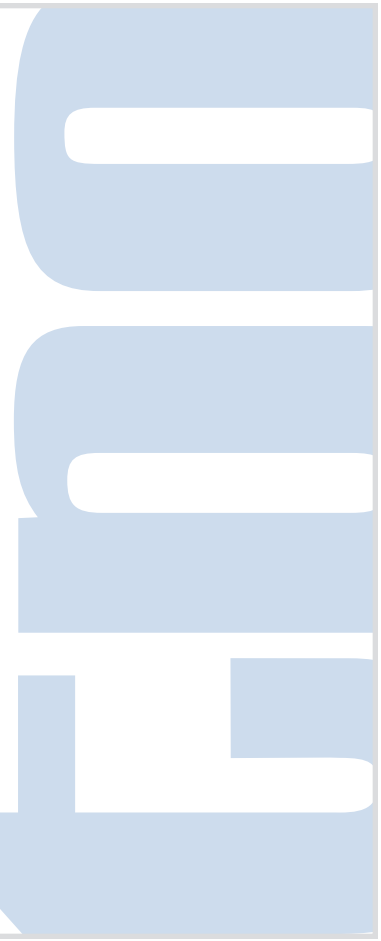
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## product spotlight wastewater

### Chemical dosing down to a science

By Craig Mandli

The treatment of water and wastewater using chemicals is an exact science. Dosing needs to be accurate to ensure that the right amount of chemical is getting into critical water and wastewater treatment systems quickly. The **ProSeries-M MS-6 chemical feed sensor** from **Blue-White Industries** is designed to accurately measure that chemical feed from metering and dosing pumps to ensure proper dosing.

This sensor ensures precision accuracy when measuring flow, and its design provides an extremely wide flow range, from 0.158 to 158.5 gph. The sensor provides the operator with an almost immediate indication if there is a problem with metering pump operations. It has a low-pressure drop of less than 1 psi.

“We designed the product in such a way that it enables the user to get a very high turndown ratio,” says Rob Gledhill, president of Blue-White Industries. “That capability is really phenomenal.”

Because the sensor is equipped with wetted parts constructed of PVDF and polyether ether ketone, it will handle harsh and corrosive chemicals associated with water and wastewater treatment. The end fittings are included with the unit and allow for more than 14 inlet and outlet configurations. It has been engineered to require minimal effort to install, including the thoughtfully designed in-line pipe fit-

ProSeries-M MS-6 from  
Blue-White Industries



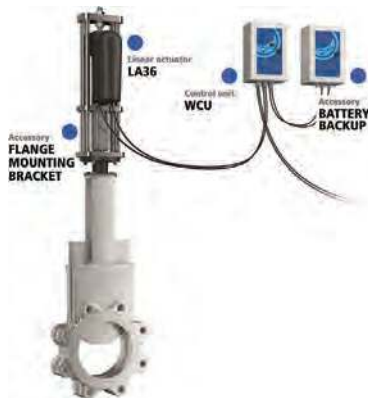
tings, which provide quick and easy setup. The unit is designed to allow the operator to set the flow rate and total setpoint triggers, with flow-rate readings as low as 10 mL/min.

“The reason this sensor is so accurate is that we are employing the latest ultrasonic technology,” Gledhill says. “We actually had to wait for the technology to get to where it’s currently at to design a sensor to have capabilities and accuracy like this.”

It is equipped with the latest technology and is configurable via Blue-Central desktop software. Blue-Central has easy-to-follow menus to make setup simple. It will automatically update to the latest software version. The operator can view the MS-6 status when it is connected via a USB port on the side of the unit.

The sensor has a configurable isolated 4-20mA output and 0 to 10,000 Hz pulse output. The built-in LED status light allows for quick visual inspection. The MS-6 sensor is NSF 61 certified. Blue-White Industries is ISO 9001:2015.

714-893-8529; [www.blue-white.com](http://www.blue-white.com)



### LINAK electric actuator systems

Electric actuator systems from LINAK can easily be mounted to slide gates, sluice gates and knife gate valves offering swift and maintenance free automation of manual valves to maximize efficiency. The LA36 actuator provides a linear thrust up to 10,000 N making it possible to open and close valve sizes up to DN300. The flange-mounting bracket allows simple actuator interchangeability and is compatible with ISO flanges F07 and F10. The water valve control unit ensures a reliable connection to the SCADA system, making remote control of the actuator easy. The battery backup is an add-on option ensuring a fail-safe operation in case of power cut-offs.

502-253-5595; [www.linak-us.com](http://www.linak-us.com)



### Powers IntelliStation Jr. digital mixing valve

The IntelliStation Jr. digital mixing valve from Powers, a Watts Water Technologies Co., has an easy-to-install smart mixing valve that con-

nects through the Building Automation System. Passcode protected and configurable on site, the IntelliStation Jr. does not require factory preprogramming, a laptop, or special software to download for commissioning or when making adjustments to the valve. Other features include programmable point range of 60 to 180 degrees F; control of water temperature plus or minus 2 degrees F in accordance with ASSE 1017; scheduling feature with temperature setback; lead-free construction; high-temperature sanitization mode to address waterborne bacteria; and Wi-Fi enabled for easy software upgrades.

800-669-5430;  
[www.powerscontrols.com](http://www.powerscontrols.com)



### Yaskawa America single-phase converter

Yaskawa America expanded its single-phase converter product line up to 125 hp at 460 volts and 60 hp at 230 volts. The SPC converts single-phase power to DC power for Yaskawa variable-frequency drives. The SPC’s active power regulator ensures minimal stress on the power grid, with less than 10% current dis-

tortion and 0.99 power factor at rated load. Combining a low harmonic solution with a soft-starting VFD allows for downsizing transformers and decreased installation costs. The SPC utilizes the same components found in a VFD, which significantly reduces maintenance time and expenses.

800-927-5292; [www.yaskawa.com](http://www.yaskawa.com)



### QED Environmental Systems SlimJim electric pump system

The SlimJim electric pump system from QED Environmental



## product spotlight

water

### Lead-free valve family meets demanding performance requirements

By Craig Mandli

The valves used in commercial and industrial water delivery systems need to not only be safe, but also durable enough to stand up to high loads. A family of **NSF lead-free brass valves** from **GF Piping Systems** is designed to handle those high loads and strong flow rates. Valve styles include pressure reducing, thermostatic balancing and thermostatic mixing.

“We are pleased to add these five high-quality brass valves to our traditionally all-thermoplastic valve product line,” says Ralph Abdelhak, product manager of GF Piping Systems. “The three valve styles provide different solutions for water systems in high-rise buildings, multifamily dwellings, hospitals, hotels, sports facilities, universities, dormitories and industrial buildings.”

First in the family are the compact, direct-acting Pressure Reducing Valves Type 1319 and 1339. The two PRVs feature excellent control characteristics, even at low flow rates. This patented design, which offers a 416 stainless steel floating seat and modular construction, allows for a more compact size. The EPDM diaphragm and seals provide superior resistance to strong and oxidizing disinfectants such as chlorine. Available in 1/2- to 2 1/2-inch sizes, these valves handle hot-water temperatures up to 158 degrees F and inlet pressures up to 357 psi, and they comply with NSF 61 and NSF 372. They include a choice of two pressure control ranges, easy cleaning and downstream pressure gauge ports standard on both sides.

NSF lead-free brass valves from GF Piping Systems



Next in the family is the Type 6320 Thermostatic Balancing Valve. The balancing valve regulates the flow rate in hot-water (up to 158 degrees F) circulating systems by continuously sensing the return water temperature with an integrated thermostat, ensuring consistent system temperature. This low-maintenance 3/4-inch valve includes field-adjustable temperature setpoints, overheat protection and simple regulator operation. Regulating the flow rate to meet temperature setpoints allows for a shorter heat-up phase after temperature drop, increasing energy savings.

Last in the new family are the Thermostatic Mixing Valves Type 3409 and 3419, which accurately deliver tempered water to hot-water distribution systems. Mountable in any position, the two mixing valves are ASSE 1017 compliant when installed with a check valve or combination check/stop on the hot- and cold-water inlets. The integrated circulation inlet saves installation labor and materials. Other performance attributes include scald protection, energy savings, capability to operate without an external power supply and field-adjustable outlet temperature ranges. **800-854-4090; www.gfps.com**

Systems requires no separate control panel and features built-in auto on/off start and run-dry protection. It offers plug-in operation at 115- or 230-volt single-phase power. With a 4.5-inch outer diameter, the pump is compact and easy to handle and weighs 22 pounds. The pump's optional three-phase operation with control panels adds other benefits, including variable speed, programmable from an iPhone, and the ability to view and change pump data and parameters. It is ideal for smaller-diameter risers such as clean-outs, collapsed pipes or bent risers. With available flow rates up to 30 gpm, the SlimJim can be used in vertical or horizontal applications and is suitable for the same applications as air-powered pumps but operates at higher flow rates.

**734-995-2547; www.qedenv.com**



### Wanner Engineering Hydra-Cell D66 Series displacement pumps

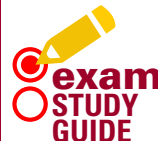
Wanner Engineering's Hydra-Cell D66 Series sealless positive displacement pumps are for use in a wide range of processing, OEM, municipal and commercial applications. The pumps offer a maximum flow capacity of 65.7 gpm and pressure ratings up to 700 psi for models featuring brass, ductile iron, or 316L stainless steel pump heads and 250 psi for models equipped with

polypropylene pump heads. The sealless design of the pumps means that there are no mechanical seals, cups or packing to leak, wear or replace. Spring-loaded, horizontal disk check valves and the sealless design enable model D66 pumps to handle viscous fluids and abrasive particulates up to 800 microns in size.

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**International Products Corp. announces two hires to its leadership team**

International Products Corp. announced the hiring of two new employees, Marcy Edwards, director of marketing, and Alphonse Kolis, sales and business relationship manager for P-80 lubricants. Edwards will oversee strategic marketing efforts focused on customer retention and driving new business across the full line of assembly lubricants and industrial cleaners for domestic and international markets. Edwards previously held marketing leadership positions at Icahn Automotive, Honeywell International, US Vision and Comcast. Kolis joins International Products Corp. with over 20 years of experience, representing Tier 1 OEM suppliers in the automotive industry. Most recently, Kolis served as sales account manager with Yapp USA in Troy, Michigan.

**Newterra acquires StormwaterRx**

Newterra announced it has expanded its footprint by acquiring StormwaterRx, headquartered in Portland, Oregon. StormwaterRx designs, manufactures, installs and maintains stormwater treatment systems including Clara, Aquip, Purus and Zinc-B-Gone products.

**Danfoss names public and industry affairs director**

Danfoss announced the appointment of John Sheff as its new director of public and industry affairs for North America. Sheff will succeed Mark Menzer in the role when Menzer retires in July. Sheff previously was business development manager for Danfoss in North America, leading cross-business initiatives within buildings, including strengthening engagement with utilities and Danfoss partners to leverage incentive rebates to improve energy efficiency in existing buildings.



John Sheff



Mark Menzer

**Anua acquires Quanics**

Anua announced it has expanded its Clean Water treatment system options by acquiring Quanics. Integrating Quanics on-site water treatment and water reuse products into Anua's growing platform will provide customers with more flexibility and more options. Anua has acquired the AeroCell and BioCoir treatment technologies, all regulatory approvals, all testing data, patents, trademarks, intellectual property, website domain, online store and other assets from Quanics. Quanics manufacturing will continue in the Crestwood, Kentucky, facility.

**SEPEX announces new personnel**

SEPEX announced a new director of application engineering and a new director of product and market management. Dale Parrett joined the SEPEX team as director of application engineering. He will be responsible for handling the applications for key accounts and seeking ways to improve the AE and project engineering tools. He has over 25 years of experience with applications and the pump industry and holds a degree in mechanical engineering technology from the University of Dayton. Mark Yingling was hired as director of product and market management. He will be responsible for overseeing processes to introduce new products to the market, perform product trainings and manage key targets. Yingling has experience with the pump and environmental industry along with a degree in environmental science from the University of Cincinnati.



Dale Parrett



Mark Yingling

**TGO Technologies establishes scholarship**

As part of its commitment to the water industry, TGO Technologies is using some of its resources to seek input from customers about how they're addressing some overarching industry concerns. The company has learned about the aging workforce challenge; how the design of TGO's equipment and its on-site training can help; and how a partnership with the American Water Works Association could also help address problems.

In a further commitment to assisting with the challenge, TGO is taking advantage of the recognition by AWWA and its members to promote a \$5,000 scholarship eligible to students attending schools where one of TGO's Chlor-Tainer containment units are sold. The company's future goal is to reach an annual donation of \$20,000, according to a company spokesperson. **tpo**

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## people/awards

**Kevin Kirwan** was promoted to senior vice president and chief environmental and operational excellence officer at American Water, a New Jersey-based water and wastewater utility company.

**David Dickson** retired as general manager of Coastside County Water District (California).

**Davina Winemiller** was hired as supervisor for the Town of St. Armand, New York. Addressing concerns about the town's new wastewater plant is among her top priorities.

The **City of Nampa** (Idaho) Wastewater Treatment Plant received a Project of the Year award (over \$3 million category) from the American Public Works Association Rocky Mountain Chapter. The city also received a 2019 Best Water/Stormwater Project award from the American Council of Engineering Companies Idaho Chapter for a best-in-class solution in meeting nutrient-removal and water-quality requirements. In addition, the city received an honorable mention for clean-water infrastructure projects from the U.S. EPA for an upgrade to its wastewater treatment plant.

**EPCOR USA** received a Gold Level Award from the Healthy Arizona Worksites Program. EPCOR, based in Arizona, is a private utility providing wastewater, water and natural gas service to 15 counties in Arizona, New Mexico and Texas.

The Vinyl Institute presented **Rep. John Katko**, R-N.Y., with its inaugural Congressional Champion Award. The award recognizes his work to secure "significant new funding" for the nation's wastewater and water infrastructure.

The **Delaware County Commissioners** received the Ohio Water Environment Authority Southeast Section's annual Public Service Award for significant commitment to the protection and improvement of the water environment.

**Randy Scott**, chief collections officer of the City of Sedona (Arizona) Wastewater Department, was named the 2019 Rod Olsen Employee of the Year.

The **North Red Deer Regional Wastewater System** received a Project Achievement Award from the Association of Professional Engineers and Geoscientists of Alberta.

The **Leesburg Water Department** received the 2018 Most Improved Water Treatment Plant – Class C award from the American Water Works Association Florida Section for the Plantation treatment facility.

The **Glasgow Water Co. Barren River Lake Water Treatment Plant** received the Microbial Area-Wide Optimization Program Champion Award from the Kentucky Energy and Environment Cabinet, Division of Water.

**Nicholas Dezelan** started as manager of the Greenfield (Indiana) Wastewater Department, replacing **David Scheiter**, who retired this spring after more than 30 years with the department.

**David Turocy**, commissioner of public services for Pittsfield, Massachusetts, retired after a 30-year career.

## events

### Sept. 3-5

Missouri Water Environment Association 5 Cities Conference, Hyatt Regency at The Arch hotel, St. Louis. Visit [www.mwea.org](http://www.mwea.org).

### Sept. 9-11

Rocky Mountain Section AWWA/WEA Annual Conference, Keystone Resort & Conference Center, Keystone, Colorado. Visit [www.rmsawwa.org](http://www.rmsawwa.org).

### Sept. 9-11

34th Annual WateReuse Symposium, Marriott Marquis San Diego Marina, California. Visit [www.watereuse.org](http://www.watereuse.org).

### Sept. 9-12

Virginia Section AWWA WaterJAM 2019, Virginia Beach Convention Center. Visit [www.vaawwa.org](http://www.vaawwa.org).

### Sept. 9-13

Ohio Section AWWA Annual Conference, Conference Hotel Cleveland. Visit <https://oawwa.site-ym.com>.

### Sept. 10-13

Wisconsin Section AWWA Annual Conference, Monona Terrace, Madison, Wisconsin. Visit [www.wiawwa.org](http://www.wiawwa.org).

### Sept. 17-20

Western Canada Section AWWA Annual Conference, TELUS Convention Centre, Edmonton, Alberta. Visit [www.wcsawwa.net](http://www.wcsawwa.net).

### Sept. 17-20

Minnesota Section AWWA Annual Conference, Conference Hotel Duluth. Visit [www.mnawwa.org](http://www.mnawwa.org).

### Sept. 21-25

Water Environment Federation Technical Exhibition and Conference, McCormick Place, Chicago. Visit [www.weftec.org](http://www.weftec.org).

### Sept. 22-25

New England Water Works Association Annual Conference, Samoset Resort, Rockport, Maine. Visit [www.newwa.org](http://www.newwa.org).

### Sept. 23-25

Soils and Site Evaluation for Septic Disposal Systems and Stormwater BMPs, Extension Conference Center, New Brunswick, New Jersey. Visit [www.cpe.rutgers.edu](http://www.cpe.rutgers.edu).

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**MISCELLANEOUS**

**LEGAL NOTICE:** On March 24, 2017 MAB environmental Services, Inc. and Matthew Brozena, former owner of MAB Environmental Services, pled guilty to violations of the federal Clean Water Act in U.S. District Court for the Eastern District of Pennsylvania. From 2009-20012, during the federal field investigation, MAB Environmental Services was a small business that operated privately-owned wastewater and drinking water treatment plants for clients. At the time, MAB employed eight wastewater/water operators who worked at 10 facilities across the state of Pennsylvania. Mr. Brozena was the only supervisor in the company. The federal investigation lasted five years and was conducted by the Pennsylvania DEP, the U.S Environmental Protection, and the U.S Department of Justice. As a result, government investigators determined that during the period 2009-2012 three operators working for MAB Environmental at two facilities committed a range of violations including (1) discarding samples and resampling when the operator believed that the measurements would exceed the permit limits, (2) failing to report sample results on monthly discharge monitoring reports making the sample results “non-representative” of the monitored activity, and (3) falsifying, tampering with, and rendering inaccurate monitoring methods required to be used under the Clean Water Act. Two of these employees were convicted of a felony clean water violation and the third was charged with misdemeanor (negligent) violation. Although Matthew Brozena was not aware of the illegal activities carried out by his employees, he believes that he should have managed his employees more closely and was responsible for their actions. He ultimately pled guilty in U.S district Court to Clean Water Act

misdemeanor. Mr. Brozena was sentenced to three years of probation with the first six months to be served as house arrest. Additionally, he had to pay a \$100,000 fine. Conditions of probation required that a notice is intended to fulfill this requirement. Since the federal investigation ended, the company has reorganized and the staff has increased to operators who now manage over 150 facilities. Prior to his conviction in 2017, and in order to ensure that these violations do not recur, Mr. Brozena voluntarily retained Burnside Environmental Group, comprised of former U.S. Environmental Protections Agency experts, to assist the company with the development of an Environmental Compliance Plan which established to ensure maximum compliance with state and federal environmental laws and regulations. After his company expanded, Mr Brozena developed the resources to employ three field supervisors to provide hands-on supervision for operators in the field. In order to ensure compliance, other companies that provide these services should make certain that they (1) hire employees with integrity and a good work ethic, (2) provide adequate supervision of field operators, and (3) they should develop and implement guidance such as an Environmental Compliance to provide appropriate direction and structure to their field operations. (009)

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