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City Engineer
Graceville, Fla.

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ON THE COVER: Charlie Martin always loved science and loved solving problems. That makes him a perfect fit in the clean-water profession. As city engineer in Graceville, Florida, he's in charge of the wastewater treatment plant, the drinking water system, and the city's National Environmental Accreditation System (NELAC) certified lab. (Photography by Joseph Victor Stefanchik)

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WATER SECURITY

Our Wake-Up Call

Urgent action on water security is essential to better prepare societies for future global health crises like COVID-19, say experts at the University of Birmingham in the U.K. and Northwestern University in the U.S. The researchers are urging policy makers across the world to focus on behavioral change, knowledge promotion and investment in water infrastructure.

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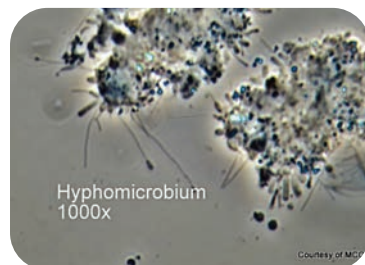
BUG OF THE MONTH

Learn About Nitrobacter

In this edition of *TPO*'s ongoing series Bug of the Month, readers will get to take a peek under the microscope at *Nitrobacter* and learn about its role in the activated sludge process.

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let's be clear

How Do You Make Your Team Members Feel?

IN A WELL-KNOWN QUOTATION, THERE'S A SIMPLE AND POWERFUL LESSON ABOUT DEALING EFFECTIVELY WITH SUBORDINATES AND WITH PEOPLE IN GENERAL

By Ted J. Rulseh, Editor



“People will forget what you said. People will forget what you did. But people will never forget how you made them feel.”

Maya Angelou

This adage from writer, civil rights activist and Presidential Medal of Freedom winner Maya Angelou rings true for me. I wish I had heard it a lot earlier in life and taken it to heart, because it would have made me a better boss, father, husband and person.

If you want to be an effective leader of people, it's a good idea to tack these words up in your office somewhere, or better yet, tack them up permanently in your brain. We all can think of times when someone made us feel great or feel horrible. If we remember those times, we'll be inclined to heed Angelou's words when dealing with others.

WHAT DO YOU REMEMBER?

To help jog your memory of such times, I'll share a few instances from my life, maybe not the most important events, but clear illustrations of Angelou's concept.

First to leap to mind is an encounter with a financial advisor when I was about 30 years old and just starting to invest money. I had bought some shares of stock; I got a notice that the stock was splitting; I wanted to know how that would affect the value of my holding.

I had met this advisor by sitting across the table from him at Rotary Club meetings. He was cordial, well spoken, engaging and upbeat. He seemed knowledgeable. So I made an appointment to seek his advice. He made light of my puny portfolio, said the stock split meant basically nothing and bragged about his method of stock trading.

I remember little of what he said other than, “Ted, what's your objective?” as in, “Obviously you don't have one.” I remember distinctly how I felt when I left his office: like an idiot. I never saw him again, nor wanted to. If he had treated me respectfully, he could have won a new client and maybe some referrals.

Then there was a salesman in a men's store. An important job interview was coming up; my wife convinced me that my outdated, wide-lapel brown polyester suit would not exactly impress. So I went shopping, in my shabby corduroy slacks and cheap shirt.

The salesman, named Ed, saw me pull an expensive three-piece off the rack. He might have said, “There's no way you could afford that.” Instead,



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he remarked, "You have excellent taste." He put that suit back on the rack, then picked out a charcoal pinstripe that he said was modestly priced, yet attractive and would hold up well.

He chose a tie, sold me a nice topcoat and even showed me how to sling the coat over my arm and walk confidently into the interviewer's office. How did I feel when I left? Like a winner. I got the job. I called Ed afterward and thanked him. I still remember him fondly.

THE FLIP SIDE

Now the other side of the coin: How did I make others feel? While compiling an anthology for a publishing label I owned, I received a story from a young woman writer; it didn't pass muster. I could have sent her a note thanking her for the submission and politely declining. Instead, I gave her chapter and verse on what was wrong with it. I bet she hates me to this day, and if so, I wouldn't blame her. I would take that note back in a second if I could.

Of course I wasn't always a jerk. In the town where I had my first newspaper job, there was a man named Dave, developmentally disabled but high functioning and well-liked around the community. He lived on his own. He loved to play basketball; he was no good at it.

Nonetheless I invited him to join the city rec league team I was forming. I drove him to the games. My teammates and I embraced him, treated him like just one of the guys. He got his share of court time. He's in a team picture (league champions) that hangs on my office wall. Maybe Dave remembers me in a good way. I hope so.

So, perhaps there's a good and simple test of things we say and do: How will it make the other person feel? It's true that sometimes as leaders we have to deliver messages that aren't at all pleasant. But we can still do it with an eye toward not knocking down but building up. **tpo**



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A Treasure to this Town

AWARD-WINNER RICHARD SAUCERMAN KNOWS HIS COMMUNITY'S WATER SYSTEM INSIDE OUT. HE CALLS HIS EXPERIENCE HIS SPECIAL SKILL.

STORY: **Steve Lund** | PHOTOGRAPHY: **Marc Lebryk**



Richard Saucerman, water treatment manager, Cloverdale, Indiana

The answer to almost any question about the water department in Cloverdale, Indiana, is just a phone call away. Richard Saucerman, water treatment manager and a 25-year department veteran, knows the town water system inside and out.

"You can call him up anytime, day or night, and say, 'Richard, I'm over here at this address and I can't find the meter,'" says Wayne Galloway, former town manager. "He'll say, 'It's behind the bush over there by the driveway.' He knows where it is."

Saucerman was named 2019 Water Systems Operations Specialist of the Year by the Alliance of Indiana Rural Water. Cheryl Galloway, the former utility clerk, nominated him. "Richard knows every waterline and 90% of the wastewater lines and the history that only an old-timer would know," the nomination states. "His knowledge has been a lifesaver on more than one occasion. He is a treasure to this town and the associates he works with."

Saucerman didn't know he had been nominated until just before he was announced as the winner. He was actually planning to skip the alliance's annual meeting because his mother was ill, but his colleagues told him to at least attend the awards luncheon.

He was proud to accept the award. His special skill, he says, is simply having a lot of experience: "I've read all the water meters through the years. The guys will call



Richard Saucerman
Cloverdale, Indiana

JOB TITLE:
Water treatment manager

RESPONSIBILITIES:
Manage a 1 mgd (design) water treatment plant and distribution system

EXPERIENCE:
25 years with town of Cloverdale

CERTIFICATIONS:
DSL water distribution, WT3 treatment plant operator, A-SO wastewater



GOALS:
Complete GIS mapping of waterlines; continue to deliver quality drinking water

AWARDS:
2019 Water Systems Operations Specialist of the Year, Alliance of Indiana Rural Water

“ You can call him up anytime, day or night, and say, ‘Richard, I’m over here at this address and I can’t find the meter’ [and] he knows where it is.”

WAYNE GALLOWAY

WATER WITCHING

Part of Richard Saucerman's job as water treatment manager for the town of Cloverdale, Indiana, involves locating underground pipes when contractors need to dig to install new utilities.

The town has maps of the water system, but they aren't always as helpful as they need to be. Sometimes, for example, they show the waterlines on the wrong side of a road. "When contractors come to town, they say, 'Well, you're not the only one who doesn't know where their stuff is,'" Saucerman observes.

Since he has to give an answer so that they know where not to dig, he gives it his best shot.

"We don't have locating wires, so we can't just hook up a machine to it and call up a tone," Saucerman says. "When our lines were all done, back in the day, they didn't do that. We have to go by some old maps and what you remember."

If that doesn't work, Saucerman has a plan B — a witching stick: "I use a piece of wire. I go to where I think the waterline is and try to narrow it down from there. I don't have the whole philosophy of witching, but if there is some disturbance in the ground, that wire will turn. It can move for a gas line, fiber line or waterline.

"I'm just picking up disturbance in the ground where it's been dug before. I just hold a piece of straight copper wire about waist high. If it picks up a disturbance in the ground, it will move to the side. It gets you close. It won't say it's 100%, but you've got to have something to go by."

Saucerman and his team operate and maintain the water treatment plant, the water distribution system, and the wastewater collection system.



Richard Saucerman, shown adding sand to the plant's catalytic reactor, brought a farm boy's work ethic to his role in water treatment.

me once in a while when they can't find a meter, and I can usually tell them where it is. They put them in weird places sometimes. Not all of them are out by the sidewalk."

DROP IN CONSUMPTION

Cloverdale is a town of about 2,200 in southwestern Indiana, about halfway between Indianapolis and Terre Haute. It's in a farming area, but it also has quite a bit of tourism because it is close to the Cataract Falls State Recreation Area.

The water treatment plant, built in 2000, draws from four wells. Its design capacity is 1 mgd, but it typically produces about 220,000 gpd. The plant uses sodium hydroxide for softening and chlorine for disinfection.

The system has one 900,000-gallon water tower. Most customers are residential but there are five hotels just off Interstate 70, and they along with the schools are the biggest customers. The plant's telemetry was recently updated with the installation of a PRIMEX control panel.

When Gov. Eric J. Holcomb issued a stay-at-home order on March 24 for the coronavirus, water use dropped to about 170,000 gpd. Households were using more water than usual, but the hotels and school used little.

FROM THE FARM

Saucerman grew up on a small farm near Cloverdale, one of Jerry and Violet Saucerman's 11 children. His father worked at a factory in Indianapolis but also had a 30-acre farm with vegetable gardens and some livestock. "I think, with that many kids, my dad figured he had to have a way to put food on the table," Saucerman says. "It was a hobby farm, I guess. I think he just had that to keep us busy."

After high school, Saucerman went to work for a local farmer, but after 10 years, the farmer was scaling down and Saucerman was glad to hear about an opening for a job

with Cloverdale. "I would have had to move on eventually," Saucerman says. "It was fortunate that the town job came up."

He started as a laborer in 1995 but soon was drawn to the water department. He passed the state water distribution exam in 1996 and earned his water treatment certification in 1997.

Now he is part of a crew of four who operate and maintain the water treatment plant, distribution system and sewers. A contractor operates the wastewater treatment plant.

The crew also takes care of the streets, including snow removal. Town workers do patching on the streets when required, but paving work is contracted. Saucerman likes that his job never has two days the same, although the variations are mainly outside the water treatment plant. There aren't many surprises where the water is concerned.

"We have very consistent water," Saucerman says. "We test twice a day for chlorine, hardness, iron, manganese and pH." The town operates its four wells alternately to make sure all of them are working. Wells 1 and 2 have identical water, and wells 3 and 4 do also. When he switches from well 2 to 3 or well 4 to 1, some adjusting may be needed. Each well usually runs three to four days at a time.

Most of the job's variety comes from finding leaks or fixing waterline breaks. The Alliance of Indiana Rural Water sometimes helps with leak detection since it has access to equipment that a small system

“I don't know if I would want to go to an inside job. The older I get, the more comfortable I get in the plant, but I still go out and do stuff.”

RICHARD SAUCERMAN

like Cloverdale can't afford. "Sometimes they find a void in the ground," Saucerman says. "I've had them come with a listening device and they pointed right to the spot."

SLEEPING OVER

In 2011, the town's water tower had to be taken out of service for maintenance. It was emptied, inspected and painted inside and out. Without the storage tower, the water plant had to operate continuously.

Saucerman installed pressure relief valves on fire hydrants at five locations so the pressure wouldn't get too high at night when water use dropped, but he still worried about the operations. "I stayed here at the plant in a camper out back," he says. "I wanted to be close if something went wrong."

The maintenance on the tower was supposed to be done in six weeks, but it lasted 10 weeks. During that period, Saucerman typically went home to have dinner with his wife, Karen, while another worker stayed late at the plant. Then Saucerman would return to spend the rest of the night in his camper.

"I don't know if anybody else would have done that, and I don't know that I was required to do it, but I wasn't at ease when I went home," he says. "If a pump quit, it meant people were out of water. I felt more comfortable being here. It was just making sure everything was going to do what it was supposed to."

STEADY CREW

Saucerman has seen a lot of staff turnover in his 25 years with the town, but his current crew members have been on board for three to five years. The crew members are Brad Fulk, project foreman; Ron "Bucky" Bewley, water plant assistant; and Bradley Dorsett.

"We've been pretty steady. A factory job might pay more, but it all depends on if you want to be inside or outside."

With his farm background, Saucerman definitely leans toward working outside. "I don't know if I would want to go to an inside job," he says. "The older I get, the more comfortable I get in the plant, but I still go out and do stuff. I wouldn't want to be inside all day." **tpo**

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At the Osprey Water Reclamation Facility in Titusville, Florida, a wet well was abandoned and a clarifier was retrofitted with double disc pumps (Penn Valley Pump) piped directly to the scum trough.

Hate That Scum? Here's a Remedy.

DOUBLE DISC PUMP TECHNOLOGY ENABLES WASTEWATER PLANTS TO ELIMINATE TROUBLESOME WET WELLS, SAVE MONEY, ERADICATE ODORS AND REDUCE MAINTENANCE

By Leslie Burrage

Scum. It's the plastics, grease and other floatables that hover on the surface during wastewater clarification. No one likes scum, and no one really wants to be the one to remove it.

But when it comes to the "traditional method" of skimming scum off the top of the clarifier surface and placing it into a scum collection box, from which the material flows into a wet well, someone has to do it.

OPERATION AND MAINTENANCE ISSUES

A wet well is equipped with a level-control system that starts and stops the associated pumps as the water rises and falls. The process typically incorporates a submersible pump in the wet well or a dry-pit pump piped to the well.

As the level rises and falls, the layer of scum will not get removed, because the pit never gets completely pumped down to the bottom. This causes the

A double disc pump eliminates the wet well altogether, along with the maintenance, odors and expense associated with it.

layer to continue to build on itself until the pump operator removes it. That is an inherent downside of a wet well.

To combat this continuous buildup, the operator must use a high-pressure hose to break up the scum layer and mix the material so it can be pumped. However, no matter how much breaking up and mixing is done to the scum, the entire content of the well never gets fully removed.

The level-control system becomes coated with floatables and stringy material that creates an unpleasant odor. If the pump fails, it must be lifted from the wet well. This can be challenging and expensive if it is necessary to enter the well, because a confined-space permit is required.

AN ALTERNATE SOLUTION

To eliminate these challenges, a double disc pump is a solution. It is a completely different system; in fact, it eliminates the wet well altogether, along with the maintenance, odors and expense associated with it.

With the wet well eliminated, the scum collection box can be piped directly to the suction side of the pump. The enclosed piping becomes the well, with a much lower volume. The piping for a double disc pump is typically 6 inches or larger to hold the volume during a few rotations from the clarifier mechanism.

The pumps are then operated using a limit switch trigger located by the clarifier arm. A timer system clears out all the contents from the entire line, preventing a scum layer from building up. Double disc technology is specifically used in this design because of the pump's unique ability to run dry and pass large solids and stringy materials.

DESIGN ADVANTAGES

Double disc pump technology is based on a non-captive free disc design where two discs are staged in the pump housing. These discs work in unison to perform the duties of both the pumping element and valving element.

The hydraulic interaction between the discs creates vacuum and pressure simultaneously to move fluid from suction to discharge. The discs have an integral elastomer design with a rigid core and do not have any external metal components.

The double disc pump has a short stroke length created by eccentric cams pinned to the drive shaft. This design provides for positive valving on every stroke since the discs are mechanically driven on the seat.

The pump incorporates an inlet-side foot valve, also known as a clack valve. This device is a priming and repriming aid and only sees action under



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At the Players Club Water Reclamation Facility in St. Johns County, Florida, a scum pump installation was piped directly to the scum collection trough.

a suction lift condition or when the suction line is under vacuum. This design allows the pump to pass larger solids, rags and debris that would routinely cause problems like clogging and failure on other types of pumps.

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No level or float controls are required when using a double disc pump. These pumps also eliminate the washdown and cleanup maintenance required

with traditional scum pits. That saves money because there is no need for operators to maintain clogged pumps and the level-control system.

No odor is emitted from the double disc pump, and all regular maintenance associated with a traditional scum system is eliminated as well. The pump can be run dry without causing damage. Both large solids and line-size semisolids pass easily through the pump.

There are only five wet end components. The pump is self-priming and self-valving. A trunnion seal design eliminates stuffing box and mechanical seals, so there is no seal water. Double disc pumps feature a leak-free operation for clean installation. Its maintain-in-place design provides easy access.

SIGNIFICANT SAVINGS

With new clarifier installations, thousands of dollars can be saved by not having to construct the wet-well structure. The pump is mounted on grade outside the clarifier, and the suction piping runs from the pump to the scum collection trough. Existing installations can be retrofitted by bypassing the wet well and directly piping to the pump inlet.

By removing the wet well and installing a double disc pump, industries that need to treat wastewater can reduce capital costs, eliminate routine maintenance, eradicate odors and save money over the long haul.

ABOUT THE AUTHOR

Leslie Burrage (info@pennvalleypump.com) is an engineering director with Penn Valley Pump, a manufacturer of double disc pumps for municipal, industrial, chemical and food applications, based in Warrington, Pennsylvania. **tpo**

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CHARLIE MARTIN PUTS ADVANCED EDUCATION AND DECADES OF EXPERIENCE TO WORK IN SEARCH OF NOVEL APPROACHES TO WATER AND WASTEWATER TREATMENT

STORY: **Ted J. Rulseh**

PHOTOGRAPHY: **Joseph Victor Stefanchik**

Seeking New Frontiers

Charlie Martin, city engineer, in front of the City of Graceville Advanced Wastewater Treatment Facility's sequencing batch reactor.



“Research in the water and wastewater industry — that’s my passion. It’s about finding novel approaches to problems that are going to continue as we live on this planet.”

CHARLIE MARTIN

Martin is a big believer in training and encourages team members to advance their levels of certification.



Charlie Martin always loved science and solving problems. That makes him a perfect fit in the clean-water profession.

As city engineer in Graceville, Florida, he’s in charge of the wastewater treatment plant, the drinking water system and the city’s National Environmental Accreditation System (NELAC) certified laboratory, which tests samples from three counties in Florida and one in Alabama.

He’s also active in training, for his own operations team and as an instructor at the University of Florida TREEO Center, based in Gainesville. While working in what he calls a “sleepy town” of about 2,000 in Florida’s panhandle, he looks beyond the day-to-day in efforts to improve his plant and perhaps contribute to the industry’s body of knowledge.

“Research in the water and wastewater industry — that’s my passion,” says Martin, who holds Class A (highest) wastewater operator and Class A water operator licenses. “It’s about finding novel approaches to problems that are going to continue as we live on this planet. Whether it’s nutrients or emerging contaminants that are coming out on the water side and that ultimately end up in the wastewater, how do we deal with that?”

“Could we use wastewater microbes to reduce those contaminants? Sometimes we just look at those things from a chemical standpoint, but bacteria may help us deal with the problem. We may have to marry bacteria with our traditional water treatment techniques. I hope to get into novel approaches to treat environmental and water challenges that are emerging in our society.”

Martin won a 2019 William D. Hatfield Award from the Florida Water Environment Association. He previously received the regional 2017 Thomas P. Smith Award for excellence and leadership from the association’s Big Bend Chapter and the 2018 statewide Leroy H. Scott Award for performance and professionalism.

Charlie Martin, Ph.D.

City of Graceville, Florida

POSITION:
City engineer (in charge of water and wastewater)

EXPERIENCE:
29 years in the industry

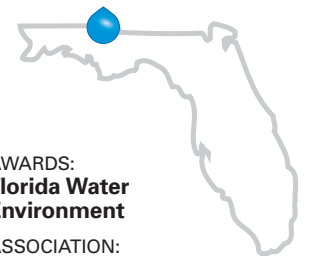
EDUCATION:
Ph.D., civil engineering, Florida A&M University - Florida State University

CERTIFICATIONS:
Class A (highest) wastewater operator, Class A water operator

AWARDS:
Florida Water Environment

ASSOCIATION:
2019 William D. Hatfield Award, 2018 Leroy H. Scott Award, 2017 Thomas P. Smith Award

GOALS:
Continue to explore treatment innovations, earn professional engineer credential



DESIRE FOR LEARNING

A Miami native, Martin earned an associate degree in chemistry from Miami-Dade Community College in 1991. Soon after he graduated, a fellow church member, who worked for the city of North Miami and knew Martin’s background, suggested he consider a career in water treatment. Before long, Martin had a job at the city’s lime softening plant.

About a year later, he moved to Graceville, about an hour west of Tallahassee and home to The Baptist College of Florida. There he went to work as a lab technician, helping with the startup of the city's environmental and water lab. While there, he earned a bachelor's degree in biology and advanced physical science from Troy University.

Martin has been there ever since, apart from a year as a vocational instructor at nearby Jackson Correctional Institution and a year teaching sciences for the Graceville school district. Along the way, he earned water and wastewater operator certifications.

In 2007, city leaders encouraged him to pursue an engineering degree. He took the prerequisite courses at the Florida State campus in Panama City

“Charlie is a wonderful trainer; he has a way of making the learning fun and easy to follow. Many students come into our classes hoping to see Charlie as one of the instructors.”

RON TRYGAR

and then transferred to the Florida A&M University - Florida State University to study for a master's degree in civil engineering.

“While I was there, I was offered a scholarship to get my doctorate,” he recalls. “I talked to my boss about it, and he said I would be crazy not to take advantage of that.” In 2015 he received his Ph.D. in civil engineering. He earned those degrees while still working at Graceville.

SOURCE OF INSPIRATION

College studies helped ignite Martin's passion to innovate. At first, he did research on a strain of *E. coli* bacteria to which a firefly gene had been inserted — the cells fluoresced in the presence of toluene. “I tried to get it to fluoresce with nitrobenzene, which is a contaminant that comes out of wastewater treatment plants,” he says. “I was trying to show that you could use those genetically engineered bacterial cells so that when they came in contact with a contaminant, they would light up like a firefly. I could never really get that to work.”

Instead, he looked closer to home to investigate simultaneous nitrification-denitrification, or SND, in Graceville's sequencing batch reactor. He wrote his doctoral dissertation on how his plant could meet its permit using SND combined with traditional nutrient reduction.

Graceville's SBR (Aqua-Aerobic Systems) serves the city, along with the 2,000-bed Graceville Correctional Facility. Its design flow is 1.1 mgd; the average flow is 0.71, although during rainstorms, inflow and infiltration can drive daily flows to 1.2 mgd or higher. Each year, the plant teams does some sewer system rehabilitation with cured-in-place pipe lining, manhole lining and pipe replacement.

Wastewater passes through a bar screen and PISTA grit system (both Smith & Loveless) before entering the SBR. Effluent is disinfected with chlorine gas before discharge to Holmes Creek. The plant consistently meets its permit limits of 5 mg/L BOD and TSS, 3 mg/L total nitrogen and 1 mg/L phosphorus.

Biosolids are treated in the Aquaconeer P-Uptake Digester Process, which is designed to limit effluent phosphorous without chemical treatment while significantly reducing aerobic digester power costs. “It includes an anaerobic period to allow bacteria and alkalinity to reduce the phosphorus level, so the decant won't have any impact on the treatment system,” Martin says. “The phosphorus level in the decant coming back to the headworks is 2.5 mg/L.” Biosolids are landfilled after dewatering on a screw press (FKC) and drying beds.

Charlie Martin stands on what remains of the old grit removal system at the Graceville treatment facility. The grit system was upgraded in 2000 and is being upgraded again.



A NOVEL APPROACH

An observation about Graceville's SBR led Martin to investigate SND. In traditional nitrification-denitrification, bacteria convert ammonia to nitrite, then to nitrate and finally to nitrogen gas, which bubbles to the surface and escapes. Typically, the steps occur in separate anoxic and aerobic tanks or in separate zones in a single tank. In SND, ammonia is converted directly to nitrite and then to nitrogen gas in a single tank; the process requires less oxygen and treatment time.

In 2008, Martin observed that the plant was delivering effluent that was low in nitrogen and phosphorus, despite never having an anoxic phase. "The next spring when we started watering the lawn, we noticed air bubbles coming up from where the air lines were running, and we realized that we had been losing air. We fixed it by putting couplings at the joints."

During college studies in 2014, he recalled that event and did a literature review in which he determined that SND had been occurring in the plant: "When the air lines were leaking, we were getting just enough air to keep the system anoxic. The way SND works is you are using nitrifying organisms that are able to nitrify under anoxic conditions. So as they nitrify, they are generating nitrite. Then the facultative bacteria on the edge of the floc use that nitrite instead of oxygen in order to break down CBOD." That process yields nitrogen gas.

He wants to explore adding variable-frequency drives to the Graceville plant's positive displacement blowers so that instead of operating all-out, they can be dialed down: "If we could control how much air is being put into the SBR, then we could keep it in an anoxic condition longer and promote SND."

EXPERT TRAINER

To keep his team sharp, Martin is a big believer in training. The plant operations team includes:

- William Austin, 17 years of service, Class B wastewater and Class C drinking water licenses
- Michael Canaday, 14 years, Class C wastewater and Class C drinking water
- George Chestnut, six years, Class B wastewater and Class B drinking water
- James Jefferson, operator trainee

"I try to get people who enjoy doing different things and are not afraid to learn," Martin says. "We encourage our people to get additional certifications, and the city gives them raises for that. I also try to make sure they are being constantly stimulated." Team members attend classes offered by TREEO Center and the Florida Rural Water Association.

Among Martin's mentors in the profession is Ron Trygar, senior training specialist at TREEO Center, who has known him since 1997. In 2005, as a region director for the Florida Water and Pollution Control Operators Association, Trygar enlisted Martin's help to provide chlorination and disinfection training sessions across the Florida panhandle.

After joining TREEO Center in 2006, he worked with Martin to build drinking water and wastewater exam preparatory classes that are still in high demand. "Around the same time, I encouraged the Florida Operator Exam Committee director to include Charlie on the drinking water and wastewater exam committees," Trygar says.



Martin, a science buff, finds there is always something new to learn in the water professions.

SEWER SLEUTHING

About 10 years ago, Charlie Martin and his team were having trouble sustaining the dissolved oxygen level in the sequencing batch reactor at the Graceville (Florida) Wastewater Treatment Plant. At certain times of day, spikes in ammonia were occurring.

"It was usually around the same time," Martin recalls. "Ron Trygar [senior training specialist at the University of Florida TREEO Center] told me there was another town having the same issue and that it was caused by meth labs dumping ammonia into the collections system."

Martin went to the police chief, who said he suspected at least two meth labs were operating in the city. After further consultation with the Public Works director, Martin assigned his operators to take and analyze samples from each of the city's eight lift stations. They identified one in which ammonia spiked at times that coincided with elevated levels in the plant.

"Then we started lifting manhole covers and getting samples from the manholes," Martin says. "We traced it all the way back to the house that we thought was the meth lab. Then we went back to the police chief and asked if that was a house he suspected. He said yes." The lab was soon busted and out of business.

At another time, operators reported a petroleum smell while spraying the plant's static screen. It tended to happen at about 4 p.m. The suspect was a business that serviced semitrucks. Upon visiting the business, Martin and the Public Works director saw a drain oil drum at the back of the shop next to a clean-out.

"He was dumping the oil," Martin says. A quick inspection using the city's camera truck verified the violation, and the business was prosecuted.

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Drinking water samples are tested for total coliform, *E. coli* and other parameters in the City of Graceville’s NELAP-certified environmental laboratory.

“Although we may be sometimes unappreciated, we can never lose sight of the value of what we do.”

CHARLIE MARTIN

“Charlie has helped TREEO Center deliver quality training to operators in both water and wastewater treatment. He has traveled out of state to deliver contract courses for us and has provided exam preparation tutoring to operators on his own time. We continue to collaborate on projects and treatment plant troubleshooting. Charlie is a wonderful trainer; he has a way of making the learning fun and easy to follow. Many students come into our classes hoping to see Charlie as one of the instructors.”

ing the learning fun and easy to follow. Many students come into our classes hoping to see Charlie as one of the instructors.”

MAKING A DIFFERENCE

Training is another facet of a career Martin quickly grew to love: “The biggest thing I love about it is that I know I’m serving the community, protecting the environment and protecting public health. I’m a science buff, and this field is basically applied science — using science to solve problems. You can never get comfortable because as soon as you think you have it figured out, there is always something new to learn.

“All operators know we are greatly needed. Although we may be sometimes unappreciated, we can never lose sight of the value of what we do.” tpo



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AN AERATION BLOWER REPLACEMENT PUTS A WISCONSIN CLEAN-WATER PLANT ON A COURSE TOWARD BEING ENERGY SELF-SUFFICIENT OR A NET PRODUCER OF ENERGY

By Steve Lund

The Beaver Dam (Wisconsin) Wastewater Treatment Plant is an extended aeration facility. Its activated sludge process allows the wastewater to spend 24 hours in aeration under average flows.

It takes a lot of air to operate that kind of plant, so saving energy on blowers has a big impact, says Rob Minnema, director of utilities for Beaver Dam, population 16,000, in southeastern Wisconsin. So, when an opportunity arose to upgrade the plant's blowers at a subsidized price, he jumped on it.

Minnema was faced with overhauling or replacing the 150 hp blowers installed in 1985 at the plant (5.5 mgd design, 4 mgd average). Overhauls would cost about \$20,000 apiece for four blowers. The staff had already tried to save electricity by installing a variable-frequency drive on one of the blowers, but it was not very effective in reducing power draw with reduced speeds, given the blowers' design.

"They were either wide open or off," Minnema says. "We were looking at spending \$80,000 and would still have the same technology." A grant of nearly \$40,000 for new blowers from Focus on Energy, funded by Wisconsin electric utilities, made the decision a lot easier.

Minnema says, "When I went through Focus on Energy, and I did the cost analysis. It was kind of a no-brainer to go to the other type of blower."

TWO DO THE WORK OF FOUR

Beaver Dam chose a pair of 200 hp ABS Sulzer HST 20 turbocompressors with magnetic bearing technology. "We replaced four blowers with two," Minnema says. "They are both on VFDs, and they rarely run at 100% of capacity. We basically get the same amount of air out of one blower at 70% speed as from two of the 150 hp blowers."

Another advantage was low maintenance: "They are essentially zero-maintenance blowers. There is no oil. We just change the filters; that's about it." The savings have been substantial. Since the new blowers were installed in 2018, plant electricity costs have decreased by about \$4,200 per month. That puts the payback on the investment at about six years.

Although most of the cost reduction was from the blower replacements, there were also some savings from replacing the air header pipes, as there had been some air loss from the pipes connecting the blowers to the aeration chambers.

HIGH BOD

The reason for the plant's long aeration time is the presence of several food processors in the city. They include a pizza plant, vegetable processor and cream cheese plant. "Our BOD loading is a little bit higher than most cities that have a commercial, residential and industrial mix," Minnema says. "We get about 50% of our load from industrial customers."



ABOVE: Two Sulzer magnetic bearing blowers replaced four old blowers at the Beaver Dam Wastewater Treatment Plant. LEFT: The biological treatment process includes extended aeration.

The wastewater from the cream cheese plant comes in a dedicated force main and is pretreated in a high-rate anaerobic system before being mixed with the rest of the influent. That pretreatment facility was built during a major upgrade of the Beaver Dam plant in 2011.

"They have an extremely high BOD load," Minnema says. "We have had an agreement with them since back in 2010. We built the pretreatment facility on our site. We have a high-rate anaerobic system that knocks the strength down before it comes into our regular process."

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The Beaver Dam Wastewater Treatment Plant has a 5.5 mgd design flow and treats 4 mgd on average.

CAPTURING BIOGAS

The pretreatment facility produces substantial biogas, which is captured and mixed with the gas from the plant's three digesters and is burned to produce heat and electricity in two 400-kW generators from Caterpillar Inc., Electric Power Division. "We run one of those generators 24/7," Minnema says. "We produce enough gas to keep a generator going all the time."

The solids from the digesters go to a 750,000-gallon secondary storage tank, which doubles as a gas storage facility. From there, the solids go to two

“When I went through Focus on Energy, and I did the cost analysis. It was kind of a no-brainer to go to the other type of blower.”

ROB MINNEMA

belt filter presses for dewatering to about 15% solids before land application on farms.

In 2011, when the cogeneration system was set up, it worked out better to send the electricity to the grid. In return, the treatment plant gets a credit worth about \$220,000 a year. That credit is likely to decrease significantly after the current contract with Alliant Energy expires in 2021. Still, Minnema expects to continue selling to the grid since using the electricity at the plant would require a substantial investment in infrastructure.

NET-ZERO ON THE HORIZON?

In the meantime, Minnema is in discussions with a solar developer for an array of solar panels on the plant property. Through a power-purchase arrangement, the developer would build the solar panels and the city would purchase all the power at a fixed price.

The solar array could produce most of the plant's power, especially since the new blowers have cut demand substantially. "If we went to solar, we'd be close to being energy independent," Minnema says. "The solar would provide most of our power. We could even be net positive. We could at least be energy neutral, but to be a little bit positive would be better." **tpo**



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A First, and a Success

AN ADVANCED NUTRIENT REMOVAL TECHNOLOGY SAVES A PLANT IN NORTHEAST WISCONSIN FROM AN EXPENSIVE EXPANSION AND BRINGS MULTIPLE BENEFITS

By **Scottie Dayton**

The Fond du Lac (Wisconsin) Regional Wastewater Treatment and Resource Recovery Facility must meet stringent phosphorous limits of 0.8 mg/L to 0.19 mg/L by spring 2023.

After submitting a preliminary phosphorus reduction plan to the state in 2013, plant and city officials faced the challenge head-on. In 2014, the city hired the Strand Associates engineering firm, which worked with operators to find an answer.

“Without a technical solution, we faced building a fourth aeration basin to handle increased industrial loading through the headworks and a high sidestream load from our high-strength waste receiving station,” says Cody Schoepke, plant superintendent.

The team evaluated three sidestream deammonification technologies. Two of the footprints required relocating tanks, but not the AnammoPAQ reactor (Ovivo-Paques). “We could use our two centrate equalization tanks and integrate the reactor tank next to them exactly where it belonged,” Schoepke says.

However, there was a hitch: Paques had representation in Europe but no reactor installations in the U.S. Schoepke contacted three plants and received operating information that clinched the team’s confidence in the process. In addition, Paques guaranteed 83% or greater ammonia removal without adding alkalinity, provided specific conditions were met.

Contractors installed the process equipment from April through October 2018, and it functioned as promised. The pilot project was the first sidestream deammonification system in Wisconsin and the first in the U.S. using the Paques system. The project earned the 2020 Engineering Excellence State Finalist award from the American Council of Engineering Companies of Wisconsin.



PHOTOS COURTESY OF FOND DU LAC REGIONAL WASTEWATER TREATMENT AND RESOURCE RECOVERY FACILITY

Standing on the internal settler over the anammox reactor, Mike Nolde, wastewater operator, pours a reactor sample into an Imhoff cone to check for granule quantity, size and color.

“Our operators were integral to startup, which happened ... during one of the coldest winters on record.”

CODY SCHOEPKE

HOW IT WORKS

A rectangular tank with fine-bubble aeration houses a high-loaded anaerobic ammonium oxidizing (anammox) upflow sludge bed reactor. Because of the high specific anammox activity and biomass concentration, deammonification occurs in one pass.

Pumps feed centrate from the equalization tanks to an Astra separator on top of the tanks. “This tilted plate settler captures residual total suspended solids, which will inhibit the bacteria,” Schoepke says. A rotary-lobe pump returns solids to the main treatment line.

Centrate overflows from the separator to the reactor. Inside the tank, 1-5 mm granules support colonies of anammox bacteria, which convert ammonium and nitrite directly into nitrogen gas, and ammonia-oxidizing bacteria. The reactor's internal settler retains the majority of dense granules (biomass) while floc and nongranulated bacteria are wasted.

Three positive displacement blowers (Aerzen) feed the aeration grid on the bottom of the reactor. Dissolved oxygen, pH, ammonia and nitrate/nitrites probes (s::can Messtechnik GmbH) control the blowers and operating DO. "Paques was uncomfortable using a U.S. probe manufacturer," Schoepke says. "S::can is prevalent in Europe and works well for us."

BEFORE STARTUP

Upgraded in 2008, the 11 mgd (design) activated sludge plant averages 8 mgd from 65,000 residents. Operators use ferric chloride for phosphorous removal, but the chemical has limitations. "Our influent ammonia is 25 to 28 mg/L, and because of the high-strength waste, the digester sidestream contributes 40% of the ammonia load," Schoepke says. "Since 2014, we've experimented with biological phosphorous removal to reduce phosphorous, but needing to nitrify makes it difficult."

While waiting for the process equipment to arrive from the Netherlands, operators replaced the old centrate feed pumps with Flygt - a Xylem Brand submersible pumps, and the maintenance staff built a hut for the rotary lobe sludge pump (Boerger) next to the location for the Astra separator.

Months before startup, the granular anammox catalyst arrived in 27 300-gallon totes from Denmark and Brazil. To keep the biomass alive, operators monitored the totes daily, adding sodium nitrate if nitrate levels were too low. If conductivity was high, they pumped off supernatant and added fresh effluent.

AFTER STARTUP

"Our operators were integral to startup, which happened on Jan. 8, 2020, during one of the coldest winters on record," Schoepke says. "The biomass required constant attention as it acclimated." The team controlled the centrate feed rate and dilution water so as not to overwhelm the bacteria with too much ammonia. They also manually controlled the blowers based on reactor samples drawn every three hours.

Within a week, ammonia levels were less than 200 mg/L in temperatures between 20 and 30 degrees below zero. During the second week, the system achieved consistent 90% or greater ammonia removal. According to Paques, it was the fastest startup in the world.

The team also learned that temperature was crucial for anammox to perform at optimal levels. "In winter, we heat the 54-degree F dilution effluent to between 95 and 98 degrees F," Schoepke says. "Since the anammox reaction produces heat, the effluent prevents the reactor from overheating in summer."

PROVING THEIR METTLE

The operators' greatest challenge was almost killing the biomass two months after startup. They were adding 20 gpd of bleach to 225,000 gpd of dilution effluent to keep it fresh. Over a weekend, the bleach feed pump air-blocked. An operator turned up the feed to push out the air, but then forgot to turn it down. By Monday morning, ammonia removal had ceased and the biomass was black with some white spots.

"Replacing the seed catalyst would have been a large expense and taken months to arrive," Schoepke says. "Instead, we turned off the centrate feed to rest the bacteria while providing air and micronutrients. Revival happened slowly, but we had high ammonia removal again by the second month."

Even polymers upset the sensitive biomass. While operators weren't guilty of overfeeding the cationic dry polymer, they did switch to a different type during a trial. "This polymer prevented the release of nitrogen gas, causing



Alex Krause, wastewater operator, optimizes the airflow control on the AnammoPAQ reactor control panel (Ovivo-Paques).



Wastewater operators are (clockwise from left) Ryan Masek, Mike Nolde, Kyle Casper, Aaron Hafermann and Alex Krause. Hafermann holds an Imhoff cone with granules.

the granules to float," Schoepke says. "My staff pumped them off the surface, and the pump's shear rate broke the polymer bond." The polymer eventually made its way through the reactor.

CONCLUSION

Compared with conventional nitrification/denitrification, the Pasque system achieved energy savings of 30% due to lower aeration demand. The reactor's smaller footprint saved 90% in construction costs and achieved 100% savings in external carbon. Schoepke's operators love the system because it functions on its own with little supervision: "Their contributions and hard work are the reason it is performing so well." tpo



Two Water Is Life Poster Contest winners were recognized by the Anaheim (California) City Council.

As part of Water Awareness Month, 29 students were recognized before a Los Angeles Angels baseball game in front of their teachers, classmates and families.



Rewarding Creativity

ANAHEIM PUBLIC UTILITIES' ANNUAL POSTER CONTESTS CELEBRATE CHILDREN FOR THEIR ARTWORK PROMOTING CONSERVATION AND WATER'S IMPORTANCE

By Sandra Buettner

Each year, Anaheim (California) Public Utilities hosts a water poster contest for first through eighth graders.

The Water Is Life contest was created in 1990 by the Metropolitan Water District of Southern California for its 26 member agencies, which include Anaheim. All members submit their contest winners, and the district chooses 36 winners for its annual calendar.

Anaheim's water supply comes from groundwater and it purchases water from the district. The city's Lenain Water Treatment Plant treats up to 15 mgd for 352,000 consumers; it is the only city-owned filtration plant in Orange County.

OUTSIDE THE BOX

The poster competition helps the Anaheim utility engage youth and their families in water conservation, given frequent droughts in Southern

California. The contest kicks off in March, and entries are due by May 1. The contest is open to all public and private schools and home-schooled children in the utility's service area. The rules are promoted through mailings to parents, teachers, the utility's educational partners and after-school programs such as the Boys & Girls Clubs.

A panel of four or five employees from the utility's sustainability group judge the entries, along with a graphic artist and one or two people from the Anaheim Convention Center, a major bottled water distributor. Winners are chosen on creativity, originality and outside-the-box thinking.

"One winning example that included all three was a drawing of a little girl taking a bath with her dog," says Melissa Seifen, the utility's communications supervisor. The title read, "Take a Bath With Your Dog to Save Water." The utility receives 400 to 500 submissions every year; two or three winners from each grade are chosen.

“ We always choose a game in May because it is Water Awareness Month. It’s so wonderful to see the faces of the children who are so excited and their parents who are so proud of them.”

MELISSA SEIFEN

WINNERS RECOGNIZED

The utility recognizes the winners — about 18 per year — in various ways. All winners, their families and their teachers attend a Los Angeles Angels baseball game in May. For many of the children, it’s their first professional ballgame.

“We always choose a game in May because it is Water Awareness Month,” Seifen says. “It’s so wonderful to see the faces of the children who are so excited and their parents who are so proud of them.” The children arrive early and receive trophies along with an Angels baseball cap. At the pregame festivities, the children and their entries are featured on the Jumbotron. Group photos of all the kids with their trophies are taken on the field.

The district frames the winners’ artwork and displays them in a traveling exhibit for member utilities’ lobbies. In addition, two winners are featured on the labels for bottled water the utility produces for distribution at community events like fiestas, open houses, school science fairs and sporting events. The utility also sells the bottled water to the Anaheim Convention Center for sale to event organizers through their concession packages. The children receive a case of bottled water to take home for family and friends.

The two winners from the bottled water contest are recognized at a City Council meeting. They attend with their families, and each student gives a speech while big monitors display their winning entries. Afterward, their artwork is framed for them to take home.

DISTRICT CALENDAR

“We are thrilled to recognize these students and their creativity each year,” says Steve Faessel, Anaheim mayor pro tem. “Anaheim has a long history of educating our students about the importance of conserving water. What’s even better is that the students’ artwork also helps educate the public by showcasing important themes at local events and for visitors at the Anaheim Convention Center.”

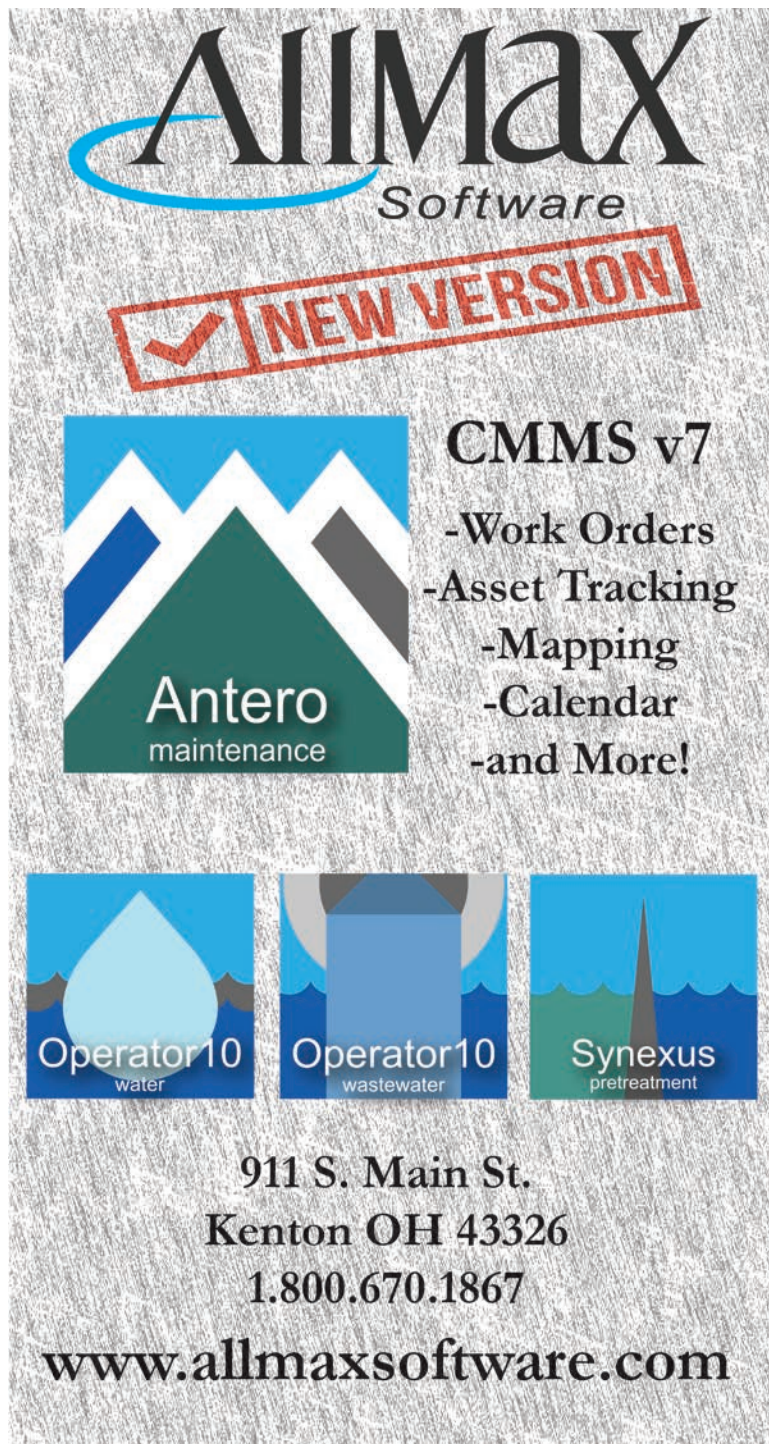
Finally, the winning entries are submitted to the Metropolitan Water District’s calendar contest. Two or three Anaheim students’ artworks are usually chosen for the calendar. The winners, their parents and their teachers attend an event in the district’s Los Angeles office boardroom, where the winning posters are framed for display. The poster collection then travels to all the member agency lobbies.

tpo

What’s Your Story?

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

Poster contests winners’ artwork is printed on water bottle labels.



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Pervasive Excellence

THE AWARD-WINNING FORT COLLINS BIOSOLIDS PROGRAM FOLLOWS QUALITY PROCEDURES IN APPLYING CLASS B MATERIAL ON A CITY-OWNED 26,000-ACRE RANCH

STORY: **Jim Force**

PHOTOGRAPHY: **Carl Scofield**



The Meadow Spring Ranch crew loads dried biosolids into a Kuhn Knight Slinger 8132 truck bed, preparing for distribution on the city's cattle ranch property.



Jennifer Ward and Nate Ader monitor one of the 11 groundwater wells on the ranch.

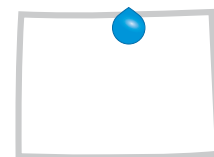
Some clean-water plants have trouble finding land to apply their biosolids. That's not the case at Fort Collins, Colorado.

The city owns the 26,000-acre Meadow Springs Ranch, a cattle ranch near the Colorado-Wyoming border that's 30 miles from the plant. Trucks haul biosolids to the ranch four to five days a week — roughly 2,300 metric tons per year.

The city began land-applying at the ranch in 2001 after 10 years of careful study in collaboration with Colorado State University, the U.S. EPA and the state Department of Public Health and Environment.

"We unload the solids directly on land, then spread them using a tractor with a spreading trailer or a wet spreader," says Jason Graham, director of plant operations for the Water Reclamation and Biosolids Division.

The wet spreader can fling solids 60 to 65 feet and has flotation tires to minimize soil compaction and impacts on vegetation. "The biosolids improve soil structure and water retention and act as a slow-release fertilizer," Graham says.



Drake and Mulberry Water Reclamation Facilities

Fort Collins, Colorado
www.fcgov.com

POPULATION SERVED:
168,000

COMBINED FLOWS:
**29 mgd design,
 19-20 mgd average**

BIOSOLIDS PROCESS:
**Dissolved air flotation
 thickening, mesophilic
 digestion, dewatering**

BIOSOLIDS VOLUME:
**2,300 metric tons
 per year**

BIOSOLIDS USE:
**Land-applied on
 city property**

AWARDS:
**2019 Rocky Mountain
 WEA Biosolids Program
 of the Year; National
 Biosolids Partnership,
 Gold Level 2018,
 Platinum Level, 2019**



The Meadow Spring biosolids facility crew includes, from left, Nate Ader, Cooper Ellis, Karl Watkins and Jennifer Ward.



“Value the individual talents each member brings to the table, especially those employees in remote areas.”

JASON GRAHAM

MULTIPLE RECOGNITIONS

All Fort Collins wastewater facilities are certified under the ISO 14001 international environmental management standard. The department has won commendations including a Gold Partnership in the Environmental Leadership Program from the Department of Public Health and Environment, a Platinum Peak Performance Award from the National Association of Clean Water Agencies, and Rocky Mountain Water Environment Association awards in sustainability and safety.

In 2019, the biosolids program achieved Platinum Level classification from the National Biosolids Partnership and the Biosolids Management Award from the Rocky Mountain WEA.

“The awards provide credibility for our ratepayers and staff that we are on the right track,” Graham says. He attributes the program’s success to his staff, especially the biosolids management program team: “They’re the ones who’ve done all the work.”

Jason Graham, director of plant operations, gives credit to his staff for the plant’s success and the resulting environmental awards.

“The biosolids improve soil structure and water retention and act as a slow-release fertilizer.”
JASON GRAHAM

The biosolids team includes Jennifer Ward, Nate Ader, David Wiedeman, Allison Becker, Mark Patterson, David Coad, Nick Russell, Tracy Bane and Jerry Yakel.

CLEANING THE WATER

The city's Water Reclamation and Biosolids Division includes an industrial pretreatment program, mechanical and electrical maintenance, plant operations, technical services and resource recovery staff. An on-site pollution control laboratory and SCADA engineering team ensure accurate process control decisions and smooth operations.

The Drake and Mulberry Water Reclamation Facilities have a combined design capacity of 29 mgd and combined average flow of 19-20 mgd. Both use a three-stage biological nutrient removal process followed by UV disinfection (WEDECO - a Xylem Brand).

All solids are treated and stabilized at the Drake facility using four mesophilic anaerobic digesters to generate Class B biosolids. Only three digesters operate at any time; the other is reserved for use during maintenance and cleaning. A pair of Centrisys/CNP centrifuges yield cake at 19% solids.

Digester gas fuels process and building heating year-round; the excess is flared off in summer. The utility is developing a cogeneration project and expects to complete it by the end of this year. Three city-owned tractor-trailers equipped with tarps transport biosolids to the ranch — typically 10 to 12 truckloads per week, or more than 580 loads per year.

The hauling presents budgeting and maintenance challenges, and weather can be a factor. “Trucks are not cheap,” Graham says. “We can get about 19 years of service out of a vehicle before we have to go to a new truck.” The trucks and spreading equipment are part of the utility's asset management plan; the use of city-owned equipment is cost-effective.

A front-end loader is used to load the spreaders at the ranch.

GREAT FOR GRAZING

The Meadow Springs Ranch sprawls over rolling grassland on the Front Range of the Rocky Mountains just off Interstate 25. Elevation is about 5,500 feet, precipitation is moderate and temperatures can vary widely between summer and winter. Summer droughts are not uncommon.

PRODUCTIVE PARTNERSHIP

The National Biosolids Partnership was created in 1992 by the Water Environment Federation, the U.S. EPA, and the National Association of Clean Water Agencies. It advocates environmentally sound biosolids practices based on the internationally recognized standard for environmental management, ISO 14001.

It's a management program tailored to the needs of the clean-water profession, serving as a model for continuous improvement, regulatory compliance, quality management and positive relations with stakeholders.

To achieve Platinum Level recognition, the Fort Collins, Colorado, biosolids management program had to operate in accordance with National Biosolids Partnership standards and conduct annual audits — self assessments and at least three independent third-party audits every five years. The standards are high: recognized programs must be efficient, responsive and protective of human health and the environment.

Other recognition levels are bronze, silver and gold. In addition to the recognition program, the National Biosolids Partnership advances sound biosolids management practices, serves as an information clearinghouse and provides technical assistance. Visit www.wef.org/resources/topics/browse-topics-a-n/biosolids.





A semi-truck pulls into the dewatering building at the Drake Water Reclamation Facility to fill up with a load of biosolids. The trucks carry about 580 loads of biosolids per year to the ranch. One load covers 1.34 acres; the application rate is calculated at about 3 to 4 dry tons per acre.

The biosolids augment soil that supports grazing land. “The biosolids are nutrient rich,” says Ward, a technical services specialist with 25 years of knowledge and regulatory expertise. “They act as fertilizer in the short term and as a soil amendment in the long term.

“We really believe in what we’re doing. It’s good for the land.”

Along with Ward, four resource recovery specialists staff the ranch. Ader is the resource recovery chief, responsible for the operation; Karl Watkins and CJ Ellis are resource recovery technicians; and Wiedeman is in charge of biosolids hauling.

Meadow Springs Ranch is a working cattle ranch, leasing cattle operations to the Natural Fort Grazing Association. “We use the local Natural Resources Conservation Service expertise to determine annual grazing plans,” Ward says. “Application sites are determined by ranch staff. Then each plot is mapped using GPS and, weather permitting, truckloads are deposited directly on the land. A front-end loader is used to load the spreaders.”

One load covers 1.34 acres; the application rate is calculated at about 3 to 4 dry tons per acre. The staff also makes sure the ranch is using all its water rights, interacts with the public and assesses forage to determine how many animals to pasture.

HOME TO WILDLIFE

The ranch is also a habitat for the pronghorn antelope and the site for the National Black-Footed Ferret Conservation Center. The utility works with the U.S. Fish and Wildlife Service and the Colorado Parks and Wildlife department to reestablish the ferrets, a species related to badgers and weasels that is native to the area but on the endangered species list. It’s the first and only project of its kind in the country.

While there aren’t many neighbors in this plains-to-mountain region, there are some, and the utility takes good relations to heart. “Fencing is always an issue,” Graham says. “Dust, traffic and occasionally odors can present problems. We try to maintain an open dialog with our neighbors. We have a flyer, and we post information on our website. We’re also planning an open house. But sometimes it’s just best to have conversations with them.”

That’s one of the lessons learned at Fort Collins, according to Graham: “Communicate with your neighbors, and pay attention to odors.”

CAREFUL ATTENTION

Since the start of the program, testing and all biosolids practices have been directed by members of the biosolids management program team. The cross-functional team meets once a month, paying attention to the whole biosolids value chain.

They review the impact of pretreatment and the effects of cake application on the environment. Team members also monitor metals, nitrogen and phosphorus, establish standard operating procedures, provide training and set goals such as feed rates to the digesters and percent solids coming off the centrifuges.

“We use the local Natural Resources Conservation Service expertise to determine annual grazing plans.”

JENNIFER WARD

They maintain contact with jurisdictional emergency response teams for quick response if anything were to happen during transportation or on the ranch. Recognition of the team’s contribution is another lesson learned: “Value the individual talents each member brings to the table, especially those employees in remote areas,” Graham says.

It’s an ethic that permeates civic activities in Fort Collins. In 2017, the city won the Malcolm Baldrige award, a prestigious national honor recognizing leadership, strategy, customers, measurement and analysis, workforce, operations and results.

Those sound exactly like the standards Graham, Ward and the team apply daily to the Fort Collins biosolids program. **tpo**

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Compliance tools from NJBSoft help operators create and modify schedules for sample collection based on permit requirements.

The screenshot shows a software interface for managing compliance schedules. At the top, there are filters for 'Type: Project', 'Group By: None', 'Project: All', 'Sample Site: All', and 'Contaminant: All'. Below this is a calendar view for 'March - May, 2020'. The calendar is organized by days of the week (Sunday to Saturday) and dates. Key features include:

- Navigation:** 'Today' button, left and right arrows, and a 'Show Schedules' button.
- Calendar Grid:** Days are color-coded (yellow for weekends, light blue for weekdays). A mouse cursor is visible over the date 19.
- Compliance Rules:**
 - 'TOTAL COLIFORM RULE' is listed on the right side of the calendar.
 - 'STAGE 2 DISINFECTANTS AND DISINFECTION BYPRODUCTS RULE' is listed on the right side of the calendar.
 - 'AOC & ATC CERTIFICATIONS-RADON/INCLUDES RULE-STANDARDIZED MONITORING FRAMEWORK' is listed on the right side of the calendar.
 - 'MONTHLY WATER OPERATIONAL SAMPLES' is listed on the right side of the calendar.
- Counts:** 'Count: 27' is shown at the bottom right of the calendar grid.

Compliance Made Easier

SOFTWARE TOOLS GIVE WATER AND WASTEWATER UTILITIES A CENTRALIZED PLACE FOR ALL FUNCTIONS RELATED TO STAYING ON THE RIGHT SIDE OF REGULATIONS

By Ted J. Rulseh

Keeping a clean-water or drinking water plant in compliance is a daily operating challenge — and also a matter of logistics.

A sound compliance program includes knowing the regulations and the testing requirements, collecting the right samples at the right time, analyzing and compiling the data, creating correct and timely reports to the regulatory agencies and more. The process can be exacting, complicated and time consuming.

NJBSoft aims to help utilities simplify and improve their compliance programs by providing technically advanced software designed for the municipal market. Offerings include SAMSWater and SAMSWastewater regulatory compliance tools, along with needs-specific software development, training and integrated asset management.

The software tools are designed to provide continuous advice and alerts, help create and modify schedules for sample collection based on permit requirements, and simplify monitoring and reporting functions. Pranam Joshi, NJBSoft president, talked about the tools in an interview with *Treatment Plant Operator*.

tpo: What was the motivation for bringing these tools to the market?

Joshi: The intention was to give utilities a common place for compli-

“We have been described as the TurboTax of water quality. We enable them to have all the data in a single place and all the technologies working together.”

PRANAM JOSHI

ance management and data management, which in many utilities are not consolidated. We have been described as the TurboTax of water quality. We enable them to have all the data in a single place and all the technologies working together. If they already have technology in place for certain aspects of compliance and are happy with that, we can use the data generated by that technology. Our tools bring everything together and then provide information about their state of compliance.

tpo: What does a typical compliance program look like without tools such as you offer?

Joshi: Typically the system would consist of Excel files. A SCADA system would give them one area of information. The GIS would look at locations

The software makes it easy to record sampling data and document that samples have been collected and results transmitted to regulators.

RawB Monthly Sampling Status										
	My Town		Downtown		Old Town		Your Town		Neighbor	
	Sample Collected	Results Transmitted	Sample Collected	Results Transmitted	Sample Collected	Results Transmitted	Sample Collected	Results Transmitted	Sample Collected	Results Transmitted
January	2/2	2/2	2/2	0/2	1/2	1/2	4/4	2/4	3/3	0/3

RawB Quarterly Sampling Status										
	My Town		Downtown		Old Town		Your Town		Neighbor	
	Sample Collected	Results Transmitted	Sample Collected	Results Transmitted	Sample Collected	Results Transmitted	Sample Collected	Results Transmitted	Sample Collected	Results Transmitted
Q1	1/1	1/1	4/4	2/4	2/3	1/3	12/12	10/12	9/9	5/9

where their assets are physically listed. They would reach out to their laboratories, internal and external, to send files or to look at the data and type it into a spreadsheet. Then they would go to state, federal and agency websites to learn what the regulatory requirements are. Finally, they would have to take action.

tpo: What does the compliance program look like for a utility that uses your tools?

Joshi: Our offering has all the schedules built in, which means it will continuously remind them what they need to do. They don't have to look up anything. The tools can send emails and text messages. They integrate with lab data. Whenever the data comes in, the tool runs through the regulations and tells them what they need to do next. It has built-in connections to SCADA and GIS. Everything is in one place, so they can see the full picture.

tpo: How do the tools help with required reporting to regulatory agencies?

Joshi: We have reporting functions that take all the data, combine it and format it into reports that are ready to be submitted physically, via email or electronically into the agencies' reporting systems. The individual states' rules and regulations are built into the tools.

tpo: How would you characterize the key benefits of the software?

Joshi: It frees compliance officers from the tedious job of entering data from PDF files into spreadsheets, so they can focus on managing compliance. The benefit of the tools should be looked at in terms of how they make a compliance program better. In order to properly manage compliance, utilities need tools that work as effectively as the most capable person. It's like an insurance policy. On perhaps 95% of the required tasks, they don't necessarily need to be reminded that something is missing. The problem is that 5% or even 1% that can be missed. Because they can't afford to miss anything on compliance.

tpo: What are some common compliance problems that these tools help users avoid?

Joshi: Monitoring is one of the biggest ones. They're required to perform a certain level of testing to make sure the water is good, and often the testing requirements are not very straightforward. A testing requirement could have several scenarios: If there are certain triggers, utilities may need to collect additional samples or respond to other agencies. Some utilities may not be aware of all the implications of the sampling results, so they run into problems.

tpo: Can you give an example?

Joshi: A very large water utility was required to collect several samples within 24 hours of getting a positive coliform reading. Their volume was so huge that the regulator said they could not manage it manually — they needed to have a system in place. They set up the program in SAMSWater, and it tracks every compliance

sample. It sends text-based notifications and reminders and enables back-and-forth communication so that they never miss a sample they have to take because of a positive coliform test.

tpo: How are these tools offered for sale?

Joshi: We offer a subscription-based service and perpetual licenses.

tpo: Is there any size of organization for which these tools are an especially good fit?

Joshi: Our clients range from very large to very small utilities. For the smallest organizations, the cost may be difficult to justify because they have a limited number of samples to collect. Some of our clients are very small utilities that have experienced being on the wrong side of compliance or have seen similar utilities get into trouble. But midsize to large companies are our prime candidates; they do not need any convincing that they need something like this.

tpo: How would you describe the usability of the tools?

Joshi: It is a cloud-based platform that enables users to access their information remotely. Our app is completely customizable. They are not limited to a standard layout. They can say, "I want to have these 20 fields. I want them arranged this way. I want them in these colors." Anything that helps them understand the compliance requirements can be designed within a desktop-based application without the need to know any programming. The tools are built on a robust platform so that they can scale at any level. **tpo**

1st Quarter			2nd Quarter		
Month	Number of Samples Taken	Monthly Ave. Chlorine Level (mg/L)	Month	Number of Samples Taken	Monthly Ave. Chlorine Level (mg/L)
April		0.68	July		0.52
May		0.59	August		0.54
June		0.56	September		0.55
July		0.52	October		0.70
August		0.54	November		0.67
September		0.55	December		0.73
October		0.70	January		0.57
November		0.67	February		0.49
December		0.73	March		0.69
January	50	0.57			
February	40	0.49			
March	40	0.69			
Running Annual Average (RAA):		0.61	Running Annual Average (RAA):		
Meets standard? (i.e. RAA < MRDL of 4.0 mg/L as Cl ₂)		X Yes	Meets standard? (i.e. RAA < MRDL of 4.0 mg/L as Cl ₂)		Yes
		No			No

The software greatly simplifies compliance report preparation.



All Aflutter

OPERATORS AT A CENTRAL WISCONSIN MUNICIPAL WATER AND WASTEWATER UTILITY PLANT FLOWER GARDENS TO HELP MONARCH BUTTERFLIES BREED NEW GENERATIONS

By Jeff Smith

Thanks to plant operators and staff, part of an otherwise unusable piece of land at the Marshfield (Wisconsin) Wastewater Treatment Facility adds beauty and provides much needed habitat for the declining populations of monarch butterflies.

Surrounding the circular ends of two 400-foot-long concrete oxidation ditches, nearly half an acre of land was converted into a garden of wildflowers and native grasses. More than 20 species of wildflowers such as black-eyed Susans, wild bergamot, yellow coneflower, joe-pye weed and swamp milkweed create an area pleasant to the eye and attractive to monarchs.

"It was a wasted end of the oxidation ditch that was hard to mow," says Sam Warp, plant superintendent in Marshfield. "Weeds had taken over the area, and so it wasn't a very good use of the property."

VOLUNTEER LABOR

Warp and his staff first prepared the area by removing brush, grass and weeds. Soil amendments were added to condition the seedbed for planting. In 2018, the wastewater and water treatment plant staffs planted the wildflower seeds, plants and native grasses. "It actually flowered a little bit the first year, so we were really happy," Warp says. "When you are rebuilding a wild prairie, it's a five-year project until you get what you're hoping for."

Since 2018, an area surrounding the sign in front of the wastewater plant has been converted into a wildflower garden. Warp says that each year, the plant teams look for a different area that can be made into a wildflower garden to attract monarchs. Last year, a garden was also created at Griese Park, a city attraction with a nature trail, picnic areas and shelters.

PHOTOS ABOVE: The original garden in front of the oxidation ditches features milkweed, black-eyed Susans, wild bergamot, yellow coneflower and joe-pye weed, while native prairie grasses surround the Marshfield plant sign.

"When you get the garden just right and the flowers that come up first are blooming, it looks fantastic," Warp says. "But the rest of the time it looks like native weeds because they're still growing."

GRASSROOTS EFFORT

The original wildflower garden resulted from a partnership in 2017 between the wastewater and water treatment divisions of Marshfield Utili-

“We also plant lots of milkweed because even though they [monarch butterflies] feed on the nectar of many flowers, they breed only where the milkweed is found.”

SAM WARP

ties to create a monarch conservation project. "I belong to Friends of Mill Creek, a grassroots community group committed to improving the water quality of Mill Creek, which is our plant's receiving stream," Warp says.

"Several members of that group share my interest in wildflower prairie restoration and asked me to find a partner for the conservation project. Because the wastewater plant seemed like the ideal location, Marshfield Utilities supported the idea."

Warp's interest in monarch butterfly habitat and wildflowers is not accidental. For more than 25 years, he has practiced his hobby of gathering the butterfly eggs from milkweed plants each spring and summer and nurturing them at his home through the larvae and pupa stages. He then releases the adult monarchs.

"Last year we fed about a hundred, but usually we feed around fifty," Warp says. "If you do too many, it starts to seem like work rather than a hobby." Warp's interest in butterflies is in line with his participation in other environmental groups, such as the Marshfield Groundwater Guardians a program promoted by the national Groundwater Foundation.

KEEPING IT BEAUTIFUL

Twice a year, members of the utility partnership team up to maintain the butterfly gardens. They set up a day in spring and fall to weed, add mulch and replace dead flowers or plants. The New England aster is emphasized as a replacement because it's a late-season bloomer that provides nectar for pollinators, especially the monarchs before their migration to Mexico.

"We also plant lots of milkweed because even though they feed on the nectar of many flowers, they breed only where the milkweed is found," Warp says.

The original garden has been designated as a Certified Wildlife Habitat through the National Wildlife Federation. It is now part of the Million Pollinator Garden Challenge, a national effort to create a million gardens that provide habitat for declining pollinator insects, like butterflies and bees.



Wildflower gardeners stand at the site of the original garden which they had prepared for planting wildflowers the following year. Front row, from left, Faith Schmidt, Cathy Lotzer, Amanda Lucas, Melissa Barnes, and Tony Nelson. Back row, Erick Boon, Patti Sternitzky, Jane Pearson, Sam Warp, and Louis Kuhlka.



From left, Faith Schmidt, Jane Pearson, (front) Cathy Lotzer, (rear) Bridget O'Brien, Tony Nelson, Jim Benson, Kathy Leick, Kent Mueller, Melissa Barnes, Patti Sternitzky and Sam Warp, planted a wildflower garden near a structure at Griese Park.

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"We actually get people who come by and if they see weeds, they'll take them out," Warp says. "Once they see how nice it is, the citizens buy in and see that it's a good thing. That was the goal, and it has worked better than we ever thought."

Warp says that when the black-eyed Susans are blooming, the gardens look really impressive, even though it only lasts for about a month. "It's like, wow! Now that's why we did all that work. Next year we might target the water field. That's where city's water wells are located, and it has nice paved walking path that lots of people use." **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 or call 877-953-3301.**

The Lead Is Out

LOUISVILLE WATER JOINS AN ELITE GROUP OF UTILITIES THAT HAVE REMOVED ALL LEAD DRINKING WATER SERVICES ON THE PUBLIC SIDE OF THE METER. NOW THOSE ON THE HOMEOWNER SIDE ARE THE TARGET.

By Ted J. Rulseh

Lead drinking water services became front-page news after widespread lead poisoning was discovered in Flint, Michigan. Some water utilities had been tackling lead services aggressively long before the trouble in Flint surfaced in 2016. One of them is the Louisville (Kentucky) Water Co., which in July hit a major milestone, removing the last of the lead service lines on the utility side of the meters.

In all, Louisville Water has removed about 74,000 lead service lines installed between 1860 and 1936. It took more than 50 years and more than \$50 million to remove those lines, which were spread throughout the service area but concentrated in older neighborhoods established before the 1940s.

Marking the occasion, Mayor Greg Fischer observed, “This achievement is a great example of how our city innovates. Removing lead pipes from the water system is something that only a handful of cities have accomplished. It shows how Louisville Water distinguishes itself as a national best-in-class water utility.”

Next on the agenda is to encourage and incentivize the removal of lead lines running from the meters into the homes. Spencer Bruce, president and CEO of Louisville Water, and Kelley Dearing Smith, vice president of communications and marketing, talked about the lead-removal initiative in an interview with *Treatment Plant Operator*.

tpo: Why did Louisville Water undertake this program long before the problem in Flint came to light?

Bruce: We’re in the business of public health. We’ve always known there was a concern about lead in the drinking water. We started replacing

“Our meter readers, inspectors and supervisors went out and inspected every meter vault in the system. Wherever they found a lead line, they documented it.”

SPENCER BRUCE

lead lines as early as the 1970s. When we did a main replacement, if there was a lead service line, we would replace it at that time. We continued that into the 1980s, and in the 1990s, we hit it hard. We wanted to be ahead of the curve. We like to be ahead on all regulatory issues.

tpo: What happened in the 1990s to accelerate the lead line initiative?

Bruce: We kicked off a significant main replacement and rehabilitation program, as well as a main cleaning and lining program. We also started

doing block renewals for lead, and we have been doing them ever since. There was an effort in the early 1990s to do an inventory of the lead in our system. Once we got the inventory, we moved into a project where, on average, we spent several million dollars every year to replace the lead lines.

tpo: What was involved in taking the inventory of lead services?

Bruce: Our meter readers, inspectors and supervisors went out and inspected every meter vault in the system. Wherever they found a lead line, they documented it. We’ve never found a lead service line for a home built in 1950 or later, so although we looked at every meter vault, we told our people to focus on the older areas of Louisville. We did an inventory again in the mid-2000s, and as we kick off our automated metering infrastructure, we’ll be visiting every meter vault one last time to make sure we didn’t miss anything.

tpo: What exactly are block renewals?

Bruce: Based on the inventory, we mapped the system, and each year we replaced the lead lines on selected blocks in the city. We tried to do a representative number of block renewals across the entire city based on funds available in a given year.

tpo: Did the utility offer to test customers’ water for lead levels?

Bruce: In the 1990s, we began to offer lead testing. If any customer wanted a lead test, we absolutely would provide that. If the level was high, then we would do a remediation for that customer. We also helped them determine if they had a private lead service. We didn’t

get a lot of takers on the lead analysis until the Flint situation became public. Flint was a game changer.

tpo: What happened to the volume of requests for analysis after Flint?

Dearing Smith: When the media around the Flint crisis happened in 2016, we had 147 requests for lead sampling that year. The year before, we only had 30 requests. In 2017 and 2018, we continued with about 150 requests per year. We announced on July 14 that we had replaced all of our lead service lines and were trying to help customers on the private side. We did a



Spencer Bruce

“In terms of lead replacement, Louisville has been a leader — not only in Kentucky, but across the nation.”

SPENCER BRUCE

press event through a virtual format, we sent out a video press release, and Spencer and I made ourselves available. In that one day, July 14, we had 76 customers contact us to get their water sampled. It even beat the highest we had seen on a single day with Flint.

tpo: Do you also deal with lead issues by way of the treatment process?

Bruce: The first line of defense is our treatment strategy to produce chemically stable water. We add lime to achieve a pH of 8.8 and balance the sulfate-to-chloride ratio. We manage that daily, and we also check our distribution system. We are a chloramine system, so we have to manage pH to make sure we have the right residuals all the way though.

tpo: How many lead services would you estimate still exist on the private side?

Bruce: We know of approximately 900. We are reaching out to those customers right now with a letter that says they have a lead service line, we have a program that we're offering, and contact us and we'll help with that.



Louisville Water has systematically replaced all lead water services on the utility side of the meters.

We have an additional number of homes where we don't know for sure if they have lead services or not. We'll be sending letters out to those property owners as a phase 2 component.

tpo: What incentives are you offering to encourage replacement of private lead services?

Bruce: We are willing to pay 50% of the cost, up to \$1,500, to replace the lead service line. About a year ago, it was 50% up to \$1,000, but when we looked at the data, it said the process was a little more expensive than it used to be, and \$1,500 is now closer to the 50% mark.

Louisville Water Requests for water testing for lead

YEAR	REQUESTS
2015	30
2016 (Flint, Michigan)	147
2017	155
2018	135
2019	128
2020*	185

* Through mid-July

tpo: Are there any special provisions for lower-income people who might not be able to afford half of the replacement cost?

Dearing Smith: In addition to the 50% match, if someone doesn't have the money for half of the cost, we will connect them to the Louisville Water Foundation. We've set up funding there, and for people who meet the eligibility requirements, the foundation can pick up the other half.

Bruce: We've also applied for some federal grant money to help with the private side.

tpo: Have you engaged plumbers as partners in the project, or are property owners free to choose their own contractor?

Bruce: They are free to choose their contractor, but we have written a letter to all the plumbers letting them know about our program. We will offer suggestions of plumbers we have worked with if the customers don't know who they want to hire.

tpo: Do you expect to be doing many private line replacements in the next few years?

Bruce: I don't think so. You would be amazed, even though we're offering this program, how many people don't want to deal with it. They don't want to mess up their yard or do something to their landscaping. Many people don't see it as an issue. I expect this program to be on our books for many, many years.

Dearing Smith: Out of the initial set of letters we sent out, maybe 200 total, we only heard from two people. We are doing some follow-up with those customers. We're sending them a postcard if we haven't heard from them.

tpo: What else are you doing to promote lead line replacement on the private side?

Dearing Smith: The city of Louisville includes a metro council with 26 council districts. We've given them the streets in their districts that have private lead service lines, and we're brainstorming with the council folks on how they can help us get the word out. In addition, the Louisville Metro Public Health Department is a huge advocate for us. As we planned the private program, we kept the director, Dr. Sarah Moyer, and her team in the loop every step of the way. We have had conversations about how they can help promote the program.

tpo: What do you see other utilities around Kentucky doing with lead line replacement?

Bruce: They are all concerned about lead. The ones I'm familiar have reviewed their treatment programs and made adjustments if needed. Kentucky has many small rural water systems, and they have other issues to deal with in addition to lead. They're trying to use their available funds as best they can. In terms of lead replacement, Louisville has been a leader — not only in Kentucky, but across the nation. I believe there are seven total utilities that have worked to replace all the publicly owned lead service lines, and we are certainly one of those. **tpo**

Treatment, Filtration and Stormwater

By Craig Mandli

Aeration Equipment

TRIPLEPOINT ENVIRONMENTAL ARES LAGOON AERATOR

The Ares Lagoon Aerator from Triplepoint Environmental combines aeration efficiency with turbulent mixing in a single, portable unit. It has a rugged, precision-machined solid hub with no seams to crack or leak. The coarse-bubble static tube draws up to 7,800 gpm of water and liquefied organic matter from the floor to keep solids in suspension and prevent sludge accumulation. Diffuser Quick Connect ensures rapid, reliable installation of high-efficiency, self-cleaning fine-bubble diffusers. Independent testing demonstrates standard oxygen transfer of up to 2.4%/ft or 4 to 7 lb/O₂ per horsepower hour, translating to up to 60% energy savings. Its high negative buoyancy ballast is 30% lighter out of the water for easier installation and maintenance. Attached to an onshore blower via laterals or individual air lines, it has no moving parts in the water and simply drops in from the surface for lagoon upgrades without downtime. **800-654-9307; www.tpenv.com**



Ares Lagoon Aerator from Triplepoint Environmental

Blowers

EURUS BLOWER ZG



ZG blower package from Eurus Blower

The ZG blower package from Eurus Blower includes an internal sound-dampening feature lowering both sound and pulsations in blower packages with or without a sound enclosure. The package includes an integrated silencer, base frame, inlet filter/silencer with automatic belt tensioning and vibration isolators. Other components include a motor, drive, valves, flex connections and controls that are provided site specific and interchangeable. The complete blower skid package

does not need to be sent to a blower repair facility in the event one item fails or needs rework. All critical components may be quickly replaced, substituted or repaired directly by the original supplier. **630-221-8282; www.eurusblower.com**

HOWDEN 827 DVJ

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



827 DVJ dry-vacuum blower from Howden

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

Dredge

SRS CRISAFULLI SYSTEM SD-110 ROTOMITE DREDGE

The self-propelled, steerable SD-110 Rotomite dredge from SRS Crisafulli System clears sediments out of water plant settling ponds, increasing the utility's ability to process drinking water more rapidly, as dredging can be performed while ponds are in service. This nimble, self-propelled diesel dredge turns in all directions and is suitable for cleaning water plant settling ponds, especially those filled with sediment. It floats in as little as 17 inches of water, uses horizontal augers and turns as it dredges. It produces 500 pounds of thrust from a 12-inch prop assembly and can quickly apply full power in forward or reverse in a 180-degree arc. The result is ideal maneuverability, even when pushing against mud and dragging a floating pipeline. **800-442-7867; www.crisafulli.com**



SD-110 Rotomite dredge from SRS Crisafulli System

Filtration Systems

LAKESIDE RAPTOR FALCONRAKE BAR SCREEN



Raptor FalconRake bar screen from Lakeside

Protecting downstream equipment in municipal and industrial applications, the Raptor FalconRake bar screen from Lakeside achieves high removal efficiency and low headloss, without the need for lower bearings, sprockets, bushings or guides that could

foul or jam conditions in the channel. The all stainless steel, corrosion-resistant construction is designed with multiple rakes that continuously

remove captured material. It is available in a range of bar shapes and depths so that it can create an efficient, durable and dependable rapid debris removal system for a range of applications. In addition, its design and construction mean a low horsepower, energy-efficient drive system. **630-837-5640; www.lakeside-equipment.com**

SCRENCO SYSTEMS MEGA SCREEN 800

The Mega Screen 800 septic receiving station from Screenco Systems includes 51 square feet of screening area, fed by a 6- or 8-inch inlet with dual-fan spreaders that deflect waste down onto the screen, making the front screen almost self-cleaning. Complete vac tank clean-out is available with the optional side and front splash sheeting. It processes up to 1,000 gpm of wet well or septic waste with an 8-inch cam outlet fitting. The Dual Screen Design is nonmechanical and uses gravity to separate trash from the waste stream. The standard unit features all-aluminum construction



Mega Screen 800 septic receiving station from Screenco Systems

with stainless steel, 3/8-inch-gapped bar screens on opposing angles and meets the Ecology 503 Regulations for septic screening. A bolt-on chute assembly allows trash to exit in either direction, and built-in forklift skids make the unit portable, allowing for setup virtually anywhere. **208-790-8770; www.screencosystems.com**

FOG Control

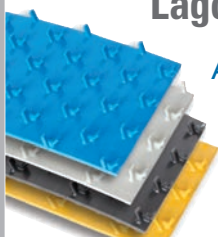
HACH EZ SERIES ONLINE ANALYZERS

EZ Series online analyzers from Hach provide a solution for continuously monitoring parameters that are critical to risk mitigation, compliance, safety and process uptime. Choose from five different technologies: titration, colorimetry, chemiluminescence, ion-selective electrode and voltammetry. The analyzers include a wide analytical range; a variety of measuring ranges, multistream capabilities and multiple parameter options; and reliable monitoring of remote locations or unmanned plants, which allows staff to focus on other tasks. **800-227-4224; www.hach.com**



EZ Series online analyzers from Hach

Lagoon Products



Sure-Grip liners from AGRU America

AGRU AMERICA SURE-GRIP

Sure-Grip liners from AGRU America are made of HDPE, HDPE-el, polypropylene, PVDF or ECTFE and serve as a long-term alternative to spray-applied concrete protection products. The liners prevent concrete corrosion and degradation, can substantially extend the lifetime of a structure and provide direct protection for the environment by preventing exfiltration and infiltration. The liners have anchoring systems that enable construction in areas of significant backpressure. Unlike spray-applied liners, which have to be reapplied regularly due to cracking or delamination, these liners are long-lasting and are designed to avoid the residuals cost often associated with concrete spray-on liners, which require tank emptying and cleaning every few years for reapplication. **843-546-0600; www.agruamerica.com**

MARKLAND SPECIALTY ENGINEERING AUTOMATIC SLUDGE BLANKET LEVEL DETECTOR

The automatic sludge blanket level detector from Markland Specialty Engineering controls solid-liquid interface levels and automates biosolids removal. Used in primary, secondary and backwash clarifiers and settlement tanks (including lamellas, dissolved air flotation units and decanting tanks), its use of LEDs enables it to locate both the settled silt or biosolids bed and overlying cloud layer, automatically adjusting beam intensity to accommodate different concentrations. Its slim profile is ideal for obstructed/constricted areas. It allows users to program pumps to operate only when necessary, helping prevent carryover, optimize feed density for enhanced dewatering and avoid pumping thin biosolids or large volumes of water (as when a core hold is pulled). These efficiencies help reduce energy use, wear and tear on pumps and downtime for maintenance. No calibration is required. **855-873-7791; www.sludgecontrols.com**



Automatic sludge blanket level detector from Markland Specialty Engineering

Moving Bed Biofilm Reactor

PARKSON TUMBLEOX MBBR

The TumbleOx MBBR from Parkson is an attached growth, fixed-film process with a media design that allows wastewater to be aerated without the use of blowers. The media is housed in a slowly rotating drum that carries the media in and out of submergence. The cup-shaped media continually lifts and discharges the liquid through the media bed, providing consistent transfer of atmospheric oxygen to the wastewater. High dissolved oxygen levels are achieved with a single 1.0 hp drive unit per drum. Media contact within the drum also prevents buildup so an active biofilm is maintained. The process is a nonactivated sludge alternative suitable for lagoon effluent ammonia removal, industrial pretreatment, treatment of sludge dewatering return flows, and small municipal and industrial BOD and ammonia removal applications. Systems can be provided as individual drums for installation in site-built tanks or as three-drum factory-assembled units. **888-727-5766; www.parkson.com**



TumbleOx MBBR from Parkson

MBR

SMITH & LOVELESS TITAN MBR

The TITAN MBR packaged membrane bioreactor system from Smith & Loveless includes high-performance flat sheet membranes, easy component access, intuitive graphical touch-screen PLC controls, smart advanced data monitoring and communications, reduced process complexity, and a streamlined membrane clean-in-place process. It is designed with a stable process tailored to permit requirements and capable of achieving high effluent quality and Title 22 approved water reuse. It has stainless steel componentry and streamlined electrical layout with an operator-friendly wire management system. The treatment plant will arrive in a complete and compact factory-built system with significantly less field assembly for even swifter installation and startup. **800-898-9122; www.smithandloveless.com**



TITAN MBR membrane bioreactor system from Smith & Loveless

SUEZ WATER TECHNOLOGIES MOBILE MEMBRANE BIOREACTOR

The mobile membrane bioreactor from SUEZ Water Technologies is a fully integrated wastewater treatment system incorporating biological processes and ZeeWeed 500 ultrafiltration membranes in a compact, ready-to-operate unit designed for direct reuse or discharge applications that require high-quality effluent. The unit is a self-contained system with modular connections for the process unit and bioreactor. It has an integrated drum screen and aeration diffusers and is digitally enabled with the company's InSight asset performance management platform. The ultrafiltration membranes have a reinforced membrane fiber structure for durability. It is well-suited for applications with variable influent quality and high levels of suspended solids. **866-439-2837; www.suezwatertechnologies.com** *(continued)*



Mobile membrane bioreactor from SUEZ Water Technologies

Media Filters

ALFA LAVAL AS-H ISO-DISC CLOTH MEDIA FILTERS

Alfa Laval AS-H Iso-Disc cloth media filters can be engineered to maximize the filtration area in an existing basin. They provide superior tertiary filtration that can meet California Title 22 reuse standards. The design enables individual disc turbidity to be measured and allows users to see the flow from each one and, if necessary, isolate an individual disc for maintenance without disrupting the rest of the flow. **866-253-2528; www.alfalaval.us**



AS-H Iso-Disc cloth media filters from Alfa Laval



AquaStorm filtration system from Aqua-Aerobic Systems

AQUA-AEROBIC SYSTEMS AQUASTORM

The AquaStorm cloth media filtration system from Aqua-Aerobic Systems is an effective solution for wet-weather applications, including combined sewer overflow, sanitary sewer overflow and stormwater. The system uses a disc configuration and OptiFiber PF-14

pile cloth media, and it operates with three zones of solids removal to filter wet-weather flows without the use of chemicals. It is designed to handle a wide range of flows in a fraction of the space and offers simple startup/shutdown with unattended operation for remote locations. The system also allows for dual-use application for tertiary and wet-weather operation. **800-940-5008; www.aqua-aerobic.com**

GALENE WATER TREATMENT AMF

Galene Water Treatment's AMF media filters fit a variety of applications and treatments, including turbidity, TOC, color, nitrates, iron and manganese. A preinstalled second bottom eliminates the need for contractors to cement floors on site. A backwashing design minimizes channeling, reduces pressure loss and lowers both operating costs and backwashing time. Filters as low as 10 gpm and up to 1,600 gpm are available. Individual units or multiple skid-mounted plug-and-play units make installation fast and easy. **844-942-5363; www.galenevt.com**



AMF media filters from Galene Water Treatment



Anox K5 Media from Kruger USA

KRUGER USA ANOX K5 MEDIA

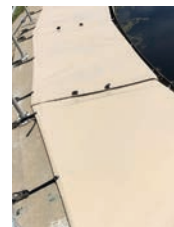
ANITA Mox is a sidestream deammonification technology that is offered in both MBBR and integrated fixed-film activated sludge configurations, depending on site conditions. As such, the system consists of engineered polyethylene carriers — Anox K5 Media from Kruger USA — to provide ample protected surface area for biofilm to thrive. The media (approximately the diameter

of a quarter) hosts two types of bacteria in the same reactor. The outer layer consists primarily of ammonia oxidizing bacteria, which convert about half of the ammonia to nitrite. The inner layer consists mainly of anaerobic autotrophic ammonia oxidizer bacteria, which utilize the resulting nitrite and much of the remaining residual ammonia and convert them to nitrogen gas that is released harmlessly to the atmosphere. **919-677-8310; www.veoliawatertech.com**

Membrane

INDUSTRIAL & ENVIRONMENTAL CONCEPTS CLARIFIER LAUNDRER COVERS

Flexible membrane clarifier launder covers from Industrial & Environmental Concepts are made from a combination of industrial membrane, stainless steel and reinforced high-density polyethylene materials. Extending from the outer tank wall to the effluent weir, the cover protects the effluent trough and weir from sunlight. Algae growth in clarifier launders can be a major problem, causing TSS excursions with NPDES permits and clogging of V-notch weirs. Algae also impairs the effectiveness of disinfection systems using UV and chlorine. Algae impairs transmissivity in UV systems and increases chlorine demand for systems using chlorine to reduce fecal counts in their effluent stream. **952-829-0731; www.ieccovers.com**



Clarifier covers from Industrial & Environmental Concepts

Mixer

JDV EQUIPMENT NOZZLE MIX SYSTEM

The Nozzle Mix System from JDV Equipment is a dual-zone mixing technology that provides uniform mixing patterns that produce even distribution and a stable environment. It can help optimize solids suspension and contact to promote efficiency in a wide range of applications. The system is designed with pumps installed outside the tanks to facilitate ease of maintenance. The pumps are typically chopper pumps or pumps incorporating in-line grinders that prevent fibrous materials from accumulating and causing plugging problems. The application dictates which type(s) of the many varied pump options can be used. The high-velocity nozzles are mounted inside the tank and are oriented to discharge in a flow pattern that completely mixes the tank contents. **973-366-6556; www.jdvequipment.com**



Nozzle Mix System from JDV Equipment

Nutrient Removal

AQUAFIX QWIK-ZYME L

Qwik-Zyme L from AQUAFIX is a grease degrader that incorporates three types of fat-degrading biocatalysts to provide dramatic hydrolysis of FOG. The biocatalysts speed the breakdown of complex fat molecules into simple short-chain fatty acids, which can help lower phosphorus. This is not a bacterial product, but rather a high-tech saliva that degrades FOG, allowing bacteria to eat it. It can degrade a range of fatty acids such as oleic, steric and palmitic, as well as fish oils, triglycerides, milk and animal fats. It is a suitable grease degrader in sequencing batch reactor, wastewater treatment plants, equalization tanks, and food and egg processing plants. **888-757-9577; www.teamaquafix.com**



Qwik-Zyme L grease degrader from AQUAFIX

CENTRISYS/CNP CALPREX

CalPrex, a predigestion phosphorus recovery system from Centrisys/CNP, works with high concentrations of soluble phosphorus and is a viable solution for utilities seeking to mitigate operations and maintenance issues related to struvite scaling and poor sludge dewaterability. It



CalPrex phosphorus recovery system from Centrisys/CNP

offers more than 65% solubilization of phosphorus in bio-P sludge, diverts more than 70% of the soluble phosphorus from the digester, reduces up to 50% of the total phosphorus in biosolids, reduces struvite buildup in the methane digester, reduces disposal costs up to 30%, reduces polymer consumption, and creates a valuable fertilizer as brushite, which is comparable to leading phosphate fertilizers on the market today. It is intended for facilities needing phosphorus removal and recovery prior to thermal hydrolysis, from waste activated sludge and/or primary sludge prior to anaerobic digestion or from aerobic or post-aerobic digestion. No ammonium is required. **262-654-6006; www.centrisys-cnp.com**

PARK PROCESS SLUDGE KING II

The Sludge King II roll-off dewatering container from Park Process uses filters that turn 90 degrees at the bottom of the container, leaving standing water in the cake. This also increases the usable area of the filters by 33%



Sludge King II dewatering container from Park Process

over older containers with only one center filter wall. The increased filter surface area and the narrowed sludge compartments formed by the additional filter panel translate into drier cake formed in less time. **855-511-7275; www.parkprocess.com**

SBR

EVOQUA WATER TECHNOLOGIES OMNIFLO SBR MAX



OMNIFLO SBR MAX system from Evoqua Water Technologies

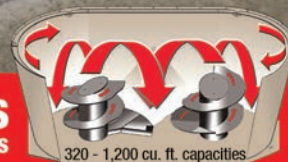
The OMNIFLO SBR MAX system with Jet Tech technology from Evoqua Water Technologies combines the benefits of a true-batch SBR with the benefits of a continuous-fill batch reactor process to treat wastewater influent flows to more than five times design. The system optimizes hydraulic handling during storm

flows, reduces equipment sizing and cost, and can trim energy costs more than 15%. At low flow rates, the system operates in the OMNIFLO SBR true-batch mode; and during peak flow events, the system automatically switches to operating as Evoqua's GoFlo continuous-fill batch reactor to dissipate peak flows and slash hydraulic overflow rates. **844-409-9492; www.evoqua.com**

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- Large, replaceable knives provide outstanding particle breakdown



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Scrubber/Biofilter

SIMPLE SOLUTIONS RMS-800

The RMS-800 recirculating molecular air scrubber from Simple Solutions is a two-stage filter that is self-contained and requires no external ventilation. It is suitable for a large array of odor control needs, including wastewater applications, but it can also be used to remove any odor associated with a volatile organic compound in any enclosed room. The odor solution offers a combination of a high airflow of 800 cfm and volume of carbon (7.5 cf). This increases the life of the carbon and results in a high contact time



RMS-800 air scrubber from Simple Solutions

of 0.56 seconds. The scrubber uses a pressure blower instead of a centrifugal fan, making it more durable to backpressure. The unit can provide two air exchanges per hour when used in a 50-by-50-by-10-foot room. It comes with a MERV 7 prefilter for removal of mold spores, dust and other contaminants; voltage in one or three phase; a magnehelic pressure gauge; a NEMA magnetic motor starter; four lift points for mounting to a winch to hold above the workplace; a built-in skid with forklift tong slots for easy maneuvering; and 250 pounds of GC 4 activated carbon. **973-846-7817; www.industrialodorcontrol.com** **tpo**

It's your magazine. Tell your story.

TPO welcomes news about your wastewater or water treatment operation. Send your ideas to editor@tpomag.com or call 877-953-3301

By Craig Mandli

Hybrid system used to alleviate odor concerns

Problem

A wastewater treatment plant outside of Charleston, South Carolina, was expanding and the existing headworks facility was being relocated. During construction, odor from the influent pump station was a major concern.

Solution

Anua delivered a multistage pre-packaged odor control system. The 3,700 cfm **AiraHybrid system** uses a two-stage process. The first stage, a biotrickling filter using engineered AiraGlass media made from recycled glass bottles, treats hydrogen sulfide. The second stage uses activated carbon media.



RESULT:

The system was completely shop-assembled, prewired, preplumbed, skid-mounted and shop-tested before shipping. It has performed as expected, mitigating odors. **346-225-8033; www.anuainternational.com**

Natural flocculent dewateres sludge and reduces polymer usage

Problem

The wastewater treatment plant in Lovington, New Mexico, had settling problems in the sequencing batch reactor tanks. They were overloaded with solids but were wasting mostly water. The 2.5 mgd (design) plant has an average flow of 1.3 mgd. There are two SBR tanks, two aerobic digesters and a screw press (HUBER Technology) for biosolids dewatering.

Solution

BICI Chemicals supplied **AT-318** and **Aqua Aide treatments**. AT-318 is a natural flocculent and settling aid. The two products reduced phosphorus, controlled filamentous bacteria bulking and helped dewater sludge. To start the process, BICI Chemicals applied a shock load of both products. The plant staff then started daily dosing, and within a couple of days, the solids were settling. The waste flow to the digesters increased from 0.5% to 2% solids.



RESULT:

FOG and filamentous bacteria have become almost nonexistent, solids settle well in the SBRs, and polymer usage in the screw press decreased by 25%. "AT-318 and Aqua Aide keep working after being activated," says Miguel De La Crus, plant superintendent. "We had to reduce the daily dosing to only four days a week. The solids in our digester were thickening so much that our screw press was having trouble pumping them for dewatering." **918-720-2066; www.bicichemicals.com**

Aerators enable BOD removal in wastewater lagoon

Problem

Kansas Dairy Ingredients was faced with fines exceeding \$65,000 per month from the City of Hugoton for excess BOD and FOG, low pH and high TSS. To address these and future issues, the city constructed a 2-acre poly-lined lagoon that's 12 feet deep to treat the waste stream. BOD discharge was more than 8,000 pounds per day, FOG was higher than 95 ppm, pH was 3.1 to 4.2, TSS was higher than 2,900 ppm and odor was extreme.

Solution

DO2E Wastewater Treatment supplied a 4 hp **Little John Digester** with four tubes of advanced oxidation processing in a lift station between the Kansas Dairy Ingredients plant and lagoon. Each tube of ozone produces 0.5 grams of ozone per hour, delivered to the waste stream through the digester. Each aerator delivered 650 scfm, transferred 18.9 mgd and produced 2.85 pounds of oxygen/hp/hour.

RESULT:

The pH stabilized at 7.65, and critical testing began. The first goal was to condition the effluent to hold its highest levels of dissolved oxygen. DO quickly increased from 0.65 ppm to 2.85 ppm, and over the next six months, it steadily climbed to 4.6 ppm, where it remained. **850-698-6805; www.do2e.com**

System solves waste treatment challenges for rural town

Problem

The rural Alabama town of Section (population of 770) sought an effective and relatively maintenance-free wastewater treatment solution.

Solution

The town installed a two-phase, 30,000 gpd **ECOPOD-D system** from **Delta Treatment Systems** that is designed for expansion. The first phase treats 30,000 gpd at 300 mg/L of both BOD and TSS and handles an average daily flow fluctuation of 50% to 100%. The units were installed in poured-in-place concrete tanks with aluminum hatches. A 14,208-gallon flow equalization tank stores wastewater and doses it to the treatment system. The equalization tank includes duplex pumps to prevent flow surges. A 19,190-gallon primary tank precedes the equalization tank. Effluent is UV disinfected. A drip disposal system, also from Delta, includes an effluent pump chamber, headworks, tubing, controls and all valves and fittings. A concrete building on site houses electrical controls and equipment.



RESULT:

The system is automated and requires minimal operator attention. It meets effluent requirements and has served as a training site. **800-219-9183; www.deltatreatment.com**

Encapsulated enzyme reduces sludge in wastewater lagoon

Problem

The wastewater treatment lagoons in Hennessey, Oklahoma, had trouble with suspended solids, excessive sludge, high COD, odor, stagnant/flat water and black mold. Their average daily flow was 160,000 gpd, and the six-lagoon system discharged through land application.

Solution

IMR Lagoon Systems supplied a turnkey lagoon maintenance and restoration program. A drip meter was installed at a lift station where the chemicals are delivered every 30 minutes. The encapsulated enzyme does not cannibalize itself and only works when introduced to bacteria. IMR Lagoon Systems staff visits the lagoons every other month to refill the chemicals, take COD, DO and pH readings, and make sure all is working properly.



RESULT:

After one year, the water was a healthy emerald green, no odor was present and TSS was eradicated. "Within the first three months, we began to see a noticeable change in the clarity of our water," says Curtis Turner, Public Works director. "Since the rise of our DO, we were able to reduce the time we run our aerators. That has saved on electricity cost." 918-381-1681; www.imrlagoonsystems.com

Venturi technology used to alleviate taste and odor issues

Problem

The North Texas Municipal Water District needed to add ozone at the Wylie Water Treatment Plant to satisfy regulatory requirements to control disinfection byproducts and remediate taste and odor problems caused by seasonal algae blooms at Lake Lavon.

Solution

Venturi sidestream injection technology from **Mazzei Injector** was chosen to minimize the size and maintenance of the 11 ozone contact basins that would treat a future maximum 890 mgd. To ensure the ozonated effluent was well-mixed into the raw water, basin inlet channels were constructed to allow confined-space gas mixing of all incoming water with a single basin nozzle manifold. To provide turndown, each manifold can operate with either a single or dual injection system.



RESULT:

Each contact basin has single-nozzle manifold with two duty and one standby injector. The final design operates at an energy cost of 0.99 kW/kg of applied ozone at the peak ozone design dosage of 3.5 mg/L. Plant operators can fine-tune ozone dosage in response to algae blooms. 661-363-6500; www.mazzei.net

Mixing system defeats biogas digester crust

Problem

A thick crust was hampering biogas operation at a Danish hog producer after problems with propeller stirrers.

Solution

Landia first lent a 30-kW digester mixing system as a temporary solution. In a short time, the facility staff saw improvement. The retrofit was simple, and slowly but surely the half-meter-thick floating layer was gone.



RESULT:

The digester has trouble-free circulation, and the staff can save energy by switching off the Landia equipment during the daytime. The facility is seeing 15% to 20% faster turnover. 919-466-0603; www.landiainc.com

Food production facility meets discharge limits with compact system

Problem

Hempler's Foods in Ferndale, Washington, needed to treat meat processing wastewater with high BOD and TKN to meet discharge limits.

Solution

Nijhuis Industries provided a compact solution for production line and smokehouse wastewater. The system consists of a static curved screen, primary dissolved air flotation, flow equalization and smokehouse storage tanks, continuous aerobic biological treatment, dissolved air flotation for sludge thickening, and a chemical dosing system.



RESULT:

The system discharges effluent with BOD and TKN well below the discharge limits, resulting in minimal impact to the local wastewater treatment plant. The system is designed for expansion. The system can reduce BOD by up to 95% and TKN by up to 90%. 312-300-4101; www.nijhuisindustries.com

(continued)

City successfully tames disinfectant residual variability in distribution network

Problem

Southlake (Texas) Water Utilities services a growing community of more than 30,000 and purchases chloramine-disinfected water from Fort Worth. With no treatment plant, it has a limited ability to control disinfectant residuals in the distribution network. Operations personnel examined techniques to improve disinfectant residuals throughout the system. They focused first on the seven water storage tanks.



Solution

Kyle Flanagan, water supervisor, thought a two-step process might be ideal; adding tank mixers first would provide systemwide improvement, and he could then more precisely determine which tanks and pressure zones would benefit from more active disinfectant residual control. Southlake installed seven **PAX Water Technologies tank mixers** in the four elevated storage tanks and three ground storage tanks. Immediately, the system reached equilibrium with a more stable systemwide disinfectant residual.

RESULT:

Southlake staff now can more precisely determine the location and quantity of the disinfectant residual boosting stations. By installing the mixers first, Southlake was able to install two boosting locations instead of the originally anticipated seven. "The mixers immediately improved the uniformity of our water and allowed us to more thoughtfully add more active water quality improvement measures," Flanagan says. **866-729-6493; www.paxwater.com**

Mixer reduces grease buildup and high solid slug loading to treatment plant

Problem

The Random Farms Wastewater Treatment Facility in Chappaqua, New York, faced issues related to pump station grease buildup, solids settling and pump clogging.



Solution

C3ND Environmental Consulting installed **PHi-Constant Air** from **Pulsed Hydraulics** within 2 inches of the bottom of the pump station to provide a full mix of the wet well, eliminate sedimentation buildup and remove residual grease at the surface and that accumulated on floats.

RESULT:

The residual grease at the surface was removed, and the complete mix enabled transfer of sedimentation through the station to the wastewater treatment plant. Within one week, residual grease accumulation on the pump floats and appurtenances was removed, enabling consistent pump operation. The installation eliminated the task of grease and debris removal every two to three months. The system paid for itself within six months. The pump station also has less odor and less maintenance related to ragging of the pump impellers. **800-641-1726; www.phewater.com**

System designed to reduce struvite buildup

Problem

The 30 mgd Tres Rios Water Reclamation Facility in Pima County, Arizona, experienced severe struvite buildup in pipelines and equipment after anaerobic digestion. A combination of ferric chloride addition and dilution water in centrate return lines was used to slow the buildup. The facility sought a more efficient method.

Solution

The county selected the integrated **phosphorus management system** from **Schwing Bioset/NuReSys** to convert orthophosphate into struvite and eliminate the need for dilution water and ferric while reducing return phosphorus loads to the facility. The two-stage process controls pH in the first stage and precipitates struvite in the second stage, allowing precise process control.



RESULT:

Orthophosphate levels are reduced from 150 mg/L to 40 mg/L, preventing struvite scaling. The phosphorus return load has been greatly reduced and so has polymer consumption for biosolids dewatering. Struvite sequestered in biosolids increases phosphorus availability and so enhances the fertilizer value. The system has flexibility to convert to hybrid operations in the future, enabling the processing of dewatering centrate and high harvest rates of the produced struvite. **715-247-3433; www.schwingbioset.com**

Plant adds oxidation ditch to meet nutrient removal requirements

Problem

The wastewater treatment plant in Lawrence, Kansas, did not include the capacity for removing nitrogen and phosphorus to meet new permit limits. The city also needed capacity for future population growth.

Solution

Consulting engineers selected a **WestTech Engineering OxyS-tream oxidation ditch** with biological nutrient removal. The ditches use an anaerobic area to increase phosphorus uptake. They also include a pre-anoxic zone that uses the system's nitrate-recycle stream to remove nitrogen as a gas and a post-anoxic zone that uses internal respiration to remove remaining nitrate.



RESULT:

The plant (average flow 3.6 mgd) delivers efficient aeration and mixing while removing phosphorus to levels below 0.5 mg/L. **801-265-1000; www.westech-inc.com tpo**

industry news

Badger Meter offers netAMP Enabled through UMS

Badger Meter is now offering netAMP Enabled through Utility Metering Solutions to expedite end-to-end advanced metering deployments. NetAMP Enabled complements smart water technologies from Badger Meter, including BEACON Advanced Metering Analytics and ORION Cellular LTE-M endpoints and smart water meters, by providing a fixed, subscription-based metering-as-a-service program to receive all Badger Meter equipment, meters, software and services to upgrade antiquated infrastructures. The system includes all planning, installation, integration, maintenance, support and training. It also provides for future software upgrades and long-term service and support for the life of the contract.

KSB names Maturana as president

KSB announced the promotion of Luis Maturana to president. He joined KSB in 2018 and had served as vice president of the water and wastewater division. He received his Bachelor of Science degree in materials science engineering from Simón Bolívar University in Caracas, Venezuela. Maturana previously served in multiple executive roles at ChemTreat and Veolia Water Technologies. Dr. Falk Schäfer, the prior KSB president, remains with KSB and is moving to the global headquarters in Frankenthal, Germany. He will serve in general industry in the role of vice president, applications.



Luis Maturana

Hawk Measurement Systems launches new website

Hawk Measurement Systems announced the release of its newly redesigned website, www.hawkmeasurement.com. The website includes new features such as a product selection tool, request-a-quote cart, product configurator, an interactive distributor locator, customer testimonials and more.

Schwing Bioset acquires assets of Custom Conveyor

Schwing Bioset announced it has acquired substantially all of the assets of Custom Conveyor of Rogers, Minnesota. In connection with the acquisition, Schwing Bioset has retained all of the Custom Conveyor staff with their decades of experience, acquired all of the equipment for the production of their products and acquired all existing project files to continue to provide ongoing aftermarket support. Additionally, Schwing Bioset has taken over more than 20,000 square feet of office and production space for the continued manufacturing of Custom Conveyor and Schwing Bioset products.

Flomatic names new national sales manager

Flomatic Corp. announced the promotion of Jim Tucci to national sales manager. Tucci will continue to lead the expansion of Flomatic valve products nationally and internationally. In addition, Tucci will now oversee Flomatic's customer service department. He joined Flomatic in August of 2014 as the industrial and municipal sales engineer after a long career as a driller both as an owner/operator of a water well and geothermal drilling company in upstate New York and several positions with environmental firms performing sonic drilling and direct-push sampling.



Jim Tucci

MFG Chemical relocates headquarters to Chattanooga

MFG Chemical moved its corporate headquarters from the original location in Dalton, Georgia, to nearby Chattanooga, Tennessee. Company growth created the need for more workspace. The new building will provide the needed workspace and closer proximity to the Chattanooga airport, making it more efficient for visitors and the MFG Chemical staff to travel and meet.

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Centrisys completes efficiency updates in two New York locations

Centrisys Corporation provided the New York City Department of Environmental Protection with 32 CS26-4 Centrisys decanter centrifuges to improve the efficiency of the wastewater treatment process. The Wards Island Wastewater Treatment Plant is the second largest of the 14 wastewater treatment facilities in New York City, serving nearly 1 million people. The Hunts Point Wastewater Resource Recovery Facility in the south Bronx cleans more than 200 million gallons of wastewater produced by 700,000 residents every day. The Centrisys engineering team integrated a centrifuge stand, diverter gate and interconnecting pipework into the NYC plant design. These design elements created a drop-in-place centrifuge system, allowing for easy integration with only a few minor modifications to the existing floor plan.

Xylem appoints Rowland as senior vice president and CFO

Xylem has appointed Sandra Rowland as senior vice president and chief financial officer, effective Oct. 1. Rowland will succeed Mark Rajkowski, who will retire from the company at the end of the year. Since January 2015, Rowland had served as executive vice president and CFO of Harman International Industries. She is also a member of the Board of Directors and Audit and Human Resources Committees of industrial manufacturer Oshkosh Corp. She will be based at Xylem's headquarters in Rye Brook, New York. **tpo**

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Federal Screen Products intake screens

Federal Screen Products offers innovative and cost-effective intake screens for water applications. Its wedge wire screens are a reliable system for wildlife protection and debris removal from surface water supplies. Screens filter raw water to be used as cooling water for sites including power, raw water, desalination plants, drainage channels and irrigation off-takes. Federal Screen specializes in T-intake, drum, shallow water and river screens and can create custom designs to meet specific depths and locations. Available in various nickel alloys to resist corrosion, intake screens are EPA/316(b) compliant with even flow over the entire surface and can include an airburst cleaning system. There are no moving parts, eliminating the need for replacement components and costly repairs.

905-677-4171;

www.federalscreen.com



Flowrox CF-V centrifugal pump

The Flowrox heavy-duty CF-V centrifugal pump runs continuously in heavy-duty conditions. Wear-resistant components are fit for the most abrasive and corrosive slurries. The pump handles flow rates through 4,997 gpm. The CF-V pump can reach heads up to 164 feet and cantilevered depth to 11 feet with a suction extension pipe. Wet parts are either elastomer or high chrome and are designed for ease of maintenance to minimize downtime.

410-636-2250; www.flowrox.com

product spotlight water

Digital system helps optimize plant operations

By Craig Mandli

In today's state-of-the-art water and wastewater treatment plants, automation leads to efficiency. When facilities can leave day-to-day operations to computers to do things on their own, they are typically done faster and without waste or error, meaning increased production at an always-important lower price point.

Schneider Electric specializes in a complete line of digital tools for process optimization in water and wastewater operations. The offerings use the Industrial Internet of Things to help operators better manage their facilities. One of those offerings, **EcoStruxure Hybrid DCS for Water**, is an all-in-one automation solution that lets users engineer, operate and maintain an entire plant in a single common database. It combines the management of field-buses, instrumentation, intelligent connected devices, operator stations, engineering stations and alarm management in a scalable automation platform.

"Connected, IIoT-based solutions offer new levels of efficiency, reliability and insight into all aspects of the water and wastewater industry," says Kakali Ray, vice president of sales at Schneider Electric. "These new technologies mark an exciting time when operators have both the process insights to understand their operations and make informed decisions, as well as the tools to implement real-time changes to optimize those operations."

The ability to provide operators with clear process information is crucial to driving production



EcoStruxure Hybrid DCS for Water from Schneider Electric

efficiency. EcoStruxure Hybrid DCS for Water provides a consistent control and operational interface with a real-time view of processes to deliver operators all the services and data they need to make timely and accurate decisions. Trends seamlessly combine real-time and historical data. When users view a trend page, they can monitor the current activity as it happens and simply scroll back through time to view the trend history. The distributed trending system handles large amounts of asset data without compromising performance or data integrity.

EcoStruxure Hybrid DCS for Water provides common services like configuration, deployment, diagnostics, communication, security, connectivity, user collaboration and data sharing. These services enable the operator to build a single, unified model that logically represents the process and a plant infrastructure that represents the actual equipment. This makes design and maintenance of the system more efficient, more flexible and less risky, according to Schneider Electric. The model also gives essential context to collected data, assisting with diagnostics and troubleshooting. It also provides valuable system documentation throughout the system life cycle.

877-342-5173; www.schneider-electric.us



JWC Environmental Monster Metal grinder cutters

JWC Environmental's Monster Metal is made from a corrosion-resistant steel alloy with superior wear resistance and excellent metal corrosion protection, so there's no need to choose between corrosion resistance or hardness. It has a Rockwell HRC of 55 to 60, which is as hard as or harder than most alloy steel cutters used on grinders in the municipi-

pal market. The grinders also have a high chromium content that is typically associated with stainless steel. Monster Metal comes with seven- and 11-tooth configurations on JWC's Muffin Monster and Channel Monster products.

800-331-2277; www.jwce.com



QED Environmental Systems MicroPurge stabilization flow cell system

The MicroPurge MP25 purge stabilization flow cell system from QED Environmental Systems makes

consistent low-flow groundwater sampling easy and accurate. The associated PurgeScan technology monitors purging parameters and performs stabilization automatically, reducing potential for error and inaccuracies. The system measures and displays electrical conductivity, pH, ORP, dissolved oxygen, temperature and calculated values such as total dissolved solids, salinity and oxygen saturation. The MP25T system adds turbidity measurement. The system's multiparameter sonde connects wirelessly to most Android tablets and smartphones using a long-life rechargeable Bluetooth battery pack.

800-810-9908; www.qedenv.com



PRESENT THE WEBINAR: Evaluating Alternative Treatment Options to Eliminate the Need for Lime Sludge Disposal in Boynton Beach, FL

November 12 at 11:00 AM EST

DESCRIPTION:

The City of Boynton Beach, Florida's East Treatment Plant uses conventional lime softening followed by filtration. The concern that landfilling the East plant sludge will not be a long-term option led Boynton Beach to look into alternative treatment options that will eliminate the need for lime sludge disposal. The ACTINA™ pellet softener was pilot tested at the Boynton Beach East facility in the summer of 2020. A brief history of the Boynton Beach East facility will be discussed during this webinar, along with the results from the pilot testing and the subsequent full-scale evaluation.

SPEAKERS:



Jake Hurley
Associate Engineer
Boynton Beach Utilities



Tom Perry
Director
Product & Market Development
Veolia Water Technologies

Contact usmunicipal@veolia.com with any questions

Register at <https://bit.ly/3hSqCz4>

product spotlight wastewater

Digital Pressure Monitor enables 'smart' diffuser operation

By Craig Mandli

As wastewater plants become increasingly high-tech, components of the treatment process are seeing "smart" upgrades. **Xylem** recently introduced its **Sanitaire Digital Pressure Monitor** that effectively transforms wastewater diffusers into smart diffusers. The Sanitaire DPM maximizes diffuser operation and increases energy savings through strategic fine-bubble aeration system monitoring and intelligence, providing an enhanced digital interface with diffuser health data, engineering and economic calculations, and asset management recommendations.

Aeration is typically a large single line item in a wastewater plant's operations budget. With utilities constantly seeking ways to reduce operating costs while maintaining treatment compliance, the DPM empowers utilities with a digital solution that intelligently monitors and manages their aeration systems.

"Energy cost savings and extended system life cycle continue to be paramount for water utilities to find both operational and financial efficiencies," says Adam McNeill, director of sales – treatment for Xylem. "The launch of the DPM reflects our commitment to evolving our water and wastewater treatment portfolio. It goes beyond improved technology to include product intelligence that delivers more value to the user."

The DPM monitors pressure in the aeration system and provides asset recommendations via a user-friendly human-machine interface. The continuous measurement of aeration pressure empowers the plant

manager to make data-driven decisions to clean or replace the diffusers, enabling utilities to achieve the most cost-effective solution.

The DPM also enables utilities to extend the useful life of system blowers by optimizing diffuser performance.

It has the versatility to track pressure readings from multiple grids with a single controller and HMI to enable real-time decisions. The system alerts users when their aeration system requires maintenance and then automatically calculates the operational savings for diffuser maintenance or the payback period for diffuser replacement. Operating as more than a monitoring system, the DPM provides valuable engineering and economic insight at the operator's fingertips.

Based on recommendations, Xylem provides complete cleaning services for a holistic solution. Periodic and strategic diffuser cleaning increases oxygen transfer efficiency and reduces operating costs. When diffuser replacement is deemed economical, Xylem offers a full portfolio of Sanitaire diffuser options. The DPM controller and HMI are based on the existing Xylem IQ SensorNet platform installed in thousands of plants. Multiple installation options are available, and DPM can be installed into new or existing aeration tanks. **855-995-4261; www.xylem.com/treatment tpo**



Sanitaire Digital Pressure Monitor from Xylem

people/awards

The Water Environment Federation has designated 15 members as 2020 WEF Fellows in recognition of their achievements and contributions in the water profession. They were recognized on Oct. 7 during WEFTEC Connect. They are:

- **James Burks**, Missouri Water Environment Association
- **Paul Causey**, California WEA
- **Val Frenkel**, California WEA
- **Burt Curry**, Ohio WEA
- **Dr. Joel Ducoste**, North Carolina WEA
- **Robert Kukenberger**, New York WEA
- **Dr. Larry Moore**, Clean Water Professionals of Kentucky and Tennessee
- **Dr. Jan Oleszkiewicz**, Western Canada WEA
- **Dr. Eileen O'Neill**, Virginia WEA
- **Michael Pollen**, Alaska Water Wastewater Management Association
- **Charles Tyler**, New England WEA
- **Dr. John Willis**, Georgia Association of Water Professionals
- **Keith McCormack**, Michigan WEA
- **Thomas Meholic**, New Jersey WEA
- **Gary Sober**, WEA of Texas

WEF announced its Life Members for 2020:

- **Edward Clerico**, member since 1985, New Jersey WEA
- **Libby Ford**, 1975, New York WEA
- **Gary E. Loesch**, 1976, New York WEA
- **Thomas Hall**, 1977, California WEA
- **Stephen M. Jenkins**, 1984, WEA of Texas
- **David R. Marrs**, 1982, WEA of Texas
- **James McGregor**, 1979, New Jersey WEA
- **Donald R. Rodgers**, 1976, New England WEA
- **Michael Sweeney**, 1982, Florida WEA
- **Robert Fergen**, 1978, Florida WEA
- **Greg Wilcox**, 1980, Illinois WEA
- **Miles Beach**, 1985, Pacific Northwest Clean Water Association
- **Thomas A. Fishbaugh**, 1975, Ohio WEA
- **Paul Usinowicz**, 1985, Ohio WEA
- **Jeffrey Macfarlane**, 1979, WEA of Utah
- **Jose Marti-Carvajal**, 1980, Puerto Rico WEA

Lydia Peri, resources program administrator at Truckee Meadows Water Authority in Nevada, earned the WEF Canham Graduate Studies Scholarship for her work on the OneWater Nevada program.

The **Fort Collins Water Treatment Facility** earned a 2020 Environmental Stewardship Award from Larimer County, Colorado.

Argyle (Texas) Water Supply Corp. employee **John Hammons** received a Citizen's Certificate of Merit from the Argyle Police Department for using his vehicle to stop another vehicle that was out of control because the driver was having a medical emergency.

The **U.S. Steel** wastewater facility in Granite City won a Best Operated Wastewater Treatment Works award from the Illinois Association of Water Pollution Control Operators.

Joseph Cotruvo, Ph.D., BCES, received the 2020 Walter F. Snyder Environmental Health Award from NSF International and the National Environmental Health Association for more than 45 years of service.

events

Nov. 2-4

North Carolina AWWA Section Annual Conference, virtual. Visit www.ncsafewater.org.

Nov. 2-4

British Columbia Section AWWA Annual Conference, virtual. Visit www.bcwwa.org.

Nov. 4-6

Nebraska AWWA Section Annual Conference, virtual. Visit www.awwaneb.org.

Nov. 9-13

Mexico AWWA Section Annual Conference, Mexico City. Visit www.awwa.org.

Nov. 10-11

AWWA | SWAN International Smart Water Symposium, virtual. Visit www.awwa.org.

Nov. 29-Dec. 3

Florida Section AWWA Annual Conference, Omni Orlando Resort and ChampionsGate. Visit www.fsawwa.org.

The **Hardin County Water District No. 2 White Mills Treatment Plant** received the Outstanding Water System Operations Award for 2019 from the Kentucky Water and Wastewater Operators Association.

The **Halifax County Service Authority Water Treatment Plant** received the 2019 Gold Award for Performance and Excellence from the Virginia Department of Health.

Lee Lambert was appointed water resource management director for the city of Surprise, Arizona.

Marjon Souza and **Noe Aguilar Vega** were appointed to run plant operations for the Summerland (California) Sanitary District after the retirement of Michael Sullivan as general manager.

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



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City of Rushville, IN

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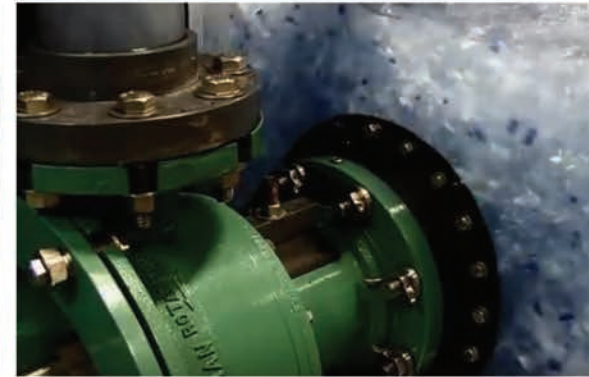


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