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Published monthly by COLE Publishing, Inc.
1720 Maple Lake Dam Rd., P.O. Box 220, Three Lakes, WI 54562

Call toll free 800-257-7222 / Outside of U.S. or Canada call 715-546-3346
Mon.-Fri., 7:30 a.m.-5 p.m. CST

Website: www.tpomag.com / Email: info@tpomag.com / Fax: 715-546-3786

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ADDRESS CHANGES: Submit to *TPO,* P.O. Box 220, Three Lakes, WI 54562; call 800-257-7222 (715-546-3346); fax to 715-546-3786; or email nicole.labeau@colepublishing.com. Include both old and new addresses.

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

REPRINTS AND BACK ISSUES: Visit www.tpomag.com for options and pricing. To order reprints, call Jeff Lane at 800-257-7222 (715-546-3346) or email jeff.lane@colepublishing.com. To order back issues, call Nicole at 800-257-7222 (715-546-3346) or email nicole.maney@colepublishing.com.

CIRCULATION: 68,563 copies per month.

It's About the Product

HOW LONG BEFORE THE INDUSTRY'S DEFAULT POSITION IS TO EMPHASIZE 'CLEAN WATER' INSTEAD OF 'WASTEWATER' OR 'SEWAGE'? IT'S TIME TO STOP TAKING BABY STEPS.

By Ted J. Rulseh, Editor

Take a minute and try an experiment. Do an internet search under "clean water plant." Then do a search under "wastewater treatment plant."

Which one brings more results? When I tried this, I got 225,000 for "clean water plant" and 17 million for "wastewater treatment plant." There's a lesson here: The profession still mostly identifies with wastewater — that is, with the raw material, not the end product.

Why should this be? Why is it that news stories about *any city* renaming its facility to clean water (or to the Water Environment Federation's preferred "water resource recovery facility") are relatively few and far between?

ACCENT ON THE POSITIVE

It's intuitively obvious that members of the public react negatively to the word "wastewater," whether as a noun by itself or as a modifier for a building or an operator. It's equally obvious that people respond favorably to "clean water." So, why the hesitation?

We don't refer to farms with Holstein cows as hay-processing centers. We call them dairy farms, and the name conjures all sorts of good things: milk, cheese, ice cream, yogurt. We don't call big buildings with tall chimneys coal- or gas-combustion facilities. We call them power plants, and we associate them with keeping the lights on and schools and businesses operating.

So why continue to associate people who dedicate their careers to clean water, and the facilities they operate, with an unpleasant word like "wastewater"?

TIDE OF CHANGE

Why indeed, asked leaders of the Water Environment Association of Kentucky and Tennessee. The group has rebranded itself as Clean Water Professionals of Kentucky & Tennessee. The change (see this month's *In My Words* feature) sets a great example that others in the industry should follow — operators, associations and cities alike.

How can something as simple as a change in terminology benefit the profession? Well, by showing utility customers what their monthly bills actually pay for. By giving a new generation of prospective operators a clear idea of the difference they can make by joining the profession. By giving operators a strongly positive note on which to start conversations about what they do.

One argument I've heard against the "clean water" branding is that average citizens might confuse it with the drinking water side. I can understand the concern, but I don't see it as reason to hold back from making the change.

Organizations around the country have adopted the clean-water terminology with no negative effects that I'm aware of. Consider the National

Association of Clean Water Agencies (formerly the Association of Metropolitan Sewerage Agencies). Look at the Oregon utility known as Clean Water Services (formerly the Unified Sewerage Agency).

And how about the Grandville, Zeeland and Wyoming clean-water plants in Michigan? Does anyone think any of these entities, given the chance, would go back to the way things were? A better question, perhaps, is why any entity in the clean-water industry would be content to remain with the "wastewater" status quo.

It's time for this change — this emphasis on clean water — to roll like a big wave across the industry. ... What in the world are we waiting for?

WHAT DO YOU THINK?

It's time for this change — this emphasis on clean water — to roll like a big wave across the industry. It will improve the industry's standing with the public. It will confer on people in the profession the stature and respect they have earned. What in the world are we waiting for?

Please share your thoughts. Do you think it's time to move wholesale to industry branding built around clean water? Send me an email at editor@tpomag.com. I promise to answer, and we'll print a selection of responses in a future issue of *Treatment Plant Operator*. tpo

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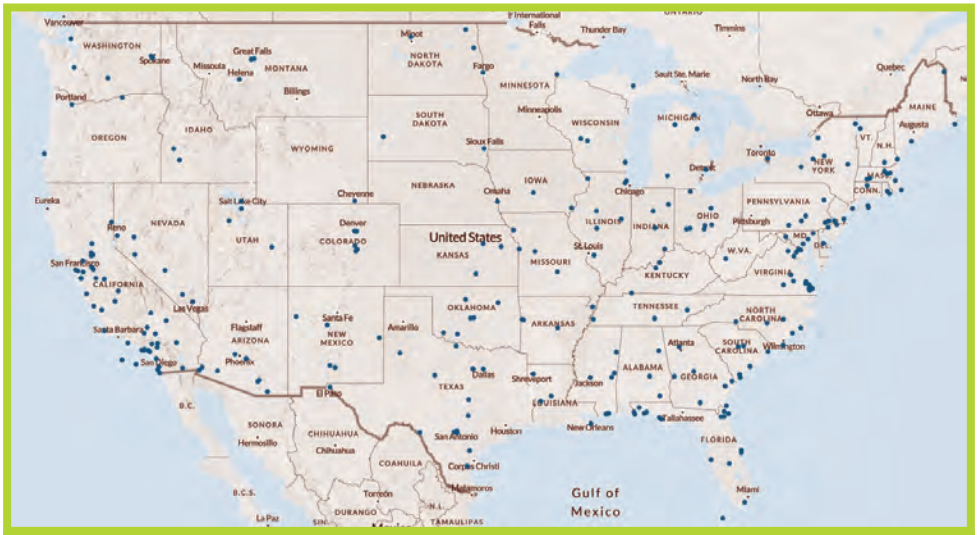

NEW MAP

Possible PFAS Contamination

The Environmental Working Group recently published a map of 305 military installations that used firefighting foams made with per- and polyfluoroalkyl substances (PFAS), which have likely contaminated drinking water or ground water on or around the bases. The new interactive map displays as many as 180 sites that haven't been previously identified.

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A DRUG PROBLEM

Pharmaceutical Removal Strategies

A recent study of seven wastewater treatment plants in the eastern United States reveals a mixed record when it comes to removing medicines such as antibiotics and antidepressants. The research points to two treatment methods — granular activated carbon and ozonation — as being particularly promising.

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FLOODING CHALLENGES

Dallas' Drainage Tunnel

Dallas, Texas' storm sewers, designed and built in the 1930s, are no match for the dense neighborhoods of a 21st-century city. With floods getting worse and more frequent, the city needs a permanent solution. That's why it's digging a giant 5-mile drainage tunnel using a tunnel-boring machine affectionately named Big Tex.

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An Accidental Enthusiast

AT FIRST, WATER TREATMENT WAS JUST A JOB FOR BRIAN MCDADE. IT SOON BECAME A CAREER AND A CALLING TO HELP OTHERS PROGRESS AND EXCEL.

STORY: **David Steinkraus** | PHOTOGRAPHY: **Freddie Dixon**

Brian McDade, operator, Frank C. Amerson Jr. Water Treatment Plant

The water business was an accident for Brian McDade.

"For most of my life, I wanted to obtain a psychology degree," says McDade, an operator at the Macon (Georgia) Water Authority's Frank C. Amerson Jr. Water Treatment Plant.

He spent some time at Georgia Military College in Milledgeville. After schooling, he worked for a company repairing power plants. "That was interesting work. You learned how to weld," he says. But it wasn't reliable. People would work for two months, get laid off, then get called back for a few more months.

During one of those layoffs, while exercising with a cousin, doing bicep curls, he mentioned that he would prefer a steady situation. "Great," said the cousin. "My husband needs help at the water company he works for."

So McDade started out as a meter reader for a private water company in northern Georgia. In 2012, after surviving a few rounds of layoffs in the wake of the recession, his day came. For a few months, he had no work and no prospects, but he had gained experience in the water industry and liked it.

OPPORTUNITY KNOCKS

In 2013 his wife, Jill, saw an ad for an operator job at the Macon authority. The deadline to apply was past, but she sent his application anyway. "I didn't have a license

McDade doesn't grumble about going to work. In fact, on the way in the car, he often can't wait to get to the plant.

> "I like running into a problem, tackling it and coming up with a solution."
> **BRIAN McDADE**

and knew I wouldn't get the job," McDade says. "We had savings we were living off of, and my wife worked."

Despite his doubts, he paid $600 for classes he needed to test for a Class 3 license, the lowest operator qualification in Georgia. Then the call came. He was asked to interview on a Monday; his wife found him a seat in a Class 3 exam session on the Saturday before. He did more than well on the test, and when he dropped the results on the desk on Monday, he had himself a job.

That was in 2013, and McDade likes his job. He really likes his job. "When I'm driving to work, I want to get there," he says. "I'm more than happy to bore you to tears with everything about my job." That attitude, and the performance behind it, earned him a 2019 Operator's Meritorious Service Award from the Georgia Section of the American Water Works Association.

PRODUCTIVE COMMUTING

His commute is about 40 miles, unusually long for the area where he lives, but it gives him a window for learning. If there is a theme to his career, that's it. He uses the time to listen to audiobooks about microbiology and other water topics.

He found a good podcast about the periodic table that goes through each chemical element and talks about its properties. He likes that one, although he listens only to the sections about elements in water tests — aluminum, chlorine and fluorine, for example.

McDade's continuous learning has had some practical advantages. One day he read about the 18-hour Colilert test for fecal coliform. A short time later, Gary McCoy, director of water operations, asked what he would do if the clear wells became contaminated. "I said, 'I don't know, turn on the recirculation pumps?'"

Then McDade mentioned the Colilert test, which McCoy didn't know about. "He pointed at the lab supervisor and said, 'Order this,'" McDade recalls. A few months later, operators discovered low pressure in a large portion of Macon and Bibb counties, and the authority issued its first-ever boil order. Because the Colilert test was on hand, the order was lifted six hours earlier than otherwise would have been possible: "I like running into a problem, tackling it and coming up with a solution."

CUSTOMER CARE

The Amerson plant serves Macon and Bibb counties but is located in Jones County. In 1994, a massive flood covered Macon and destroyed the old water plant. The new plant sits on higher ground. "It would have to be a Biblical flood for this plant ever to be flooded," McDade says.

There are always two operators on duty at the plant. Mornings are typically devoted to doing tests. One day an operator might work in the lab and the next day outside. After 4 p.m., customer calls to the water system's business office are routed to the plant, and operators must add that work to their other tasks. That can be a challenge, yet if there's a water main break in the middle of the night, customers need to be helped.

Every four hours, operators are expected to take a walk through the plant. They might see a leak and write a repair order. One day, while looking at the filter building, McDade started thinking about the backwash tank and how it was connected to the rest of the plant.

He discovered that in an emergency, a million gallons of potable water could be gravity-fed directly to the clear wells. With the city consuming up to 25 mgd, the backwash water would provide another hour of cushion.

ALWAYS ASKING

One thing McDade learned from McCoy is that when you've climbed up on the ladder of success, you lower a rope to help the people below. McDade recently mentored a new operator on the verge of testing for his Class 3 license:

> "He was so proactive. I've never in my years of managing seen someone take it upon himself to get a certification without having a job."
>
> **GARY McCOY**

Brian McDade runs an alkalinity test on a sample.

Brian McDade, Macon (Georgia) Water Authority

POSITION:
Water plant operator, Frank C. Amerson Jr. Water Treatment Plant

EXPERIENCE:
14 years

EDUCATION:
7 quarters at Georgia Military College

CERTIFICATION:
Class 1 (highest) operator

AWARDS:
2019 Operator's Meritorious Service Award, Georgia Section of the American Water Works Association; 2017 Operator of the Year for Georgia Association of Water Professionals District 5

GOAL:
Work toward a leadership role

(continued)

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After McDade earned his Class 1 operator license, he immediately set to work sharing with colleagues what he had learned along the way.

"He asks a lot of good questions. He'll call me at my house, and I don't mind."

What convinced McCoy to hire McDade was learning that he had paid for his own licensing classes. "He was so proactive," McCoy says. "I've never in my years of managing seen someone take it upon himself to get a certification without having a job. He used to get on my nerves because he asked every question trying to learn everything. That's what I really respect."

It was the same with making suggestions, like recommending the Colilert test. When the boil-water order went out, McCoy says it was McDade who remembered the test was on hand. No one on staff was trained to perform it, so McDade did it. "The president of the company was very impressed because that six hours made a big difference," McCoy says. "All the businesses were down, and every minute a business is down, they're losing money."

Sometimes McDade's ideas are not financially workable, yet sometimes they can be worked into a five-year plan. Other team members have seen his example and started to make their own suggestions.

LEADING HUMBLY

When McDade earned his Class 1 (highest) license, he wasn't cocky. "He took every single thing he had learned and started training the operators," McCoy says. "It wasn't about, 'Look what I did.'"

McCoy mentioned a testing program McDade started. The Amerson plant draws raw water from the Ocmulgee River, next to the plant property. On the other side is Javors Lucas Lake, 580 acres of protected water that's available in cases of drought.

McCoy started the practice of opening the intake valves at the reservoir at intervals so lake water mixes with river water. He wanted to reduce the concentrations of manganese and other substances that accumulate in deeper water as lakes stratify. Operators would do this until the raw water characteristics were constant.

McDade questioned whether there was truly an effect out in the lake, and so he began his own analysis program. He went out in a boat, took samples at various depths, analyzed the samples and compiled all the data. "His research let us know if we had a lake turnover," McCoy says.

Even though McDade leads without having a leadership title, he sees a future for himself that may include a position such as assistant plant director. But really, any water job will make him happy. He has found the place he needs to be. **tpo**

SPOTTING FUTURE OPERATORS

One of the standard jobs at the Frank C. Amerson Jr. Water Treatment Plant is to host college classes. Macon, Georgia, is home to the campuses of Middle Georgia State University and Mercer University.

Usually the students coming to see the plant are in chemistry or microbiology. A visit to the plant shows them a practical application for the classroom work. When a class comes through, Brian McDade looks for the potential operator.

"There's always one student in 20 or 30 who's overly interested," he says. "They're asking a lot of questions and have that fascination in their eye." He spends more time with those people and tells them it's interesting work that pays well.

It doesn't hurt that the plant helps sell the profession. The Amerson plant sits on 3,000 acres that includes the Javors Lucas Lake reservoir, with a buffer zone to protect the water quality. "I come in through the big gate and it's not unusual to see 15 turkeys or 15 deer inside," McDade says.

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Names Matter

THE NEWLY BRANDED CLEAN WATER PROFESSIONALS OF KENTUCKY & TENNESSEE LOOKS TO START A MOVEMENT TO LEND THE INDUSTRY GREATER STATURE AND MORE RESPECT

By Ted J. Rulseh

It's often asked: Why do people in the wastewater professions often suffer from a lack of respect among the public?

Part of the reason may be simply the use of "wastewater" as a descriptor. Utilities and individual professionals are slowly coming around to that realization. Among them are professionals from Kentucky and Tennessee, who recently rebranded their Water Environment Federation Member Association.

That's right: The Water Environment Association of Kentucky and Tennessee is now officially called the Clean Water Professionals of Kentucky & Tennessee (CWP-KT). Valerie Lucas, executive director, observes that the organization strives to protect the planet, protect people and make play possible by being the stewards of the two states' many lakes, rivers and streams.

The branding change is part of what organization leaders call a Clean Water Movement to restore dignity to the profession and put members at the forefront of environmental advancement, economic expansion and community development. CWP-KT also offers resources to utility partners to encourage a culture shift that emphasizes clean water.

Lucas and Shannon Lambert, president of CWP-KT and chief operating officer of the Barge Design Solutions consulting engineering firm in Nashville, Tennessee, talked about the movement in an interview with *Treatment Plant Operator*.

Valerie Lucas

Shannon Lambert

tpo: How would you sum up the reason for this rebranding and movement?

Lucas: It's time to explain what we really do. Most workers in our field know that above all else we are about clean water, so why do we still call ourselves wastewater professionals? We don't waste water — we clean water.

tpo: How did your group decide to make this change?

Lucas: It began a couple of years ago when we started advocating for water in Washington, D.C., as part of NACWA/WEF fly-in. We formed an ad hoc committee to talk about a name change, and it became clear that we needed a better descriptor of what our members do every day.

tpo: What process was followed after the decision was made to change the name?

Lucas: We hired Melissa Zoeller, a marketing professional, and Sally Estes, a design expert. They heard us talk about what we wanted and what we envisioned for the future of water. They observed that we had a "shame bubble" around our profession and didn't understand why, in view of everything we do to improve the quality of life.

tpo: Did you look to any other outside resources for advice?

Lucas: I reached out to Mark Jockers, who is government and public affairs director at Clean Water Services in Oregon and who was instrumental in their name change. I asked him for advice about what kind of language they use and how they talk to their customers.

tpo: Is there any special symbolism built into the organization's new logo?

Lucas: We made our logo very intentional. There are three interconnected water drops to represent our mission statement, which includes advocacy, education and innovation. We incorporated all the colors of water because we had not done a great job of telling the story of water and the water cycle. The arrow represents that we are the future of water.

tpo: At the most basic level, why is it important to use different language in talking about the profession?

Lambert: Most professions and most industries don't describe what they do in terms of the raw material they start with. They describe what they do based on the finished product. Our sector produces clean water. That's the end product, and that's what we should associate ourselves with.

Lucas: When we emphasize wastewater, it's like ending the story with "once upon a time …" instead of "happily ever after." If our story were a fairy tale, it would be like identifying with the frog instead of what the frog ultimately becomes, which is a prince. If we want people to change their minds about how they think about water, then as water professionals we have to change our language first.

tpo: How has the Water Environment Federation responded to the new branding?

Lambert: They were very supportive, and they have promoted what we've done to other Member Associations.

tpo: Was there any resistance to the name change from the membership?

Lambert: There was a lot of history with the old name, but in the process we went through, we identified those who might have the strongest connection, reached out to them and explained the why behind the change. They got on board fairly quickly.

tpo: Who were the people most attached to the old name?

Lucas: Mostly they were folks who had been a part of the association for the longest time. We still have members who recall when we were the Pollution Control Association. One of our long-standing active members, Bob O'Dette, who is also a WEF Fellow, sent the nicest email when we reached out to him. He was proud of the name change and sent us a picture of a colleague of his in Michigan who changed his facility name to "clean water" in the late 1970s.

tpo: What are you doing to reach out beyond the CWP-KT membership?

Lambert: We've reached out to several Utility Partners who have signed on to the Clean Water Movement and are helping to lead the initiative within their organizations. It will help us to have the support of some of our states' leading utilities.

tpo: Are those partners making changes along the lines of those your group is making?

Lambert: We believe so. We see some changing their facilities from wastewater treatment plants to water resource recovery facilities. They're making those kinds of changes to their language.

tpo: Can you elaborate on what the Clean Water Movement consists of?

Lucas: We have an introductory packet for anyone who wants to be part of the Clean Water Movement. We're developing one-page educational pieces that utility leaders can give to their team members: How do you introduce yourself at a barbecue? Did you know that one-third of our workforce will be retiring? We also did interviews with our officers and committee chairs during last year's Water Professionals Conference about why it's important to change our name. We put those out on our YouTube channel. Our push for 2020 is to have a road show where we visit utility boards and talk about why it's important to change our language.

tpo: What is your experience in talking about your profession in social situations?

Lambert: I've worked on the drinking water and wastewater sides. When I'm in social setting and people ask me what I do, my tendency has been to talk about the drinking water side. There is no reason that should be the case other than the way we've always portrayed ourselves and the language we've always used. It doesn't portray us in a great light.

tpo: What impact do you see the new language and mindset having on recruitment?

Lucas: I've had many women come up to me and say they really like the logo, the color scheme, and the idea of protecting human health and what we do to clean the water. This name change and identity change will help recruit more women into the field. Right now, only about 15% of the water workforce is women.

Lambert: The younger generation is driven by making a difference in what they do. The brand change we're making will help us connect with them better. They'll be more likely to view the water sector as a place where they can have a great career and make a difference.

tpo: How do you intend to support your members in spreading the clean-water message?

Lucas: We hope to provide our members with the materials, encouragement and resources they need to talk to the public. We feel our utilities have connections with their customers, and we want to help them communicate broadly to the public.

You can learn more at www.cleanwaterprofessionals.org or www.facebook.com/cwpkt.org. You can follow the organization on Twitter at @cwp_kt, join them on LinkedIn and watch testimonials from members by searching on YouTube under Clean Water Professionals. tpo

Opportunities Knocking

CHRISTEN WOOD FOLLOWED HER HEART FROM LAB WORK INTO A SUCCESSFUL CAREER IN OPERATIONS (AND AS A MUSICAL PERFORMER AT WEFTEC)

STORY: **Scottie Dayton**
PHOTOGRAPHY: **Amy Voigt**

Christen Wood, operations administrator, Upper Tuscarawas Wastewater Treatment Plant

Wood was one of the first people to qualify for the Professional Operator through the Certification Commission for Environmental Professionals.

Christen Wood, Upper Tuscarawas Wastewater Treatment Plant Number 36

Akron, Ohio

POSITION:
Operations administrator

EXPERIENCE:
11 years

EDUCATION:
Bachelor's degree, biology; MBA, University of Findlay

CERTIFICATIONS:
Class III wastewater operator; Class II wastewater analyst; Class IV Professional Operator, wastewater (C2EP)

MEMBERSHIPS:
Ohio Water Environment Association, Water Environment Federation

GOALS:
Cultivate a team dedicated to treating the water right

Christen Wood was an accident waiting to happen — in a good way.

A chance encounter with the local newspaper led Wood to the Ashtabula (Ohio) Wastewater Treatment Plant, which hired her as a laboratory analyst in 2009. Then she accidentally moved from the laboratory to operations and found her true calling.

"This is the career of a lifetime, and I never knew it existed when I graduated from college," says Wood, who holds a bachelor's degree in biology. Since October 2018, she has been operations administrator for the Upper Tuscarawas Wastewater Treatment Plant Number 36 in Akron, operated by the Summit County Department of Sanitary Sewer Services.

"I discovered I have an operator's mind. I love seeing the big picture, pulling all the pieces together, figuring out what's wrong and coming up with creative solutions."

Her enthusiasm provided the impetus to establish a Women's Employee Resource Group and organize Operations Challenge teams. Wood also wrote a rap about wastewater, a colleague turned it into a music video, and it won the Water Environment Federation 2017 Sound Off for Clean Water Song Contest.

After Wood sang "Treat the Water Right" at that year's Jammin'4Water fundraiser, an article in *WEF Highlights* called her "one of the wastewater world's top performing artists."

The Northwest Section of the Ohio Water Environment Association recognized her exceptional service as an operator with the 2017 Herb Hansen Award. In 2018, she received the Professional Wastewater Operations Award from the Ohio Water Environment Association.

She also was one of the first people to qualify as a Professional Operator with the Certification Commission for Environmental Professionals, the industry's first professional designation for wastewater and water operators. "I never planned any of this," Wood says. "I just said yes to the opportunities, then lived them to the fullest."

CHALLENGES OF AGING

The Upper Tuscarawas plant (4 mgd design, 2.7 mgd average) is a rotating biological contactor facility built in 1980 and upgraded in 1997 and 2015.

Wastewater flows through a manual bar screen. Pumps (Pentair - Fairbanks Nijhuis) then send it through a fine screen (Hydro-Dyne Engineering) to a grit removal system (Evoqua Water Technologies). A Sigma raw wastewater sampler (Hach) draws upstream of the sodium aluminate feed for phosphorus removal. Liquid from the two primary tanks feeds into 31 rotating discs in the RBC (Envirex, an Evoqua brand) for cBOD and ammonia removal.

Final settling occurs in two clarifiers. Tertiary treatment is completed by 10 WWETCO FlexFilter units (WesTech Engineering). Effluent flows though post-aeration tanks and UV disinfection (TrojanUV) before discharge to the Tuscarawas River.

Christen Wood, front, operations administrator, with her crew, from left: Tom Robinson, Jerry Sams, Jeremy Anderson, Joe Brafehak, Matt Sabo, David Moore, Joshua Flaitz, Wiley Wyman, Doug Gerry, Bob Arnold and Pat Workman.

Biosolids are aerobically digested (Walker Process Equipment, A Div. of McNish Corp.), dewatered in a 12,000-gpd belt filter press (Alfa Laval), and landfilled. The plant produces 539 dry tons annually.

Until another upgrade in 2020, the facility's aging poses operational challenges. "In 2018, we clocked 49 permit violations, mostly *E. coli* and ammonia," Wood says.

Antiquated equipment wasn't the only culprit. The plant was designed to use alum for phosphorus removal,

Wood, shown watching while Doug Gerry, plant operator, checks the sludge depth at a primary clarifier, extends her duties to leading plant tours and teaching kids about wastewater treatment.

but a switch to lower-priced ferric chloride in the early 1990s destroyed the bacteria on the RBCs, making it difficult to meet ammonia limits. The chemical also coated the UV bulbs, making them ineffective.

CLEANING THE SLATE

Wood and her team fought back. In January 2019, they began a comprehensive sampling program to track results as changes were made to the sys-

COMPETITION BONUS

Christen Wood loves competition so much that she competed in the 2016 Operations Challenge at WEFTEC while eight months pregnant. Her Minimal Headloss teammates were patient and accommodating, modifying events to her condition.

Although the team didn't place that year, the experience introduced Wood to the OpTool simulation software (Hydromantis Environmental Software Solutions) used in the process control event. Three years later, she lobbied to have it installed in the Upper Tuscarawas Wastewater Treatment Plant Number 36, where she is operations administrator.

The application went online in autumn, helping to train operators as the plant was upgraded from rotating biological contactors to biological nutrient removal. "With RBCs, the water flows in and it flows out," Wood says. "There are no levers to pull or buttons to push. The BNR plant is all hands-on control, and changes are incremental."

The software simulates what operators and staff do daily, but it can be programmed with frightening scenarios. For example, how does the treatment train react if wasting or the ferric chloride feed is turned off or increased? Or if the pumps go down? Or if the return activated sludge rate is 400% of the influent?

"It's the Kobayashi Maru of wastewater treatment plants," says Wood, referring to the no-win training exercise in the 1982 Star Trek film. "The scenarios help operators, electricians and mechanics communicate with each other early in the game. That was exciting for me."

tem. Wood collaborated with Kim Noll, laboratory supervisor at the Fishcreek Wastewater Treatment Plant in Stow (Ohio), to refine influent sampling at the headworks, RBCs, clarifiers, filters and UV system. They also tracked loading and percentage removal rates and compared them to design standards.

In February 2019, the plant switched to sodium aluminate for phosphorus removal. In March, the operations and maintenance teams replaced the bulbs, sleeves and wipers in the UV system. Throughout spring, the operations team chemically stripped the 28 operational bio-discs. In June, a contractor installed three refurbished units, bringing the total back up to 31 discs. The refit took out a quarter of the treatment train, resulting in temporary permit violations.

"Every change brought massive improvements, including no *E. coli* violations as of August 2019," Wood says.

DATA STREAM

As data trickled in, it revealed that wasting the final clarifiers to the headworks hammered the RBCs with 2,000 mg/L BOD. "RBCs don't like batch processing, and it slows ammonia removal," Wood says. "Since the piping existed, the operators suggested opening two valves and wasting to the digesters. Problem solved."

Within a week of the first process changes, a monumental shift occurred. Wood suddenly began hearing the operators, three mechanics, six electricians and plant supervisor talking to each other. "They were discussing lab data, which valves to open or close, the best way to drain tanks and should they waste simultaneously," Wood says. "No one had asked these questions before, and I was excited because they were making suggestions to improve the process."

For example, the plant doesn't have grease removal, so the sewer maintenance department vacuums the scum layer on the primary tanks. To improve efficiency, Frank Garisto, operator, suggested off-loading the grease into the belt press influent instead of at the headworks.

Another example involved the FlexFilters, which were not designed to filter ferric chloride. The chemical matted the compressible media (fuzzy orange balls), limiting their filtration capacity.

Enter Pat Workman, a mechanic with a construction engineering background and more than 40 years at the plant. He fabricated a device powered by a sewer cleaning truck to pressure-wash the media in situ. In three hours, the balls regained their original dimension, raising the media height by 12 inches, increasing flow rates and reducing backwashes by half.

"This was huge for the operators, but I was doubly thrilled because the answer came from maintenance," Wood says. "Pat is an amazing team member, and we are fortunate to have him." His contributions include modifying almost everything in the plant and designing concrete and aluminum covers for the influent and effluent channels. The latter reduce algae buildup and lift easily via recessed hooks.

CAREER PATH

Wood's 11 years in the industry almost ended in the Ashtabula lab on her first day: She threw away all the components for the TSS tests instead of just the filter pads. Rather than fire her, boss and mentor Kim Nordquist (retired), made sure she understood that occasional mistakes were the cost of doing business.

"Accepting I have the latitude to err has been the key to my success," Wood says. "I'm not afraid to test the potential for greater things. If I'm wrong, mistakes become a learning tool because now I have to fix them."

From Ashtabula, Wood moved to the Northeast Ohio Regional Sewer District as a laboratory technician in 2011. At first that appeared to be a mistake. "I was accustomed to variety and this was a specialized lab," Wood says.

> "Accepting I have the latitude to err has been the key to my success. I'm not afraid to test the potential for greater things."
>
> **CHRISTEN WOOD**

(continued)

After a year of doing only *E. coli* analysis and bioassays, she followed a former colleague who had moved to operations in the district's Southerly Wastewater Treatment Plant. "I've been in love ever since," she says.

Wood joined the Summit County Department of Sanitary Sewer Services to grow professionally. Instead of managing processes, she manages seven operators and a plant supervisor who staff the Upper Tuscarawas plant and three smaller package plants. She also oversees three mechanics responsible for the county's six treatment plants and six electricians who service those plants and the county's 219 pump stations.

Matt Sabo, left, electronic instrumentation technician, troubleshoots the SCADA system while Christen Wood and Joe Brafchak, electronic instrumentation technician, look on.

> "Even if the youngsters don't become future industry personnel, they will become ratepayers who now understand the value of the service."
> **CHRISTEN WOOD**

ORIGINAL APPROACH

Wood's passion for the industry has taken her in interesting directions, including outreach for groups requesting her educational program. The toughest audiences are elementary students. To pique and retain their curiosity, Wood offers something different. "The approach works for all audiences, but especially kids because of the yuck factor," she says.

Wood brings samples from the plant and encourages sniff tests. "They often make fart jokes when smelling the influent. Then they begin giggling and asking questions. I see future operators in those who like the earthy aroma of the activated sludge or fixed-film sample.

"All the talk about treatment doesn't mean half as much as seeing and smelling the difference between influent and effluent. Even if the youngsters don't become future industry personnel, they will become ratepayers who now understand the value of the service."

BRIDGING THE GAP

Wood is also involved with the Northeast Section Ohio Water Environment Association's Student Design Competition, which collaborates with universities to promote real-world design experience for engineering students interested in water careers. "I accidentally became the operations and maintenance judge because I said yes without knowing what it was," she says.

University teams choose from either a wastewater or stormwater problem, both authentic and deliberately vague. Then they interface with industry professionals to obtain operational and design data to develop solutions. The plant or city receives a free engineering project, and it enhances the students' resumes.

"The competition also helps to plug the gap between people looking for jobs in their course of study and plants needing workers," Wood says. "So far, the competition has produced three engineering job applications for the county. Considering our size, that's huge."

SILOS OF KNOWLEDGE

As much as Wood enjoys these excursions, her heart is in the plant. An MBA helps her to better liaison between front-line workers and upper management. At the Northeast Ohio district, when women operators gravitated to share experiences and troubleshoot, Wood saw an opportunity to establish the Women's Employee Resource Group.

"I'm proud of the group because it reduced the district's information silos — the sequestering of information rather than sharing it with related departments, job titles and plant locations," Wood says. "We built a strong network that now includes all women in the district. We discuss problems, often resolving them by explaining why."

For example, operators questioned a procedure that appeared illogical to them and made extra work. Human resources said it was required by law. Discussions also helped human resources understand that documentation is not the main priority for operators focused on preventing wastewater from polluting a river.

CAREER MILESTONES

The Operations Challenge is another bridge between silos, building links between departments and breaking down barriers. "People who fight together for a common goal form much stronger teams capable of tackling complex tasks," Wood says. "The greatest compliment for me as a manager is to train teams so well that other people covet them."

From 2016-18, Wood organized and took part in the Northeast Ohio district teams. In 2017, her "Treat the Water Right" rap burst on the scene and pounded through the Southerly plant's public address system. Wood's Insane in the Force Main challenge team debuted in 2018, placing third in process control, Division 2. For Wood, standing on the winner's podium was a dream come true.

Back on Earth, Wood and her team face the challenges of bringing a new plant online as she writes hundreds of pages for her Ohio EPA Class IV (highest) certification exam. To keep it all in perspective, Wood visits the outfall daily: "It makes me happy to see how we are protecting our community in a tangible way." **tpo**

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> "Our approach is unique. We're providing more than an off-the-shelf, out-of-the-box solution. What we're doing is much more comprehensive."
> **ANTHONY STANLEY**

A Different Spin on Sensing

THE GRUNDFOS MACHINE HEALTH MONITORING SERVICE FOR ROTATING EQUIPMENT FORGES PARTNERSHIPS WITH CUSTOMERS AIMED AT ACHIEVING NEW LEVELS OF RELIABILITY

By Ted J. Rulseh

The days are fast vanishing when treatment plant operators monitor pumps, motors and other equipment by making rounds, doing spot checks and recording data on paper.

Today, equipment health monitoring is all about electronic sensing and increasingly about feeding data wirelessly to a central digital monitoring platform for review, analysis and reporting. The aim is to give plant operators and maintenance people timely and accurate data that they can use to structure maintenance programs cost-effectively and extend equipment life.

Now pump manufacturer Grundfos offers a machine health monitoring service that's designed not just to collect and compile machine data, but to present it in ways operators can easily understand so they can act on it appropriately.

The actionable insights found in the reports are extremely precise and allow for immediate, targeted responses to ensure continuous reliability. Anthony Stanley, business development director for digital services, talked about the offering in an interview with *Treatment Plant Operator.*

tpo: How does this offering fit with your company's products and business?

Stanley: It's part of our larger portfolio of digital solutions, one of a number that we are planning to roll out globally. It's about connecting critical equipment to our network and to the cloud so we can assess machine health in real time.

> "Our platform is designed so that any authorized person in the organization can understand the conclusions being drawn and what needs to happen. It's presented in language everybody can understand and discuss."
> **ANTHONY STANLEY**

tpo: What is the marketplace need you are addressing with this capability?

Stanley: The industrial world is changing, and that includes the water and wastewater sector. Our customers increasingly expect digitally enabled offerings. By offering monitoring services like machine health in addition to our efficient and reliable pumps, we become a full-range solution provider. This is a proactive move on our part to participate in the innovations going on in the market.

tpo: In a basic sense, how does this offering work?

Stanley: Our approach is unique. We're providing more than an off-the-shelf, out-of-the-box solution. What we're doing is much more comprehensive. We partner with users to understand what is critical to them and what they trying to protect and prevent. It involves integrating with their team, installing Bluetooth sensors at critical points on the equipment, marrying those sensors to our web platform through the cloud, and then transmitting and translating our findings or insights so users can easily understand and react to them.

tpo: What is the most different aspect of this technology?

Stanley: This is much more than the setting of alarms. When there's an alert, we let the customer know, but we're very specific about what the alert is, where it's located, what is causing it and, most important, what they should do about it in the short term to make sure it doesn't turn into a more serious problem.

tpo: Is there a component of artificial intelligence in this monitoring platform?

Stanley: Absolutely. Artificial intelligence and machine learning are factored in. We are constantly getting better at identifying what certain vibration, temperature and magnetic flux signatures represent. The more data we collect, the better we are at identifying issues. So there is an automated side that sends out insights and helps identify problems and their causes.

tpo: Is there a human component to it as well?

Stanley: Yes, there is a need for human interaction to confirm some of the insights, make sure we're understanding things correctly and customize the insights for the users, so it's not just a canned answer. It's a personalized view of the facility with insights that relate to the user's business objectives and capabilities.

tpo: Where on the equipment are the sensors located?

Stanley: We're a pump company, but this solution is equipment agnos-

tic. It's designed for all types of rotating equipment. The type of equipment determines the locations of the sensors and how many we need. Typically, we focus on the bearing points where we can detect sources of vibration and catch issues the earliest.

tpo: Is there an operations center where Grundfos personnel watch the data?

Stanley: We have teams that monitor platform data 24/7. When something changes in health status, such as when a machine goes into an alert state, our team will look at the equipment signatures, confirm the insight and immediately share that insight with the user.

tpo: Do you then provide any type of support to help the user rectify the issue?

Stanley: Some of our customers have robust technical service and maintenance teams that can react quickly and fix things in-house. Others who don't have that expertise can tap Grundfos and invite us to come out and fix it for them.

tpo: When a machine has a change in health status, how is the customer notified?

Stanley: The customers have access to the same portal that we do, and they can view it at any time. We also work with them to determine how best to deliver the insights and who should receive them. It could be by text message, email or a phone call.

tpo: What do you do differently in presenting the data?

Stanley: Traditional solutions deliver insights that are rather general and very technical. That makes it hard for operators to tell the story up the chain of stakeholders, such as to finance and leadership teams. Our platform is designed so that any authorized person in the organization can understand the conclusions being drawn and what needs to happen. It's presented in language everybody can understand and discuss so decisions can be made quickly.

tpo: Can you provide an example of how this might work?

Stanley: A traditional solution might deploy sensors with threshold alarms. When there is an alarm, it essentially acts like a flashing red light on top of the equipment. For example, the vibration has exceeded a threshold, here is the reading, go check it out. Our solution also detects vibration, but not just that it has crossed a threshold. It is anomaly detection that allows us to be more specific and more personalized: Something has changed, this is the likely cause, this is when to act on it, and this is how to fix it.

tpo: So you're helping them assign priorities to the issues that are detected?

Stanley: Yes. If it's urgent, the machine health assessment will reflect that; it will actually be in the red. But that's what we want to prevent. With a successful implementation, we really shouldn't get into the red. We should get into the yellow, which tells us we've found an anomaly and something needs to happen.

tpo: How might a plant team interact with this solution?

Stanley: It's designed so that first thing in the morning they can log in and see the state of all the equipment. Is there a trend? Has something changed status? If everything is in the green, then they can plan their maintenance and service teams' schedules accordingly.

tpo: What is the net benefit of this solution to operator and maintenance people?

Stanley: Sensing is the future. If you're not able to measure the health of your equipment, that's a major blind spot. We offer partnerships with extensive support, regular discussions and best practices so that we can help our customers get to a new state of reliability. tpo

First Line of Defense

DIANA HEIMBACH AND HER TEAM MAKE SURE THE LEHIGH COUNTY AUTHORITY SENDS HIGH-QUALITY PRETREATED WATER DOWN THE PIPELINE FOR FINAL TREATMENT

STORY: **Jim Force** | PHOTOGRAPHY: **Kevin Blackburn**

If Diana Heimbach needs a break from work, she can always head out to her parents' farm and tend the dairy goats.

But that doesn't happen often. She loves her job as project manager for JACOBS, the firm responsible for operating the Lehigh County Authority Wastewater Pretreament Facility in Fogelsville, Pennsylvania.

"I like what I do," she says. "Wastewater is not luxurious, but you're helping the environment and your community. Our client, the Lehigh County Authority is very nice to work with. We communicate well."

Heimbach started her wastewater career by working in the laboratory. After six years, she moved up to assistant project manager. Then, at age 29, she was named project manager, responsible for the Lehigh County plant — a 5.75 mgd (design) pure oxygen facility — and for staff supervision and relationships with area industrial dischargers and some 70 waste haulers.

Her rise to that position doesn't surprise colleague Tracey Sherwood, administrative specialist: "From day one, she's been our go-to person. She never ceases to amaze me with her ability to pick things up. She multitasks better than anyone I've ever seen. She's extremely bright, yet a good people-person."

HOMETOWN

Heimbach is from Slatington. She graduated from Cedar Crest College in Allentown with a degree in chemistry and math, and she came out of school looking for a job in industry, possibly food processing.

The Lehigh County Authority Wastewater Pretreatment Facility has a 5.75 mgd design capacity.

But when the opportunity to work in the lab at the pretreatment plant came up, she took it, eager to fill a role in environmental protection. Her facility treats industrial and hauler waste to the point where it can be sent via the Western Lehigh Interceptor to Allentown's main wastewater treatment plant on Kline Island.

By contract, the pretreatment facility must deliver wastewater with less than 25 mg/L BOD and TSS. It handles waste from industrial accounts including food and beverage companies, along with some residential customers and about 200,000 gpd of waste from haulers. The wastewater is collected in a wet well and then pumped up to a pair of automated bar screens, followed by grit removal and primary settling.

> “Wastewater is not luxurious, but you’re helping the environment and your community.”
>
> **DIANA HEIMBACH**

DOING IT RIGHT

Diana Heimbach has opinions on all the current issues in water management, but one that’s especially nettlesome is the backlash against land application of biosolids.

She wishes critics of the practice could see what the Lehigh County Authority is doing: “We’re not just throwing biosolids on the ground. I don’t feel we’re causing any harm, and frankly I sometimes think they’re just making assumptions about what we are doing and how we are doing it without knowing all the facts.”

Heimbach points out that her plant and other biosolids producers have to meet environmental parameters controlling the quality of the material being applied. “We are well below the limits of our permit,” she says.

Heimbach considered a career in the chemical industry earlier in life, but backed away because of issues with some of the products being made and distributed. She chose the environmental field instead: “I like the idea of reusing biosolids as a resource. We follow the letter of the law to ensure it is safe for the environment.”

Diana Heimbach,
Fogelsville, Pennsylvania

POSITION:
Project manager, JACOBS

EXPERIENCE:
11 years

DUTIES:
Manage 5.75 mgd Lehigh County Authority industrial pretreatment facility

EDUCATION:
Bachelor’s degree, chemistry and mathematics, Cedar Crest College, Allentown

CERTIFICATIONS:
Class A Subclass 1 wastewater operator; Certified Maintenance & Reliability Technician (CMRT)

AWARDS:
2018 Pennsylvania Water Environment Association Operator of the Year (Large Plants); 2017 JACOBS aland Lehigh County Authority Employee of the Year

GOALS:
Advance within JACOBS; continue strong relationship with county authority

GROWTH ON THE WAY

The Air Products pure oxygen system follows. "We generate the oxygen on site," Heimbach says. "It is the most complex system at our plant." Two large compressors liquefy and distill air and separate oxygen gas. At 98% to 99% purity, the oxygen is mixed into the wastewater in the aeration deck of the closed tanks, accelerating biological treatment.

The treated water flows to final clarifiers and then to the interceptor for delivery to Kline Island. There is no disinfection, and the plant has no discharge permit. Primary sludge, scum and secondary sludge are pumped into two primary aerobic digesters that flow into a third secondary digester before dewatering on belt presses (Alfa Laval). The resulting Class B cake is land-applied.

Odor control is a high priority. The staff operates chlorine scrubbers, and all tanks but the final clarifiers are enclosed. A plant upgrade with a new SCADA system and capacity expansion is in the future.

"We need to balance our processes with economic growth in the area," Heimbach says. "We have lots of space to expand. Some of the piping is already in place." The area expects continued commercial and industrial growth along the main highway corridor. In addition, the groundwater table is high, and the trend toward increased rainfall is expected to add flow.

The team at the Lehigh County Authority pretreatment plant includes, from left, Tom Elias, Dave Barnhart, Chris Harding, Tracey Sherwood, Andrew Burcaw, Dean Vermeulen, Diana Heimbach, Jeremy Binder and Kristopher Kromer.

ESPRIT DE CORPS

Heimbach supervises a staff of 11 that includes:

- Dean Vermeulen, assistant project manager
- Harry Siegel, operator; Joseph Figueroa and Chris Harding, operators in training
- Dave Barnhart, lab supervisor, and Andrew Burcaw, lab analyst

Heimbach's dedication and ability to multitask helped drive her rapid rise in the career.

- Tim Deturk, hauler administrator
- Tom Elias, maintenance clerk; Kristopher Kromer, maintenance specialist; and Jeremy Binder, mechanic
- Tracey Sherwood, administrative specialist

Heimbach says everyone works well as a team; her earlier experience on the staff helps her understand the challenges they face. "I didn't have a lot of experience with things like finances or the budget," she says. "But having been part of the staff, I know how hard the team works and what needs to be done."

She welcomes staff members to come to her with issues. The esprit de corps is maintained through weekly staff meetings, where team members talk about the treatment process, recent problems, lab issues and changes in industrial sample collection. "It's a group effort," Heimbach says. "From lab to administration and operations, we deal with everything."

In addition to the weekly meetings, the team holds a monthly meeting devoted to safety and team building: "We're in constant communication. Rarely does a day go by when we aren't in touch with each other."

REVAMPING A PROGRAM

The relationship with haulers is an example of Heimbach's skills and dedication, according to Sherwood, who has administrative responsibility for the program. Permitted haulers deliver grease, septage and other liquids, some once a day and some several times a day. While the program has existed for 20 years, one of Heimbach's first tasks as project manager was to revamp and improve it.

Heimbach addressed weaknesses in the program by forming a team consisting of staff and management, and the haulers themselves. "The perspective of the haulers really helped a lot," Sherwood says. "The old program was simply outdated. We rewrote the permits, revamped our testing and identified risk factors."

The team also addressed market conditions, especially competitive practices, rates and limits on wastes to be treated. As a result, revenue and profits have increased. The overhaul has helped the company, clients and community, Sherwood says.

> "It's a group effort. From lab to administration and operations, we deal with everything."
> **DIANA HEIMBACH**

It has also been a factor in the success of the JACOBS operation and maintenance contract with Lehigh County Authority. JACOBS has been operating the pretreatment plant since 1995. The contract was recently renewed for another 10 years.

Heimbach and her staff make sure members of the public know what they're doing: "We hold tours of the facility every year. One of the teachers comes out at least three times a year."

EXCELLENCE NOTED

The hard work of the staff and the excellent performance haven't gone unnoticed. For 2018, Heimbach received the Pennsylvania Water Environment Association's Mark B. Hannum Award for Large Plant Operator of the Year.

She stresses that the recognition belongs to everyone at the plant: "We applied for the award, and my name was on the entry form." She also received the Employee of the Year award in 2017 from JACOBS and the Lehigh County Authority.

Heimbach's work ethic, humility and sense of responsibility could well stem from her upbringing on a farm still owned and operated by her parents. "It's hard to own a farm today, and it's nice to have a place to go," she says.

She helps with the breeding and showing of the livestock and often takes her 3-year-old son to the farm: "He loves it." It's obvious that his mom does, too. **tpo**

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PERSISTENT EFFORTS TO CUT ENERGY CONSUMPTION YIELD A STATEWIDE ENERGY EFFICIENCY AWARD FOR A REGIONAL UTILITY IN NEW HAMPSHIRE

By Steve Lund

The journey toward an energy efficiency award for the Winnipesaukee River Basin Program started many years ago.

In 2019, the New Hampshire Department of Environmental Services and NHSaves recognized the program's clean-water facility as the most efficient in the state based on flow. NHSaves is a collaboration of the state's electric and natural gas utilities that promotes energy efficiency and environmental action.

The Winnipesaukee River Basin Program, is a regional utility serving 10 communities in the Lakes Region of central New Hampshire. It operates an activated sludge treatment plant in Franklin (11.5 mgd design, 6.4 mgd average). It uses 853 kWh per million gallons treated, far below the national benchmark of 1,200 to 2,400 kWh for similar-sized activated sludge plants.

Sharon McMillin, administrator, says the Winnipesaukee River Basin Program has a long track record of making cost-effective energy efficiency investments since its first energy audit in 2003. It has had two more energy audits since then. "It's just kind of ingrained that we look for the most energy efficiency, best cost-benefit, and best life-cycle cost, whether we do individual replacements or capital projects," McMillin says.

The Winnipesaukee River Basin Program's administration/operations building has a vegetated roof.

SAVINGS IN AERATION

The biggest energy savings came from replacement of the aeration and grit blowers during a capital project in 2010-12. Three old blowers were replaced with two 100 hp and two 150 hp turbine blowers (APG-Neuros), automated and controlled by a SCADA system based on dissolved oxygen in the aeration tanks. In the grit chamber, three new Aerzen blowers operate one at a time to help settle out solid material.

Ken Noyes, chief operator, says replacing the coarse-bubble diffusers with fine-bubble diffusers (Sanitaire - a Xylem Brand) achieved payback from energy savings in one year. Together, those changes cut the electricity usage for aeration in half, and because aeration accounts for 40% to 50% of the plant's energy use, the reduction was substantial. "The plant's energy use was cut by about 25% just by that one upgrade," McMillin says.

CENTRIFUGES DEWATERING

Another significant reduction came by changing from plate-and-frame filter presses to centrifuges for dewatering biosolids. The filter presses were losing effectiveness, forcing operators to work until 9 p.m. at night and on Saturdays during the summer, "and we still couldn't keep up in the summertime," Noyes says. "With the centrifuges, we operate five days a week with no overtime, and the solids are more consistent."

Although the centrifuges draw more electricity than the filter presses, they are much more efficient and only need to operate about one-third as much. That means lower labor costs, along with lower cost to haul the drier biosolids. The plant produces Class B biosolids, which are applied to hay and other nonfood crop fields. Other steps taken to save energy include:

- Reflective roofing and vegetated roofing on the administration/operations building
- An upgrade of the UV disinfection system so it no longer needs to be supplemented with chlorine tablets for flows over 10 mgd and it now operates at 24 kW instead of 86 kW
- Replacing two 40 hp plant water pumps with two 15 hp and two 25 hp pumps (MCI Flowtronex) with variable-frequency drives (ABB)
- Several lighting upgrades
- A new entry vestibule that paid for itself in three months from savings on heat
- Upgrades and rightsizing of the main switchgear and transformer

> "It's just kind of ingrained that we look for the most energy efficiency, best cost-benefit, and best life-cycle cost, whether we do individual replacements or capital projects."
> **SHARON MCMILLIN**

NO SOLAR, NO COGENERATION

Over the years, the utility considered but rejected solar power and cogeneration with biogas. "Neither was cost-effective for us," McMillin says. "We use the biogas to heat our anaerobic digesters and to heat our occupied buildings."

Solar power also has not been economically feasible. "Because we are a state agency, we pay the state rate of 8.5 cents per kWh versus the utility rate of 11 cents," McMillin says. "Solar developers wanted to start power purchase agreements at 11 cents. We can't immediately pay more to have solar." In addition, there were physical constraints to the placement of solar panels that would affect construction cost.

Still, solar power and cogeneration remain as potential future projects. "We keep those on the radar," McMillin says. "For example, if we do anything with our solids handling and produce more biogas, we may revisit cogeneration. The same thing with solar. That technology is changing rapidly, and the installation costs have come down since we last looked at it only three years back. It may become cost-effective or the state laws may change."

OPTIONS OPEN

McMillin considers it essential to evaluate each energy reduction or energy production project on a case-by-case basis. For example, the treatment plant uses most of the biogas it produces but it flares some in the summer, when the facility accepts more septage and when heat demand is lower. The staff has looked at ways to use the excess gas instead of flaring it.

"We evaluated just using what we were flaring for some sort of cogeneration, but the cost of cleaning up the biogas was prohibitive for that amount of gas," McMillin says. "Sometimes it looks good on paper until you start asking questions. Is it really feasible and cost-effective? Or do you spend that money somewhere else where you can get a better payback?" **tpo**

A Splash of Color

MURALS ON THE PRIMARY CLARIFIERS AT AN OHIO CLEAN-WATER PLANT HELP PASSERSBY APPRECIATE THE ROLE OF TREATMENT IN HABITATS AND ECOSYSTEMS

By Jeff Smith

PHOTO ABOVE: The completed mural by artist Jolena Hansbarger on the side of one of the clarifiers.

Two circular primary clarifiers at the Athens (Ohio) Wastewater Treatment Plant get a lot more attention since a mural was painted on each of them.

"They face a popular bike path that gets traffic all day long," says Lisa Agriesti, plant manager. "It's just good for the trail users to see something bright and vibrant rather than just machinery and concrete."

Painted by local artist Jolena Hansbarger, the two identical 5-by-24-foot murals show schools of fish swimming under a sunlit skyline and flocks of birds winging through a moonlit night. Each has an urban background, symbolizing the artist's vision of wildlife harmonizing with an ever-growing Ohio city.

> "Our bike path is a crown jewel of the city, and the murals are a charming enhancement to the whole bike path experience."
> **CAROL PATTERSON**

SKETCHES FIRST

"I wanted to beautify the space and help people think about the impact population growth has on wildlife habitat and our ecosystem," Hansbarger says. "And I wanted people to recognize the importance of our wastewater treatment plant's role in that relationship."

Hansbarger, a graphic designer, used sketches to frame her vision, then uploaded the creation to Adobe Illustrator to finalize the layout, colors and shapes of objects to be painted. She and a high school student serving as apprentice outlined the design on the clarifiers, using a grid to pinpoint location and proportion.

Putting in a series of 10-hour days, the artists rolled and brushed more than 5 gallons of Valspar SeasonPLUS flat exterior latex paint to complete the murals in nearly 30 days. A UV-protectant coat was applied to both murals. "The weather really cooperated," Hansbarger says.

Plant operators prepared the surface for the murals using several coats of Sherwin-Williams PrepRite ProBlock flat latex.

The 20-mile, 6-foot-wide, asphalt-surfaced Hockhocking Adena Bikeway passes on two sides of the activated sludge plant (4.8 mgd design). "The murals are bright and vibrant and add a nice pop of color and interest to our plant," Agriesti says.

BETTER BIKING

The Athens Municipal Arts Commission, appointed by the City Council, issued a regional call for artists to submit proposals for the murals. Commission chair Carol Patterson says six artists made inquiry; four submitted their ideas with the requisite proposal data. A five-member ad hoc committee

selected Hansbarger for the $3,000 project. Funding came through a city ordinance that allocates 1% of capital projects' total cost to the arts.

"Our bike path is a crown jewel of the city, and the murals are a charming enhancement to the whole bike path experience," Patterson says. Agriesti say the murals complement a 10-by-17-foot mural painted in 2016 on the side of a highly visible lift station.

"I really do enjoy the brightness that each piece adds," Agriesti says. "In our world of pumps, piping and biosolids, getting a glimpse of something colorful can instantly change your mood for the better." tpo

ABOVE: Hansbarger and her apprentice work on one of the clarifier murals. LEFT: This mural was painted by a different artist on a city lift station several years before the clarifier murals.

Reclaimed water from the 4S Ranch facility is pumped through 46 miles of pipelines to customers that include homeowner associations, schools, parks, golf courses and municipal street departments.

Water to Share

THE OLIVENHAIN MUNICIPAL WATER DISTRICT WORKS IN PARTNERSHIP TO ENSURE ABUNDANT RECYCLED WATER FOR ITS OWN RESIDENTS AND FOR NEIGHBORING COMMUNITIES

STORY: **Jim Force** | PHOTOGRAPHY: **Rob Andrew**

In a part of the country where freshwater supplies are often scarce, the Olivenhain (California) Municipal Water District is doing its part.

The 4S Ranch Water Reclamation Facility recycles some 1 million gallons of high-quality effluent each day for irrigation and shares even more with neighboring communities. "We're reusing 100%," says John Onkka, facilities supervisor. "We have no outfall."

What doesn't go directly to irrigation is stored in reservoirs to meet spring and summer demands. The district partners with other utilities to meet all of its customers' irrigation needs.

A consistent safety award winner, the facility also won the California Water Environment Association Plant of the Year award in 2018. Communications in both directions, to the public and among the staff, are strong reasons for the success.

> "Our team does a tremendous job keeping the plant and collections system in compliance."
> **JOHN ONKKA**

TERTIARY PROCESS

Onkka's team is responsible for collections and treatment. The system feeding the plant contains 15 pump stations, 65 miles of gravity sewer and 25 miles of force main.

At the plant, wastewater passes through a headworks containing a Bandscreen Monster grinder (JWC Environmental) and a grit removal system. The flow then passes through a splitter box to an oxidation ditch set up for extended aeration. Two Flender Gear units provide aeration for the ditch.

The plant has two treatment trains. The older Train A is held in reserve and used for storage or when the other train is being worked on. The newer Train B serves as the main treatment system. After treatment in the ditch, the flow moves on to a pair of circular clarifiers, operated using Eimco drives (Ovivo USA).

Two 225,000-gallon equalization tanks provide storage and flow control. A US Filter shallow-bed sand filter system (Evoqua Water Technologies) polishes the water and removes fine particles; it is backwashed twice a day on average. Filtrate is UV disinfected and sent to a recycled water pump station. In summer, the water is pumped into the Olivenhain's distribution system. In winter, it is stored in a pond that can hold 410 acre-feet of water and is available to users as needed.

Water that is directly recycled is pumped through 46 miles of purple pipelines to customers throughout the southeast quadrant of the district. Users include homeowner associations, schools, parks, golf courses and street departments. None of the recycled water is used for residential lawns or green spaces.

Biosolids are aerobically digested and aerated with a disc filter system (Sanitaire, a Xylem brand).

Olivenhain (California) Municipal Water District, 4S Ranch Water Reclamation Facility

www.olivenhain.com

BUILT:
1990 (private system turned over the district in 1998)

CUSTOMERS:
7,500 homes in 4S Ranch and Rancho Cielo area

AREA SERVED:
48 square miles in San Diego County

FLOWS:
2 mgd design, 1 mgd average

TREATMENT LEVEL:
Tertiary

TREATMENT PROCESS:
Oxidation ditch, sand filtration

DISCHARGE:
Irrigation, or storage basin for seasonal reuse

BIOSOLIDS:
Aerobically digested, land-applied as cake

AWARDS:
2018 California Water Environment Association and local California Water Environment Association section Small Plant of the Year; Water Environment Federation George W. Burke Jr. Safety Award

ANNUAL BUDGET:
$4 million (treatment facility and collections system)

The 4S Ranch facility has a design capacity of 2 mgd and now treats an average of 1 mgd.

Raymond Motas and Jymy Briseno, water reclamation operators, work with the plant's new polymer feed system (Polyblend from UGSI).

The solids are then thickened and dewatered on a pair of recently rehabilitated belt filter presses (Alfa Laval). The cake is applied to alfalfa and barley fields around Yuma, Arizona.

MAKING IT BETTER

While the plant operates in an award-winning fashion, improvements are in the future. "We're planning to change our UV units to a WEDECO - a Xylem Brand Duron system, which uses fewer lamps to accomplish the same amount of disinfection," Onkka says.

Plant instrumentation is being upgraded through the addition of a Hach RTC system, which will add more ammonia and nitrate probes and analyzers in the aeration section of the oxidation ditches. That will establish better setpoints and produce better data, enabling the plant to adjust more effectively between night and day operation.

New instrumentation and valving are being added to the sand filter system, which Onkka says should last another 10 years. The plant just added a new skid-mounted polymer dosing system (UGSI Chemical Feed, a UGSI Solutions Co.) and installed new chlorine pumps (Blue-White Industries) to control algae growth in the equalization system and support the chlorine residual in the distribution holding tank. Because households lie on and above the plant's property boundaries, two chemical scrubbers (Integrity Municipal Systems) control odors.

Weather is a factor in the recycled water scheme. Recent winters have been rainy, reducing usage of the recycled water storage basin contents. "This past winter, we had pretty unusual patterns and amounts of rain," Onkka says. "No one was using the recycled water, and the pond was filling up."

A CULTURE OF SAFETY

A safety program that John Onkka calls "extremely robust" has kept operations at the 4S Ranch Water Reclamation Facility safe for years and has led to the clean-water profession's top safety award.

"Safety is a huge part of our culture," says Onkka, facilities supervisor. The program includes semimonthly safety committee meetings, a monthly team member forum that includes safety topics, a safety incentive program and safety suggestion box.

For these efforts, plus a spotless performance record, the facility has won the California Water Environment Association Safety Plant of the Year award and recently the Water Environment Federation's George W. Burke Jr. for safe operations.

"That was a big deal for us," Onkka says. "We've gone an unheard of number of days — over 4,900 — without a lost-time accident. We're all very proud of our safety record." The safety committee includes two board members, plus key senior staff, and the water plant and operations supervisors. A safety subcommittee meets monthly and brings concerns and ideas forward to the larger committee.

At the team-member forum, safety issues are discussed. Each month, team members receive safety handouts that include such topics as active shooter situations and cybersecurity.

The incentive program includes safety awards for meeting certain targets. For example, every team member is eligible for up to a $150 recognition award if there are no lost-time injuries during the calendar year and damage to vehicles or property is less than $10,000.

The team at the 4S Ranch Water Reclamation Facility includes, from left, John Onkka, water reclamation facilities supervisor; Nate Naugles, pump/motor technician I; Jason Emerick, Jymy Briseno and Raymond Motas, water reclamation operators; Sean Peterson, backflow and cross connection coordinator; Dominic "Bruno" Brunozzi, pump/motor technician; Gabriel Hernandez, chief plant operator; and William Broadhead, water reclamation operator.

Briseno (left) and Broadhead monitor the SCADA system.

> "Wipes and other disposables are a major issue. At the plant, the headworks screens are effective in removing these objects, but they can be a problem in the collections system."
> **JOHN ONKKA**

The staff was in touch with regulators to discuss the possibility of the pond overflowing into the storm drain, or amending the district's permit to allow recycled water to flow into a nearby creek. "Finally, the rain stopped and we breathed a sigh of relief," Onkka says.

Kim Thorner, district manager, adds, "We were pretty nervous. We have one large reservoir and two smaller ones, but otherwise there's no place to put it."

FINDING CUSTOMERS

One solution is to find more customers, and new soccer fields in the San Diego area are coming on board as recycled water customers. Negotiations with other districts and communities is an important part of the district's success. "We partner with the Rancho Santa Fe Community Services District or the City of San Diego to provide supplemental water as needed," Thorner says.

John Onkka, facilities supervisor

In the northwestern quadrant of the district, the district purchases recycled water from neighboring districts. It's a coalition approach that enables the district to collaborate with other agencies. As a result, Thorner says, the district has met its objective to reduce potable water for nonresidential irrigation by 15%.

Not all the challenges facing the district relate to distribution. "Wipes and other disposables are a major issue," Onkka says. "At the plant, the headworks screens are effective in removing these objects, but they can be a problem in the collections system."

Decreased flows throughout the system, brought about by water conservation in drought conditions, can cause additional problems. The system sees an increase in hydrogen sulfide odors, as well as corrosion, and the treatment plant can experience increased ammonia. "That's the long-term trend," Onkka says. "We're seeing per capita water usage in our households going down." Per- and polyfluoroalkyl substances (PFAS) are looming as an issue as regulators pay more attention to those contaminants.

COMMUNITY COLLABORATION

Onkka and the district view water reuse as a partnership between the water system and the end users. It's a relationship that depends on active and effective public communication. That effort needs to be continuous. "In the end, it's always a challenge to educate our customers about recycled water, how it's safe and what we do," Onkka says.

The 4S Ranch facility and the district publish a bimonthly newsletter and use social media, including tweet of the week. Team members take pictures of what they're working on and send them to the public relations department for use on social media.

"It's cool," Onkka says. "If you're replacing a motor, take a picture and send it in." An incentive program encourages team members to do just that. An annual open house at the plant is a hit: "We've done it six years in a row now. We open the gate and set up booths that describe all activities at the plant. We invite vendors. We feature a landscape education program — how to use sprinklers and save water by drought-proofing your grass. We encourage people to convert to native landscapes."

> "In the end, it's always a challenge to educate our customers about recycled water, how it's safe and what we do."
> **JOHN ONKKA**

Board members are on hand to talk with visitors, and the staff leads tours of the plant. "It's family friendly," Onkka says. "We hand out snow cones and popcorn. Overall, it's a big success." When areas are added to the recycle system, team members go out to meet with and educate the new customers.

STAFF PRIDE

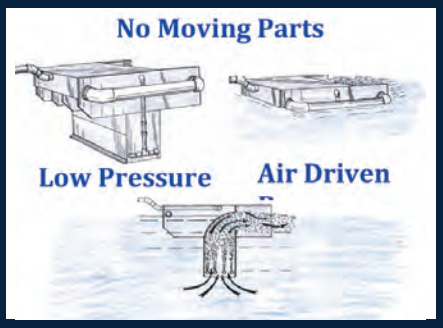
Internal communication is just as important to the success of the recycled water program. Onkka supervises five operators and one cross-connection control specialist. Two of the district's electricians and two pump and motor technicians report to the plant. In 2016, one of them, Dominic "Bruno" Brunozzi, was named California Water Environment Association Mechanical Technician of the Year.

"It's a great team," Onkka says. "We work well together, and we take pride in our work. Our team does a tremendous job keeping the plant and collections system in compliance." He points to the recent awards as evidence of teamwork.

Experience is another plus. "Three of our guys have 10-plus years of experience. They like it here and are motivated to be successful. I respect them as professionals. We set a professional tone. We don't look down on or demean anyone. It's a team environment and an open door. There are no fears of making a mistake."

Onkka says acceptance of responsibility and willingness to learn are important factors in his staff's success. It's a theme echoed by Thorner: "They have a great group of people. We're proud of the plant and the awards they've won." tpo

"SOLVING
the World's Water Problems with
INNOVATIVE GREEN
Technologies"



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- High Volume Water Flow
- Reduces BOD & COD
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- Oxidizes Hydro-Carbons
- De-stratifies the Water Column
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e. randy@do2e.com
www.do2e.com

Pumps Directory 2020

tpo TREATMENT PLANT OPERATOR

	Archimedes/ Screw	Centrifugal	Chemical Feed	Chopper	Deep Well	Dewatering/ Bypass	Diaphragm	Effluent	Grinder/Sump
Ashland Pump 1899 Cottage St., Ashland, OH 44805 855-281-6830 Fax: 877-326 -1994 www.ashlandpump.com								YES	YES
Blue-White Industries 5300 Business Dr., Huntington Beach, CA 92649 714-893-8529 Fax: 714-894-9492 sales@blue-white.com www.blue-white.com See ad page 2			YES				YES		
Boerger, LLC 2860 Water Tower Pl., Chanhassen, MN 55317 612-435-7300 Fax: 612-435-7301 america@boerger.com www.boerger.com See ad page 4			YES			YES			YES
Crane Pumps & Systems 420 Third St., Piqua, OH 45356 937-778-8947 937-773-2157 cranepumps@cranepumps.com www.cranepumps.com See ad page 11				YES				YES	YES
DO2E Wastewater Treatment LLC 36220 State Hwy 59, Stapleton, AL 36578 850-698-6805 Fax: 251-937-8400 randy@do2e.com www.do2e.com See ad page 41									
EPIC INTERNATIONAL, Inc. 10993 Richardson Rd., Ashland, VA 23005 804-798-3939 Fax: 804-798-9175 try@epicintl.com www.epicintl.com	YES								
Franklin Electric 9255 Coverdale Rd., Fort Wayne, IN 46809 800-348-2420 Fax: 260824-2909 techsupport@fele.com www.franklinengineered.com See ad page 19		YES			YES	YES		YES	YES
Gardner Denver, Inc. 1800 Gardner Denver Expy., Quincy, IL 62305 866-428-4890 www.gardnerdenver.com/gdproducts See ad page 7		YES				YES			
Gorman-Rupp Company 600 S Airport Rd., Mansfield, OH 44903 419-755-1011 Fax: 419-755-1251 grsales@gormanrupp.com www.GRpumps.com See ad page 15		YES				YES		YES	
Hawkins Water Treatment Group 2381 Rosegate, Roseville, MN 55113 800-328-5460 612-331-6910 john.andren@hawkinsinc.com www.hawkinsinc.com/groups/equipment		YES	YES				YES		
Hydra-Tech Pumps 167 Stock St., Nesquehoning, PA 18240 570-645-3779 Fax: 570-645-4061 htpump@hydra-tech.com www.hydra-tech.com See ad page 61				YES		YES			
Industrial Flow Solutions 123 Spencer Plain Rd., Old Saybrook, CT 06475 860-399-5937 aauger@flowsolutions.com www.flowsolutions.com See ad page 33		YES		YES		YES		YES	YES

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

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Pumps
Directory 2020

tpo TREATMENT PLANT OPERATOR

	Archimedes/ Screw	Centrifugal	Chemical Feed	Chopper	Deep Well	Dewatering/ Bypass	Diaphragm	Effluent	Grinder/Sump	
IWAKI America 5 Boynton Rd., Holliston, MA 01746 508-429-1440 info@iwakiamerica.com www.iwakiamerica.com		YES	YES				YES			
Jaeco Fluid Systems Inc. 100 Quaker Ln., Malvern, PA 19355 877-778-3456 610-4 07-7207 Fax: 610-240-4906 sales@jaecofs.com www.jaecofs.com See ad page 57			YES				YES			
JDV Equipment Corporation 1 Princeton Ave., Dover, NJ 07801 973-366-6556 sales@jdvequipment.com www.jdvequipment.com See ad page 9		YES		YES						
Komline-Sanderson 12 Holland Ave., Peapack, NJ 07977 800-225-5457 908-234-1000 Fax: 908-234-9487 info@komline.com www.komline.com See ad page 65						YES				
Lakeside Equipment Corporation 1022 E Devon Ave., Bartlett, IL 60103 630-837-5640 Fax: 630-837-5647 sales@lakeside-equipment.com www.lakeside-equipment.com See ad page 3	YES									
LMI Pumps 201 Ivyland Rd., Ivyland, PA 18974 800-564-1097 215-293-0401 Fax: 215-293-0445 info@lmipumps.com www.lmipumps.com			YES				YES			
Lutz-JESCO America Corp. 55 Bermar Park, Rochester, NY 14624 800-554-2762 585-426-0990 Fax: 585-426-4025 mail@jescoamerica.com www.lutzjescoamerica.com		YES	YES				YES			
Milton Roy 201 Ivyland Rd., Ivyland, PA 18974 877-786-7298 215-441-0800 Fax: 215-441-8620 infoweb@miltonroy.com www.miltonroy.com See ad page 59			YES				YES			
Penn Valley Pump Co., Inc. 998 Easton Rd., Warrington, PA 18976 800-311-3311 215-343-8750 Fax: 215-343-8753 info@pennvalleypump.com www.pennvalleypump.com See ad page 31			YES				YES			
Philadelphia Gear - A Timken Brand 901 E 8th Ave., Ste. 100, King of Prussia, PA 19406 800-766-5120 610-265-3000 Fax: 610-337-5637 info@philagear.com www.philagear.com										
PRIMEX 22650 Cty. Hwy. 6, Detroit Lakes, MN 56501 218-847-1317 Fax: 218-847-4617 info@primexcontrols.com www.primexcontrols.com										
Proco Products, Inc. 2431 N Wigman Dr., Stockton, CA 95205 800-344-3246 209-943-6088 Fax: 209-943-0242 miquelm@procoproducts.com www.procoproducts.com										

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

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Pumps
Directory 2020

tpo TREATMENT PLANT OPERATOR

	Archimedes/ Screw	Centrifugal	Chemical Feed	Chopper	Deep Well	Dewatering/ Bypass	Diaphragm	Effluent	Grinder/Sump
ProMinent Fluid Controls, Inc. 136 Industry Dr., Pittsburgh, PA 15275 412-787-2484 Fax: 412-787-0704 marketing-us@prominent.com www.prominent.com			YES				YES		
Pulsafeeder, Inc. 27101 Airport Rd., Punta Gorda, FL 33982 800-333-6677 941-575-3800 ppgspotech@idexcorp.com www.pulsatron.com			YES				YES		
Schwing Bioset, Inc. 350 SMC Dr., Somerset, WI 54025 715-247-3433 Fax: 715-247-3438 marketing@schwingbioset.com www.schwingbioset.com									
Screenco Systems 13235 Spur Rd., Genesee, ID 83832 208-790-8770 sales@screencosystems.com www.screencosystems.com See ad page 65		YES				YES		YES	
SEEPEX Inc. 511 Speedway Dr., Enon, OH 45323 937-864-7150 Fax: 937-864-7157 sales.us@seepex.com www.seepex.com See ad page 33			YES					YES	
Smith & Loveless, Inc. 14040 Santa Fe Trail Dr., Lenexa, KS 66215 800-898-9122 913-888-5201 answers@smithandloveless.com www.smithandloveless.com		YES							
Sulzer Pumps Solutions, Inc. 140 Pond View Dr., Meriden, CT 06450 800-525-7790 203-238-2700 Fax: 203-238-0738 info.abs.usa@sulzer.com www.sulzer.com See ad page 25		YES		YES	YES	YES		YES	YES
Trillium Pumps USA SLC - WEMCO 440 West 800 South, Salt Lake City, UT 84101 801-359-8731 Fax: 801-530-7828 wemco@trilliumflow.com www.trilliumflow.com See ad page 35	YES	YES		YES		YES		YES	
Vaughan Company, Inc. 364 Monte-Elma Rd., Montesano, WA 98563 888-249-2467 360-249-4042 Fax: 360-249-6155 info@chopperpumps.com www.chopperpumps.com See ad back cover	YES	YES		YES		YES		YES	YES
Vertiflo Pump Company 7807 Redsky Dr., Cincinnati, OH 45249 513-530-0888 Fax: 513-530-0893 sales@vertiflopump.com www.vertiflopump.com		YES				YES		YES	YES
Wastewater Depot, LLC 4446 State Rte. 132, Batavia, OH 45103 513-732-0129 Fax: 513-735-1485 info@wastewaterdepot.com www.wastewaterdepot.com See ad page 57			YES					YES	YES
Watson-Marlow Fluid Technology Group 37 Upton Technology Park Rd., Wilmington, MA 01887 800-282-8823 978-658-6168 Fax: 978-658-0041 info@wmftg.us www.wmftg.com See ad page 9			YES						

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

(continued)

Blowers Directory 2020

tpo

		CENTRIFUGAL			POSITIVE DISPLACEMENT			OTHER
		Multistage	Single Stage	High-Speed Turbo	Rotary Lobe	Hybrid	Rotary Screw	
AERZEN See ad page 23	**Aerzen** 108 Independence Way, Coatesville, PA 19320 610-380-0244 order-usa@aerzen.com www.aerzen.com/en-us	YES	YES	YES	YES	YES	YES	
ALL-STAR Process Blowers Vacuum Pumps Process Compressors	**All-Star Products** 2095 Exeter Rd., Ste. 80-324, Memphis, TN 38138 800-431-8258 901-755-9613 Fax: 901-758-0816 edwardb@all-star-usa.com www.all-star-usa.com							Regenerative
Atlas Copco See ad page 67	**Atlas Copco Compressors** 300 Technology Center Dr., Ste. 550, Rock Hill, SC 29730 866-546-3588 info@atlascopco.com www.atlascopco.com	YES	YES	YES	YES	YES	YES	
EurusBlower See ad page 53	**Eurus Blower, Inc.** PO Box 4588, Wheaton, IL 60189 630-221-8282 Fax: 630-221-1002 tomh@eurusblower.com www.eurusblower.com	YES	YES		YES			
Gardner Denver See ad page 7	**Gardner Denver, Inc.** 1800 Gardner Expy., Quincy, IL 62305 866-428-4890 www.gardnerdenver.com/gdproduct	YES	YES	YES	YES		YES	
Howden See ad page 35	**Howden** 900 W. Mount St., Connersville, IN 47331 800-557-6687 765-827-9200 Fax: 765-827-9317 inquiries.usa@howden.com www.howden.com	YES	YES	YES	YES			
INDUSTRIAL FLOW SOLUTIONS See ad page 33	**Industrial Flow Solutions** 123 Spencer Plain Rd., Old Saybrook, CT 06475 860-399-5937 aauger@flowsolutions.com www.flowsolutions.com		YES					
MILTON ROY an Accudyne Industries brand See ad page 59	**Milton Roy** 201 Ivyland Rd., Ivyland, PA 18974 877-786-7298 215-441-0800 Fax: 215-441-8620 infoweb@miltonroy.com www.miltonroy.com						YES	
SULZER See ad page 25	**Sulzer Pumps Solutions, Inc.** 140 Pond View Dr., Meriden, CT 06450 800-525-7790 203-238-2700 Fax: 203-238-0738 info.abs.usa@sulzer.com www.sulzer.com			YES				
Wastewater Depot, LLC See ad page 57	**Wastewater Depot, LLC** 4446 State Rte. 132, Batavia, OH 45103 513-732-0129 Fax: 513-735-1485 info@wastewaterdepot.com www.wastewaterdepot.com	YES			YES			

SEEPEX launches Fast Ship Pump Program

SEEPEX is now offering a Fast Ship Pump Program to its customers who require expedited delivery of a progressive cavity pump. SEEPEX is offering the ability to order select pump models in as few as five business days with other build-to-order models available in two to three weeks. SEEPEX pumps offered in the Fast Ship Pump Program include the MD Series accurate dosing pumps; select BN Series general industrial pumps; and general industrial pumps with split-stator smart conveying technology.

Brandstetter joins Grundfos Pumps as new chief technology officer

Markus Brandstetter joined Grundfos Pumps as its new chief technology officer. An experienced technology leader and champion of digitalization, he brings significant experience from senior roles in large industrial companies. He will lead operational strategy development with a special focus on Internet of Things and service-oriented business strategy. In addition to serving as the CEO at Bosch Industrial Boilers, he has held various other leadership positions within international groups like Siemens, Alcatel and Bosch.

Centrisys/CNP exclusive US distributor for LIPP America Tank Systems

Centrisys/CNP signed an exclusive U.S. distributor agreement with LIPP America Tank Systems for water, sludge and digester tanks. LIPP has a patented stainless steel digester system that allows digesters to be built on site in less than two months. The short construction period and patented digester building system allow Centrisys/CNP to offer cost-effective, high-quality digesters with a long life cycle. The LIPP product line complements the Centrisys/CNP product portfolio by offering its customers solutions for resource intensification and resource recovery.

Wilo USA acquires pump manufacturer American-Marsh Pumps

Wilo USA, through its newly established subsidiary, American-Marsh Pumps, acquired the assets of U.S. manufacturer J-Line Pump Co., doing business as American-Marsh Pumps. Headquartered in Collierville, Tennessee, American-Marsh Pumps currently employs 55 people.

Xylem announces partnership with The Chris Long Foundation

Xylem announced it is partnering with The Chris Long Foundation's Waterboys initiative to bring clean and sustainable water to communities in need across the U.S. Established in 2015, Waterboys is the signature initiative of The Chris Long Foundation, dedicated to raising funds and awareness to provide clean water to 1 million people. Working with Xylem's corporate social responsibility program, Watermark, and activated by the company's Goulds Water Technology brand, the partnership will deliver a series of water well projects to provide rural communities with reliable, safe water access.

Kohler Power Systems expands distribution to Kinsley Power Systems

Kohler Power Systems announced that it is awarding distribution rights in New York City, Long Island, New Jersey and metro Philadelphia to Kinsley Power Systems. The 55-year-old distributorship has serviced and rented power systems in this area for years and will now immediately begin selling Kohler products. The company will continue to provide Kohler sales, service and rentals in New England and upstate New York.

MFG Chemical upgrades pilot plant in Georgia

MFG Chemical completed an upgrade of its pilot plant in Dalton, Georgia. The company upgraded a 100-gallon stainless steel reactor, which produces hot oil and steam reactions up to 550 degrees F. The pilot has internal cooling coils, two top feed ports, one bottom (dip tube) feed port, a pack column condenser, reflux column, standard tube condenser, small distillation column and vacuum capability at 8 torr. The reactor now sits on a mezzanine 12 inches off the floor, with new insulation. tpo

Visitors at the Jurassic Plant Tour greet Zook the *Tyrannosaurus rex*.

> "All the decorations and ideas were created by our plant staff. It was truly a team effort and required great cooperation."
> **LAURA ROMANO**

Dino Alert!

VISITORS ENCOUNTER A 30-FOOT *TYRANNOSAURUS REX* AT A GOLETA SANITARY DISTRICT TREATMENT PLANT OPEN HOUSE

By Sandra Buettner

The dinosaurs came forward in time at a Goleta (California) Sanitary District open house last October.

The district held its second Jurassic Plant Tour to educate guests from neighboring communities about wastewater treatment facility operations. The highlight was a 30-foot-tall, inflatable *Tyrannosaurus rex*.

"The district has been hosting a free open house every other year since 1951," says Laura Romano, management analyst for the district. "The past two times, we have gone with a dinosaur theme because we know it's something children can relate to."

The district, based in Goleta, supports a population of 80,000, has more than 132 miles of sewer pipes and recycles 3 mgd of wastewater for irrigation throughout the area.

FAMILY FRIENDLY

The gates opened at 10 a.m. to a crowd that included families with children wearing dinosaur T-shirts. Visitors received backpacks bearing a Jurassic Plant Tour logo. The bags contained fun items such as a plunger pencil, a squishable stress toy in the shape of a toilet, and a dinosaur notepad.

There were also dinosaur-themed bouncy houses, a "Tyranno-Hoe" backhoe made to simulate a dinosaur, and food stations that included "Dino dogs" and "Paleo pizza." An actor dressed as a dinosaur walked around the grounds and interacted with the guests. In addition, the local Audubon Society displayed a red-tailed hawk.

The event drew about 900 visitors of all ages. The event was promoted through the district's Facebook page, mailers to customers, press releases, word-of-mouth and a radio station interview. The giant *T. rex* attracted attention in advance, as the district headquarters is across the street from the Santa Barbara Municipal Airport and down the street from the University of California, Santa Barbara.

PASSPORT TO ADVENTURE

Each visitor received a passport with seven stops recommended for visits. At each stop, they received a stamp. They got one ticket after collecting four stamps and a second ticket after receiving all seven stamps. The tickets were entered in a drawing for giveaways throughout the day. The seven stops were:

- A booth where attendees made bracelets with different-colored beads representing steps in the water cycle.
- A collections department display with demonstrations of a sewer-cleaning truck and a CCTV sewer inspection truck.
- The power and maintenance building where attendees learned about the treatment process.

A tour participant shows off her bracelet with beads representing steps in the water cycle.

The Adventure Tour's missing dinosaur finds a tour group.

- The recycled water facility where visitors learned how wastewater is turned into irrigation water.
- A self-guided walking tour of the plant with storyboards featuring a biofilter, methane flare, digester, headworks, odor reduction system and primary clarifier.

District staff and board members shared their talents to help with the Jurassic Plant Tour exhibits and activities.

- A lab station where visitors saw a video on organisms from the activated sludge process.
- A narrated, 10-minute Adventure Tour around the plant with visits from several dinosaurs for the kids.

IT TAKES A VILLAGE

In a survey, attendees gave overwhelmingly positive feedback, Romano says. Even children made comments on the surveys their parents submitted. The children especially loved the dinosaur theme.

When asked how much they knew about the district before their visit, many said little to nothing. When asked how much education they took away, scores went way up. Visitors also said they would spread the word and recommend the next open house to their neighbors.

Orchestrating the event took a lot of work from numerous sources. Several sponsors donated resources and services. Depending on their support level, sponsors were recognized through signage and handouts and on social media.

About 40 district employees and board members shared their talent to make the event come to life. About 20 more volunteers were recruited and trained to help. "All the decorations and ideas were created by our plant staff," Romano says. "It was truly a team effort and required great cooperation. The attendees clearly appreciated their hard work and creativity." **tpo**

Noncontact UV Brings Savings

A REPLACEMENT UV DISINFECTION SYSTEM CUTS COSTS FOR ENERGY, PARTS AND MAINTENANCE LABOR AT A MASSACHUSETTS CLEAN-WATER PLANT

By Kenneth Harwood and Thomas G. Valorose

A 2007 expansion of the Town of Ayer (Massachusetts) Wastewater Treatment Plant included UV disinfection to replace gaseous chlorine, eliminating safety concerns and significantly reducing chemical and operation and maintenance costs.

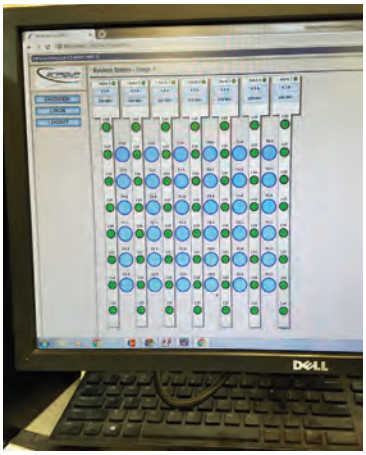
Soon afterward, plant personnel observed that the UV units were not robust enough to meet the NPDES permit limits for coliform. To avoid permit violations, the plant had to supplement the UV process with the addition of chemicals.

Rather than continue under that scenario, the plant team investigated alternative UV disinfection systems, and in 2014 it installed a noncontact UV system in which water flows through transparent tubes and UV lamps surround each tube in a dry environment. The system has produced substantial savings in power costs, parts and labor, and total cost of ownership.

CORRECTIVE ACTION

The Town of Ayer's activated sludge treatment plant (1.8 mgd design, 1.4 mgd average) serves a population of 8,100 in Middlesex County. The 2007 expansion included new anoxic tanks and tertiary filters for TSS removal in addition to the UV disinfection units.

Previously, disinfection was accomplished by the addition of chlorine gas, followed by dechlorination with sodium bisulfite before discharge to the Nashua River. When the original UV system failed to meet the facility's needs, the plant team supplemented it by overdosing with sodium hypochlorite to ensure complete disinfection and permit compliance. This led to chemical costs and to energy consumption beyond the power required for the UV units.



A control room display shows the status of the UV reactor.

The original disinfection system was a flanged, in-line system between two isolation valves with disinfection lamps perpendicularly inserted into the flow stream. Each lamp was encased in a quartz sleeve for protection and to allow UV light to pass. The sleeves needed regular cleaning and replacement. The lamps, lamp seals, ballasts and other components also needed replacing; the town had to keep a large inventory of spares on hand.

Ken Harwood, assistant foreman, checks the lamp racks in the noncontact UV disinfection unit.

In addition, operators found the UV system difficult to maintain and keep clean. To perform routine maintenance and repair, it had to be drained and taken offline, during which time chemical disinfection was necessary.

REVIEWING OPTIONS

In summer 2011, the town retained a consulting engineer to investigate and recommend a new UV disinfection system. Decision factors included:

- Capital cost including ancillary equipment
- Energy and maintenance costs
- Ability to meet the coliform permit limits (200 cfu/100 mL) without chemicals
- Fit within the existing system footprint and facility hydraulic profile
- Ease of operation and interface with the plant SCADA system

After the consultant interviewed three UV system manufacturers, the town selected the noncontact system. Water flows through activated fluoropolymer tubes (AFP840) surrounded by the UV lamps. Each tube is exposed to UV light from all sides. Velocity within each tube produces a scouring effect that prevents solids deposition in the tubes. There are no quartz sleeves to clean.

Two noncontact UV units were commissioned in 2013; only one unit needs to be online at any given time. After six months of continuous service, the town operations staff found significant reductions in operating costs.

In the noncontact UV system, water flows through transparent tubes and UV lamps surround each tube in a dry environment.

The dual UV reactors fit into an existing building space and required no significant piping modifications.

COUNTING BENEFITS

The original system consumed 315,360 kWh per year at a cost of $50,458; the news system consumed 77,088 kWh per year at a cost of $12,334, a savings of $38,124 or 75%. Costs also decreased for parts (from $23,000 per year to $2,330) and maintenance labor (from $31,200 to $90). As a result, the noncontact UV disinfection system showed a full payback on the investment after 1.8 years of operation, based on a capital cost of $166,000 and annual power, parts and labor savings of $89,904.

The noncontact UV disinfection system continuously meets permit requirements. The two reactors fit the existing building and allotted space. It required no significant piping modifications and in fact simplified the piping.

The Ayer Wastewater Treatment Plant staff is committed to reducing the use of chemicals wherever possible, as less chemical addition for disinfection means less going into the environment. UV disinfection has proven to be a viable way to move away from chemicals. The noncontact UV disinfection system has produced tangible savings in plant operations while reducing the financial burden to ratepayers.

ABOUT THE AUTHORS

Kenneth Harwood is an assistant foreman with the Town of Ayer (Massachusetts) Wastewater Treatment Plant. Thomas G. Valorose (tvalorose@r-r-inc.com) is a sales engineer with Russell Resources, a manufacturer's representative firm in East Greenwich, Rhode Island. **tpo**

Share Your Ideas

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

Send your ideas to editor@tpomag.com or call 877-953-3301

Pumps and Blowers

By Craig Mandli

Chemical Feed Pumps

GRUNDFOS PUMPS SMART DIGITAL

SMART Digital dosing pumps from Grundfos Pumps

Grundfos Pumps SMART Digital dosing pumps deliver reliable, safe and cost-effective chemical dosing for water and wastewater treatment. The pump's built-in sensor and variable-speed stepper motor solves off-gassing chemical issues, safety and reliability concerns, and system maintenance costs. Advanced monitoring and self-analyzing options offered by several control variants provide intelligent process control that looks beyond the pump and keeps an eye on the entire system. **913-227-3400; us.grundfos.com**

PULSAFEEDER PULSATRON

PULSAtron chemical feed pumps from Pulsafeeder

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

Dewatering/Bypass Pumps

CAT PUMPS STAINLESS STEEL TRIPLEX PUMPS

Triplex pumps from Cat Pumps

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

GORMAN-RUPP RELIAPRIME

ReliaPrime emergency bypass station from Gorman-Rupp

Designed to deliver the benefits of sound-attenuated silent pumps, the ReliaPrime emergency bypass station from Gorman-Rupp operates on natural gas. The engine-driven pump comes with autostart and level controls that allow it to start and stop in response to the liquid level. The unit includes a 3-inch Ultra V Series pump capable of passing a 3-inch spherical solid, and it offers a soundproof, lightweight aluminum enclosure with lockable door panels that can be removed for maintenance of the pump or engine. The unit is a complete backup package ready for hookup for primary pump repair and additional pumping capacity, or during emergencies and power outages. **419-755-1011; www.grpumps.com**

Effluent Pump

ASHLAND PUMP EFFLUENT PUMPS

Effluent pumps from Ashland Pump

Heavy-duty effluent pumps from Ashland Pump are available in multiple horsepower sizes for various performance requirements, with efficient permanent split-capacitor motors. The oil-filled pumps have an upper and lower ball bearing design and handle up to 3/4-inch solids. They are made of cast iron, with cast iron impellers and equipped with a piggyback switch (20-foot standard cord) or in manual configurations. They are offered in 3/10, 2/5, 1/2, 3/4, 1 and 1 1/2 hp models. **855-281-6830; www.ashlandpump.com**

Rotary Lobe Pump

BLUEline rotary lobe pump from Boerger

BOERGER BLUELINE

The BLUEline rotary lobe pump from Boerger is a self-priming, valveless, positive displacement pump used to convey viscous and abrasive materials. There are 21 pump models in six series with pulsation-free operation, fully reversible rotation, dry-run capabilities and flow rates up to 7,500 gpm. The pumps are stable and wear resistant with a maintenance-in-place design that allows for all wetted parts to be easily replaced through the front cover without the removal of pipe or drive systems. **612-435-7300; www.boerger.com**

Solids/Sludge Pump

VERTIFLO PUMP SERIES 2100

Series 2100 trash- and solids-handling self-priming pumps from Vertiflo Pump offer easy access to the impeller and case to remove debris. They have an oversized, tapered bore and a self-flushing seal chamber. An optional external flush can result in extended seal life. A back pull-out design with external impeller adjustment, plus a replaceable case

wear-plate, allows for continuous high-efficiency performance. They have capacities to 1,300 gpm, heads to 112 feet TDH and are available in 3-, 4- and 6-inch sizes. They are capable of handling up to 3-inch solids, and the suction lifts to 25 feet. Standard construction is all iron and all CD4MCu. **513-530-0888; www.vertiflopump.com**

Series 2100 pumps from Vertiflo Pump

Submersible Pump

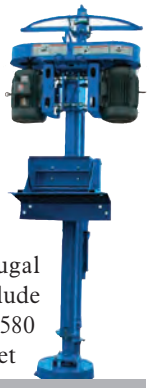
POLYLOK PL-CPE4A

PL-CPE4A pump from Polylok

The Polylok PL-CPE4A is a submersible, 4/10 hp, 115-volt, single-phase effluent pump with a 2-inch NPT vertical discharge. It has a maximum head of 38 feet and a maximum flow of 56 gpm. The pump is designed with a 3,450 rpm oil-filled permanent split-capacitor motor and has an amp rating of 6.6 for 115 volts, a rugged cast iron housing and volute equipped with a cast iron vortex impeller capable of passing a 3/4-inch-diameter solid. The stainless steel shaft is supported by two single-row, oil-lubricated ball bearings. The shaft seal is an inboard design with a secondary Exclusion V seal. It has a 20-foot UL/CSA-listed power cable suitable for submersible service and fitted with a three-prong plug. The unit is supplied with an integrated clip for the included piggyback mechanical float switch for automatic operation. **888-765-9565; www.polylok.com**

Vertical/Lift Station Pumps

SCREENCO SYSTEMS PATZ SHAFT DRIVE PUMPS


Patz Shaft Drive Pumps, distributed by ScreencO Systems

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


Vertical pumps from SRS Crisafulli System

SRS CRISAFULLI SYSTEM VERTICAL PUMPS

SRS Crisafulli System vertical pumps are designed for stationary applications, such as sewage digesters and lift stations, manure tanks, chemical sumps and dry docks. They are submersible, centrifugal pumps that range in size from 2 to 24 inches. The pumps require no priming, check valves, suction pipes or screens, and they are self-drained. Steel construction assures long life and trouble-free operation. The pumps pass large solids and pump high-weight/high-viscosity fluids with ease. Standard Duty pumps move relatively clean water and are equipped with grease-lubricated and sealed bearings. Severe Duty vertical pumps move sand, silt, mud, sludge or abrasives; are constructed with abrasion-resistant, heat-treated steel (450 Brinell hardness); have dual mechanical shaft seals (to prevent contamination); and an enclosed, oil-filled bearing frame, allowing the pump to perform in demanding environments. **800-442-7867; www.crisafullipumps.com**

Blowers

EURUS BLOWER ZG


ZG blower package from Eurus Blower

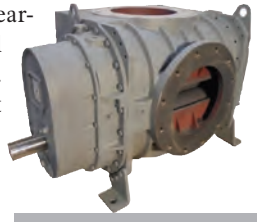
The ZG blower package from Eurus Blower includes an internal sound-dampening feature lowering both sound and pulsations in blower packages with or without a sound enclosure. The package includes an integrated silencer, base frame, inlet filter/silencer with automatic belt tensioning and vibration isolators. 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**

GARDNER DENVER TRI-FLOW 825


Tri-Flow 825 blower from Gardner Denver

The Gardner Denver Tri-Flow 825 blower for combination sewer jetter trucks achieves 19 inches Hg vacuum and delivers 4,311 cfm at 18 inches Hg and weighs less than 1,500 pounds, making it suitable for jetting and excavation work. Paired with the company's product-tuned silencer, the unit is quiet and uses 70% less space than a traditional silencer, according to the maker. For greater work site efficiency, it provides 6% higher flow and 7.2% more fuel efficiency at 18 inches Hg. **866-428-4890; www.gardnerdenver.com/robuschi**

HOWDEN 827 DVJ


827 DVJ dry-vacuum blower from Howden

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 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**

(continued)

NAMWON TURBO ONE BLOWERS

Blowers from NamWon Turbo One

Blowers from NamWon Turbo One are equipped with high-speed permanent magnet synchronous motors, boosting their maximum efficiency of around 98%. They include the latest innovations in air bearing, precision, machining impeller, high-speed high-efficiency permanent magnet motor, high-speed control inverter, automatic control logic and system design. They use an airfoil bearing that employs air as a lubricant, meaning they do not need separate lubricant and have a long service life. Maintenance costs are low because only the suction filter is replaced. There is no vibration and no need for separate sound proofing with a noise of 70 to 80 dB. **821-544-2280; www.nwturbo.com**

Pump Controls

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

DELTA TREATMENT SYSTEMS CP20/40/50 SERIES

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

FLYGT - A XYLEM BRAND MAS 801

MAS 801 pump monitoring system from Flygt - a Xylem Brand

As part of a complete Flygt - a Xylem Brand pumping system, the MAS 801 pump monitoring system helps reduce costs over a pump's lifetime. Thanks to its 24/7 on-site overview of pump data that simplifies methods for diagnostics, this technology enables continuous station health checks on pump operation. In addition, with three-axis vibration, current measurement, and temperature and leakage measurements, you can take timely, preventive measures for increased lifetime of the pumping equipment. **704-409-9700; www.xylem.com**

IMI SENSORS, A DIVISION OF PCB PIEZOTRONICS, SWIVELER ICP

Swiveler ICP accelerometer from IMI Sensors, a division of PCB Piezotronics

Treatment plant operators can be confident that the vibration sensor selected for submersible pumps is impervious to water ingress when using the Swiveler ICP accelerometer from IMI Sensors, a division of PCB Piezotronics. It has a waterproof housing and an IP68 ingress protection rating backed by an integral cable and polyurethane over mold. The product has a 360-degree swivel mount with a floating locknut that allows for easy cable positioning. The accelerometer has small footprint and low-profile design for trouble-free mounting in tight spaces. There are 10-, 20-, 30- and 50-foot versions available. **800-828-8840; www.pcb.com**

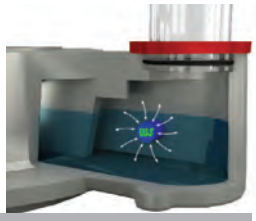
KwikSwitch float switch connection system from PRIMEX

PRIMEX KWIKSWITCH

The KwikSwitch quick-release float switch connection system from PRIMEX improves reliability and reduces installation and float switch replacement time. It is designed to be installed directly in a wet well. The four-port manifold easily connects one to four float switches for level control applications, and its color-coded wiring pairs and corresponding colored caps make installation and maintenance easy. It is rated for temporary submersion, and its dual-seal design provides improved protection against water ingress and corrosive gases typically found in sewage lift stations. It includes a single manifold multiconductor direct burial rated cable and stainless steel mounting bracket for the manifold. Sealing plugs for unused ports and mechanically activated float switches are available. It is CSA certified. **844-477-4639; www.primexcontrols.com**

Pump Part/Supply/Service

SMITH & LOVELESS WAVESTART



WaveStart pump prime sensing system from Smith & Loveless

WaveStart, an enhanced pump prime sensing system from Smith & Loveless, is designed to enable faster and more reliable pump priming while eliminating nuisance maintenance associated with flushables rampant in today's wastewater collections systems. Efficient pump priming allows wastewater pumping to be accomplished at ground level in a safe environment, eliminating confined-space entry for all routine maintenance and inspection. Designed for its complete line of vacuum-primed, nonclog, solids-handling S&L Pumps and EVERLAST Wet Well Mounted Pump Stations, it offers Multi-Variable Sensing, which senses the wastewater profile and determines the pump prime status. Rags, strings, wipes, films, flushables and other debris do not prevent it from sensing the pump's prime status. Priming speed is increased with a reaction time of less than 100 milliseconds. **800-898-9122; www.smithandloveless.com** tpo

By Craig Mandli

Peristaltic metering assists with arsenic removal in wells

Problem

The drinking water sources in the town of Mammoth Lakes in northeast California consist of nine wells and water from Lake Mary. Arsenic is present in the well water, and the Mammoth Community Water District developed two groundwater treatment stations and one surface water station to combat it. Sodium hypochlorite and ferric chloride are used in the multistep arsenic-removal process. Initially, the well stations used solenoid type pumps, but the off-gassing nature of the sodium hypochlorite created vapor lock in the pumps.

Solution

The district installed **Proseries-M M-3 peristaltic metering pumps** from **Blue-White Industries** to assist in treatment. The pumps are capable of feed rates to 33.3 gph, with a 10,000-1 turndown ratio. The maximum pressure rating is 125 psi.

RESULT:

The peristaltic design allowed the excess gas to be pumped through the tubing while maintaining smooth, accurate and constant flow with no potential for vapor lock. **714-893-8529; www.blue-white.com**

Aerators and mixers enable cost savings, reduce biosolids buildup

Problem

The town of Monroeville, Alabama, faced aeration and mixing issues, sludge buildup in one of its wastewater lagoons, and power bills of $12,500 per month after a major employer relocated its garment manufacturing facility. The company had generated about 90% of the wastewater entering the lagoon, and its fees covered 90% of the operation and maintenance cost, which included $1,500 per month for aerator maintenance. The lagoon was 80% full of biosolids, and the estimated cost to dredge was over $1.6 million. The lagoon had to remain operational and the town needed to reduce costs.

Solution

DO2E Wastewater Treatment installed two 5 hp high-volume floating **aerators** and two 3 hp floating **mixers.**

RESULTS:

In four years of operation, the equipment saved the town some $513,000 in electricity and $72,000 in maintenance while reducing biosolids buildup by 90%. **850-698-6805; www.do2e.com**

Facility employs peristaltic dosing pumps to apply sodium hypochlorite

Problem

A wastewater facility in Nashua, New Hampshire, needed a system to control the dosing of sodium hypochlorite for disinfection, and peristaltic metering tube pumps to deliver pumping of sodium bisulfite and sodium hypochlorite.

Solution

The facility purchased two **Flowrox LPP-D25 peristaltic dosing hose pumps** with a Halar coating for protection against the aggressive sodium hypochlorite in case of a hose failure. They included hose leak detection to shut the pump down in case of hose failure, and integral variable-speed motors with 4-20mA input for control. The pumps combine intelligence with suitable turndown. They will not experience vacuum degassing in summer.

RESULT:

The city has been satisfied with the pumps' performance. **410-636-2250; www.flowrox.com**

Bypass system helps plant expand

Problem

To stay in compliance with state EPA requirements, the Kiski Valley Water Pollution Control Authority in Pennsylvania had to double the capacity of one of its plants from 15 to 31 mgd. As part of the expansion, the authority had to replace its influent pump station once construction was completed.

Solution

With help from an engineering contractor and **Xylem,** the authority built a **bypass pumping system** to handle the flow during construction. Xylem installed five Flygt NS 3301 electric submersible pumps as a rental. Since the plant did not have enough power to run the pumps, each one ran off of a 104-kW **Godwin** generator with a 100 hp Godwin variable-frequency drive to handle the variations in flow. Two 24-inch Xylem MJK flowmeters were also installed, in addition to level transducers in the wet well. At the core of the project was a SCADA system to receive data from level transducers in the wet well and trigger the generators and start the pumps at predetermined levels. The VFDs then controlled pump speed to maintain appropriate system flow. The pumps, generators and VFDs worked sequentially. For optimal efficiency and to save energy and diesel fuel costs, each pump activated only when increased flows called for pump activity.

RESULT:

Over the life of the project, the technology saved thousands of dollars through energy efficiency. The real-time, advanced remote monitoring and control technology also provided authority personnel and customers with peace of mind. **800-247-8674; www.xylem.com/dewatering**

Chopper pump helps stop clogging at lift station

Problem

A Texas wastewater treatment plant's main lift station needed better mixing to break up persistent grease and scum layers. Three small pumps could no longer cope, and objects such as mopheads caused blockages. The maintenance team was always on call. In some cases, a vacuum truck had to be called at significant cost.

Solution

The municipality chose a **Gator series submersible chopper pump** from **Landia,** developed to eliminate lift station clogging caused by wet wipes and other debris. It has a hardened steel knife system at its inlet that continuously macerates and mixes solids. Its open impeller enables it to pump even high-viscosity flows.

RESULT:

The duty pumps are now better protected. The chopper pump picks up the solids from the bottom of the lift station and breaks them up so that they do not accumulate and cause clogging. **919-466-0603; www.landiainc.com**

Reactor system enables power plant to increase effluent oxygen level

Problem

To protect its equipment from corrosion, a Texas power plant removed oxygen from its process and cooling water before use. But releasing water with low dissolved oxygen into a watershed can harm the aquatic environment and violate government regulations. The facility pumps 1.5 to 3 mgd of cooling tower effluent 2 miles to a settling pond and another 0.75 mile to a nearby creek. Regulations require 5 mg/L minimum DO; the plant saw levels from 0 to 3 mg/L.

Solution

Mazzei Injector's sidestream venturi injection and **Pipeline Flash Reactor system** solved the problem. It is installed on a 30-square-foot skid at the discharge and requires minimal maintenance — the only equipment with moving parts is the small sidestream pump. The boosted sidestream passes through an injector and then is mixed back into the main flow through the pipeline flash reactor.

RESULT:

Weekly sampling showed a rise in DO to the 8 mg/L requested by the plant managers. **661-363-6500; www.mazzei.net**

(continued)

Switch-rated plugs significantly cut pump replacement and maintenance downtime

Problem

During construction of a wastewater treatment plant in Watertown, Wisconsin, submersible pumps for effluent were hard-wired. Soon after operations began, one pump had to be replaced. That took the maintenance crew almost a full day; most of the time was spent disconnecting the electrical connections and rewiring the new one.

Solution

MELTRIC Switch-Rated plugs and receptacles, which combine the safety and functionality of a disconnect switch with the convenience of a plug and receptacle, were installed on all the pumps. Because they are Type 4X/IP69K/3R watertight, the plugs and receptacles are suitable for connecting submersible pumps indoors and outdoors. Spring-loaded, silver-nickel, butt-style contacts provide consistent electrical performance. The contacts resist wear, corrosion and oxidation.

RESULT:

The plug-and-play functionality significantly reduced pump replacement time by eliminating unwiring/rewiring. Because of the safety of the devices, maintenance technicians can easily replace or service the pumps without needing an electrician or using personal protective equipment. **800-433-7642; www.meltric.com**

Progressive cavity pump replaces piston pump, lowering maintenance costs

Problem

A wastewater treatment plant near Lexington, Kentucky, had frequent maintenance with piston pumps used to convey sewage. Replacement parts and maintenance hours were becoming costly.

Solution

SEEPEX provided **BN progressive cavity pumps** with Smart Conveying Technology for ease of maintenance without piping removal. SCT includes stator retensioning, which provides longer intervals between stator replacements. These features keep costs and personnel time to a minimum.

RESULT:

"Compared to the previous piston pumps, Smart Conveying Technology makes maintenance and repair work significantly easier," says Mike Smith, maintenance supervisor. "The spare parts are much more cost-effective and downtime constitutes a fraction of previous values. Pumps with SCT can be serviced in a fraction of the time without having to dismantle them." **937-864-7150; www.seepex.com**

Plant updates biosolids piston pump

Problem

The Noman M. Cole Jr. Pollution Control Plant in Lorton, Virginia, installed four Schwing Bioset sliding-frame intermediate storage silos and KSP 45 piston pumps to store and pump biosolids. The units have been in service for 15 years pumping centrifuge-dewatered biosolids into an incinerator. The original equipment was sized for growth that has not materialized; the plant struggled with turndown while heating up the incinerator after a shutdown. The plant would overcome this issue by artificially starving the pumps or by cycling them on and off during that condition.

Solution

The KSP 45 piston pumps are to be replaced with smaller **Schwing Bioset KSP 25 piston pumps** that have the same footprint, operate from the same power unit, and have the same operational features, including sludge flow measuring for U.S. EPA reporting, while providing the turndown needed to resolve incinerator restart issues.

RESULT:

The new equipment is to be delivered in the first half of 2020 and is expected to provide the same reliability and longevity as the existing pumps. **715-247-3433; www.schwingbioset.com** tpo

Patterson Mfg. davit cranes

New davit cranes are available from corrosive environment and safety expert, Patterson Mfg. Give your operations a lift with models in 1/2- and 1-ton capacities. The cranes exhibit the company's hallmark safety, simplicity and durability, with key features such as a reliable brake with long life and readily available parts, a hot-dipped galvanized finish, and no plastic sheaves or pulleys. They put safety and simplicity within your reach with a low-maintenance, easy-to-assemble design that is made in the U.S. For over 160 years, Patterson has been a trusted supplier of winches, rigging, fittings and custom products for lifting applications in the marine, construction and mining markets. These davit cranes continue to deliver the company's promise of helping businesses run safer, easier and faster. Find out how our team and products can improve employee safety and positively impact your bottom line.
800-322-2018;
www.pattersonmfg.com/davit-cranes

product spotlight
wastewater

Identify and target effluent organisms

By Craig Mandli

Quantifying, specifying and targeting the organisms found in water and wastewater systems is a major component in a utility's effort to release the cleanest effluent back into the water system. **LuminUltra Technologies** microbial monitoring recently launched their portfolio of DNA-based solutions designed to deliver a rapid, accurate quantification of the total microbial population in a sample.

The **GeneCount DNA-based solution** offers insight on which microbes — good or bad — make up that population, helping users devise tailored solutions for microbial management. GeneCount Quantitative Polymerase Chain Reaction (qPCR) analysis lets users rapidly screen for specific microbes or groups of microbes known to be significant in their processes. The analysis can detect low levels of the targeted organisms and quantify their populations.

"Our ATP (adenosine triphosphate) technology was already recognized as an effective way to rapidly monitor microbiological content in water. Now, with GeneCount, we can show exactly what types of microbes are present. This allows system operators to better manage the cause-and-effect relationships on their systems," says Pat Whalen, LuminUltra president and CEO. "Customers who use our products and services are able to maintain stable operating conditions through proactive monitoring. They can also quickly identify and solve problems when they arise. That saves them money and helps keep systems running more smoothly."

GeneCount from LuminUltra Technologies

Users can select from three options to suit their operations, including in-house Next Generation Sequencing (NGS) and qPCR services in which the company does the testing, turnkey qPCR workflow as a service to clients, or the purchase of a portable qPCR device for in-house testing.

GeneCount NGS analysis lets users see what is happening inside their processes by identifying nearly all types of microbes present along with an insight into what benefit or harm they may be causing. Together, the systems help users understand the cause-and-effect relationships microbes are having, see trends and understand future triggers for proactive decision-making, adjust biocide to account for the changes detected and apply targeted treatments for harmful organisms.

"Our GeneCount line is flexible, so no matter what a customer's current level of DNA knowledge, we can accommodate their needs," says Neil Sharma, LuminUltra's vice president of Product Development. "With all GeneCount solutions, we provide fast results, comprehensive training and ongoing support." **506-459-8777; www.luminultra.com**

FCI - Fluid Components International wet gas MASSter sensor

FCI - Fluid Components International's optional wet gas MASSter sensor for the ST80 Series flowmeters delivers accurate, repeatable gas flow measurement in the presence of more moisture and condensation droplets. The sensor configuration features a mechanical design that shunts moisture, condensation and water droplets away from the thermal flow sensor, maintaining an accurate gas flow measurement while minimizing errors that could occur from a cooling effect on the sensor that might cause a spike or false high reading. The MASSter sensor option can be used in applications that have either moisture entrained in the gas (annular mist) or for protection against down the pipe rain in larger, vertical stacks.
800-854-1993;
www.fluidcomponents.com

product spotlight
water

Managing the information flow

By Craig Mandli

Ovation OCC100 from Emerson

Today's water utilities often rely on nonintegrated programmable logic controllers with limited functionality to automate smaller, standalone equipment or processes. Unfortunately, these can limit broad information sharing necessary for optimal operational efficiency. The modular **Ovation OCC100 controller** from **Emerson** cost-effectively manages the flow of information from various sources to ensure continuous, reliable operation.

The compact model OCC100 is a nonredundant controller with a small footprint designed for the water and wastewater industry. A suite of communication protocol software and wide-area networking technology reside in the controller, reducing complexity and giving small and midsized municipalities a cost-effective way to boost reliability and control geographically dispersed equipment.

"The real breakthrough is its ability to communicate using wide-area network technologies," says Tom Snowdon, business development manager for Emerson. "You can use it to control widely distributed assets from a simple control location using multiple forms of wireless technology."

It is well suited for applications where redundancy may not be needed. Examples include reservoir monitoring, gravity filtering, disinfection, tertiary treatment, and pump or booster station operation. Besides operating independently, the controller can be merged into a larger Ovation distributed control system, enhancing visibility into plantwide operations.

The model OCC100 can be paired with an Ovation playback recorder that automatically and continuously records operational data at the same resolution as the live control system. Like a digital video recorder, it has standard functions such as play, pause, fast forward and rewind. With the ability to visually step through logic sequences using process graphics and signal diagrams, users can view historical data through the lens of what the operator would have seen under actual plant conditions.

"You can have local control of processes in a water treatment plant while taking advantage of our programming power, all with a single plantwide control platform," Snowdon says.

This holistic and repeatable view of plant events can be used to speed troubleshooting, enhance training and support decision-making. Plant personnel can review actions taken during an abnormal event, such as a chemical spill or wet-weather event, to identify best mitigation responses. They can then update operating procedures to better manage similar events in the future. The recorder lets them quickly diagnose problems, minimize equipment damage and reduce maintenance. **314-553-2000; www.emerson.com** tpo

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WASTEWATER

By Rick Lallish

In pump hydraulics, what condition is a measurement of the physical vertical distance between the surfaces of two fluids, but is not related to how far the fluids are apart horizontally?

A. Specific gravity
B. Lift
C. Static head
D. Dynamic head

ANSWER: C. Static head is the physical vertical distance between the surfaces of two fluids no matter the physical distance apart horizontally. Dynamic head is the theoretical distance rather than the physical distance. Both conditions are measured in feet of head. More information may be found in the textbook *Pumps and Pumping* by Skeet Arasmith, 2011.

DRINKING WATER

By Drew Hoelscher

An operator is attempting to disinfect a source water that contains naturally occurring ammonia with a free chlorine residual. For the operator to be successful, what Cl:N ratio must be accomplished?

A. Any Cl:N ratio less than 5:1
B. Any Cl:N ratio between 5:1 and 6:1
C. Any Cl:N ratio between 6:1 and 7:1
D. Cl:N ratio greater than 7:1

ANSWER: D. Naturally occurring ammonia concentrations in source waters can vary drastically. Typically, elevated levels of naturally occurring ammonia are associated with water sources supplied from an aquifer. Economically, it becomes more challenging for an operator to surpass breakpoint chlorination and disinfect with a free chlorine residual when natural ammonia is present at elevated concentrations. Breakpoint chlorination is achieved after all the chlorine and ammonia bonds have decayed and there is nothing else left in the water for the chlorine to react with. This free available chlorine for disinfection is available at Cl:N ratios greater than 7:1.

ABOUT THE AUTHORS

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

people/awards

The Township of Edison, New Jersey, hired **Robert Smith** as director of its Water and Sewer Utilities Department.

The Town of Bridgton, Maine, hired **David Madsen** as public services director, replacing **Jim Kidder,** who retired.

The Forest Lakes (Colorado) Metropolitan District hired **Keith Rountree** as district manager.

The **Town of Niskayuna (New York) Wastewater Treatment Plant** received the 2019 Capital Region Project of the Year award from the American Public Works Association. The plant was built as a net-zero energy facility, meaning it produces all the electricity it needs.

The **City of Long Beach Wastewater Treatment Plant** received an Outstanding Achievement Award from the state of Washington.

The **City of Starke,** Florida, received a $7.8 million grant from the U.S. Department of Agriculture, in addition to an $8.8 million loan, to update its 40-year-old wastewater treatment facility.

The **Nebraska Water Environment Association** presented wastewater awards for accident prevention and safety awareness:

- Industrial: Gold – Tyson Fresh Meats, Lexington
- Plants with 10 or more operators: Gold – Fremont
- Plants with five to nine operators: Gold – Columbus; Silver – North Platte and Norfolk
- Plants with one to four operators: Gold – Scottsbluff, Beatrice
- George W. Burke Jr. Award: Scottsbluff

The **Southwestern Parkway Combined Sewer Overflow Basin** project received the Best in Engineering Design Award and a National Award of Excellence from the Design-Build Institute of America. The Kentucky-based project is a component of Louisville/Jefferson County Metropolitan Sewer District's federal consent decree to mitigate CSO discharges.

The **DeKalb County Department of Watershed Management** received the 2019 Collection Systems Gold Award from the Georgia Association of Water Professionals.

Robert S. Rak, environmental science and technology coordinator at Bristol Community College, received a Massachusetts Water Works Association 2019 Water Works Pride Award for giving extra effort to make a positive impact.

Lorenz Sutherland retired from the La Junta (Colorado) Board of Utilities Commissioners after more than 25 years.

Ray Jack, Public Works director for Falmouth, Massachusetts, retired.

The **North Port water treatment facility** was recognized by the Florida Section American Water Works Association as an American Water Landmark and as a Florida Water Landmark.

The **Danville (Kentucky) Water Treatment Plant and Raw Water Improvements Project** was named one of the 10 Exceptional Projects on the top tier of the 2019 AQUARIUS Recognition Program, awarded through the U.S. EPA.

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

events

March 4-6
Iowa Water Environment Association Collection Systems Conference, Marshalltown Best Western, Iowa. Visit www.iawea.org.

March 15-17
Water Environment Federation National Stormwater Symposium 2020, Duke Energy Convention Center, Cincinnati. Visit www.wef.org.

March 15-18
Odors and Air Pollutants Conference, presented by the Water Environment Federation in cooperation with the Ohio Water Environment Association and The Water Research Foundation, Duke Energy Convention Center, Cincinnati. Visit www.wef.org.

March 16-20
AWWA 2020 Membrane Technology Conference & Exposition, Phoenix Convention Center, Phoenix. Visit www.awwa.org.

March 23-25
National Green Infrastructure Certification Program Train-the-Trainer Workshop, Milwaukee Metropolitan Sewerage District, Milwaukee. Visit www.ngicp.org.

March 24-26
Water Innovation Week 2020: The Next Decade, San Francisco. Visit www.imagineh2o.org.

March 29-April 1
Missouri Water Environment Association and Missouri Section AWWA Joint Annual Conference, Margaritaville Lake Resort, Osage Beach, Missouri. Visit www.mwea.org.

March 29-April 1
AWWA Sustainable Water Management Conference, Hyatt Regency Minneapolis, Minneapolis. Visit www.awwa.org.

March 31-April 3
Water Environment Federation Residuals and Biosolids Conference, Minneapolis Convention Center, Minneapolis. Visit www.wef.org.

March 31-April 3
California Water Environment Association Annual Conference, Reno-Sparks Convention Center, Reno, Nevada. Visit www.cwea.org.

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