

TREATMENT PLANT OPERATOR

# tpo™

DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS

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OCTOBER 2019

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Michelle Tarantino  
Senior Operator  
Martinez, Calif.

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## Residual Sulfite Monitor

### Reduce Chemical Costs



Prevents costly chemical overfeed by controlling the amount of chemical added for process dechlorination.

#### FEATURES

- Gas Phase Sensing Prevents Sensor Fouling
- Automatic Control of Sample Line Cleaning
- Low Cost Operation

## Dissolved Oxygen Monitor

### Optical Sensor with Q-Blast



The Q-Blast D.O. System is ideal for aeration basin control, resulting in improved process performance and energy savings.

#### FEATURES

- Integral Air Compressor Generates Air Blast
- Optical Luminescence or Membraned Sensor
- Unique Cal-Check Ensures Sensor Cleaning

## pH/ORP Monitor

### Self-Cleaning pH System



The Q46P/R Monitors enhance the reliability of long-term pH or ORP measurement by providing automatic sensor cleaning.

#### FEATURES

- "Q-Blast" Air-Blast Sensor Cleaning System
- Differential pH and ORP Sensors
- Sealed Reference Prevents Sensor Contamination

## Total Chlorine Measurement

### Amperometric Measurement



The Q46H/79S provides a high accuracy measurement at low concentrations of chlorine in wastewater effluent.

#### FEATURES

- Unique Gas Sensor Prevents Sensor Fouling
- High Accuracy and Sensitivity Down to PPB
- EPA Compliant for Effluent Reporting

## Toxic & Combustible Gas XMTR

### "Smart Sensor" Technology



Model D12 Gas Transmitters provide the ultimate in application flexibility. Automatic sensor testing ensures functionality.

#### FEATURES

- Interchangeable "Smart Sensors"
- Internal Data-Logger
- Automatic Sensor "Bump Test"

## Total Chlorine Monitor

### Reagent Free Measurement



The Q46/79PR direct measuring system is ideal for controlling chlorine addition in disinfection contact chamber.

#### FEATURES

- Submersible or Flowcell Type Sensor
- Optional pH Measurement
- Easy Installation and Low Operating Cost

Optimize Clarifier & Thickener Performance

# EchoSmart Interface Level Analyzer



## Continuous sludge level measurement supports effective process control

- Prevent sludge wash-out
- Control blanket loss from over-pumping
- Maintain underflow sludge density
- Eliminate manual spot check measurements

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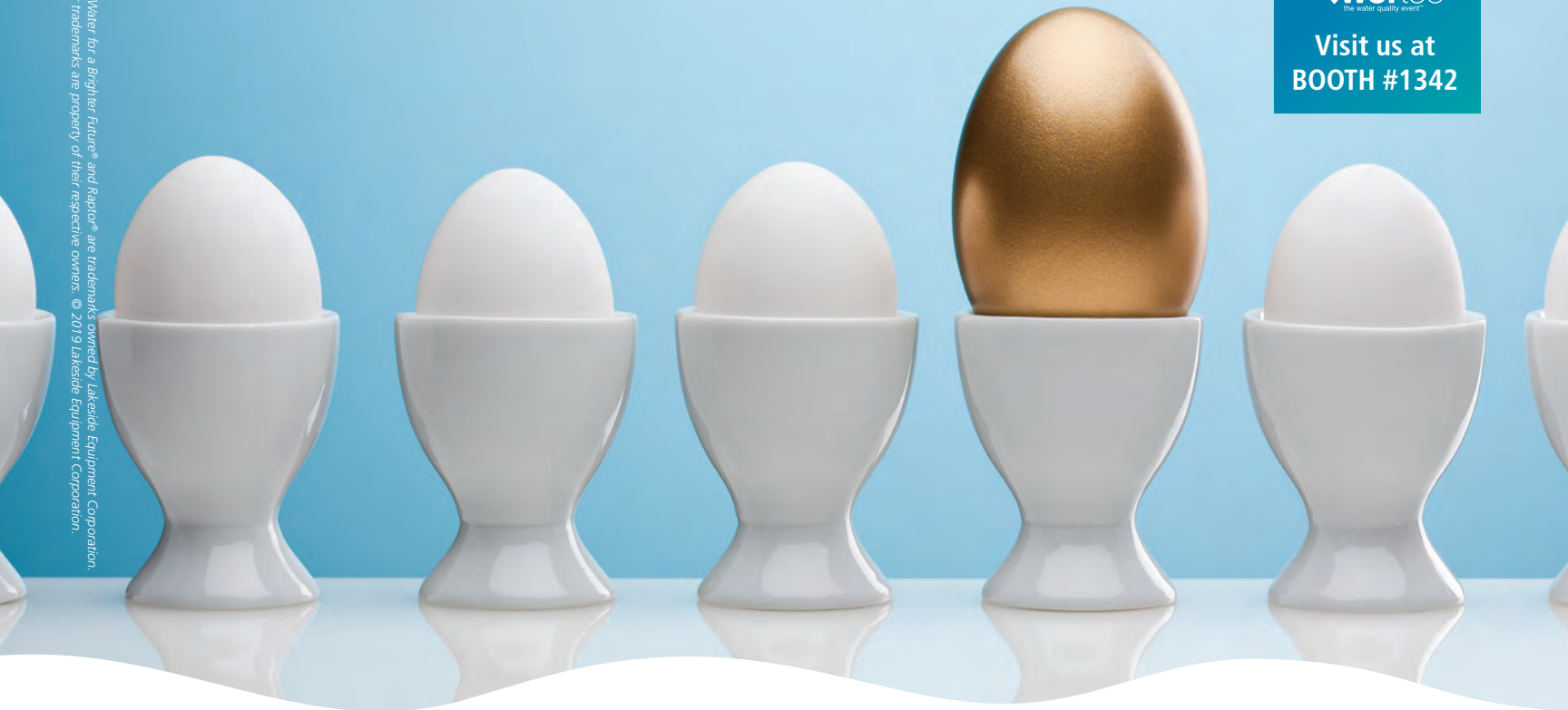


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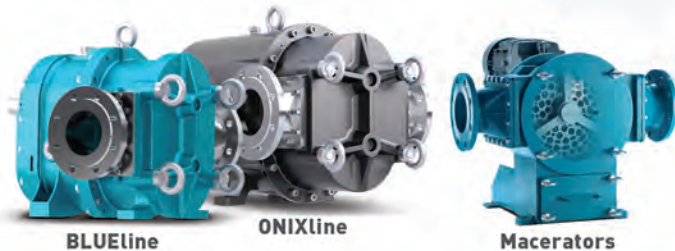


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- FalconRake™ Bar Screen
- Rotary Strainer Screen
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ON THE COVER: You won't find many women senior wastewater operators today. You'll find even fewer who operate a four-story, 200 wet-ton-per-day multiple-hearth furnace. Yet, that's part of the job for Michelle Tarantino of the Central Contra Costa Sanitary District (known as Central San) in Martinez, California, east of San Francisco. She is one of only two women among the 20 operators at Central San, yet she sees no barriers keeping women from the field. (Photography by Collin Chappelle)
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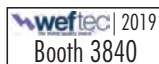


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let's be clear

## Now You're Home. What Next?

GETTING THE MOST FROM WEFTEC OR ANY INDUSTRY CONFERENCE MEANS SCHEDULING TIME TO SHARE WHAT YOU LEARNED WITH YOUR COLLEAGUES

By Ted J. Rulseh, Editor



**S**o you attended WEFTEC in Chicago. You're back at home and on the job. What will you do with what you learned?

If you want to get the most from your investment, you'll schedule a time to give a full report to your colleagues. It's a great way to reinforce and help retain the knowledge you gained. And it's a way to maximize the impact of your learnings.

This is true not just for WEFTEC, but for any conference or other educational event you attend, whether it's a meeting of your state or regional Water Environment Association or your state's operators group.

### KNOWLEDGE IS POWER

In a fast-changing arena like wastewater treatment, knowledge is a valuable commodity, eminently worth sharing. When you attend a conference, you're exposed to new concepts, trends in the industry, new technologies and techniques, and more.

Years ago while working for a public relations agency, I was a member of a national association for environmental communicators. I attended a couple of its national conventions, and each time, I took notes on the sessions I attended.

Then, when I got back, I'd set up a brown-bag session in a conference room and invite my whole team, including my supervisor. I'd take 20 or 30 minutes and go over the convention highlights, with emphasis on things I thought others on my team could use.

That way I wasn't the only one newly enlightened; others shared and could act on what I learned. One result is that, because I had to revisit and report on my discoveries, I still remember things from those conventions that otherwise I might well have forgotten.

### MULTIPLIER EFFECT

Those conventions were held in the days before the internet and smartphones. Just imagine how much more effective a post-conference report can be today, when we're able to share links to websites related to sessions we attended and to papers we saw presented. Knowledge shared is knowledge multiplied.

I know how it feels to come back from a convention. You're tired from three or four days away from home. Your head is splitting from everything you've tried to pack in. Chances are you've fallen behind a bit at work and need to play catch-up. That makes it hard to think about adding the responsibility to give a report.



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But if you plan properly, it's not such an onerous task. While attending each session, take down notes on, say, half a dozen of the most important points. Attach those notes to the handouts you received.

Then, on the last night in your hotel room, or during your plane flight home, review the sessions and decide which ones your team would most appreciate learning about. You don't have to report on every one that you attended. Just pick the ones of highest interest.

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Besides serving as a learning tool, your presentation can help encourage your organization to invest in attendance at more conferences. The sharing of information across your team adds value, which is what organizations look for in making investments in continuing education.

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Things were looking great for the Three Lakes (Wisconsin) Sanitary District (TLSD) after it was approved for a federal program that allowed it to do \$4 million in upgrades for only \$1.6 million in fully subsidized loans. But that good feeling wouldn’t last, as only a few years into its 20-year loan repayment plan, the district lost two of its largest commercial ratepayers to fire. Read about small-town wastewater woes in this online exclusive article.

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## PROACTIVE ABOUT PFAS

### Wisconsin WWTPs Submitting Samples

The Wisconsin Department of Natural Resources is asking its largest municipal wastewater treatment plants to test for per- and polyfluoroalkyl substances (PFAS). The department sent a letter to 125 facilities in July requesting that they sample their influent and document PFAS levels. The plants were chosen based on their size or the likelihood PFAS could be in their wastewater stream due to industrial customers that may be using the chemicals.

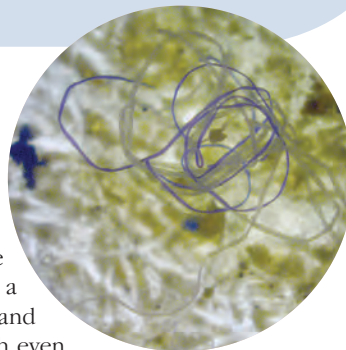
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### What’s the Next Move?

Two researchers from the University of Toronto recently collaborated with drinking water providers in a quest to find out whether microplastics are present in tap water. The answer to that question is a resounding yes, but without more information and research, drinking water professionals are left with even more questions.

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# A People Business

ERIC OSBORNE HELPS HIS UTILITY SUCCEED BY SELECTING THE RIGHT PEOPLE AND KEEPING THE TEAM TRAINED. HE ALSO GIVES BACK THROUGH ASSOCIATION INVOLVEMENT.

STORY: **David Steinkraus**

PHOTOGRAPHY: **Kaylinn Gilstrap**

**E**ric Osborne ended up in the water industry because of a call from a prospective employer that didn't come.

Now, after 30 years, the industry has given him opportunities and rewards as broad as an ocean. As water production manager for the Henry County (Georgia) Water Authority, Osborne oversees Tussahaw Water Treatment Plant (16.1 mgd) and the Towaliga Water Treatment Plant (24.4 mgd), along with 27 full-time team members, the compliance and process-control labs, water tank maintenance, and major contracts for painting and renovating storage tanks.

It's a big job. Henry County is part of metropolitan Atlanta. In 2017, the county's estimated population was 225,813, up 10.8% from 2010. That growth has brought increased demand for water.

## GROWING DEMAND

The Tussahaw plant was completed in 2007 and is piped so that the treatment system in place can be duplicated on site when demand requires it. The Towaliga plant was built in the 1970s and has been expanded four times. Both plants use conventional technology.

Five reservoirs provide source water, and treatment consists of standard coagulation (alum), sedimentation and filtration with sand-anthracite beds. Chlorine and phosphate, plus lime for pH adjustment, are fed after filtration and before water flows to a contact tank and then into the distribution system.

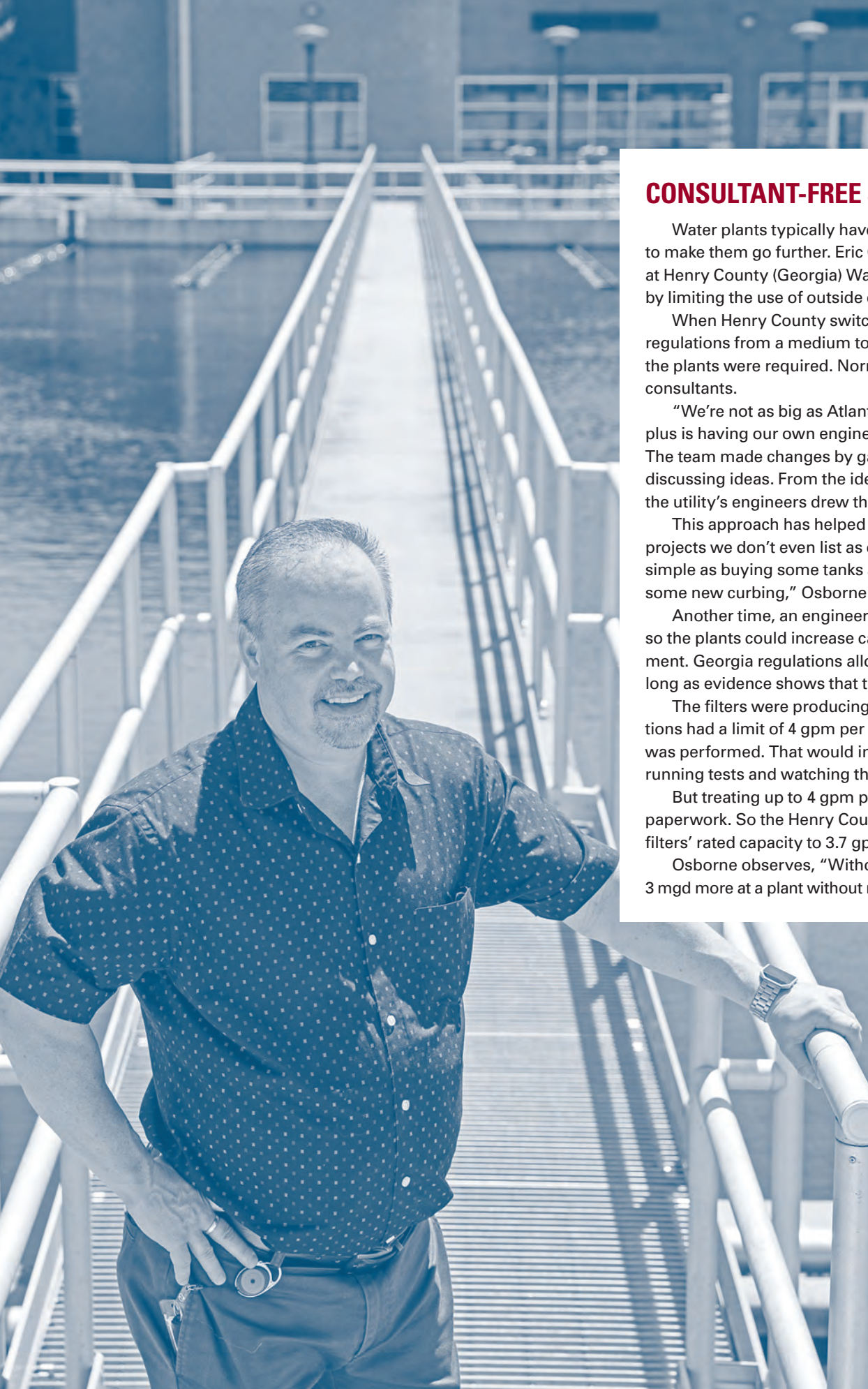


Eric Osborne came to the water treatment profession with a background in plumbing.

Osborne has won several awards for his work, most recently an Operator Meritorious Service Award from the Georgia Section of the American Water Works Association. He is also vice chair of the Georgia Board of Water and Wastewater Treatment Plant Operators, which licenses operators in the state.

## THE CALL THAT CAME

Osborne grew up in a small town in upstate New York and learned about water at an early age. With his grandfather, he would drive a tractor to a family property, fill a tank, haul it to his grandfather's home and



## CONSULTANT-FREE SAVINGS

Water plants typically have limited resources, but there are ways to make them go further. Eric Osborne, water production manager at Henry County (Georgia) Water Authority, does that by limiting the use of outside consultants.

When Henry County switched its designation under Georgia regulations from a medium to a large operation, some changes in the plants were required. Normally that would have required consultants.

"We're not as big as Atlanta and we run differently, but a big plus is having our own engineering department," Osborne says. The team made changes by gathering the in-house staff and discussing ideas. From the ideas came a rough design, and then the utility's engineers drew the plans.

This approach has helped the utility save money. "Some projects we don't even list as capital projects because it's just as simple as buying some tanks and a couple of pumps and pouring some new curbing," Osborne says.

Another time, an engineering firm suggested doing a filter study so the plants could increase capacity without buying new equipment. Georgia regulations allow an increase in filter throughput so long as evidence shows that the filters can handle the volume.

The filters were producing 3 gpm per square foot; the regulations had a limit of 4 gpm per square foot unless a detailed study was performed. That would include taking half the plant offline, running tests and watching the filtrate turbidity.

But treating up to 4 gpm per square foot required only a little paperwork. So the Henry County team did that and increased the filters' rated capacity to 3.7 gpm per square foot.

Osborne observes, "Without using outside contractors, we got 3 mgd more at a plant without much more than presenting extra data."

Eric Osborne, water production manager, Henry County Water Authority





## Eric Osborne, Henry County (Georgia) Water Authority



**POSITION:**  
**Water production manager**

**EXPERIENCE:**  
**30 years in the industry**

**EDUCATION:**  
**Bachelor's degree, Georgia State University**

**CERTIFICATIONS:**  
**Class I water operator, distribution operator, water laboratory analyst, backflow**

**AWARDS:**  
**Operator Meritorious Service Award, Georgia Section of the American Water Works Association**

**GOALS:**  
**Share knowledge to make the industry better**

dump it into the well, which didn't recharge fast enough to meet demand. Years later, while on a church mission trip to Cuba, he met a couple of men doing the exact same thing to a well there.

Osborne started studying at the University of Pittsburgh, but then met a woman from Georgia. He transferred to Georgia State University, where he finished his bachelor's degree in biology with a minor in chemistry. Yes, they did marry.

The twist of fate that moved him into the water industry came while he was doing plumbing at a company making hot tubs. "I would say I can fix any plumbing in my house that I need to, but I don't know if an inspector would think it was very good work," he says. "But I can plumb a hot tub in less than half an hour."

The Tussahaw Water Treatment Plant team includes, from left, Jason Pair, Class 2 operator; Bridgett Graham, water quality and compliance supervisor; Barry Brand, operations supervisor; Osborne; Andy Young, Towaliga Water Treatment Plant operations supervisor; Meredith McClendon, administrative assistant; and Jeffrey Strickland, building and grounds maintenance.

For a young man looking to start a family, it wasn't an ideal job; it had limited benefits and time off. Osborne applied to Delta Air Lines and to the Clayton County Water Authority. Delta didn't call. Clayton County did.

Although Osborne had interviewed for a midnight shift job as a plant operator, the interviewer said there was another job he might be better suited for: They wanted him to work in the lab. He started with Clayton County in 1988 and after 11 years was promoted to lab supervisor. Meanwhile he moonlighted as an operator in the authority's water plant and picked up substantial operational knowledge as well as several licenses. After 20 years in Clayton County, he was hired on with neighboring Henry County, where he was living, as lab supervisor and compliance coordinator. About 18 months later, he was promoted to his current position as water production manager.

### PROJECT PRIDE

Since he became a manager, the project he takes the most pride in is the conversion from dry to liquid chemical feeds. Henry County has switched from hydrated lime to liquid lime and from dry to liquid phosphate, and it's converting to liquid permanganate. "The main reason to convert is to save money, because you can feed liquid more accurately," Osborne says.

An important secondary reason is safety. Liquid chemicals arrive by truck and are piped into the appropriate tank. That means plant workers are not exposed to the hazards of dust from handling bags of dry chemicals.

The liquid lime project was especially involved. First Osborne had to convince the manufacturer to sell him a system to go inside a plant instead of in a separate building.

“We had to take the roof off part of this building, take the old silo out and put the new tank in,” he says. “And it’s probably a six-story basement.”

The same metal roof that came off the building went back on: “I wound up contacting the manufacturer and finding a contractor who could unseam it, save the panels and reseam it. It required taking beams out of the attic and all kinds of stuff. It was a big project to do in-house, and it came in early and under budget.”

In any career there are mistakes. “I’ve learned a lot about dealing with people who work for me and around me,” he says. “At certain parts of my career, I wish I’d been more emotionally intelligent. I feel like I’m more emotionally intelligent now, and I wound up being a much better manager.”

## OUTREACH AND INVOLVEMENT

Early in his career, Osborne joined the Georgia Section of the AWWA as a way to give back, learn from others and make his lab better. “I’ve borrowed ideas from everybody I’ve done an inspection for,”

“I’ve learned a lot about dealing with people who work for me and around me. At certain parts of my career, I wish I’d been more emotionally intelligent.”

**ERIC OSBORNE**

he says. “That brings the level of all utilities in the state up when you have that kind of back and forth. I’m not ashamed to call other people for help.”

A year after he came to Henry County, Osborne contemplated a more formal contribution to the profession. There were several vacancies on the state board that tests and licenses operators. Over the years, Osborne had seen what happened when the board wasn’t active: Problems were not resolved quickly, and people would pass their tests but issuance of licenses would be delayed.

“So I thought, Well, I’m pretty responsible, and I think I’ll be able to attend six meetings a year. I put in an application to the governor’s office, and I was selected for the water operator seat. When I got on the board, we had to revote on about two years’ worth of items because there hadn’t been a quorum.”

Osborne believes certification, including reciprocity between states, will become more important as time goes on. He speculates that eventually, perhaps in the next 10 years, there will be a national license for operators. Licensing should be a top priority for any utility looking for employees, he says. Henry County looks first for people who are already licensed.

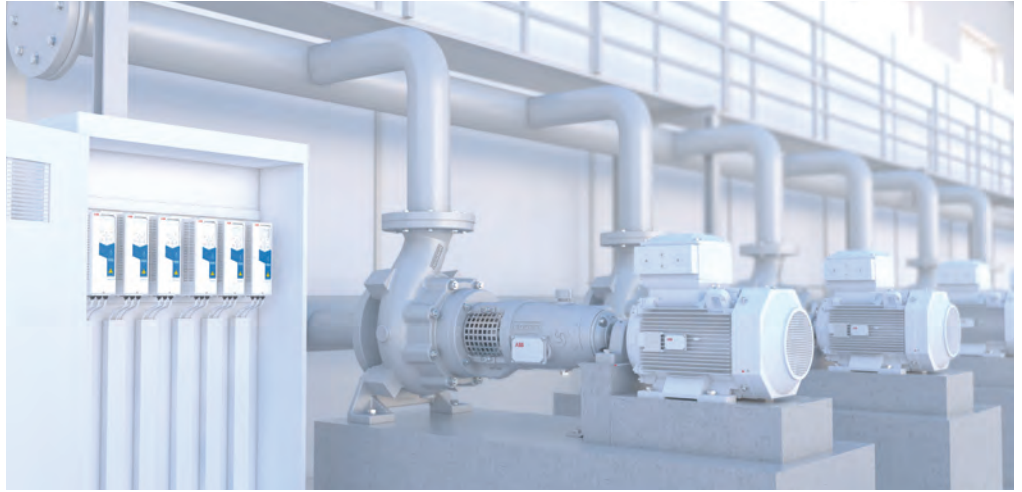
“Training people is a good way to go, but a lot of people can’t pass the test, so you have to pick your trainees carefully,” Osborne says. “We have a pretrainee certification. People have to do certain things to be placed in the trainee category. In part we do that so we don’t waste money on someone who can’t pass the test and may not be suited for plant operations.”

Certification is doubly important for Henry County because, as a large utility, it’s required by the state to have at least one Class I (highest) operator at work on every shift.

## TRAINING FOR SUCCESS

To keep team members up to date and meet the continuing education requirements for licensing, Osborne launched a twice-a-year, in-house training symposium in 2011. It enables team members to obtain all their recertification credits without taking a trip.

The 2018 spring symposium included a talk by the county laboratory supervisor about problems with industries discharging high-strength wastewater. In another session, a manufacturer representative talked about devices to test water in streams and lakes. At an earlier session, an expert from another metro Atlanta utility spoke about chlorine analyzers. *(continued)*



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“Training people is a good way to go, but a lot of people can’t pass the test, so you have to pick your trainees carefully. We have a pretrainee certification.”

**ERIC OSBORNE**

After a couple of years offering the symposiums only for its own people, the county expanded it to include personnel from other utilities within driving distance. “We typically fill the place up when we do this,” Osborne says.

He deliberately schedules his sessions so they don’t conflict with offerings from national and state professional water organizations. “At the same time, a lot of people who work in the water industry would rather come to work, do their job and go home, and if I train them in-house, they’re happy as can be,” he says.

**VALUING WATER**

From the time he started with Clayton County, Osborne has appreciated the role of public water systems: They provide fire protection and are primary guardians of public health. “You can put a thousand people in the hospital if the water supply is bad,” he says.

The model for his career starts with his grandmother, a schoolteacher, whose motto was: “We learn from each other.” Osborne is determined to continue that tradition. **tpo**

Shown with Barry Brand (right) at the plant’s liquid lime control panel, Eric Osborne takes pride in the facility’s switch from dry to liquid chemical feed.





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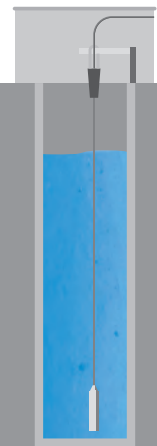
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# Learning Naturally

A SMALL-SCALE WASTEWATER TREATMENT PLANT IS PART OF AN ECOCENTER IN SAN FRANCISCO THAT TEACHES STUDENTS AND ADULTS ABOUT THE ENVIRONMENT IN A WETLAND SETTING

By Sandra Buettner

The EcoCenter in San Francisco's Heron's Head Park holds classes and sponsors activities to teach students and adults about ecosystems and habitat restoration in a natural wetland environment.

This 2,292-square-foot, net-zero energy, LEED Platinum building was constructed in 2010 by the non-profit organization Literacy for Environmental Justice to help educate an underserved community on sustainability and the environment.

The Literacy for Environmental Justice constructed the building to support its environmental education and public engagement programs and to inspire the community about green building technologies that can help counteract the adverse environmental impacts the area has experienced. The facility is located on a long peninsula that includes 14 acres of upland areas and 8 acres of tidal salt marsh. A one-third-mile walking trail extends the length of the peninsula.

## TREATMENT DEMONSTRATION

The building includes an operable wastewater treatment plant rated to treat 600 gpd. It includes a lift station, primary and secondary treatment tanks, a disinfection unit and an effluent tank. A man-made, pilot-scale wetland home to plants, fish, snails and other creatures supports educational demonstrations.

The plant serves as a learning tool for visitors to reflect on the water purification processes that happen naturally in the wetlands outside the center, according to Carol Bach, environmental affairs manager for the Port of San Francisco, which oversees the building and land.



ABOVE: Wilderness Arts and Literacy Collaborative youth help clean up the outdoor classroom, called The Stomping Ground. RIGHT: EcoCenter2 Youth Stewardship Program intern Lydia Nichols-Russell (left) and staff member Carissa Ortega gear up for an EcoCenter program.





“There is a certain poetry to being in the wastewater treatment room and understanding how the plants and bacteria that performed the water treatment inside the EcoCenter are mirrored outside the window in the natural environment in the salt marsh.”

CAROL BACH

“There is a certain poetry to being in the wastewater treatment room and understanding how the plants and bacteria that performed the water treatment inside the EcoCenter are mirrored outside the window in the natural environment in the salt marsh,” Bach says.

### FIELD TRIPS AND INTERNSHIPS

Although the Literacy for Environmental Justice is still an important partner to the site and center, it handed the keys for the EcoCenter to the Port of San Francisco. At that point, the nonprofit Bay.org became a tenant to establish additional classes, tours and activities for the center and the park.

For five years Bay.org, along with San Francisco Recreation and Parks, worked with area schools to establish K-12 field trips that meet California’s Next Generation Science Standards. The recreation and parks organization is now the sole program provider.

“Students touring the EcoCenter learn about the living roof, solar panels and how energy is harvested to power the building,” says Brenda Cartagena, youth services manager for the parks group. “They also learn about the wastewater treatment plant and the importance and significance of filtering our water.”

Paid internships for high school students and young adults focus on issues around sustainability. The Youth Stewardship Program offers internships to young adults interested in careers in teaching and environmental or outdoor education. They learn key aspects of planning, programming and project management, and lead field trips to parks and open spaces. Many have gone on to roles in the environmental sciences.

A Greenagers internship program is for ninth and 10th graders. Students get a stipend to help with projects at the center and help with site cleanup and restoration. The program empowers them to become community and environmental leaders through civic engagement, park stewardship and outdoor recreation.

The building also serves as a community meeting center for youth and adult organizations related to sustainability. Visitors are intergenerational and cross all demographics. “One of our primary pushes is to bring in schools in the Bay Area neighborhood and for them to tour the buildings and grounds and take advantage of this unique experience,” Cartagena says. “There are not many facilities of this type where you can see the different earth systems happening in nature.”

### EARTH DAY BIRTHDAY

The EcoCenter opened its doors around Earth Day in 2010. On April 21, 2019, the center hosted a public celebration to commemorate its ninth birthday. People took part in a cleanup of the area, and tours of the facility were given.

The site also hosts a Healthy Parks Healthy People Trail Walk and a Science Saturdays program where visitors learn about the native plants growing at the site. Other recent public activities include a California Coastal Cleanup Day, a Martin Luther King Day of Service and the BaySplash festival. These attract hundreds of visitors and residents every year. **tpo**

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# A New Life for Mined Land

AN AWARD-WINNING PROJECT IN GREATER SUDBURY PUTS CLASS A BIOSOLIDS TO WORK RESTORING VEGETATION AND WILDLIFE TO MINE TAILINGS AREAS

By Steve Lund

**I**n a mining district of northeastern Ontario, biosolids from wastewater treatment plants are being used to revegetate land that had been covered with mine tailings.

The mining reclamation is the result of a public-private partnership between the City of Greater Sudbury and N-Viro Sudbury LP, a wholly owned subsidiary of Walker Environmental Group. The partnership built a \$47 million (U.S.) biosolids processing facility, completed in May 2015. It processes all thickened waste activated sludge or solids from the treatment plant in Sudbury and from 10 smaller treatment plants.

The facility uses a proprietary N-Viro advanced alkaline stabilization process to yield a product called N-Rich that can be spread over the tailings, the finely ground waste rock generated by mining. The solids help to establish grass and plants and bring back wildlife.

For about 30 years before the facility was built, the solids from the Sudbury treatment plant were simply dumped into a mine tailings pond. That practice drew complaints about odors, and changing environmental standards required the city to find an alternative.

“This practice is a big step forward — not only for protecting the environment, but also for reclaiming land,” says Akli Ben-Anteur, water and wastewater projects engineer for the city. He managed the design and construction of the city’s largest project to date and oversees the biosolids processing facility, which is operated by N-Viro under Mick Ricci-Lyddiatt, plant manager.

## VARIETY OF AWARDS

The project won the 2013 Chuck Willis Award for Innovation and Excellence in a Municipal-Private Partnership from the Canadian Council for Public-Private Partnerships. The award cited the project for commitment to sustainability and for bringing health, environmental and economic benefits to area residents.



The biosolids facility transforms solids from all wastewater treatment plants in Greater Sudbury into Class A biosolids. The facility is owned by the city but operated by N-Viro and uses a patented N-Viro process. The final product is used in mine reclamation.

“This practice is a big step forward — not only for protecting the environment, but also for reclaiming land.”

**AKLI BEN-ANTEUR**

The city was also recognized by the Canadian Association of Municipal Administrators in 2014 for excellence and for adapting to changing environmental standards.

The Sudbury treatment facility, also known as the Kelly Lake Wastewater Treatment Plant, uses an activated sludge process. After aeration and clarification, the sludge collected at the end of the process contains about 0.5% solids. Polymer is added to thicken the material to about 3% solids. It is then pumped to the biosolids facility, where it is dewatered in centrifuges and mixed with an alkaline admixture to raise the pH. “When it dries out, it becomes an earthlike product,” Ben-Anteur says.

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The alkaline component (lime or cement kiln dust) brings the pH up to 12. Then the material gets moved by conveyor belt to large trailers or bins where it sits for about 12 hours. As it rests, an exothermal reaction occurs, raising the temperature to about 140 degrees F in a process N-Viro calls pasteurization. The high pH and heat kill pathogens. "It's almost pathogen-free; it's a Class A biosolid," Ben-Anteur says.

The plant produces 3,400 dry tons of biosolids per year. It processes the sludge from the Sudbury wastewater facility (42 mgd design) and from 10 other wastewater treatment plants, which are in municipalities that were amalgamated into Greater Sudbury.

### REVENUE PRODUCER

N-Viro sells the final product under a revenue-sharing arrangement with Sudbury. A Walker Environmental Group spokesman says about 80% of the product is used in mining reclamation and the rest in agriculture.

The use of biosolids for mine reclamation is growing in Ontario. One of the reclamations won a 2019 Top Project Award at the Environmental Leader & Energy Manager Conference in Denver in May. It went to Terrapure Environmental, an environmental service provider based in Burlington, Ontario, for its application of the biosolids at the Copper Cliff Central Tailings Area in Sudbury.

The judges liked that the project solved two problems at once, helping to rehabilitate mined land and finding a beneficial use for biosolids in winter, when regulations prevent application to agricultural land. The award noted that Terrapure Environmental had formed a partnership with Sudbury to blend leaves and yard waste with the biosolids to render the mixture nearly odor-free and to provide a better balance of nutrients.

The award announcement also mentioned that the project had covered more than 370 acres of exposed mining waste materials, and vegetative growth was evident wherever the biosolids were applied. Wildlife activity had also increased, with Canada geese and sandhill cranes nesting and white-tailed deer and black bears feeding. **tpo**

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**OURS, A TEAM.**



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# No Energy Shortage

MINDI DEARING BRINGS A MARATHONER'S DRIVE AND DEDICATION TO SUPERVISING THE LABORATORY AT THE BEAVER WATER DISTRICT IN ARKANSAS



STORY: **Ted J. Rulseh**

PHOTOGRAPHY: **Philip Thomas**

**M**indi Dearing never stops pushing the envelope. Twenty-six years removed from her bachelor's degree in biological science, she earned an MBA. Several years after taking up running for recreation, she completed a marathon.

Dearing brings that level of energy and determination to her job as laboratory supervisor for the Beaver Water District in Lowell, Arkansas. She leads a lab team in collecting and analyzing samples from plant process stages, finished water and source water from the 31,700-acre Beaver Lake.

Their work helps the water treatment plant team optimize processes, reduce chemical costs and produce water of sufficient quality to earn the Directors Award for five consecutive years from the Partnership for Safe Water. Accumulated data from the testing, stored in a laboratory information management system (limsExpress Plus by Dynamic Databases), enables district management to spot trends and make sound decisions about plant operations and investments for the future.

Dearing's work has earned her the 2018 Water Laboratory Professional of the Year award from the Northwest District of the Arkansas Water Works & Water Environment Association.

"Mindi is indispensable," says her supervisor, James McCarty, manager of environmental quality. "She is consistently one of our top employees because of her dedication to the district and its mission. Her personality is ideally suited to the job. She's incredibly focused and well organized. She works well in a team environment because everybody recognizes her level of professionalism. She listens well and also knows how to take charge of a situation."

---

Mindi Dearing, laboratory supervisor,  
Beaver Water District, Lowell



Mindi Dearing and Nikki Holloway, laboratory analyst, evaluate data from an ion chromatograph (Metrohm).

“ We have lab coverage 365 days a year. I think that demonstrates the district’s commitment to excellence and quality.”

MINDI DEARING

### LONG LAB HISTORY

The Beaver Water District is a wholesaler serving the cities of Fayetteville, Springdale, Rogers and Bentonville, which supply on average 55 mgd of drinking water to more than 330,000 customers. The current water treatment capacity is 140 mgd. The water plant uses a conventional process with chlorine dioxide addition as a preoxidant.

Dearing started at the district in 2005 with an extensive laboratory background in the public and private sectors. A native of Enid, Oklahoma, she earned her bachelor’s degree from Oklahoma State University in 1993. While in school, she worked part-time at a private testing lab; she went to work there full-time after graduating and later became assistant lab manager. In 1998, she took a position as an environmental chemist with Oklahoma City, working at two water treatment plants. She became an American Water Works Association member and now wears a 20-year member pin.

Before applying for her job at the Beaver Water District, she showed the help wanted ad to her supervisor in Oklahoma City. “He said, ‘Mindi, did anybody ever tell you that you can’t write your own ad? It sounds just like you.’”

### CERTIFIED LAB

The district’s lab is state certified through the Department of Health to run total coliform and *E. coli* tests and can run samples for customer cities in case of boil orders. The lab is also certified by the Department of Environmental Quality for 20 general chemical and bacteriological parameters. In addition, the DEQ certification allows the lab to run some required param-

## Mindi Dearing, Beaver Water District Lowell, Arkansas



#### POSITION:

**Laboratory supervisor**

#### EXPERIENCE:

**28 years of professional lab experience**

#### EDUCATION:

**Bachelor’s degree, biological science, Oklahoma State University; MBA, Southeastern Oklahoma State University**

#### LICENSES:

**Class IV water operator, Class IV water distribution**

#### MEMBERSHIPS:

**American Water Works Association**

#### GOALS:

**Continue to learn, improve lab performance and prepare for future opportunities**

eters for the NPDES permit, including pH, total residual chlorine and TSS.

“We have lab coverage 365 days a year,” says Dearing, who holds Class IV water operator and Class IV water distribution licenses. “I think that demonstrates the district’s commitment to excellence and quality. People are used to operators staffing treatment plants every day, but not always the lab.

“I create a rotating weekend schedule for the entire year so staff members know which weekends and holidays they will work. They don’t have to stay all day, but they come in to read out and set up bacteriological samples and run required parameters like fluoride, chlorine dioxide and chlorite, as well as a select set of chemical parameters that are not required, but are use-





extract a lot of chlorophyll-a samples to help gauge algae levels in the lake,” Dearing says. “The data can help us predict if a taste and odor event might be developing, if treatment changes should be made and

“Mindi is indispensable. She is consistently one of our top employees because of her dedication to the district and its mission.”

**JAMES McCARTY**

ABOVE: A key challenge for Dearing and her team is keeping up with regulatory changes. BELOW: The lab team at the Beaver Water District includes Cindy Harp, laboratory technician; Mindi Dearing, laboratory supervisor; and Nikki Holloway, laboratory analyst.

if the frequency of sampling and analysis should increase.

“Increases in the abundance of algae trigger an increase in our cyanotoxin sampling protocol. Since that test is costly, we follow a minimal cyanotoxin sampling routine until we reach that trigger point.”

### EQUIPPED FOR PERFORMANCE

Dearing’s team includes Nikki Holloway, lab analyst, and Cindy Harp, lab technician. Environmental specialists Brad Huffhines and Matthew Rich primarily handle watershed monitoring, but also fill in shifts in the lab.

Dearing’s job includes making sure the lab has the equipment to meet current needs, prepare for emerging regulations and in some cases support wholesale customers. “We don’t have a lot of higher technological instruments,” Dearing says. “We have a TOC analyzer (Shimadzu Scientific Instruments) that’s important for monitoring precursors for disinfection byproducts. We have an ion chromatograph (Metrohm) for measuring fluoride, chloride, nitrate, nitrite and other parameters.

“We have a trihalomethane analyzer (Parker Hannifin Corp. - Instrumentation Products Division) that is not a certified instrument, but has been useful for helping our customers identify problem areas in their distribution systems. We are doing 27 samples a month for them just as a courtesy to help them see where they might need to do some flushing or check water age.

“We also provide some support with our customer cities’ field staffs, helping them calibrate and double-check the meters they have in the field to make sure they are accurate, as well as training them in sampling techniques.”

Dearing plays a key role in recommending new lab equipment and decid-

*(continued)*



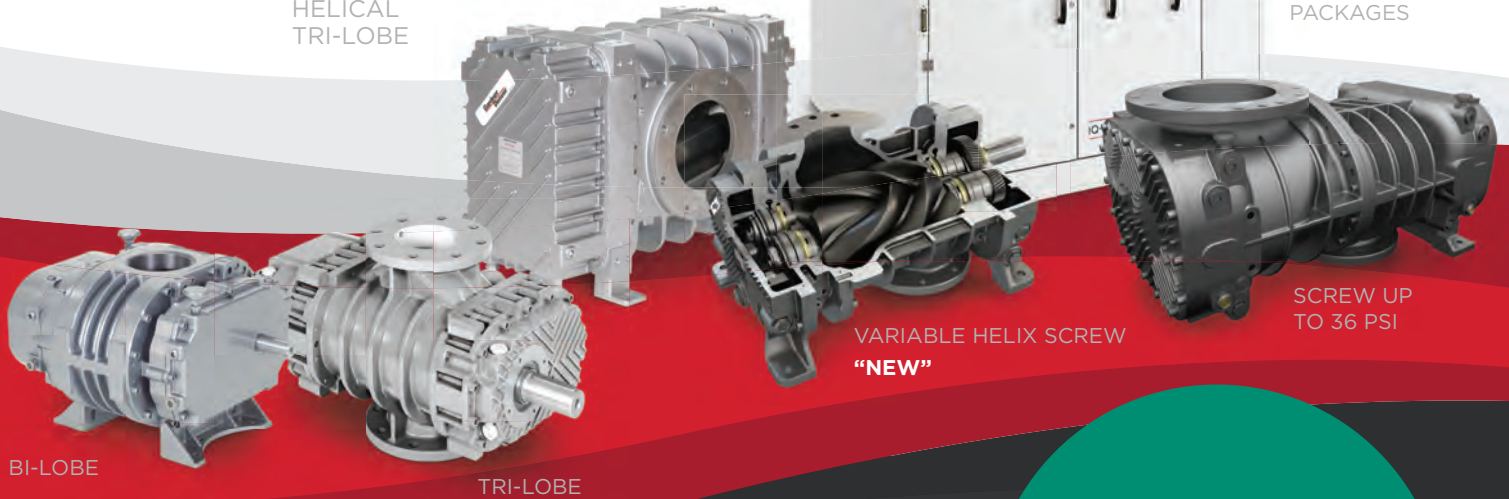
ful for process control. That allows the operators on any shift to have current data at their disposal.”

The lab’s work includes watershed monitoring, covering a wide suite of analysis with special attention to total nitrogen and total phosphorus. “We

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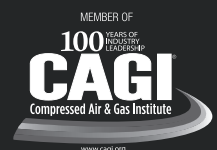
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ing when instruments need replacing. “Our managers take my recommendations,” she says. “I’ll always offer justification, such as that we’ll require less personnel time because this piece of equipment has an autosampler versus someone manually titrating. They respect my decisions and know I’m not wasteful in spending money.”

## SIMPLY DEDICATED

Dearing stays energized simply knowing her role’s importance: “The product we provide is for public health. We provide safe, clean drinking water, making sure that we comply with all the regulations. I feel the lab is a support group for other groups in the district, including water plant operations staff and our electrical and instrumentation staffs. It’s rewarding to know we’re helping and not just holed up in the laboratory.”

She keeps a close eye on new regulations and serves on the AWWA’s Emerging Water Quality Issues Committee. One such issue is the Unregulated Contaminant Monitoring Rule (UCMR 4). “As a wholesaler, we don’t officially sample under that rule,” she says. “But our customer cities do, and some of their entry points are right in our plant. So I assist with reviewing their data and the EPA database and making sure the lab results look OK.”

Another timely topic is perfluorinated compounds, found in nonstick cookware, foam fire retardants and other common products. They are ubiquitous in the environment, and concern is rising about their potential health effects. Dearing sees it as part of her job to help the public understand the issue and keep the risks in the proper perspective.

“The greater the technology gets, and the lower the detection limits get and the lower the regulatory limits become,” Dearing says. “It’s a challenge predicting what the regulators will do and what to be prepared for. One thing that’s on my plate is creating fact sheets so that when we get calls on these issues, we have resources available to help educate the public.”

## LESSONS IN LEADERSHIP

Communication with her team also takes a high priority. The district has low staff turnover in part because of a family atmosphere, which Dearing tries to foster. “There are times when people want to do things differently, but we’ve always been able to overcome, and we’ve worked really well together.

“I tell employers who haven’t sent [Top Ops] teams that it will benefit them because their people will study and learn things that will be good for the organization.”

**MINDI DEARING**

“It’s important to understand the personalities of each individual and understand they all function differently. Over the years, I’ve learned to prepare my messages in multiple ways and deliver them in a manner that best fits each staff member.”

“It’s also about keeping things light. Occasionally I’ll say, ‘OK, we’re all going to have lunch together today.’ I also make sure my staff knows I always have an open door. I want them to come and tell me things. That is important because I’m pretty focused. I want them to know that while I might be walking fast, ‘It’s OK, you can talk to me.’”

One activity she enjoys is working on the annual AWWA Top Ops competition. She observed it at the AWWA Annual Conference & Exposition several years ago and with a few allies prodded the regional section (covering Oklahoma, Arkansas and Louisiana) to get involved. “Now we have an annual competition at the section,” she says. “Last year we had four teams. The winner went on to ACE, and that happened to be our team from the Beaver Water District.”

This year’s Top Ops team includes plant operators Dustin Mayhew, Steven Caudle and Gabe Frost. Their coach, Holloway, took part for the first few years as a member of the team. Jesse Burch, operations supervisor, preceded her as coach.

## GOING THE DISTANCE

Earning an MBA is not the only example of Mindi Dearing pushing the limits. Several years ago, she completed a marathon.

“I’m always up for a challenge and like to push myself in various areas,” says Dearing, lab supervisor with the Beaver Water District in Lowell, Arkansas. “Eight or nine years ago, one of my family members had the crazy idea to run a 5K. It was the first time I’d ever really run in my life. I was always in sports, mainly basketball, but I had bad knees and never did distance running.

“I did my first 5K race, and then I got hooked. Some friends said, ‘Well, we run, too.’ If I’m running with somebody, I can do that. I didn’t enjoy it enough to run by myself. So I got into it, and then I said, ‘Well, I’m going to do my first half marathon.’ And I did.”

Then she entered a weekend challenge event that included a half marathon on Saturday and another on Sunday. “A couple of crazy friends talked me into doing that,” she recalls. “I got home and one of my boys said, ‘Mom, if you can do a marathon in two days, you can do a marathon in one day.’

“I’d never had the desire to do one; it was his encouragement that pushed me. I said, ‘You’re going to be there as my support and aid station.’ So I ran the Tulsa (Oklahoma) Route 66 Marathon in November 2015.”

She hasn’t run any more marathons, but she feels the experience has helped her. She still teaches classes in cycling, yoga and other fitness activities: “It’s another way I can help people, help them meet their goals. Now I’m going to shift gears and train my son for cross country.”

Dearing, meanwhile, chairs the regional Top Ops committee and serves on the national Top Ops subcommittee. “I think it’s a great opportunity,” she says. “I tell employers who haven’t sent teams that it will benefit them because their people will study and learn things that will be good for the organization.”

## BRIGHT FUTURE

While she rarely stands still, Dearing is content with her current role. She believes her MBA, completed last March at Southeastern Oklahoma State University, will make her more effective in areas from accounting and finance to leadership and people skills — and prepare her for a management position if the opportunity should arise.

“I appreciate the support I’ve had here,” she says. “I have the ability to do research, and since things are always changing, the work never gets boring or stagnant. I’m not just stuck here in the lab. I can get out and educate people, work with community groups and continue working on the technology, too.”

And after all, a career is not a sprint — it’s a marathon. **tpo**

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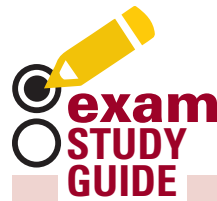
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## WASTEWATER

By Rick Lallish

**What is the expected or recommended time it should take for the contents in an oxidation ditch to travel the complete circuit of the ditch or go from rotor to rotor?**

- A. 30 seconds to 1.5 minutes
- B. 2.0 minutes to 2.5 minutes
- C. 3.0 minutes to 6.0 minutes
- D. 7.5 minutes to 9.0 minutes

**ANSWER:** C. For proper treatment time and flow velocities, the textbooks say the velocity in the ditch should be maintained at 1.0 to 1.5 feet per second. This will prevent the organics from settling in the ditch. This should allow the treatment contents to flow around the ditch or rotor to rotor in 3.0 to 6.0 minutes. In an oxidation ditch, the treatment time is related to the flow of the mixed liquor and is typically controlled by an adjustable weir.

## DRINKING WATER

By Drew Hoelscher

**What simplified reaction represents monochloramine?**

- A.  $\text{NHCl}_2 + \text{HOCl} \rightarrow \text{NCl}_3 + \text{H}_2\text{O}$
- B.  $\text{NH}_2\text{Cl} + \text{HOCl} \rightarrow \text{NHCl}_2 + \text{H}_2\text{O}$
- C.  $\text{NH}_3 + \text{HOCl} \rightarrow \text{NH}_2\text{Cl} + \text{H}_2\text{O}$
- D.  $\text{Cl}_2 + \text{H}_2\text{O} \rightarrow \text{HOCl} + \text{HCl}$

**ANSWER:** C. Many reactions take place when chlorine is added to water for disinfection. Chlorine destruction by reducing agents dissolved in water such as hydrogen sulfide, ferrous ion or manganous ion is initially what occurs. If the water disinfected with chlorine contains naturally occurring ammonia, the hypochlorous acid formed from the addition of chlorine reacts with the nitrogen within the ammonia compound and forms chloramines. The chloramine residual is dependent on the pH and on the chlorine-to-ammonia ratio (by weight) of the water. The ideal ratio of chlorine to ammonia is somewhat specific to each system. Systems looking to boost the chloramine residual in the distribution system may prefer to have small amount of free ammonia available to react with additional chlorine added at a booster station.

### ABOUT THE AUTHORS

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



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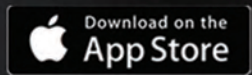
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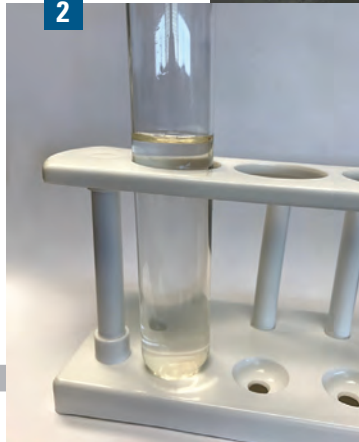
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1



2



3

1. An RE300 tote is set up to add the coagulant to wastewater before it enters an aeration basin.
2. A sample of the RE300 coagulant, which is a clear liquid.
3. RE300 totes are shown in storage at a treatment plant. The product can be stored outside even in winter.

# A Chemical Solution for Low-P Permit Compliance

A RARE-EARTH-BASED COAGULANT IS DESIGNED TO HELP CLEAN-WATER PLANTS ACHIEVE ULTRALOW PHOSPHORUS LIMITS AT A MORE AFFORDABLE COST

By Ted J. Rulseh

Clean-water plants are challenged to meet ever-stricter limits on effluent phosphorus.

Typically, the remedies include chemical treatment, media filtration and process changes enabling biological removal, or some combination of these. A major difficulty is cost, especially for smaller facilities with constrained budgets.

Bishop Water Technologies and Neo Chemicals and Oxides offer a phosphorus removal alternative in the U.S. and Canada through distributors such as WaterSolve. It comes in the form of a rare-earth-based coagulant that they say can help plants cost-effectively achieve effluent phosphorus as low as 0.07 mg/L without tertiary filtration.

The coagulant, Neo RE300, has the rare-earth elements lanthanum and cerium as the active ingredients. It is designed to replace conventional ferric- or alum-based coagulants. Its rare-earth minerals bond tightly to phosphorus to form a dense, heavy precipitate that settles about twice as fast as with conventional chemicals, improving clarifier performance while reducing the amount of coagulant used and the volume of solids produced.

The material also inhibits the formation of struvite and, being rated as nonhazardous, is safe for operators to handle. Kevin Bossy, CEO of Bishop Water Technologies, and Marc Rancourt, wastewater specialist, talked about the offering in an interview with *Treatment Plant Operator*.

**tpo:** What was the rationale for bringing this product to market?

**Bossy:** Our BioCord reactors were developed for ammonia removal, and we wanted something that would complement that as it pertained to phosphorus removal. We found the RE300 product to really work well, giving us a complete nutrient removal solution for both ammonia and phosphorus.

“The size of the plant doesn’t matter. What matters is the total phosphorus limit. ... Once you’re at a 0.5 mg/L total phosphorus limit, that’s the sweet spot for RE300.”

KEVIN BOSSY

**tpo:** In simple terms, how does this product work as compared to conventional additives like ferric or alum?

**Rancourt:** An easy way to think about it is in terms of the strength of the bond. The reaction of phosphorous and the RE300 elements is analogous to a strong Velcro bond, whereas with the legacy chemistries, it’s more like the static electricity bond you get from rubbing two balloons together. It also works at a lower dosage. Typically, for example, alum reacts on a 5:2 ratio — five parts alum to two parts phosphorus. With RE300, it’s a one-to-one molar ratio. That means less dosage to get a better result.

**tpo: Are there any other benefits from the rare-earth coagulant?**

**Rancourt:** There are trickle effects downstream. For one, less dosage means less sludge production. Testing has also shown that the sludge dewaterers more readily, yielding a drier material. That means less transport of sludge so lower greenhouse gas emissions. It's also a safer product. It's less acidic so there is less corrosion of plant infrastructure. In addition, it can be stored outside down to 40 degrees F below zero. That means in many cases there is no need for an energy-consuming heat trace on lines feeding it into the process.

**tpo: Where in the process would this product be added for the greatest effect?**

**Rancourt:** Every treatment system is a little bit different. It's about knowing the dynamics of the system. Where do you have the most retention time, and where is the best opportunity for success in a particular system? At the front end of the system, in the primary clarifiers, is probably the most common site for injection. Getting most of the solids out before you add it is key. If you add it where there are a lot of suspended solids, you will consume some of the coagulant unnecessarily. But every setup is a little bit different.

**tpo: What does this material look like?**

**Bossy:** It's a clear liquid, a concentrated solution. We sell it in totes like any other liquid chemistry. It is also available in tankers.

**tpo: Is any special kind of feed system needed for this product?**

**Bossy:** If you're already using an inorganic coagulant, there is nothing you need to change. You would use the exact same feed system.

**tpo: What about mixing systems?**

**Rancourt:** It's no different from any other chemistry. You need it to be well distributed to get good contact with the phosphorus, but there are no special mixing requirements.

**tpo: Does your company offer any services to help customers find the optimum dosage?**

**Rancourt:** Bench testing is always the first step. We use a calculator to determine the optimum feed rate. We don't just look at parts per million. We can target specifically down to the molar ratio. It helps to have an analysis on the different fractions of phosphorus, meaning what portion is soluble versus insoluble, reactive versus nonreactive. That can help us target the dosage better.

**Bossy:** We also fabricate our own line of chemical feed equipment. We are there for customers, come what may. If they don't have the feed equipment, we can provide that.

**tpo: What makes this material more cost-effective than conventional chemistries?**

**Bossy:** It's less expensive on life-cycle cost. When you look at the absence of heat tracing, the better dewatered solids, the less sludge produced, and the avoidance of capital equipment associated with filters if you have particularly low limits, that's where it's cheaper.

**tpo: What results have facilities seen in using this product?**

**Rancourt:** First and foremost is consistently meeting ultralow phosphorus limits. There is no doubt the product works. It will get you to levels of phosphorus as low as 0.07 mg/L. In addition, a 25% to 30% reduction in sludge volume is not uncommon.

**tpo: Are there any sizes of plants for which this product is most advantageous or any other kind of sweet spot?**

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# The Lowdown on High Flows

A VIRGINIA AUTHORITY CONDUCTS A SERIES OF STORM-EVENT SIMULATIONS TO HELP PREPARE ITS CLEAN-WATER PLANT INFRASTRUCTURE FOR ACTUAL HIGH-FLOW CONDITIONS

By Kipp Hanley

A series of high-flow simulations conducted last winter by the Prince William County (Virginia) Service Authority will help the utility identify near- and long-term infrastructure needs at its wastewater treatment plant.

The H.L. Mooney Advanced Water Reclamation Facility in Woodbridge receives wastewater from two remote pumping stations that converge at the plant headworks. There, influent enters two preaeration chambers before going through pretreatment, where flow can be split between two automatic screens and one manual bar screen.

After screening, the flow is conveyed through the grit channels and then into one of three equalization basins. Flow is then gravity fed from those basins to the primary clarifiers. Under high-flow conditions, hydraulic bottlenecks have been seen at the preaeration influent chambers, upstream of the screening channels, in the grit channels and at the equalization basin influent gates.

## INVESTIGATING CAUSES

To determine the cause of the bottlenecks and identify possible solutions, the authority hired the Stantec consulting firm to provide a dynamic hydraulic model for the front of the plant all the way through to the primary clarifier effluent.

In earlier stages of the project, the consultant identified areas where additional level sensors and flowmeters were needed to gather data for the model. Once those instruments were installed, the project called for five high-flow



Jayson Warren, water reclamation operator, raises the level of one of three equalization basins during a high-flow demonstration.

cess engineer and project manager; Doug Chapman, acting operations manager; Robert Jenkins, WWF manager; William Hann, WWF mechanic; and Nathan Griffith, modeler.

“Testing the capabilities of our plant during a high-flow scenario is critical to understanding what we may need to address before a real emergency occurs.”

RACHEL CARLSON

event simulations to capture the level and flow data actually being observed in each process area.

To simulate large rain events, staff from the authority's Water and Wastewater Facilities (WWF) Department stopped pumping during the morning peak to accumulate wastewater in a nearby pumping station wet well and upstream collections system. They then rapidly put the pumps into service to push a peak flow to the plant. The peak flow events lasted about 30 minutes before the pump station ran out of wastewater.

Operations staff members were deeply involved because they were responsible for taking the tanks in and out of service and cleaning the tanks once taken out of service. Key contributors included Maureen Oshaughnessy, pro-

## PREPPING FOR EMERGENCIES

For each simulation, plant staff took tanks and channels in and out of service to gain valuable data on how the 24 mgd (design) plant would respond to increased flows under each configuration.

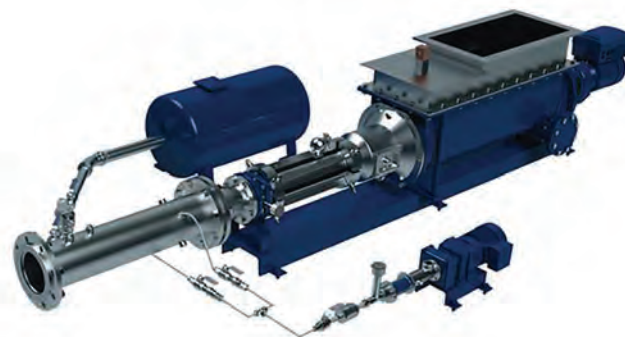
“Testing the capabilities of our plant during a high-flow scenario is critical to understanding what we may need to address before a real emergency occurs,” says Rachel Carlson, plant superintendent. “This project has been very enlightening so far, and we couldn't have done it without the cooperation of WWF staff.”

The next step of the modeling project is for plant staff to use the collected data to calibrate the model. The final phase will use the model to identify hydraulic issues and provide recommendations to resolve bottlenecks. That work will likely be completed by the end of 2020.

Options to address the bottlenecks may include additional screening channels, adding a pump station to increase flow out of the equalization basins into the primary clarifiers, or constructing a new pretreatment facility. Those improvements will likely cost \$5 million to \$15 million.

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### SAVING THE DAY

In the nine months ending in May 2019, the authority saw a large increase in average daily flows, in part due to exceptional amounts of rainfall in the Mid-Atlantic region. The increase was attributed mainly to inflow and infiltration into the more than 600 miles of sewer mains that feed the treatment facility. During that period, the plant saw a 25% increase in its average flows. Ironically, planned high-flow simulations had to be cancelled due to actual large rain events that occurred late last winter.

One of the high-flow simulations prevented a potential sewage spill at the plant, which is situated close to the Potomac River. Wastewater entering the plant goes into one of three equalization basins, which are used to help balance fluctuation in flows. While preparing for a flow simulation in February, plant staff discovered a leak in one of those basins.

During a simulation to test the hydraulic limitations on the flow discharged from equalization basin No. 3, a leak was observed from a joint in the tank wall. The simulation was stopped immediately, and plant staff cleaned up the small amount of liquid that had seeped out.

According to Carlson, the joint likely leaked due to age and the additional head pressure on the full tank. Each of the three equalization basins is put into service every six months, barring high flows that require two basins to be working at the same time.

“The service authority is all about preventive maintenance,” Carlson says. “By running this exercise, we have potentially saved ourselves a lot of headaches.”

#### Share Your Ideas

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#### ABOUT THE AUTHOR

Kipp Hanley (khanley@pvcusa.org) is a copywriter with the Prince William County (Virginia) Service Authority. tpo

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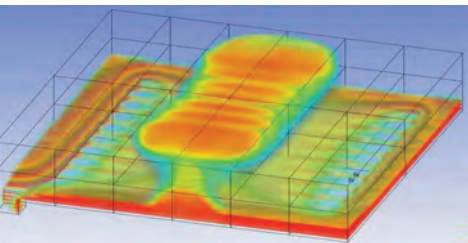
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Michelle Tarantino, lead operator, Central Contra Costa Sanitary District wastewater treatment plant

# No Barriers

CENTRAL SAN'S MICHELLE TARANTINO SEES A LIMITLESS FUTURE FOR HERSELF AND OTHER WOMEN IN OPERATIONS AND OTHER ROLES IN THE CLEAN-WATER INDUSTRY

STORY: **Jim Force**

PHOTOGRAPHY: **Collin Chappelle**





Tarantino inspects the furnace facilities within the Central San solids building.



You won't find many women senior wastewater operators today. You'll find even fewer who operate a four-story, 200 wet-ton-per-day multiple-hearth furnace.

Yet, that's part of the job for Michelle Tarantino of the Central Contra Costa Sanitary District (known as Central San) in Martinez, California, east of San Francisco. In just 11 years, she has risen from a position in the warehouse to senior operator. Today she rotates on the day shift in charge of the plant's biosolids operation, including the furnace, as well as its primary, secondary and tertiary wastewater treatment processes.

Holder of a Grade 3 wastewater operator license, she is one of only two women among the 20 operators at Central San, yet she sees no specific barriers keeping women from the field: "As long as they're willing to put in the time and are determined to succeed, the sky's the limit for women."

### TEAM APPROACH

Tarantino is part of a three-person crew, plus a supervisor. The team is organized so that one operator manages the solids handling process, which includes dissolved air flotation thickeners, dewatering centrifuges, the furnace, boilers, a cogeneration unit, biosolids cake pumps and odor control.

The second person assists in solids handling, monitoring the entire biosolids system. The third operator oversees the wet end of the 35 mgd (average) treatment plant.

Central San is one of the last plants in California to operate a biosolids incinerator. It produces 14 tons of sterile ash per day that is recycled as a turf additive. The furnace is fired by natural gas and landfill gas. A waste-heat boiler produces steam to drive the aerator turbines in the secondary treatment process, as well as some smaller plant equipment.

### CHANGE OF CAREERS

Wastewater operations was not exactly on Tarantino's career wish list. "I worked in the technology field before the dot-com crash and then was in interior and residential design when the housing market cratered in 2009,"

## Michelle Tarantino, Central Contra Costa Sanitary District Martinez, California

POSITION:  
**Senior operator, wastewater treatment plant**

EXPERIENCE:  
**11 years**

DUTIES:  
**Operate biosolids process and primary, secondary and tertiary treatment**

EDUCATION:  
**Bachelor's degree, interior architecture, University of Wisconsin-Stevens Point**

CERTIFICATION:  
**Grade 3 wastewater operator**

AWARDS:  
**2018 Emerging Leader Award, California Water Environment Association**

GOALS:  
**Attract women to the profession; advance in career and become a supervisor**

she recalls. A friend thought she might have the right stuff for wastewater treatment and encouraged her to apply at Central San.

Having been laid off, anything looked good; she decided to give it a try: "Nothing grosses me out," she says. "It was very different." In her first job she managed parts as a materials coordinator, but within six months she joined the plant's operator-in-training program, and achieved the necessary licenses to become a wastewater operator.



“I was already taking some of the courses the district was offering through local colleges, so that helped a lot,” she says. Over the years, she has worked her way up through the first, second and third levels to senior operator.

## TAKING THE HEAT

The biosolids operation is complex and requires a delicate touch. It starts with the Sharples centrifuges (Alfa Laval), which must work properly to produce quality cake at a consistent rate for the cake pumps (Schwing Bioset) that deliver material to the furnace.

## CREATING VALUE

The Central Contra Costa Sanitary District collects and provides wastewater, recycled water and household hazardous waste collection to nearly half a million people and some 3,000 businesses in a 145-square-mile service area east of San Francisco Bay.

Started up in 1946, the district’s wastewater treatment plant has an average daily flow of 35 mgd and design capacity of 200 mgd. The plant’s slogan, “Waste to Worth,” plays out in the production of energy and the recycling of water and biosolids.

Wastewater flows through 1,500 miles of sewers, mostly by gravity, to the plant. It undergoes primary and secondary treatment and UV disinfection (Ironbrook UV) before discharge through a 4-mile-long pipeline to Suisun Bay. Filters and disinfection units further treat about 600 million gallons of effluent per year for irrigation, industrial use and in-plant processes.

For 20 consecutive years, Central San has earned the Platinum Peak Performance Award from the National Association of Clean Water Agencies.

“Running the furnace is similar to being the conductor of an orchestra, keeping all the instruments coordinated while maintaining a pleasant atmosphere for the audience,” Tarantino says. “While the biosolids are being incinerated, there must be certain oxygen levels and temperatures maintained to optimize burning of the cake.

“I call it being a furnace whisperer, making subtle, calculated changes to gently move temperatures or oxygen in a direction for success. You can’t make too many changes to the burners or air ports too quickly or else you will be fighting yourself constantly for hours.”

In addition, the waste heat boiler, two auxiliary boilers and the cogeneration unit (Solar Turbines) and its waste-heat boiler must be monitored for proper pressure and water and chemical levels. Other critical components include the wet scrubbers that clean particulate emissions and gases from the furnace exhaust, a carbide lime system that maintains proper pH in the sludge storage tank, and a conveying system that removes furnace ash.

“Oxygen, opacity, hearth temperature and solids loading levels are only a few of the parameters monitored as just a part of our Bay Area Air Quality Management District regulations (Title V permit),” Tarantino says.

Even more challenges lie ahead as the Central San plant expands and changes to deal with future issues. “We’re facing huge upgrades in the next 10 years,” Tarantino says. “Power swaps, getting new equipment up and running, and training staff and new people. We say it can take up to five years for operations to adjust to and master new equipment and processes. Changes are starting to kick in. Some of our equipment is nearing the end of its useful life.”

*(continued)*

Tarantino with Central San colleagues, from left: Nick Hansen, senior plant operator; Frank Favalora, plant supervisor; and Jesse Lucia and Mike Tarantino, senior plant operators.



“As long as they’re willing to put in the time and are determined to succeed, the sky’s the limit for women.”

MICHELLE TARANTINO



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“ I call it being a furnace whisperer, making subtle, calculated changes to gently move temperatures or oxygen in a direction for success.”

**MICHELLE TARANTINO**

## ROLES FOR WOMEN

While managing the facilities and her own career, Tarantino is an advocate for women in the water professions. She believes it's about not only acquainting women with the field, but also educating the general public about water and wastewater.

She thinks social media like Facebook and Twitter offer unique and effective ways for utilities to get their message out to young people in general and to women in particular.

“Some pages put out by individual plants are fantastic,” she says. “They feature pictures and stories of women at work in the field. They're very helpful in spreading the word.”

Job fairs and industry conferences are other ways, although Tarantino thinks conferences and events more focused on the general public are better for recruiting women. “The other woman operator here and I have been involved in panel discussions about our jobs,” she says. “I think we've been successful in presenting the opportunities.”

Central San publishes a quarterly flyer to ratepayers, and it often features women in professional positions. Tarantino thinks that's effective, too.

She admits that while physical tasks at wastewater treatment plants can be challenging for some women, there are many jobs in engineering, process control and administration that women could readily fill.

“Other than life issues like child care that need to be worked out, I don't see any barriers for women in this field,” says Tarantino, who is married and the mother of two daughters. “I'm crossing my fingers that we'll see more women operators. As we host tours by school groups and scout troops, I hope we present a positive impression instead of a scary place to work.”

She felt accepted by the Central San team right from the start; it was no big deal when she passed the test. That doesn't surprise her supervisor, Frank Favalora. “She's wonderful to work with,” he says. “She's a real team player and thinks outside the box.”

Recently, Tarantino came up with a way to make up two batches of carbide lime at a time, instead of one. “She'll see something and figure out a better way — quicker, easier, safer,” Favalora says. “She's been on my crew ever since she became an operator, and she makes my job easier. You don't have to tell her; she's already on it. We're lucky to have her.”

## ZERO WASTE

The feeling is mutual. “I feel great about working for this plant,” Tarantino says. “We have zero waste. We recycle every bit of biosolids as ash. We recycle energy and water for irrigation. I'm definitely sticking with this plant and this career.”

For 2018 she was named an Emerging Leader by the California Water Environment Association. In the write-up about her, she was quoted as saying: “I'm a big fan of John Wayne. You need true grit to be a woman in oper-



ABOVE: Michelle Tarantino checks the control panel for one of the facility's gas-fueled furnaces. It uses either natural gas or methane piped in from a nearby landfill. BELOW: Tarantino takes a sample of the dewatered biosolids before the material is fed into the furnace.



ations, but if you hold your own, keep growing and keep studying, there's really no stopping you.”

Becoming a shift supervisor is in her sights, and Favalora believes she has the stuff to make it: “She has participated in the supervisory academy. She has the potential, for sure.” **tpo**

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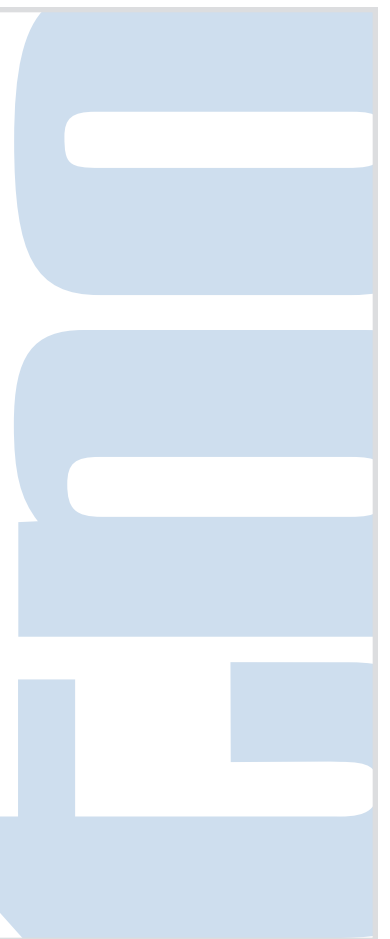
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# Clean Water: A New Paradigm?

THE NATURE AND VARIETY OF TODAY'S WATER-QUALITY CHALLENGES MAKE THE CLEAN WATER ACT SEEM OUTMODED. NACWA ARGUES IT'S TIME FOR A FRESH APPROACH.

By Ted J. Rulseh

**N**o one questions the importance and success of the Clean Water Act. It has without a doubt led to better technology, better processes, cleaner water and improved public health.

But after 47 years, are the Clean Water Act's provisions up to today's challenges — like nutrients, climate change and emerging contaminants such as pharmaceuticals and per- and polyfluoroalkyl substances (PFAS)? How well does its command-and-control approach work in the modern world? Are we using a mid-20th-century framework to address 21st-century problems?

The National Association of Clean Water Agencies argues that this is in fact the case. "The time has come to modernize the clean-water paradigm in a way that preserves the strongest and most successful aspects of our current structure while creating a new suite of tools and resources to address the water-quality realities of today and those of the coming decades," a NACWA issue paper states.

To NACWA, that means developing a statutory construct that takes a holistic "one water" approach to regulation. It also means making utilities' relationships with regulators more collaborative, and engaging stakeholders and the public in new ways to elevate the importance of clean water. Nathan Gardner-Andrews, NACWA's chief advocacy officer, talked about these issues in an interview with *Treatment Plant Operator*.

**tpo:** What exactly do you mean by taking a more holistic approach to regulation?

**Gardner-Andrews:** If you talk to different stakeholders involved in water quality — municipal utilities, agriculture, industries, citizen groups — everyone gets on a conceptual level that addressing pollutants from a watershed approach, rather than discharge by discharge, could lead to overall better water quality. The challenge is how to change the laws and regulations to reflect that.

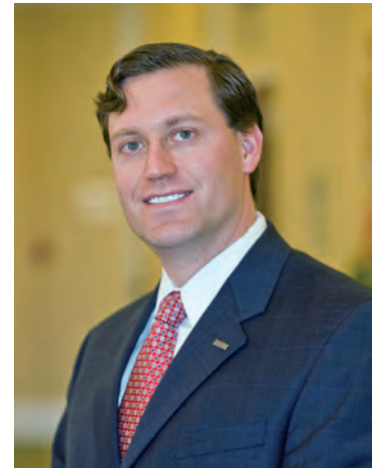
**tpo:** What makes that so challenging?

**Gardner-Andrews:** What we have, at least at the federal level, is a system that's very siloed. We have one major statute, the Clean Water Act, that deals with wastewater issues. We have a separate federal statute that deals with safe drinking water and other statutes like the Endangered Species Act that can cross over into water issues. Within the Clean Water Act, we have classes like point sources and urban stormwater. Certain farm operations are regulated under the NPDES point-source discharge program, and an entire universe of impairment sources are not regulated under the act. Getting to a new framework means changing decades of how water is regulated, how permits are written and how discharging utilities operate.

**tpo:** What might a watershed-based program look like?

**Gardner-Andrews:** We would envision a federal statutory and regulatory framework that doesn't differentiate between drinking water, waste-

water and stormwater but looks at water as one entity. From sixth grade science, we all know about the water cycle. We need a structure that acknowledges that any ecological challenge in a watershed has impacts across the board. It's a structure that breaks down the silos and also looks at all sources of impairment in a watershed — agricultural, industrial, municipal, air deposition. Then it looks at all the uses of water in a watershed — drinking water, irrigation, recreation; integrates the water-quality challenges around those uses; and determines the best way to make trade-offs among all those to find an optimal balance of environmental and health protection and the uses of the resource.



Nathan Gardner-Andrews

**tpo:** You assert that a paradigm such as you describe would encourage innovation. In what way do you see that happening?

**Gardner-Andrews:** I would argue that the Clean Water Act is the most successful of all environmental statutes, but it hasn't been fundamentally updated to acknowledge the realities of the 21st century. For example, when the drafters wrote the bill, climate change was not on anybody's radar screen, yet it is now arguably the defining environmental issue of our time. None of the issues that go with climate change — rising sea levels, changing precipitation patterns, hardening of facilities against these threats — are addressed in the act.

Issues like climate change, resiliency, toxics and nutrients present opportunities for utilities to innovate and find new ways to address them, whether through technology or new management approaches. A new paradigm could give them the regulatory flexibility to do that.

**tpo:** Can you offer an example to illustrate?

**Gardner-Andrews:** Consider nutrients. You can have a body of water that's impaired by nutrients, yet the impairment has nothing to do with a wastewater treatment plant — it's all due to upstream agriculture. And yet, all the U.S. EPA and the states can do under the Clean Water Act is ratchet down that point source to lower and lower levels, when that's not solving the problem.

**tpo:** Isn't it true that some states are addressing upstream nutrient issues with adaptive management and other approaches?

**Gardner-Andrews:** Yes, some places are pushing the envelope with adaptive management and nutrient trading, but that isn't changing the targets utilities are being asked to hit. We're still setting targets for point sources to meet that may not be rational targets. Under a holistic approach, we could set water-quality standards that more equitably distribute responsibility for accommodating the designated uses of the water resources while sharing the benefits among all the interested stakeholders.

That's where innovation comes in, and there are technologies that could help us get there. They're not necessarily technologies to put in at the treatment plant to get to a certain limit. We could ratchet down discharge limits further and further, and creative companies and engineers would come up with new technologies to meet them, but at the end of the day, is that really improving water quality? In many places, the answer will be no.

**tpo:** How would you describe your desired relationships between utilities and regulators?

**Gardner-Andrews:** Municipal utilities have done the hard work over the years to make the Clean Water Act the success it has been. They have made the investments in their plants. Sometimes the federal and state governments have had to nudge or force them along, but by and large they have done their part. In addition, many utilities have successfully run industrial pretreatment programs for years, and that is a regulatory function.

There will always be a role for the federal and state governments to provide oversight, but we would like to see that done not in an antagonistic way but in partnership. The utilities would sit down with their regulator and say, "Here is where we know we need to improve. Here are our priorities over the next years." The regulator would say, "Here are our concerns about water quality and where we need to see improvement." Then they would jointly decide where to make investments to enable progress.

**tpo:** What do you believe it will take to make such an approach a reality?

**Gardner-Andrews:** First it takes a mindset shift among utilities to see the regulators as partners in achieving a common goal, which is best balancing the needs of the water body versus the desired uses, while also looking at cost. Sometimes a utility may know better than the regulators where that investment sweet spot is. The flip side is that the regulators also need to look at utilities in a partnership. There needs to be a relationship of trust and common purpose. Then you can start creating a more symbiotic relationship.

From the utility side, it becomes less about what is being done to me and more about how I work collaboratively and proactively with my regulator so the next permit that comes down isn't a surprise — it's something I had influence in crafting. Then I can feel confident that the things I will be required to do, and that I will be asking my community to pay for, are things that really improve the environment and public health.

**tpo:** Engaging the public around the importance of clean water is always a challenge. How does NACWA propose to do that as part of setting a new regulatory paradigm?

**Gardner-Andrews:** Some key milestones now and over the next few years create an opening for communications to elevate the message. This year is the 50th anniversary of the Cuyahoga River fire, the galvanizing moment for the modern environmental movement. Next year is the 50th anniversary of Earth Day and of NACWA. In that context, we plan to celebrate the amazing success of clean-water utilities in terms of water quality, fishable and swimmable waters, and economic impact — the jobs and other benefits created by communities having fresh, safe water. Then in 2022 we have the 50th anniversary of the Clean Water Act itself.

**tpo:** How will that help lead to the new regulatory paradigm that NACWA envisions?

**Gardner-Andrews:** It all comes down to the general public — the average Joe and Jane — understanding the value of what utilities do and understanding the value of the money and what they're getting for what they

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pay. If we can elevate the message and get the public to buy into and understand it, then the policymakers will follow. We can make the next three years a celebration of clean water and help the public understand how much work, effort and money go into that.

Utilities have to do a better job of telling their story. Think about how schoolteachers, firefighters and police officers are honored for the services they provide. There is no reason the folks who work at the water or wastewater utility shouldn't be viewed in the same light. Utilities need to be more loud and proud about what they do. Once the public starts to recognize their contributions, the respect will come. But it doesn't happen overnight. Through our membership, we're going to put together collateral, videos, social media and other items to spread far and wide to any utility that wants to localize and use them. If you localize the story, you begin to develop a national coalition and voice that will push the issue globally. **tpo**





From left, Raymond Perez, wastewater operator; Richard Britton, operations supervisor; and Clifford Creeks Jr., supervisor IV/operations, monitor the bar screen control panel for alarms.

# A Short Trip. A Lifetime Journey.

CLIFFORD CREEKS JR. QUICKLY DEVELOPED A PASSION FOR WASTEWATER TREATMENT. NOW HE PUTS IT TO WORK DAILY AND TRIES TO IMPART IT TO A NEW GENERATION.

STORY: **Steve Frank** | PHOTOGRAPHY: **Olivia Ogren-Hrejsa**

It's been 23 years since Clifford Creeks Jr. traveled the short distance, just five minutes from where he grew up, to the Central Wastewater Treatment Plant in Dallas.

"I played and practiced little league football across the street from here, and I never knew what the plant was until I came here for the job interview," he recalls. Creeks understood there's no "new" water in the world, but like many others, "I was blown away by what happens here to turn wastewater into clean water."

By the time he was hired as an apprentice operator at the Dallas Water Utilities' Central plant in 1996, the facility had been in operation for 81 years. When it came online in 1915, treatment consisted of a couple of clarifiers that discharged to the Trinity River, still the plant's receiving stream. The population it served then was about 100,000. Today it serves some 1.3 million. Creeks is now supervisor IV/operations at the plant (170 mgd design, 100 mgd average).

## THE BAD OLD DAYS

In the early 20th century, there was public debate over whether wastewater treatment was even necessary. It had been only about

60 years since Lord John Snow in London confirmed the relationship between cholera and drinking water contaminated by human waste.

Many still believed diseases like cholera were caused by "bad air." An article in the *Journal of Urban Technology* says that in 1924, 88% of people in U.S. cities with populations of more than 100,000 simply dumped their untreated wastes into the nearest waterway. Dallas was ahead of its time with a wastewater treatment plant.

Still, Creeks chuckles as he recalls, "Even in my lifetime we weren't disinfecting with chlorine." Now Dallas has two wastewater treatment plants with a combined capacity of 310 mgd. The other plant is 140 mgd design, 60 mgd average.

## LONG ROAD TO TRAVEL

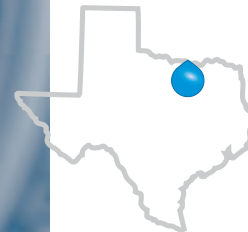
It took Creeks awhile to come to his current profession. After he graduated from high school, he went to college for a year at El Centro College in Dallas for general studies with hopes of earning an engineering degree. Then he joined the Marine Corps. He'd wanted to be an electrician, "But you have to be real specific with recruiters."



Clifford Creeks Jr.,  
supervisor IV/operations,  
Central Wastewater  
Treatment Plant, Dallas  
Water Utilities

“You can’t work here without being blown away by what’s happening. We have to work harder to market wastewater as a profession.”

**CLIFFORD CREEKS JR.**



## Clifford Creeks Jr., Dallas (Texas) Water Utilities

**POSITION:**  
Supervisor IV/operations, Central  
Wastewater Treatment Plant

**EXPERIENCE:**  
23 years in the industry

**EDUCATION:**  
Associate of arts and science degree,  
Richland Community College

**CERTIFICATIONS:**  
Class A wastewater operator

**AWARDS:**  
2017 Water Environment Association  
of Texas Operator of the Year,  
2018 Water Environment Federation  
William D. Hatfield Award

**GOALS:**  
Continue learning and passing that  
knowledge on to others





“Wastewater is alive and interesting; it’s fascinating. What goes on in the plant is not the same as in the textbook. But don’t forget the textbook either.”

**CLIFFORD CREEKS JR.**

Clifford Creeks Jr. discusses samples and schedules with Emanuel Kasey, laboratory supervisor.

six-month probation period. After that, you have a year to obtain your C license to retain your position. You can stay at that C level until you retire, but you’ll need an advanced license to get promoted.”

### ALWAYS IMPROVING

Today Creeks holds a Class A wastewater operator license. He reports to the assistant plant manager for operations, who reports to the plant manager. Five supervisors and 30 operators and apprentice operators report to Creeks. Along the way, he earned an associate of arts and science degree at Richland Community College in the Dallas metroplex area, using college credits earned in the Marines and others earned locally.

In his 23 years with the Dallas utilities, Creeks has seen many changes and improvements. The city is now engaged in a Lean Six Sigma program that depends on data and statistical analysis to improve processes and save money. One project he’s working on is electronically collecting and using operations data with digital tablets. He wants operators to stop collecting data on paper operator logs and transferring that data somewhere else,

## A TEACHABLE MOMENT

Clifford Creeks Jr.’s passion for teaching others about wastewater treatment extends to his home and his off-duty time as well. He recently gave a houseguest a lesson about what should and should not go down the drain.

His 66-year-old houseguest was cooking dinner. When the ground beef was done, she was about to pour the liquid down the drain, but Creeks stopped her. She said, “It’s just water.” He said, “No, there’s grease in there.”

His guest said she hadn’t used any grease in cooking the meat. Creeks said, “Let me show you something.” He got a glass jar and poured off the liquid from the pan. “If you pour this liquid down the sink, it just goes down the drain and sets up. Pretty soon, you have a mess.”

As the grease congealed in the jar, his guest exclaimed, “Well, I’ll be. I never knew that.” Creeks replied that he and his colleagues work every day to educate the public about what they put down the drain: “It’s a big part of what our pretreatment people do when they go out to restaurants and conduct their public outreach events.”

After basic training he went to what’s called A School where he learned basic electricity. Then his commanding officer called Creeks and a colleague into his office and told them he needed two Marines to go to aviation air conditioning mechanic and electrician school and then to Marine Corps Air Station Iwakuni, Japan.

Creeks spent a year there and was then assigned to Marine Corps Air Station El Toro in California, the base used for several scenes in the 1996 film *Independence Day*. While at El Toro (which closed in 1999), he wrangled an additional six-month temporary duty assignment back at Iwakuni.

While in the Marines, Creeks earned general education college credits through Saddleback College in Mission Viejo, California, despite the rigors of military life. He left the Marine Corps as a corporal when his enlistment expired in 1990 and returned to Dallas. He worked there for five years in hotel maintenance as an air conditioning mechanic and electrician, but he felt something was missing.

“I started looking around and saw an opening with the City of Dallas,” he recalls. “I got on here as an apprentice operator. That’s the entry-level position. You have to get a D wastewater license (lowest) by the end of your



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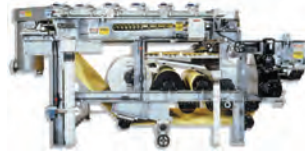
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because data on paper logs is nearly useless and transcription errors can creep in.

Consultants and others have periodically asked for 10 years of data on one process or another. He takes them to a room full of boxes of paper operator logs and says, "Have at it. Just bring the boxes back when you're through copying the log sheets." The aim of the Lean Six Sigma approach is to make everything in operations run more efficiently by using data to make decisions. "We're working toward data integration," Creeks says.

### TEACHING THE YOUNG

Experience and a thorough understanding of the processes still have a place in his world. "When I was hired on, there were operators who could listen to and smell the plant and tell you how it's operating," he says. "They could tell you how to set your wasting, and they could look at an aeration basin and tell you the RAS (return activated sludge) pump was off and you needed to go turn it on."

He's concerned about the work ethic of millennials coming into the workforce: "They don't take pride in their work; it's just a job to them. But it's not. It's so much more." He notes that they're good at pushing buttons "and can run the plant with their phones," but they need to understand what happens after they push the buttons and who they affect downstream.

"You can't work here for any length of time and not be excited about what's going on in these tanks," Creeks says. That's one reason he volunteered to teach the professional wastewater skills courses the utility provides to help operators get and maintain their licenses. He took two 40-hour courses



From left, Lance Phillips, manager III/operations; Clifford Creeks Jr.; Ron Patel, senior engineer; and Dan Halter, plant manager, discuss operations plans.

to learn how to teach before he stepped into the classroom: "The courses taught me how to put together a lesson plan on anything."

His drive to impart his passion for the profession motivates him: "We have to fight against smartphones that make our kids dumb. I didn't want to



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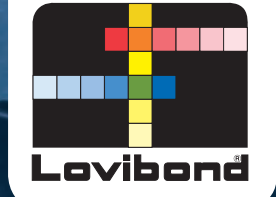
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Team members at the Dallas Central Wastewater Treatment Plant include, from left, Ryan Kelly, shift supervisor; Larry Middleton, supervisor; Clifford Creeks Jr.; and Richard Britton, operations supervisor.

stand up there sounding like the teacher in the Charlie Brown cartoons: Wa-wa, wa-wa, wa-wa. The instruction was geared to being able to instill and communicate the knowledge, not just possess it.

“Wastewater is alive and interesting; it’s fascinating. What goes on in the plant is not the same as in the textbook. But don’t forget the textbook either.”

## EARNING RECOGNITION

Creeks is proud of a 2-year-old program with the utility, Southern Methodist University, and the AECOM engineering firm. Three-student teams work with AECOM to provide the utility with a workable solution or improvement to a real process problem. The students do the work from start to finish.

Utility personnel see presentations during the project and critically advise the students. In the end, the students get a grade and real-world experience, the utility gets the project and Creeks gets his payoff later when those students show up working for some of the same engineering firms he has worked with for years. “I feel like I’ve had a hand in giving them a taste of the real world,” he says.

His peers recognized his drive to teach others to be as excited about wastewater as he is. Two years ago, they presented him with the Water Environment Association of Texas Operator of the Year award. They nominated him for the Water Environment Federation’s William D. Hatfield Award last year. “I looked at the requirements and I didn’t think I’d get it,” he says. But he did.

One of the Hatfield award criteria is a good public relations program. “We have to work hard to reach out to the public,” Creeks says. “When we have tours, we ask the kids what they want to be. I work hard to let them know that whatever they want to be, we probably have it right here.

“You can’t work here without being blown away by what’s happening. We have to work harder to market wastewater as a profession.” That’s the only way to attract new people — and start them on the journey for a lifetime. **tpo**

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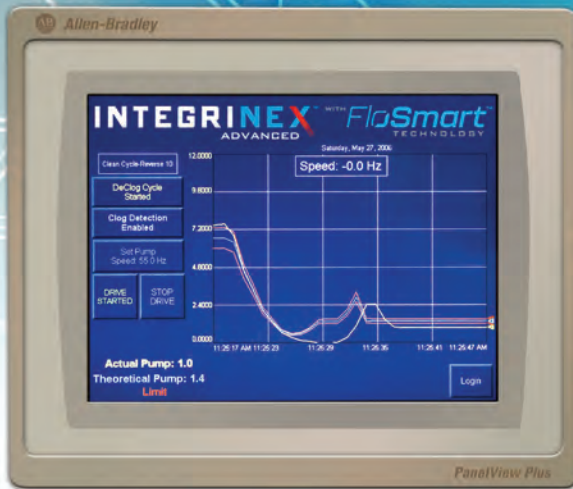
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# The Light's Fantastic!

COLORED LEDS ADD VISUAL APPEAL TO A CALGARY LIFT STATION AND HELP THE PUBLIC UNDERSTAND WHAT GOES ON WITHIN THE BUILDING WALLS

By Jeff Smith

Unlike most wastewater lift stations whose owners try to hide or disguise them, the Calgary Forest Lawn Lift Station in southern Alberta sits on the crest of a hill in full public display.

It's adorned by an artistic arrangement of LED lights mounted on two walls of the metal-clad concrete block building. The lights change color as the flow to the lift station varies.

"Combining art and infrastructure works great for us because it tells the story to the public of what's happening underneath their feet," says Chris Huston, manager of drinking water distribution for Calgary. "It also allows us to see from outside the building whether the station is working."

## TEAM VENTURE

As one of the Calgary Utilities & Environmental Protection department's 39 wastewater lift stations, the Forest Lawn station has become a centerpiece for the combination of an artist's creativity and management's planning. "Its location and prominence overlooking the city makes it a highly visible piece of infrastructure," Huston says.

The creation was a collaboration between artists, engineers and architects. Plans were being made in 2011 to replace the original station, which was built in 1960 and had reached the end of its life cycle and capacity. At the same time, the city was initiating a public arts program named Watershed+, developed to integrate art with infrastructure.

Funded in part through the city's directive to spend 1% of capital project budgets on public art, the 23-by-36-foot lift station building was constructed not just to perform its normal function, but also to reveal what

PHOTO ABOVE: The Forest Lawn Lift Station at night with its LED light arrangement glowing "green" to indicate the lowest influent flow.

happens inside the walls. A chain of NemaLux GS industrial luminaires are arranged on two walls, representing the lift station's catchment network of underground pipes.

## INGENIOUS AUTOMATION

Varying in length from 4 to 60 inches, a total of 71 lights change color between blue (the lowest flow rate), green, yellow, orange and red (the highest flow rate). Custom brackets attach the lights to the building's exterior, behind a perforated metal architectural screening façade that shrouds the entire building and protects the lights.

“Combining art and infrastructure works great for us because it tells the story to the public of what's happening underneath their feet.”

CHRIS HUSTON

"Control of the lights is based on level change in the wet well, which varies with influent flow rate," says Daniel Schaefer, operations engineer. The level change is transmitted to the station's PLC by way of a 4-20mA signal from a Siemens 200 MultiRanger ultrasonic level controller. The PLC calculates the flow rate based on level change and provides a digital output to a NemaLux controller, which changes the color of all the lights at the same time.



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## PUBLIC UNDERSTANDING

As the lead artists of the city's Watershed+ program, a Calgary-based international art firm named Sans façon created the wall-mounted abstract image of the underground piping system.

Rather than introduce art after the project was completed, the artists were embedded within the Utilities & Environmental Protection department to learn about lift stations and collaborate with engineers. "There was a great balance between what the artists needed and what the engineer's needs were," Huston says.

Since at least 60% of a lift station's infrastructure is underground and people don't see it, the early design and art collaboration made it possible to show the public what a lift station does. "The Forest Lawn lift station links the public to what the city does each and every day within our wastewater system," Huston says. "It helps us tell that story."

tpo

PHOTOGRAPHY BY SANS FAÇON. © CITY OF CALGARY



Three views of the Forest Lawn Lift Station seen at night, displaying varying levels of influent flow by the changes of color of its LED lights which are arranged on the external walls of the station.

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Settlements have been reached in a lawsuit pending in the United States District Court for the District of New Jersey (the "Court") against the following Defendants: General Chemical Corporation, General Chemical Performance Products, LLC, General Chemical LLC, GenTek Inc., Chemtrade Logistics Income Fund, Chemtrade Logistics Inc., Chemtrade Chemicals Corporation, Chemtrade Chemicals US, LLC, Chemtrade Solutions, LLC, C&S Chemicals, Inc., USALCO, LLC, Kemira Chemicals, Inc., Southern Ionics Incorporated, GEO Specialty Chemicals, Inc., Frank A. Reichl, Vincent J. Opalewski, Alexis Palvos Avraamides, Amita Gupta, Milton Sundbeck, Kenneth A. Ghazey, Brian C. Steppig, American Securities LLC, Matthew Lebaron, and Scott Wolff. Plaintiffs in the lawsuit claim that Defendants hurt competition and violated state antitrust, consumer protection, and other laws by allocating customers and markets and fixing the price of Liquid Aluminum Sulfate ("Alum"), thereby causing indirect purchasers to pay too much for Alum. Defendants deny any wrongdoing.

Settlements have been reached with Defendant Kemira Chemicals Inc. and its current and former, direct and indirect parents, subsidiaries, affiliates, insurers, directors, officers, shareholders, and employees (collectively, the "Kemira Settling Defendants"), with Defendants General Chemical Corporation, General Chemical Performance Products, LLC, General Chemical LLC, GenTek Inc., Chemtrade Logistics Income Fund, Chemtrade Logistics Inc., Chemtrade Chemicals Corporation, Chemtrade Chemicals US, LLC, Chemtrade Solutions, LLC, and their current and former, direct and indirect parents, subsidiaries, affiliates, insurers, directors, officers, shareholders, and employees, including Frank A. Reichl, Vincent J. Opalewski, Alexis Palvos Avraamides, Amita Gupta, Matthew Lebaron, and Scott Wolff (collectively, the "Chemtrade Settling Defendants"), with Defendants Southern Ionics Incorporated and its current and former, direct and indirect parents, subsidiaries, affiliates, insurers, directors, officers, shareholders, and employees, and Milton Sundbeck (the "Southern Settling Defendants"), with USALCO LLC, and its current and former, direct and indirect parents, subsidiaries, affiliates, insurers, directors, officers, shareholders, and employees (the "USALCO Settling Defendants"), with American Securities LLC, and its current and former, direct and indirect parents, subsidiaries, affiliates, insurers, directors, officers, shareholders, and employees (the "American Securities Settling Defendants"), and with C&S Chemicals, Inc. and its current and former, direct and indirect parents, subsidiaries, affiliates, insurers, directors, officers, shareholders, and employees ("C&S Chemical Settling Defendants") (collectively, the "Settling Defendants").

**WHO IS INCLUDED IN THE CLASS?** The Indirect Purchaser Settlement Classes consist of all persons or entities in AL, AR, AZ, CA, CO, DC, FL, HI, IL, IA, KS, ME, MA, MI, MN, MS, NE, NV, NH, NM, NY, NC, ND, OR, PR, RI, SC, SD, TN, UT, VT, WV, and WI that purchased Alum, not for resale, which was manufactured, produced, or supplied by Defendants or their unnamed co-conspirators from January 1, 1997, through February 28, 2011. Excluded from the Class are Defendants, co-conspirators, and their respective parents, subsidiaries, and affiliates.

**WHAT DO THE SETTLEMENTS PROVIDE?** The Kemira Settling Defendants agreed to pay into an Escrow Account the sum of \$2,350,000, the Chemtrade Settling Defendants agreed to pay the sum of \$14,000,000, the Southern Settling Defendants agreed to pay the sum of \$5,000,000, the American Securities Settling Defendants agreed to pay the sum of \$2,200,000, the USALCO Settling Defendants agreed to pay the sum of \$5,000,000, and the C&S Chemicals Settling Defendants agreed to pay the principal amount of \$700,000 plus interest (collectively, the "Settlement Funds"). In addition, the Kemira Settling Defendants, the Chemtrade Settling Defendants, and the Southern Settling Defendants each agreed to provide certain nonmonetary assistance to Indirect Purchaser Plaintiffs.

At this time, Interim IPP Lead Counsel will seek an award of attorneys' fees in the amount of 33 1/3% of the Settlement Funds, plus reimbursement of certain of their out-of-pocket expenses incurred so far in this litigation and not already reimbursed, including expert witness expenses incurred to date, as well as service awards for the class representatives of up to \$25,000 each from the Settlement Funds in recognition of their efforts to date on behalf of the Classes.

**HOW DO I RECEIVE A PAYMENT FROM THE SETTLEMENTS?** You must submit a Claim Form **postmarked no later than February 15, 2020**. The Claim Form and instructions on how to submit it are available at [www.LiquidAluminumSulfate.com](http://www.LiquidAluminumSulfate.com) or by calling 1-866-217-4455.

**WHAT ARE YOUR OPTIONS?** If you wish to remain an Indirect Purchaser Settlement Class Member, you need not take any action at this time. You will give up your right to sue the Settling Defendants for the claims that the Settlements with them will resolve. If you want to keep the right to sue or continue to sue some or all of the Settling Defendants about the legal issues in this case, then you must exclude yourself from some or all of the Indirect Purchaser Settlement Classes. **If you exclude yourself from any of the Indirect Purchaser Settlement Classes, you will not get any payment from the Settlements for such classes.** To exclude yourself from some or all of the Settlements, you must send a letter to the Settlement Administrator, **postmarked no later than October 7, 2019**. You may also comment on or object to some or all of the proposed Settlements. Your objections must be **filed no later than October 7, 2019**. Details on how to request exclusion, to comment, or to object to some or all of the Settlements are available on the Settlements' website, [www.LiquidAluminumSulfate.com](http://www.LiquidAluminumSulfate.com).

**WHO REPRESENTS ME?** The Court appointed Jay B. Shapiro of Stearns Weaver Miller Weissler Alhadeff & Sitterson, P.A. and Marvin A. Miller of Miller Law LLC as Interim IPP Lead Counsel to represent the Indirect Purchaser Settlement Classes on an interim basis and for purposes of the Settlements. If you want to be represented by your own lawyer, you may hire one at your own expense.

The Court will hold a final fairness hearing to decide whether to approve the terms of the Settlements at **2:00 p.m. on November 7, 2019**, at the Martin Luther King, Jr. Building & U.S. Courthouse, 50 Walnut Street, Room MLK 4A, Newark, New Jersey 07101. If there are objections, the Court will consider them but may still approve the Settlements. You may appear at the hearing, but you are not required to do so. The hearing may be rescheduled without notice to the Class, so if you plan to attend, please periodically check the Settlements' website for any updates.

**This Notice is only a summary. For more information and updates on the status of the lawsuit, please visit [www.LiquidAluminumSulfate.com](http://www.LiquidAluminumSulfate.com) or call 1-866-217-4455.**



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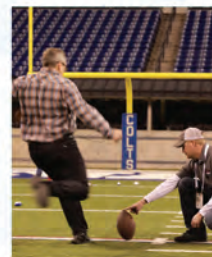




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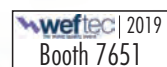
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# Tanks, Structures & Components

2019 directory



See ad page 57

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888-839-0373 Fax: 603-947-9500  
info@amtechtanklining.com www.amtechtanklining.com



See ad page 57

**BinMaster Level Controls**  
7201 N 98th St., Lincoln, NE 68507  
800-278-4241 402-434-9102 Fax: 402-434-9133  
info@binmaster.com www.binmaster.com



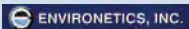
See ad page 73

**Bright Technologies, Specialty Div. of Sebright Products, Inc.**  
127 N Water St., Hopkins, MI 49328  
800-253-0532 269-793-7183 Fax: 269-793-4022  
julie@brightbeltpress.com www.brightbeltpress.com  
WEFTEC Booth 959



See ad page 18

**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 75

**Environetics, Inc.**  
1201 Commerce St., Lockport, IL 60441  
815-838-8331 Fax: 815-838-8336  
info@environeticsinc.com www.environeticsinc.com  
WEFTEC Booth 1838



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**Force Flow**  
2430 Stanwell Dr., Concord, CA 94520  
925-686-6700 Fax: 925-686-6713  
info@forceflow.com www.forceflowscales.com  
WEFTEC Booth 2621



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**Industrial & Environmental Concepts (IEC)**  
21390 Heywood Ave., Lakeville, MN 55044  
952-829-0731  
anderson@ieccovers.com www.ieccovers.com  
WEFTEC Booth 4255



See ad page 8

**JDV Equipment Corporation**  
1 Princeton Ave., Dover, NJ 07801  
973-366-6556 Fax: 973-366-3193  
sales@jdvequipment.com www.jdvequipment.com  
WEFTEC Booth 3840



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**Kationx Corp.**  
442 Fourth Ave., Indialantic, FL 32903  
321-914-0722 863-937-3040  
info@kationx.com www.kationx.com



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**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  
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Baffles/Flumes/Gates	Bins/Hoppers/Silos	Booms/Skimers/Weirs	Buildings/Structures	Clarifiers	Covers/Domes	Digesters	Doors/Hatches
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	X						
	X						
X						X	
X					X		
X				X	X		
	X				X		
						X	
				X			

	Grating/Handrails/Ladders	Mixers	Secondary Containment	Tanks - Chemical Storage	Tanks - Cleaning/Inspection/Repair	Tanks - Coatings/Linings	Tanks - Concrete	Tanks - Fiberglass/Plastic	Tanks - Mixers	Tanks - Pressure	Tanks - Slurry	Tanks - Stainless Steel	Tanks - Steel	Tanks - Storage	Water Towers	Other
			X	X	X	X	X		X	X	X	X	X			
		X							X							Advanced Corrosion Protection
																Chlorine and chemical tank scales
			X			X										
		X							X							
					X											Packaged Treatment Plants

(continued)



# Tanks, Structures & Components

2019 directory

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**Putzmeister**  
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262-497-0292  
stephen.bell@putzmeister.com www.putzmeister.com  
WEFTEC Booth 6536

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**Red Valve Co. / Tideflex Technologies**  
600 N Bell Ave., Carnegie, PA 15106  
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sales@redvalve.com www.redvalve.com  
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**Smith & Loveless Inc.**  
14040 Santa Fe Trail Dr., Lenexa, KS 66215  
800-898-9122 913-888-5201 Fax: 913-888-2173  
answers@smithandloveless.com www.smithandloveless.com  
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X			X		X		
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**SUEZ Water Technologies & Solutions**  
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215-355-3300  
www.suezwatertechnologies.com  
WEFTEC Booth 2302

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info.abs.usa@sulzer.com www.sulzer.com  
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**Vaughan Company, Inc.**  
364 Monte Elma Rd., Montesano, WA 98563  
888-249-2467 360-249-4042 Fax: 360-249-6155  
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**World Chemical USA**  
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Melissa Kahoun, Aqua Illinois Area Manager,  
Joseph Donovan Regional Water Treatment Plant, Kankakee, Ill.

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															Chemical and digitally enhanced services
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	X							X	X			X			
				X	X			X							

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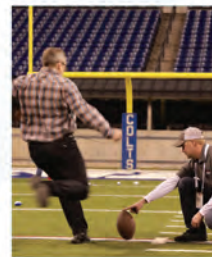






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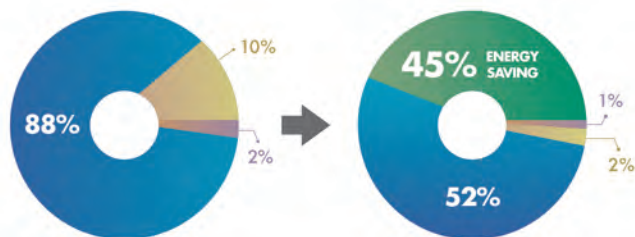


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# Tanks, Structures and Components

By Craig Mandli

## Building/Structure

### LEGACY BUILDING SOLUTIONS TENSION FABRIC BUILDINGS

Tension fabric buildings from Legacy Building Solutions provide a high level of flexibility for a variety of building applications. They use a durable, rigid frame in place of hollow-tube, open web truss hoop framing. The strength of the structural steel frame provides the ability to easily customize buildings to the exact width, length and height required. In addition to long clear spans, the buildings have straight sidewalls that maximize the useable square footage inside the structure. The design allows for the ability to add lean-tos, mezzanines and sidewall doors. The structures are engineered to provide desired overhangs or handle additional loads for items such as sprinklers and conveyors. The solid structural steel I-beams are not vulnerable to unseen corrosion originating inside a tube. There are multiple coating options available for all steel components, including hot-dip galvanizing, primer and powder-coat paint. **877-259-1528; www.legacybuildingsolutions.com**



Tension fabric buildings from Legacy Building Solutions

## Clarifiers

### ENVIRODYNE SYSTEMS 21ST CENTURY CLARIFIERS

Envirodyne Systems 21st Century Clarifiers are equipped with Hercules Drives, flow-impinging energy dissipation inlets, true full-radius scum troughs, return activated sludge booster rings with spiral blades or suction headers, and algae control systems. They offer 100-year gear and bearing life. The true full-radius scum trough includes beefy dual skimmers that clean both outside and inside the feedwell. The RAS booster ring creates highly concentrated, uniform RAS to save pumping energy. The ring is also self-cleaning and has maintenance-free seals. Sealless designs are also available. The algae control system consists of an algae brush cleaner and/or algae spray cleaner. **717-763-0500; www.envirodynesystems.com**



Envirodyne Systems 21st Century Clarifiers

### SMITH & LOVELESS MODEL R OXIGEST

The Model R OXIGEST treatment system from Smith & Loveless provides stable operation and flexible process options for high-strength wastewater or larger flows up to 5 mgd. The field-erected design encompasses complete aeration, clarification and advanced treatment processes while allowing these units to be individually separated and controlled. The system achieves advanced nutrient removal and produces pristine



Model R OXIGEST treatment system from Smith & Loveless

effluent quality suitable for water reuse and direct or indirect discharge. Its concentric tankage maximizes space efficiency in its footprint, thereby preserving facility land for other key plant operations. Multiple aeration zones can be employed to provide specific activated sludge processes for desired treatment levels, including multistage aeration, complete mixed, plug-flow and nitrification/denitrification. Integral treatment process steps can include grit removal, flow equalization, reaeration, tertiary filtration, chlorination, dechlorination and sludge storage. **800-898-9122; www.smithandloveless.com**

## Coating and Lining

### AMTECH TANK LINING & REPAIR DURACHEM 500 SERIES

DuraChem 500 series spray-up elastomeric polyurethane lining systems from AmTech Tank Lining & Repair are formulated for the containment of wastewater, potable water, abrasive materials, chemicals and select corrosives. These 100% solids high-build lining systems have maximum flex modulus and extreme adhesion characteristics to permanently bond to most materials at the molecular level. They are compliant with requirements such as ANSI, NSF, NLP, API and UL for specific immersion and containment applications. **888-839-0373; www.amtechtanklining.com**



DuraChem 500 series lining systems from AmTech Tank Lining & Repair

## Covers/Domes

### CLEARSPAN FABRIC STRUCTURES ARMOR SHIELD COVER

ClearSpan Fabric Structures' Armor Shield Cover is a 29-ounce architectural vinyl building cover that is designed for ultimate durability. The protective membrane consists of seven layers, including a sturdy base fabric, multiple layers of protective coating and a dual-sided PVDF topcoat that repels dirt. It is both mildew resistant and flame retardant. It is available in white, gray, tan and green. A 12-ounce poly cover is also available for all ClearSpan buildings upon request. **866-643-1010; www.clearspan.com**



Armor Shield Cover from ClearSpan Fabric Structures



Defender tank covers from Environetics

### ENVIRONETICS DEFENDER TANK COVERS

Defender tank covers from Environetics are custom manufactured from industrial-grade materials to fit the profile of a new or existing wastewater treatment tank or potable water tank. They contain volatile organic compounds at their source. Low-profile structurally supported covers minimize emission treatment volume to reduce the cost of air filtration equipment. They can help eliminate the ongoing expense of applying costly odor control chemicals through atomizer and misters. **815-838-8331; www.environeticsinc.com**



## INDUSTRIAL & ENVIRONMENTAL CONCEPTS ODOR CONTROL COVERS

Odor Control Covers from Industrial & Environmental Concepts can be designed to be semigas or 100% gastight. They are designed with an impermeable flexible membrane to contain

Odor Control Covers from Industrial & Environmental Concepts

odors while still enabling access for equipment maintenance or sampling. The covers are commonly used on sludge/liquid tanks and aerobic and anaerobic systems. The company's Disinfection Covers block penetrating sunlight and are commonly used over chlorine contact chambers. The result is reduced algae and chlorine loss due to volatilization, which improves disinfection and lessens chlorine demand. Both covers are maintenance-free and long-lasting. 952-829-0731; [www.ieccovers.com](http://www.ieccovers.com)

## Media

### KRUGER USA ANOX K5 MEDIA

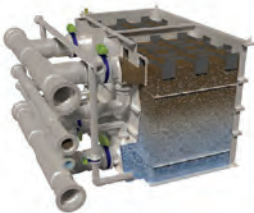
ANITA Mox is a sidestream deammonification technology that is offered in both moving bed biofilm reactor and integrated fixed-film activated sludge configurations, depending on site conditions. As such,



Anox K5 Media from Kruger USA

the system consists of engineered polyethylene carriers — Anox K5 Media from Kruger USA — to provide ample protected surface area for biofilm to thrive. The media (approximately the diameter of a quarter) hosts two types of bacteria in the same reactor. The outer layer consists primarily of ammonia oxidizing bacteria, which convert about half of the ammonia to nitrite. The inner layer consists mainly of anaerobic autotrophic ammonia oxidizer bacteria, which utilize the resulting nitrite and much of the remaining residual ammonia and convert them to nitrogen gas that is released harmlessly to the atmosphere. 919-677-8310; [www.veoliawatertech.com](http://www.veoliawatertech.com)

### SUEZ WATER TECHNOLOGIES & SOLUTIONS FILTRAFast



FiltraFast media filter from SUEZ Water Technologies & Solutions

The FiltraFast media filter from SUEZ Water Technologies & Solutions is designed for treatment of high flows and includes compressible media to enable up to 10 times the loading rate of conventional

media filters. The high-rate downflow gravity or pressure filter uses hydraulic loading to

create the required media porosity with no mechanical compressing devices. The backwash sequence is designed to enable maximum recovery, extend media life and limit energy consumption. FiltraFast units are available in different configurations and can be customized to specific applications. Based on project requirements, units can be fully shop-assembled and delivered, or erected on site. [www.suezwatertechnologies.com](http://www.suezwatertechnologies.com)

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## Mixers

### JDV EQUIPMENT NOZZLE MIX SYSTEM

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



Nozzle Mix System from JDV Equipment



Mixers from Pulsafeeder

### PULSAFEEDER MIXERS

Pulsafeeder mixers have a 304 stainless steel shaft with an integral impeller(s). Epoxy and vinyl shaft coatings are available for applications where the solution being agitated is not compatible with stainless steel. The Bracket Mount Mixer mounts to the tank cover or flat surface with four bolts and two 3/8-inch steel brackets holding the mixer securely in place. The Flange Mount Mixer provides a convenient and economical means of mounting smaller mixers. The mixer can be mounted directly to the tank cover or other flat surface. It can also be mounted directly onto Pulsafeeder 35- and 55-gallon solution tanks featuring rigid covers. Thread Mount Mixers provide a simple means of mounting smaller mixers onto tanks or drums with a bung hole in the cover. Thread mounts have a 2-inch nipple, which screws directly into a standard bung, cutting labor and cost for drilling mounting holes. **800-333-6677; www.pulsatron.com**



Agitator propellers from SUMA America

### SUMA AMERICA AGITATOR PROPELLERS

During the stirring process, abrasive and aggressive liquids can cause considerable wear on stirring blades. Agitator propellers from SUMA America combat this issue, as they are designed to not lose substance over time when exposed to aggressive media. In order to increase the service life, the manufacturer relies on an elastic, durable and multilayer polymer reinforcement. The polymer-coated propellers are protected against corrosion. The material is UV resistant, abrasion resistant and impact resistant, and it prevents fungal attack and microbial development on the propeller. **847-427-7880; www.gosuma.com**

### VAUGHAN ROTAMIX

The Rotamix system from Vaughan is a reliable means of mechanical hydraulic mixing for sludge tanks, digesters and other high-volume applications. It incorporates several basic principles of physics and hydraulics, including uniform and vertical fields of flow, induced flow

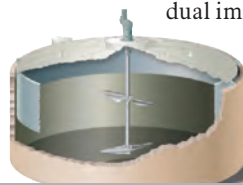
and surface contact. Using custom engineering software, each application is analyzed and sized in order to achieve the desired mixing effect. Combined with a Vaughan chopper pump, this mixing system optimizes solids contact due to the homogeneous state. The system may be applied in circular, rectangular or oval tanks and basins, and other process configurations such as egg-shaped digesters, combined sewer overflow tunnels and pump stations. **888-249-2467; www.chopperpumps.com**



Rotamix system from Vaughan

### WALKER PROCESS EQUIPMENT, A DIV. OF MCNISH CORP., VERTICAL SHAFT MECHANICAL MIXER

The Walker Process Equipment, A Div. of McNish Corp., vertical shaft mechanical mixer provides a low-energy solution for thorough and effective mixing in an anaerobic digester. Each agitator is custom-designed for the application and the specific geometry of the digester tank. The



Mixer from Walker Process Equipment, A Div. of McNish Corp.

dual impeller arrangement is designed to optimize the most effective glide ratio at the lowest power usage and the highest pumping capacity. Features include a leveling base, low-power consumption compared to pumped systems, high turnover and controlled downward pumping to achieve whole volume mixing. The dual impellers are fabricated from stainless steel and attached to a carbon-steel shaft that is clad and

sealed in stainless steel to provide the strength of carbon steel and the corrosion resistance of stainless steel. This system comes complete with full electrical controls. **630-892-7921; www.walker-process.com**

## Tank Inspection/Repair

### BINMASTER LEVEL CONTROLS NCR-21

The NCR-21 from BinMaster Level Controls is a noncontact liquid level measurement sensor for water, wastewater and other liquids stored in vessels with distances up to 26 feet. It is suitable for pump stations and overflow monitoring indoor or outdoor without restrictions. Its flood-proof IP68 enclosure withstands submersion, dust, dirt or sand to ensure maintenance-free continuous operation. It is easily set up and monitored using integrated Bluetooth for wireless communication with data access via a smartphone, tablet or personal computer. It is also compatible with the BinView web application for monitoring levels from multiple sensor types or sites. Digital panel meter displays can be mounted in the plant for convenient, instant readings. **800-278-4241; www.binmaster.com**



NCR-21 sensor from BinMaster Level Controls

### PITTSBURG TANK & TOWER GROUP ROV INSPECTIONS

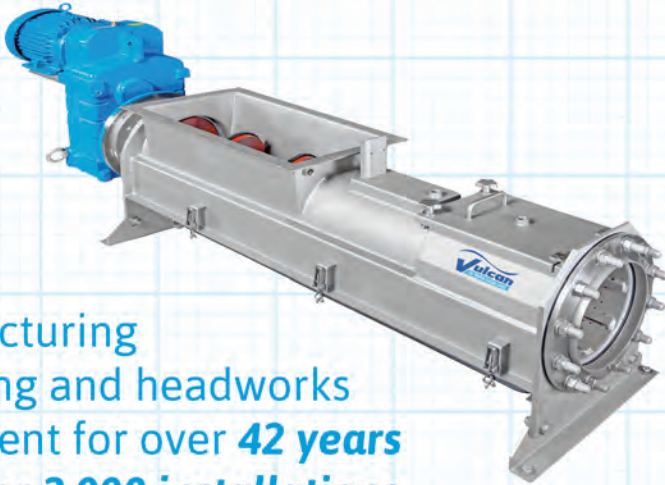
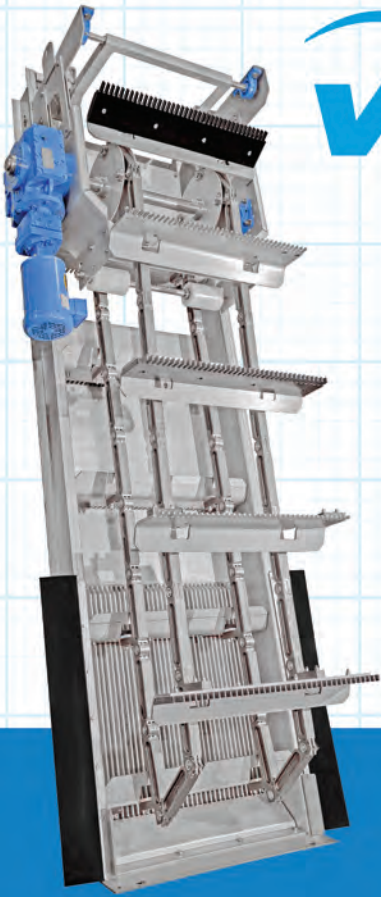
Potable tanks should be inspected every three to five years, according to the American Water Works Association. Pittsburg Tank & Tower Group performs this service using a remotely operated underwater vehicle. The inspections don't require tanks to be drained. Instead, a disinfected ROV is placed inside to gather images with its video equipment while a trained operator manipulates the robot safely outside the tank. The robot has high-definition video recording capabilities. Inspections usually take about two to three hours. Once finished, the company provides a video of the ROV inspection to the customer. **270-869-9400; www.pttg.com**



Potable tanks inspections from Pittsburg Tank & Tower Group



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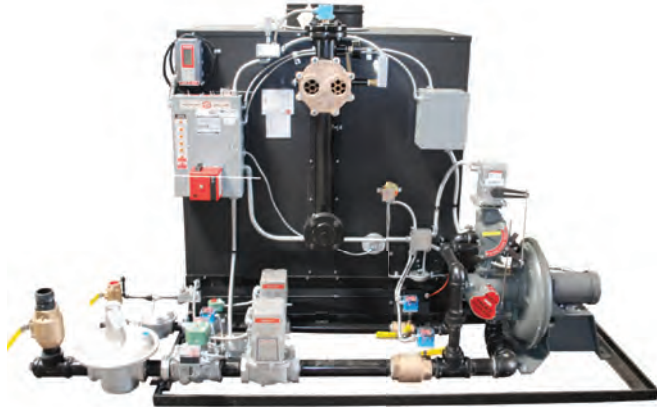
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case studies

**TANKS, STRUCTURES  
AND COMPONENTS**

By Craig Mandli

## Turnkey solution eliminates chain and scraper downtime

### Problem

The Grass Valley area of California has challenges that include mine drainage and heavy flows during the winter storm season in the Sierra Nevada foothills. On average, the city discharges 2.1 mgd to Wolf Creek, a tributary of the Bear River. In 2013, the chain and scraper clarifier system was reaching the end of its useful life, increasing the burden on the treatment system and its operators. Matters became worse when a collector system in two of the tanks became inoperable after a breakdown of the triple-output shaft drive system. The outage left just one of three secondary clarifiers operational and threatened to shut down the entire system.



### Solution

The utility commissioned an upgrade to replace the chain and scraper systems, drive system, and scum pipes with new equipment from **Evoqua Water Technologies**. The new chain and scraper system has nonmetallic chain components with individual drives and simple lever-operated scum pipes. The technology was pioneered by Envirex, an Evoqua brand. The system's lightweight design made installation easy and simplifies maintenance.

**RESULT:** With the new equipment, downtime and maintenance issues have been eliminated. The system has increased the efficiency of solids removal and operating life has been extended for another 15 to 20 years. [www.evoqua.com](http://www.evoqua.com)

"There are a lot of people depending on us for clean drinking water. That's one thing I like about the water treatment business. You can take a lot of **pride** in your job."

Don Gariepy  
Water Treatment Plant Mechanic  
Charlotte-Mecklenburg (N.C.) Utility Department



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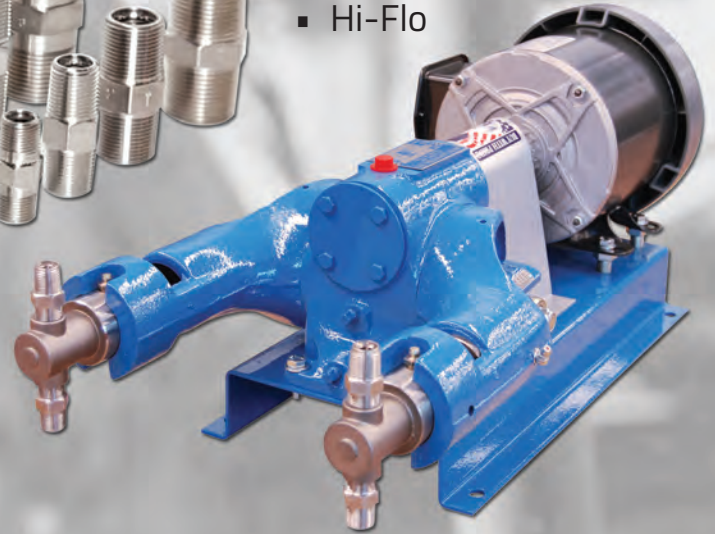
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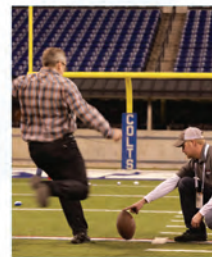


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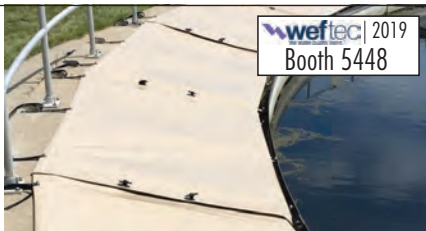
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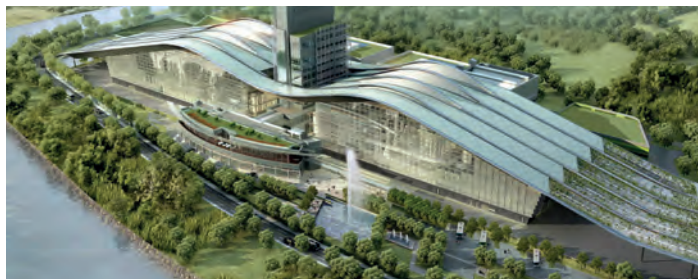
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888-637-7333;  
www.nidec-motor.com



### Schneider Electric arc flash isolation design

Schneider Electric's ArcBlok technology in the Square D brand Model 6 motor control center is a new equipment design that is not just a barrier to arc flash events, but also helps to prevent arc flash causes from originating, extinguishing and containing the arc energy if they occur. Thermal sensors allow temperature

## product spotlight wastewater

### Flygt leverages 3D printing to decrease production time

By Craig Mandli

Pumping liquids containing high chloride or extreme pH levels can require specially made equipment. The stainless steel **Flygt N3069** from **Xylem** is made specifically for those situations, delivering corrosion resistance and pumping performance with sustained high efficiency.

Not only is this workhorse pump designed to solve pumping challenges in very aggressive media, such as highly acidic or alkaline water-based liquids, seawater, organic waste and other harsh media applications, 3D-printing techniques used in its production dramatically reduce the lead time for customized pump orders by up to 75%. The combination of a submersible pump in stainless steel and a self-cleaning adaptive design provides continuous pumping with suitable performance.

"The new N3069 stainless steel integrates the best of our technology to provide our customers in the industrial sector with unparalleled reliability, guaranteeing optimized, trouble-free pumping operations," says Veronica Jergelind, Xylem's vice president of Water Infrastructure Wastewater Pumping.

The pump is suitable for use in tough pumping challenges in complex municipal applications, such as process water and waste sumps, and in industrial applications, such as aquaculture, tanneries, breweries and food applications.

Furthermore, as companies globally seek to advance the sustainability of their operations, the Flygt N3069's Adaptive N-technology delivers higher pumping efficiency than traditional hydraulic designs, reducing energy consumption and greenhouse gas emissions by up to 25%. Adaptive N-technology has



Flygt N3069 from Xylem

been tried and tested in over 500,000 installations globally, offering superior hydraulic design for any heavy-duty pumping operation. The technology's hydraulic design not only prevents pumping downtime, but enables more sustainable, energy-efficient operations.

In an effort to decrease production time, Xylem has embraced 3D-printing technology in the foundry line at its facility in Emmaboda, Sweden, to print one-off sand molds for the N3069 stainless steel pumps. This allows Xylem to supply small volumes of highly customized pumping solutions in short lead times. For applications with little or no chlorides but that contain abrasive particles, the N3069 can be fitted with hard iron hydraulic parts — a high chromium material that combines corrosion protection with up to five times higher wear resistance compared to duplex stainless steel hydraulic materials. Hard iron is a suitable choice for long-lasting peace-of-mind pumping, even in the most abrasive and demanding industrial applications.

"We are constantly improving our production processes to respond to customers' needs for highly customized pumping solutions in a fraction of the time," Jergelind says.

855-995-4261; www.xylem.com

monitoring in a mobile device while standing outside the arc flash boundary. Faster temperature readings can be done without the personal protective equipment normally required for infrared thermography. Zigbee communication protocols can be used to monitor main breaker operating temperatures on a wireless device. The unit can be specified for new installations or retrofit as a new main section as a part of a modernization project to add protection to an existing motor control center installation.

919-266-3761;  
www.schneider-electric.us



### Apollo Safety Man Down/Lone Worker safety devices

Apollo Safety introduced an enhanced line of Man Down/Lone Worker detection devices from Industrial Scientific. Through its monitoring technology, when a lone worker falls and does not get back up right away, the system can trigger an audible, visual and vibration alarm back

to a monitoring station, to a cell through text or email notifications, or directly to emergency services. The system can alert responders and direct them in real time to a precise outdoor location or, if indoors, to the exact floor and room where an employee is located. Man Down/Lone Worker technology also features false fall detection, enabling the lone worker to cancel the pending alert before it's communicated to monitoring personnel. A press of the check-in button returns the device to normal operation.

800-813-5408;  
www.apollosafetyproducts.net

## product spotlight

water

### Flowmeter designed for significant cost savings

By Craig Mandli

As municipal budgets have tightened over the last decade, operators are constantly on the hunt for infrastructure to fit both their performance needs and budgets. The **FPI Mag meter** from **McCrometer** is in that wheelhouse, as the magnetic flowmeter employs a configuration where the coils and electrodes are assembled in a tube that inserts into a pipe perpendicular to the full flow profile of the pipe. The advantages of this configuration are numerous in a wide variety of applications.

“The FPI Mag’s ability to be installed and removed under pressure translates to real cost and productivity savings for plant operators,” says Barry Spiegel, director of municipal sales at McCrometer. “The cost savings at installation are clear. Installation takes a fraction of the labor and the time, due to being hot-tappable, versus a full-bore mag meter. There is never the need to shut down the flow.”

The FPI Mag is comparable to a full-bore mag, though, in terms of specifications. It achieves this by measuring flow at various points within the pipe diameter using a multielectrode sensor design. The ability for a utility to install and remove the flowmeter under pressure means significant cost savings, and it provides greater budget flexibility. If it is being installed

for the first time, a cost savings of up to 45% will result from not needing to shut the service processes down during installation, as well as a reduction in manpower, materials and equipment.

Additionally, flanges are not required, pipes do not have to be cut and welding is generally not necessary. This makes installation simple and easy, making it suitable for retrofits, upgrades and maintenance projects, as well as sites never metered before.

“In addition, the cost savings continues for the life of the product, as the FPI Mag can be easily removed for inspection, cleaning or calibration, if that is mandated by the applicable regulatory authority,” Spiegel says.

The flowmeter features ISO and CSA certification, covers pipe sizes from 4 to 138 inches and is available in both forward and bidirectional configurations. A signal converter, standard with all McCrometer mag meters, offers many features, including built-in dual 4-20mA outputs for communication flexibility, additional programmable outputs to support SCADA systems and a simplified menu structure for ease of use. The unit comes precalibrated, requiring no recalibration in the field.

800-220-2279; [www.mccrometer.com](http://www.mccrometer.com)



FPI Mag meter from McCrometer



### Watson-Marlow Fluid Technology Group ReNu PU pump head

The launch of a new pump head designed for use with the Qdos range of peristaltic metering pumps has been announced by Watson-Marlow Fluid Technology Group. Qdos 20 with the ReNu PU pump head offers repeatable flow of 7.67 gph at 60 psi for fluids of wide-ranging viscosity. Metering accuracy is assured to plus or minus 1%. The pump head is designed to deliver maximum process uptime. There is no need for special tools and no requirement for specially trained on-site maintenance technicians. The ReNu PU pump head offers integral leak detection and chemi-

cal containment, as cleaning up polymer spillages can be hazardous to operatives and time consuming.

800-282-8823; [www.wmftg.com](http://www.wmftg.com)



### Beckart Environmental Velcro filter press cloths

Beckart Environmental new line of filter cloths are designed for much faster changeovers than traditional cloths. They are available in sizes to fit most filter press plates on the market. Because there are no gaskets to install and removal of the plate from the press is not necessary, no special tools or equipment are necessary, and the cloths can typically be changed easily by one person. Designed with Velcro tabs along the

edges of a fitted one-piece pattern of nylon sheet, installation of the new cloth is quick and hassle-free. Beckart’s Velcro cloths are available for filter plates in these sizes: 18.5, 24.8, 31.5, 39.4, 59 and 78.7 inches.

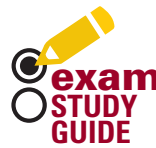
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## people/awards

**Lisa Rhea** was hired as the senior water resources manager for the City of St. Petersburg, Florida. She will oversee the city's wastewater system.

**Thomas Hunter** was hired as the Public Works and Utilities director for the City of Port Angeles, Washington.

**John Weigold** was hired as general manager for the Cambria Community Services District in California.

**Steve Perez** was hired as general manager of the Rosamond (California) Community Services District.

**Oscar Antillon** was hired as Public Works director for the City of Moab, Utah.

The National Association of Clean Water Agencies presented Platinum Peak Performance awards to:

- The **H.L. Mooney Advanced Water Reclamation Facility** in Prince William County, Virginia
- The **James R. DiIorio Water Reclamation Facility** in Pueblo, Colorado
- The **South Treatment Plant** and the **Vashon Treatment Plant** in King County, Washington.

**Leslie McClure** of the City of Adairsville received the 2019 District 1 Wastewater Top Operator Award from the Georgia Association of Water Professionals.

The South Carolina Department of Commerce's Community Development Block Grant program awarded \$928,000 to the **City of Bishopville** to

complete phase two of the city's Wastewater Trunk Line and Rehabilitation Project and \$693,700 to the **Town of Turbeville** to address inflow and infiltration in its wastewater treatment system.

The **Delaware County Commissioners** received a Public Service Award from the Ohio Water Environment Authority Southeast Section.

**Larry Oelrich**, director of administrative services and public works for the City of Prairie Grove, Arkansas, received the Arthur Sidney Bedell Award from the Water Environment Federation in recognition of his service to the New York Water Environment Association.

**Kennebunk, Kennebunkport & Wells (KK&W) Water District** in Maine received an award for on-the-job safety performance from The MEMIC Group.

**Jason Barnes**, water plant superintendent in Valdosta, Georgia, received the Elizabeth McEntire Award from the Georgia Association of Water Professionals for excellence in the public water system operation.

**Flint Hills Resources** was recognized by the Minnesota Pollution Control Agency for outstanding permit compliance at its Pine Bend refinery wastewater treatment facility in Rosemount.

**Beaver Water District** in Lowell, Arkansas, was recognized by the American Water Works Association Partnership for Safe Water for maintaining Directors Award status for the past five years.

The **Western Carolina University** water treatment plant received North

## events

### Oct. 2-3

AWWA Customer Service Seminar, City Hall – One Technology Center, Tulsa, Oklahoma. Visit [www.awwa.org](http://www.awwa.org).

### Oct. 3-4

AWWA Effective Utility Management Seminar, City Hall – One Technology Center, Tulsa, Oklahoma. Visit [www.awwa.org](http://www.awwa.org).

### Oct. 6-8

Atlantic Canada Water and Wastewater Association Annual Conference, Halifax (Nova Scotia) Marriott Harbourfront Hotel. Visit [www.acwwa.ca](http://www.acwwa.ca).

### Oct. 8-10

North Dakota Water & Pollution Control Conference, Ramkota Hotel, Bismarck, North Dakota. Visit [www.awwand.org](http://www.awwand.org).

### Oct. 9-11

Intermountain Section AWWA Annual Conference, Sun Valley Resort, Idaho. Visit [www.ims-awwa.org](http://www.ims-awwa.org).

### Oct. 16-17

Kentucky Water and Wastewater Operators Association North Central/Eastern Wastewater Fall Conference, Lexington, Kentucky. Visit [www.kwwoa.org](http://www.kwwoa.org).

### Oct. 16-18

New England Water Environment Association North East Residuals and Biosolids Conference, Sheraton Hotel, Springfield, Massachusetts. Visit [www.newea.org](http://www.newea.org).

### Oct. 20-22

Southwest Section AWWA Annual Conference, Chateau on the Lake, Branson, Missouri. Visit [www.swawwa.org](http://www.swawwa.org).

### Oct. 20-23

AWWA Water Infrastructure Conference & Exposition, Hyatt Regency at The Arch hotel, St. Louis. Visit [www.awwa.org](http://www.awwa.org).

### Oct. 21-24

California-Nevada Section AWWA Annual

Conference, Town and Country hotel, San Diego. Visit [www.ca-nv-awwa.org](http://www.ca-nv-awwa.org).

### Oct. 22-24

Iowa Section of the AWWA Annual Conference, Gateway Hotel & Conference Center, Ames, Iowa. Visit [www.awwa-ia.org](http://www.awwa-ia.org).

### Oct. 23

AWWA IT Forum, Hyatt Regency at The Arch hotel, St. Louis. Visit [www.awwa.org](http://www.awwa.org).

### Oct. 30

Indiana Water Environment Association Specialty Conference — Doing More With Less: Innovations, Efficiencies and Creative Solutions, The Commons event center, Columbus, Indiana. Visit [www.indianawewa.org](http://www.indianawewa.org).

### Oct. 31

Missouri Water Environment Association Fall Technical Conference, Stoney Creek Inn, Columbia, Missouri. Visit [www.mwea.org](http://www.mwea.org).

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The **Regional District of North Okanagan (British Columbia) Duteau Creek Water Treatment Plant** received the 2019 Association of Consulting Engineering Companies British Columbia Award of Merit in the Municipal and Civil category.

**Sonja Michaluk** won the 2019 U.S. Stockholm Junior Water Prize from the WEF. Michaluk, a student at Hopewell Valley Central High School in Pennington, New Jersey, explored the use of DNA barcoding to measure the health of waterways with larval *Chironomidae* (order *Diptera*). She won \$10,000 and an all-expense-paid trip to Stockholm to represent the U.S. at the international competition.

The **East Ohio Regional Water Authority** received the Facility Image Award from the Southeast Ohio Water Environment Association.

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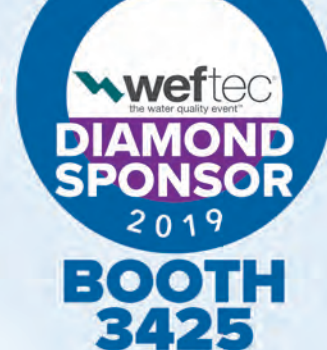
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