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ANNUAL  
**COMPANY  
DIRECTORY**  
44

**SUSTAINABLE OPERATIONS:  
Green stormwater  
infrastructure in  
Kansas City | 32**

Bob Leible  
Superintendent of Water Production  
Aurora, Illinois

# Up the Ladder

**THROUGH DIVERSE EXPERIENCES,  
BOB LEIBLE BUILT AN AWARD-WINNING  
CAREER IN WATER TREATMENT LEADERSHIP**

26

**IN MY WORDS:  
A biosolids association  
for the Midwest | 30**

**HOW WE DO IT:  
Blower upgrade in  
Paducah, Kentucky | 36**

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## advertiser index

May 2023

|   |    |   |            |
|---|----|---|------------|
| 360water, Inc. ....   | 89 | Howden .....  | 71         |
|  <b>AERZEN</b>   |    | Hurst Boiler .....  | 47         |
| Aerzen .....  | 31 | Hydro-Thermal Corporation .....   | 67         |
| Anaergia .....  | 23 |  <b>IMPERIAL INDUSTRIES</b>    |            |
|  <b>AQUA-AEROBIC SYSTEMS, INC.</b><br>A Metwater Company |    | Imperial Industries, Inc. ....  | 55         |
| Aqua-Aerobic Systems, Inc. ....   | 37 | Inovair Geared Centrifugal Blowers  | 42         |
|  <b>Aqua-Zyme</b>  |    |  <b>JDV</b>                    |            |
| AQUA-Zyme Disposal Systems, Inc. ....   | 63 | JDV Equipment Corporation .....   | 19         |
| Aqualitec Corp. ....  | 8  |  <b>JWC Environmental</b>      |            |
|  <b>Atlas Copco</b>                                      |    | JWC Environmental Inc. ....   | 39         |
| Atlas Copco Compressors .....   | 7  |  <b>KELLER</b>                 |            |
| Automation24, Inc. ....   | 5  | Keller America Inc. ....  | 35         |
|  <b>BDP</b>  |    |  <b>Komline-Sanderson</b>      |            |
| BDP Industries, Inc. ....   | 61 | Komline-Sanderson .....   | 9          |
|  <b>Blue-White</b>                                       |    | KROHNE Inc. ....  | 69         |
| Blue-White Industries .....   | 2  |  <b>KUHN</b>                   |            |
| Bright Technologies, Division of Sebright Products, Inc. ....   | 83 | Kuhn North America, Inc. ....   | 41         |
| Byo-Gon, Inc. ....  | 89 |  <b>LAKESIDE</b>               |            |
| Cam Spray .....   | 19 | Lakeside Equipment Corporation  | 3          |
| CAS DataLoggers .....   | 89 | Linde .....   | 51         |
| Central Life Sciences .....   | 43 |  <b>Lovibond</b>              |            |
| Charter Machine Company .....   | 34 | Lovibond .....  | 42         |
| Cla-Val Company .....   | 9  |  <b>MYRON L COMPANY</b>      |            |
| Crane Pumps & Systems .....   | 49 | Myron L Company .....   | 15         |
| E&I Corporation .....   | 81 | NSI Lab Solutions .....   | 33         |
|  <b>ESL</b>  |    | OBIC, LLC .....   | 59         |
| Earth Science Laboratories, Inc.  | 41 | Park Process .....  | 89         |
| ELODE USA, Inc. ....  | 65 | Paxxo .....   | 79         |
| Environmental Resources, Inc., DuraMax Chain Products Group   | 57 | Prime Solution, Inc. ....   | 75         |
| Eurus Blower, Inc. ....   | 81 | Pulsar Measurement .....  | 57         |
| Evoqua Water Technologies LLC   | 77 | Pulsed Hydraulics, Inc. ....  | 89         |
| FLS .....   | 91 |  <b>SAF-T-FLO</b>            |            |
| Force Flow .....  | 83 | Saf-T-Flo Chemical Injection .....  | 80         |
| Fournier Industries .....   | 87 |  <b>SAVECO</b>               |            |
|  <b>Franklin Electric</b>                              |    | SAVECO North America, Inc. ....   | 73         |
| Franklin Electric .....   | 29 |  <b>Screenco</b>             |            |
| Glasdon, Inc. ....  | 79 | Screenco Systems LLC .....  | 89         |
|  <b>GORMAN-RUPP PUMPS</b>                              |    | SealRyt Corporation .....   | 4          |
| Gorman-Rupp Company .....   | 17 |  <b>Smith &amp; Loveless</b> |            |
|  <b>GRAPHALLOY</b>                                     |    | Smith & Loveless, Inc. ....   | 25         |
| Graphite Metallizing Corporation  | 85 |  <b>SULZER</b>               |            |
|  <b>scientific</b><br>A WATTS Brand                    |    | Sulzer Pumps Solutions Inc. ....  | 53         |
| HF scientific, a Watts Brand .....  | 11 |  <b>Vaughan</b>              |            |
|   |    | Vaughan Company, Inc. ....  | back cover |
|   |    | YSI, a Xylem brand .....  | 38         |
|   |    | <b>CLASSIFIEDS</b> .....  | 89         |





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# contents May 2023

- 8 **LET'S BE CLEAR: GIVING WHAT IT TAKES**  
NACWA list of 2022 extreme weather events puts the spotlight on the need to be serious about climate change and remedies for it.  
**By Ted J. Rulseh, Editor**
- 10 **@TPOMAG.COM**  
Visit daily for exclusive news, features and blogs.
- 18 **HEARTS AND MINDS: CELEBRATING YOUNG WRITERS**  
A Georgia water planning agency's middle school essay contest challenges students to write about the importance of water and think about water-related careers.  
**By Sandra Buettner**
- 30 **IN MY WORDS: FILLING A NEED IN THE HEARTLAND**  
The newly formed Midwest Biosolids Association looks to foster education, research, and collaboration among diverse industry participants.  
**By Ted J. Rulseh**
- 32 **SUSTAINABLE OPERATIONS: CAPTURING THE FLOWS**  
Green stormwater infrastructure projects help KC Water make progress toward goals for reducing CSO frequency and volume.  
**By Steve Lund**
- 36 **HOW WE DO IT: GETTING CONTROL IN GEAR**  
A blower upgrade helps a Kentucky clean-water plant optimize aeration basin airflow and significantly reduce energy consumption.  
**By Tim Dobbins**
- 40 **TECHNOLOGY DEEP DIVE: COMPACT. COST-EFFECTIVE.**  
Passive aeration and fixed-film media help make the Ecosim biological treatment systems attractive for on-site decentralized applications and small communities.  
**By Ted J. Rulseh**

## 44 ANNUAL COMPANY DIRECTORY

- 83 **INDUSTRY NEWS**
- 84 **PRODUCT NEWS**  
Product Spotlights:  
Water: Technology enables plants to utilize more data  
**By Craig Mandli**  
Wastewater: Air-filled pump motor designed to create premium efficiency  
**By Tim Dobbins**

## top performers



- 12 **WASTEWATER PLANT: "TRIPLE CROWN WINNER"**  
A top-performing team in Georgia's Clayton County adds a Plant of the Year award to a long list of honors at the Northeast Water Reclamation Facility.  
**By Jim Force**
- 20 **WATER PLANT: DRAWING DEEP**  
Corkscrew Water Treatment Plant optimizes lime treatment, staff communication and management support to provide award-winning results.  
**By Mary Shafer**
- 26 **WATER OPERATOR: UP THE LADDER** cover story  
Through private and public sector experiences, Bob Leible moved steadily upward to an award-winning career in water treatment leadership.  
**By James Careless**  
  
ON THE COVER: Robert "Bob" Leible began his path in the drinking water profession right out of college. Through diligence and a steady record of accomplishment, he worked up through the ranks at the Aurora (Illinois) Water Production Division and is now superintendent of water production. (Photography by Rob Hart)

- 87 **EXAM STUDY GUIDE**  
**By Rick Lallish and Drew Hoelscher**
- 88 **WORTH NOTING**  
People/Awards; Events

coming next month: June 2023 FOCUS: **Odor Control and Disinfection / ACE Show Issue**

» Let's Be Clear: The Professional Operator credential » TOP PERFORMERS – Wastewater Biosolids: Tres Rios Water Reclamation Facility, Tucson, Arizona | Water Operator: Grace Rixen, Southwest (North Dakota) Water Authority | Wastewater Plant: Fair Oaks Ranch (Texas) Wastewater Treatment Plant » How We Do It: Clarifier launder covers for algae control in Rochester, Minnesota » In My Words: Operators' bravery in Colorado's Marshal Fire » Sustainable Operations: Solar-powered lagoon mixing in Slayton, Minnesota » Hearts and Minds: Student art calendar in Polk County, Florida » Technology Deep Dive: Comprehensive water leak detection





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let's be clear

## Giving What It Takes

NACWA LIST OF 2022 EXTREME WEATHER EVENTS PUTS THE SPOTLIGHT ON THE NEED TO BE SERIOUS ABOUT CLIMATE CHANGE AND REMEDIES FOR IT

By Ted J. Rulseh, Editor



A sportswriter once asked the great Oakland A's and New York Yankees slugger Reggie Jackson about the secret to winning.

His reply: "Don't give me what you got. Give me what it takes."

Those words come to mind as I see the dramatic ways in which Earth's climate is changing. Glaciers and ice caps melting away in Greenland and Antarctica. Droughts, wildfires and growing water shortages in the Southwest U.S.

And, perhaps of most immediate impact to water and wastewater utilities, more frequent and more extreme weather events, most notably those that bring heavy rains and flooding.

### COUNTING THE COST

Last year the National Association of Clean Water Agencies created a fact sheet listing ten extreme events that happened in the U.S. in 2022. You can find the two-page presentation on the NACWA website under advocacy and analysis; for now here are a few of the events listed:

- Kentucky: 636-year flood and 1,000-year rainfall, July 26-30, \$277 million total damage, \$16.8 million to water infrastructure, 39 deaths, extended loss of water service.
- St. Louis, Missouri: 1,000-year rainfall, July 25-26, \$87 million in damage, water systems overwhelmed by flood waters.
- Dallas, Texas: 1,000-year flood and rainfall, Aug. 21-22, \$4.5 billion to \$6 billion in damage.
- Jackson, Mississippi: 1,000-year rainfall, Aug. 24-25, \$1 billion in damage, contributed to failure of water infrastructure, two-month boil water advisory.
- Florida: Hurricane Ian, Sept. 28-30, \$30 billion to \$60 billion in damage, more than 100 deaths, multiple clean-water plants forced to release raw or partially treated sewage.

Climate scientists say the increase in such events in recent years is no coincidence. A warming climate means more and heavier rain events and floods in the years and decades ahead.

### WHAT'S TO BE DONE?

NACWA argues essentially that the time for half measures has passed. Its statement on climate adaptations and resiliency observes, "Increased intensity of storm events and flooding, the threat of sea level rise at treatment works ... and increased attention to water scarcity and reuse are just some of the ways in which clean-water agencies are seeing impacts from a rapidly changing climate.

"Given the critical services clean-water agencies provide in their communities, our sector needs to be closely engaged in climate and resiliency conversations. NACWA believes that climate change is primarily a water issue."

In light of all this, action on climate change and climate resiliency is not something that should occupy some remote corner of a utility's priority list and budget. The issue's importance requires doing "what it takes." That means planning for the long term and allocating enough resources to do what needs doing.



DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS

Published monthly by COLE Publishing, Inc.  
P.O. Box 220, Three Lakes, WI 54562

In U.S. or Canada call toll free 800-257-7222  
Mon.-Fri., 7:30 a.m.-5 p.m. CST

Website: [www.tpomag.com](http://www.tpomag.com) / Email: [info@tpomag.com](mailto:info@tpomag.com) / Fax: 715-350-8456

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**ADDRESS CHANGES:** Submit to TPO, P.O. Box 220, Three Lakes, WI 54562; call 800-257-7222; or email [holly.gensler@colepublishing.com](mailto:holly.gensler@colepublishing.com). Include both old and new addresses.

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

**DIGITAL REPRINTS AND BACK ISSUES:** Visit [www.tpomag.com](http://www.tpomag.com) for digital reprint options and pricing. To order back issues, call Holly at 800-257-7222 or email [holly.gensler@colepublishing.com](mailto:holly.gensler@colepublishing.com).

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#### STEPPING UP

It's been my observation that municipalities, and the clean-water and drinking water utilities that serve them, have been well ahead of our federal government in embracing the reality of climate change and planning responses to it.

We see initiatives like converting vehicle fleets to renewable natural gas refined from biogas produced in anaerobic digesters. Expansive conservation initiatives among utilities in water-scarce areas. Plans to achieve net zero energy and to hit carbon reduction goals — with budgets and timelines to match. That's encouraging.

Many state governments are also on board with long-term climate-related strategies. The private sector to a large extent is engaged. Many large companies are switching to electric vehicle fleets and setting their own goals for carbon footprint reduction, even when no government regulation requires such action.

#### GOING GLOBAL

Meanwhile, recent legislation at the federal level — the infrastructure law and the measure known as Build Back Better — contain significant funding for both mitigating and adapting to climate change and its effects.

Unfortunately, the UN Climate Change Conference back in November left many participants and observers less than satisfied with the commitments made, and with doubts about whether those commitments will be fulfilled. The issues are complex.

There's hope in the growth of electric vehicles, solar and wind energy, battery storage, and other technologies. Even nuclear fusion, perhaps the ultimate in clean energy has shown a glimmer of hope, although its use on a commercial scale may still be decades away.

Meanwhile, I do believe that on facing climate challenges, our water-related utilities are helping to set an example on doing what it takes to win. **tpo**

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## DISPOSAL CRISIS

### Utilities Seek Biosolids Solutions

In Maine, public perceptions and state officials' concerns about PFAS contamination have put biosolids programs in limbo. First came a moratorium on land application, with limited exceptions. Next came an outright ban. And finally, earlier this year, severe restrictions emerged on taking biosolids to the state's few landfills.

[tpomag.com/featured](http://tpomag.com/featured)

## TOILET PAPER

### An Unexpected Source of PFAS

Researchers recently reported that toilet paper is an unexpected source of PFAS in wastewater systems. Some paper manufacturers add PFAS when converting wood into pulp, which can get left behind and contaminate the final paper product. In addition, recycled toilet paper could be made with fibers that come from materials containing the substances.

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## OVERHEARD ONLINE

“Water systems across the country are working hard to remove and replace lead service lines, but current IRS rules make it hard for utilities to finance these projects with tax-exempt bonds carrying the lowest interest rates.”

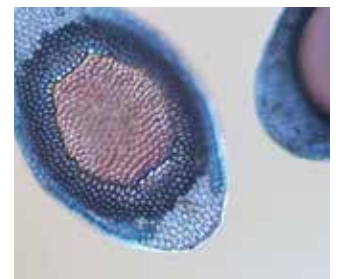
*FLOW Act Aims to Expedite Financing for Lead Pipe Replacement Projects*  
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## BUG OF THE MONTH

### Learn About Sponges

In this month's wastewater microbiology spotlight, wastewater microbiologist Ryan Hennessy takes a look at water sponges — immobile invertebrates that have specialized cells for filtering water for food. Water sponges are occasionally found in biological wastewater treatment systems (most often fixed-film systems) in which sunlight may be present.

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The Northeast Water Reclamation Facility received the 2020-21 Plant of the Year award (for plants between 6.0 and 9.9 mgd) from the Georgia Association of Water Professionals.



# “Triple Crown Winner”

A TOP-PERFORMING TEAM IN GEORGIA’S CLAYTON COUNTY ADDS A PLANT OF THE YEAR AWARD TO A LONG LIST OF HONORS AT THE NORTHEAST WATER RECLAMATION FACILITY

STORY: **Jim Force**

PHOTOGRAPHY: **Matt Odom**

Whether it’s biosolids, safety, or overall plant performance, the Northeast Water Reclamation Facility staff gets the job done.

Even the COVID pandemic couldn’t upset the award-winning operation, which Herlon Fayard Jr., manager of the plant in Clayton County, Georgia, describes as a team effort. “Everybody here does everything,” he says. “There’s nothing we won’t do. We work well together. You could say we’re a triple crown winner.”

## SMOOTH OPERATION

Located in the unincorporated area of Rex, Georgia, the Northeast facility is designed to handle 10 mgd, with a peak capacity of 25 mgd. Average flow is 4 mgd. The facility serves about 18,000 sewer connections in northern Clayton County, about 20 miles south of Atlanta.

Influent enters the plant through a raw-water pumping station, powered by six pumps (Flygt, a Xylem brand), and then passes to two preliminary influent structures with fine screens (Parkson Corp.). A PISTA grit system (Smith & Loveless) follows.

The flow bypasses the primary clarifiers so that, given the low flow relative to design, adequate nutrients are fed to the biological nutrient removal process. The water enters an anaerobic and anoxic basin, and then passes

into aeration basins with Schreiber diffusers (Parkson). The treated water flows through a mixed liquor return station into circular secondary clarifiers. Tow Bro sweepers (Ovivo) remove solids.

The water then is pumped to a flocculation tank and is drawn off to a battery of Fuzzy Filter compressible media filters (Parkson). It is disinfected in a UV system (Wedeco - a Xylem Brand) before discharge to Panther Creek.

Biosolids are pumped to centrifuges (Andritz) The EARTH Products composting firm picks up about 20 dry tons of dewatered cake per week. With housing developments advancing to within 1,000 yards of the plant perimeter, BIOREM odor-control systems have been installed. A SCADA system (MR Systems) automates and monitors plant functions. Fiber optics link 24 remote access points.

## RECOGNIZED FOR EXCELLENCE

The Northeast plant was built in 1971 as a treatment pond with drying beds for solids. It was upgraded to secondary treatment four years later and expanded in 2007 before the recession of 2008. “The planned community growth didn’t happen, and we’re basically running half the plant,” Fayard says. “The anticipated growth has been pushed out to 2052.”



# Northeast Water Reclamation Facility

Clayton County, Georgia

www.ccwa.us

BUILT:  
**1971**

POPULATION SERVED:  
**20,000**

FLOWS:  
**10 mgd design, 4 mgd average**

TREATMENT LEVEL:  
**Tertiary**

TREATMENT PROCESS:  
**Biological nutrient removal,  
media filtration**



RECEIVING WATER:  
**Panther Creek**

BIOSOLIDS:  
**Centrifuged, cake to  
composting**

ANNUAL BUDGET:  
**\$3.2 million (operations)**



The team at the Northeast Water Reclamation Facility includes, from left, Keith Kiblinger, chief operator; Carmen Burns, operator; Kentson Parks, plant worker; and Herlon Fayard, plant manager.



## NUTS ABOUT BIOSOLIDS

Like many clean-water plants around the country, the Northeast Water Reclamation Facility recycles its biosolids as a Class A material for land application. Unlike other plants, it gets a boost from peanut hulls.

Herlon Fayard Jr., plant supervisor, says the biosolids are mixed with peanut hulls and composted to make what the U.S. EPA recognizes as an Exceptional Quality product, well suited as a soil amendment, mulch or fertilizer.

“We contract with a company called Environmental Resource and Technology for Humanity Products,” Fayard says. The company hauls dewatered biosolids from the treatment facility—about 26 wet tons a month—to a composting operation near Plains.

There it is composted with the peanut hulls in an aerated static pile process pioneered by the U.S. Department of Agriculture. The end product is marketed as EARTH Food. The company says it’s a uniform, stable, premium-quality product useful for architectural landscaping, erosion control, transportation projects, and golf course fertilization.

The company website states: “We believe through the use of compost we can change the way the world grows — protecting our natural resources and ensuring a sustainable future.”

## Northeast Water Reclamation Facility PERMIT AND PERFORMANCE

|                         | INFLUENT  | EFFLUENT  | PERMIT<br>(monthly average) |
|-------------------------|-----------|-----------|-----------------------------|
| <b>BOD<sub>5</sub></b>  | 183 mg/L  | 1.2 mg/L  | 6.0 mg/L                    |
| <b>TSS</b>              | 184 mg/L  | 1.3 mg/L  | 20 mg/L                     |
| <b>Total phosphorus</b> | 4.86 mg/L | 0.2 mg/L  | 0.3 mg/L                    |
| <b>Ammonia</b>          | 24.2 mg/L | 0.05 mg/L | 1.3 mg/L                    |



The plant has multiple monitoring stations. It is operated and manned around the clock. (SCADA display supplied by MR Systems)



Herlon Fayard,  
plant manager

The facility’s outstanding performance and efficient operation have earned it numerous awards.

Perhaps the most prestigious is 2020-21 Plant of the Year (category for plants between 6.0 and 9.9 mgd) from the Georgia Association of Water Professionals. Fayard is proud of the accolade, pointing to the facility’s cleanliness, consistent permit compliance and the safety.

“Grading you against other people head-to-head makes it fun,” Fayard says. “It’s a 32-page questionnaire and you get to see how you’re doing. We’ve been number one on a couple of occasions in the past, and it makes me feel good that we’re carrying on that tradition.”

No less significant, the facility won the George W. Burke Jr. Safety Award from the Georgia Water Environment Association and GAWP in 2021. “I’m a bear on safety,” Fayard says. “We do fire drills, inventory personal protective equipment, and test this and that on a continuous basis.” As of late 2022, the facility’s last lost-time accident was in 2016.

Biosolids awards have come from GAWP and the U.S. EPA, both for recycling of the dewatered material. Before contracting with EARTH Products, the plant maintained its own composting facility on the grounds.

## QUALITY TEAM

As usual, it’s the staff that makes the facility tick and achieve such high performance. The facility is staffed 24/7, with two operators, the plant manager and chief operator, a plant worker on the day and afternoon shifts and two operators on the midnight shift.

The crew uses JD Edwards/Oracle, a daily, weekly, and monthly work order system that keeps everything and everyone up to date. Keith Kiblinger is chief operator, serving under Fayard. “You couldn’t ask for a better chief operator,” says Fayard. “He’s beyond dedicated and passionate about what he does. He facilitates all the preventive and corrective maintenance and fills in when I am away from the plant. He’s my go-to guy for anything at the facility.”

Operator Crystal Dodson works midnights. “She’s dependable, works lots of overtime and completes our weekly microscopic exams,” says Fayard. “She’s willing to complete any task and is a 100% team player.” Keri Gable also works midnights, fills out the plant’s daily Water Information Management System reports and collects all permit-required samples.

On the day shift, Daniel Hudgins is the longest tenured operator. “He has lots of historical knowledge,” Fayard says. “He maintains our Fuzzy Filters and does all our stormwater sampling and daily lab tests.”

Carmen Burns joins him and assists Kiblinger with daily preventive maintenance. The newest member of the operations team is Miracle Johnson, a U.S. Army veteran who has recently completed the plant’s operator trainee program. All operators are certified Class 1 (highest) except Johnson, who is Class 3.

The Northeast Plant looks sharp, and that results from the efforts of Kenton Parks. He maintains the entire facility from sweeping and mopping the buildings to pressure-washing around the facility and cutting grass. He also assists with maintenance when needed.

The team is smart and dependable. “We depend on our folks to do their jobs; they know what we have to do,” Fayard says. “We maintain an easy  
(continued)



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approach. If you need help, I'm here, but I don't stand over your shoulder. We work well together, hand in hand."

Kiblinger supports that assessment. "This has been a great place to work for the last 23 years," he says. "What makes us click? One word: professionals. With this group, it's amazing the minimal amount of instruction required." He most enjoys helping newcomers study for the wastewater exams: "When they pass, it makes me proud."

Dodson observes, "The way the staff clicks is by passing along crucial information and being able to go above and beyond what is required of each operator to ensure that shifts run smoothly. I view my job as part of a whole because it takes all three shifts to make the plant function."

Fayard says communications and sensitivity toward others are keys to success: "I have a way I like to do things. I'm very organized and like things neat and clean and orderly. When I came here it was a new group. I needed to see how they did things, and then adjust to make it work for all of us. You learn about your staff by listening and understanding. Some have kids, or grandkids, or grown kids. Every person is different, with a different personality."

## DEALING WITH COVID

The camaraderie and dedication were at no time more evident than during the COVID pandemic. "We worked 12-hour shifts and kept people here to keep from spreading the virus," says Fayard. "We put out good water every day and had no violations. There were no complaints on overtime and no overtime pay. Our team simply jumped in and took care of things."

“Everybody here does everything. There's nothing we won't do. You could say we're a triple crown winner.”

**HERLON FAYARD JR.**

The tests for certification can also be a barrier. Fayard says new exam versions are difficult for some potential operators. He cites four or five candidates recently who didn't pass. To find more people, the county utility sponsors in-house training for anyone showing an aptitude with mechanical systems.

"Our training program lasts 18 months," Fayard says. "We bring in the classes that candidates need and give them the opportunity to take the test as many times as needed."

While finding and hiring qualified operators remains the main issue, other challenges include tighter regulations on effluent permits, which Fayard

While staff is the strength of the plant, it's also the biggest challenge facing Fayard and the operation. "Finding new people is more and more difficult," he says. "We're getting older. Yet it's hard to find people with mechanical aptitude who are interested in this type of work." He observes that recruits aren't looking for a 30-year career; they have their sights set on the next 30 months.

The tests for certification can also be a barrier. Fayard says new exam versions are difficult for some



Turblex/Howden Roots aeration blowers provide aeration for the secondary treatment process.



Fayard, shown with a Hach AS950 Autosampler, faces challenges that include increasingly strict permit limits.



Joe Barnett (left) and Bob Martin perform maintenance on AUMA actuators.

refers to as "a natural progression." PFAS loom large, as is the case nearly everywhere across the country.

But Fayard remains confident about the future: "We have amazing redundancy and are experiencing just half our design flow. We have spare parts for just about everything. Realistically, we are in a really good spot." **tpo**

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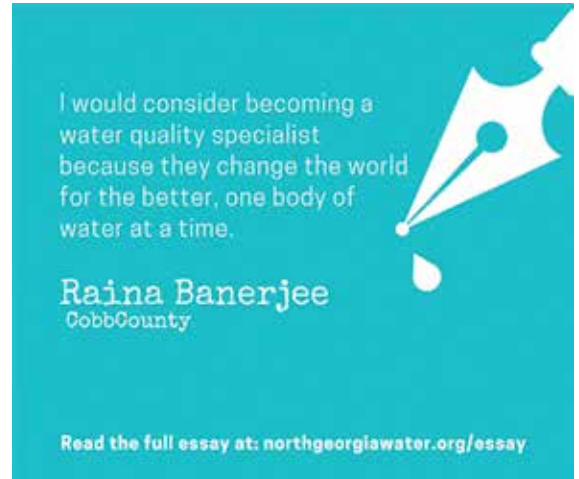


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ABOVE: A quote from the 2021 Cobb County winner of the annual Middle School Essay Contest. LEFT: A student winner of the 2018 contest reads her entry during the awards ceremony.

# Celebrating Young Writers

A GEORGIA WATER PLANNING AGENCY'S MIDDLE SCHOOL ESSAY CONTEST CHALLENGES STUDENTS TO WRITE ABOUT THE IMPORTANCE OF WATER AND THINK ABOUT WATER-RELATED CAREERS

By **Sandra Buettner**

Last year the Metropolitan North Georgia Water Planning District held its 21st annual middle school essay contest. The theme was the unique nature of the region's water resources and the critical role water infrastructure and water professionals play in society.

Established in 2001, the district is staffed by the Atlanta Regional Commission. It includes 15 counties and 95 cities in the Atlanta area, representing 5.5 million residents.

## RULES OF ENGAGEMENT

The contest opens at the end of August, just when the children are returning to school. Submissions are due in October. It is open to middle school students in private, public and charter schools and to home-schoolers in the 15 county metro region.

The 300- to 500-word essays are on a choice of two topics, one dealing with research and the other an opinion. The topics for the 2022 contest focused on how students' communities adapted to the cycles of drought and flooding in metro Atlanta, and what the students believed they could do to help conserve water.

"We offer the students two topics because that way they can choose the one they are most interested and comfortable writing about," says Sarah Skinner, education and public awareness coordinator for the district. "It also gives us more quality of essays over quantity. Before, essays were on many topics, including world water issues not specific to our region."

## SPREADING THE WORD

The competition is promoted through the district's social media platforms. The district has a list of 3,000 educators who receive an email each year about the contest and the two topics. Many teachers are repeat customers, promoting it year after year.

“We offer the students two topics because that way they can choose the one they are most interested and comfortable writing about.”

**SARAH SKINNER**

"We also have 51 water utilities in our region, and they help us promote the contest by notifying their residents," Skinner says. "The utilities have relationships with the middle schools in their areas. They go into the classrooms and give presentations, and also offer tours of their facilities."

School superintendents, curriculum coordinators and school principals are also notified of the contest and help to spread the word. In addition, Georgia Project WET, a water education program for K-12 educators, notifies its members. The counties and cities in the district's service area also help with promotion.

## HELPING HANDS

The district gets about 500 entries per year. Justine Schwartz, education and public engagement specialist, culls that number down by first removing the essays that don't match the criteria. She then picks the top three to five from each county and city.

After that she sets up a group call with utility representatives, who help judge the finalists, pick the winners for their county or city, and then select the grand prize winner. Staff members from Georgia Project WET and H<sub>2</sub>Oportunity, an organization of water professionals that encourages students of all ages to consider careers in water, also review the submissions.

The winners' submissions are placed on the district's website, and a celebration is held at the state capitol around the middle of December. All winners, their teachers, parents, and grandparents are invited, as are the governor and state, county and local officials.





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Winners of the 2019 Middle School Essay Contest pose at the awards ceremony with (from left) Danny Johnson, manager of the Metropolitan North Georgia Water Planning District; Katherine Zitsch, director of the district; and Lynn Smith, chair of the House Natural Resources and Environment Committee.

“Quite often, the chair of the House or Senate National Resources Committee speaks at the event,” Schwartz says. The essays are blown up, mounted on poster boards and displayed around the room. A photographer is present, and breakfast is served.

The grand prize winner and runner-up get to read their essays to all in attendance. All winners receive a plaque and \$100; the grand prize winner gets \$500. Schwartz emails each teacher and parent to announce their students’ winning entries.

One father called her back because he thought the email was fake. His son had been acting up, and the parent had just spent all day with his son’s teacher hearing about it. He grounded his son, and so when he got Schwartz’s email that day, he wanted to make sure it was genuine. The day ended on a high note after all. **tpo**



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# Drawing Deep

CORKSCREW WATER TREATMENT PLANT OPTIMIZES LIME TREATMENT, STAFF COMMUNICATION AND MANAGEMENT SUPPORT TO PROVIDE AWARD-WINNING RESULTS

STORY: **By Mary Shafer** | PHOTOGRAPHY: **Chris Tilley**

**P**assion for the work, respect for team members, and open communication add up to a winning workplace.

Just ask Steven Matuska, lead operator at the Corkscrew Water Treatment Plant in Fort Myers, Florida, one of five water plants operated by Lee County Utilities. The lime softening treatment plant withdraws groundwater from 54 wells in three aquifers: sandstone, surficial and Lower Hawthorn.

Matuska's results-oriented leadership style helps ensure the highest-quality drinking water for customers. Last year the facility received the Plant Operations Excellence Award from the Florida Department of Environmental Protection among plants serving communities of more than 50,000 customers.

The Corkscrew plant team includes assistant lead operator Juan Quintero; operators Frank Vlassich, John Craft, Tom O'Brock, Israel Guadarrama, Nick Horvath and Jeff Lavicka; operators in training Michael Rogers and Jose Gonzalez; and maintenance specialist Ray Pinola.

## GIVE AND TAKE

The Corkscrew plant was brought online in 1980 with one lime softener and one lime silo. It serves most of unincorporated Lee County. Today it operates the same process but with three softeners and silos, keeping pace with 42 years of growth. The entire Lee County system includes five water plants and six wastewater treatment plants, with a total of 303 team members.

The Corkscrew plant processes an average of about 10.6 mgd; maximum capacity is 15 mgd. An aquifer storage and recovery system provides extra capacity during the tourist season.

"We have five injection/recovery wells, in a separate layer of the aquifer, called the Mid-Hawthorn aquifer," Matuska says. "For three months each year, we pump 425 gpm — 300 million over 90 days — into the ground. When the snowbird season comes, we recover that water at the same increment — 2,125 gpm — back to the plant. That gives us an extra 3 mgd.

“I have basically three little plants here; three softeners that go to three separate recarbonators.”

STEVE MATUSKA







## Corkscrew Water Treatment Plant, Lee County Utilities

Fort Myers, Florida

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COMMISSIONED:  
**1980**

POPULATION SERVED:  
**Most of Lee County, 95,000  
connections/268,000 people**

SOURCE WATER:  
**Sandstone, surficial and  
Lower Hawthorn Aquifer  
groundwater**

PRODUCTION CAPACITY:  
**15 mgd**

TREATMENT PROCESS:  
**Conventional**

SYSTEM STORAGE:  
**29.5 million gallons**

DISTRIBUTION:  
**1,525 miles of water mains**

OPERATIONS TEAM MEMBERS:  
**8**

ANNUAL BUDGET:  
**\$3.38 million**

Michael Frazzetto, water manager,  
over looks the clarifier at the Lee  
County Utilities Corkscrew Water  
Treatment Plant in Fort Myers, Florida.





From left, operators in training Michael Rogers and Jose Gonzalez, and operator Israel Guadarrama backwash the filters.

“The good, bad and ugly of that is, it was finished water when put into the ground, but it needs to be re-disinfected when recovered. We don’t need to retreat the entire process, although restrictions are tighter now. We used to be able to recover that water straight into the ground storage tank, but now it flows in about halfway into the treatment process. That eliminates about half the chemicals added to the process.”

#### DATA PARSING AND SHARING

The county’s five plants are dispersed fairly evenly around the service area’s outer perimeter. Corkscrew can share extra water as local plants need it. Each plant has its own SCADA systems, and overview portals allow all operators to see all plants’ tanks.

“Operators can pull up their distribution system and see how much water they have in each booster station. I can do the same for each of our facilities,”

says Matuska. “Any of my staff can go to a SCADA screen that shows what other plants are making, how much water is going out, their chlorine residual and pressure, and for some of the plants, their pH.”

Lee County uses a computerized maintenance management system called Lucity, which supports preventive maintenance tracking, work order management, and asset inventory tracking for all 10 county plants. The county also uses a Water Information Management System (Hach) that accommodates water-specific data entry, treatment tracking and related tasks.

“My assistant manager and I have updated the WIMS, making it a little more user-friendly,” Matuska says. For example, operators have a lab sheet where they take notes on testing data. When they enter the data into the WIMS, that number turns green to indicate levels within desired parameters. If it’s yellow, the operators need to make an adjustment. If red, they must notify Matuska immediately about the out-of-range parameter.

#### RUNNING CLEAN

The Corkscrew plant is environmentally friendly and cost-effective, in part because the water flows through the plant entirely by gravity. Source water is pumped to the highest point, a perforated metal tray atop the aerator basin. From there it cascades down, removing hydrogen sulfide and volatile gases before entering the softening units.

After aeration, the water goes into the Infilco Degremont and Accelator lime softeners (Veolia Water Technologies & Solutions) for combined coagulation, flocculation and sedimentation. “It’s very, very unique, especially for something designed in the 1980s,” Matuska says.

“I have basically three little plants here; three softeners that go to three separate recarb basins,” Matuska says. “They share common filters. We run two at a time. If we have lime issues on one side of the plant, I can increase the lime feed on the other to make up for it. I have worked at this plant for eight years, and I’ve only seen it shut down for about six hours at a time. It’s the biggest producer in the county, so it’s really important to keep everything well-maintained.

“It’s also the most profitable Lee County water plant. The others operate at around \$1.90 per 1,000 gallons produced; that’s staffing, chemicals, everything. This plant operates for around 96 cents per 1,000 gallons. The reason is the simplicity of the process.”

#### FINISHING TOUCHES

The raw water comes into the softener at pH 7.4 to 7.8. The combination of water from 54 wells can lead to wide variations. On average, only 16 to 18 of them run at one time, but that still leaves multiple combinations, requiring different chemistry. Water leaves the softener at a pH of 10.1.

It next enters a concrete recarbonation basin where CO<sub>2</sub>/carrier water solution lowers the pH to 8.65. The water then flows to a chamber where sodium hypochlorite is added. In the next chamber, anhydrous ammonia is added for monochloramine formation, which creates a longer-lasting residual.

Dual-media filtration —18 inches each of sand and anthracite — comes next. After filtration, the water flows to the clear well for contact time to inactivate viruses and *Giardia*. After fluoridation, it flows into storage tanks and then onto the county’s Airport Haul plant, which handles most of the distribution.

In 2017, Corkscrew was runner-up for Best-Tasting Water in a competition held by the Florida Section  
*(continued)*

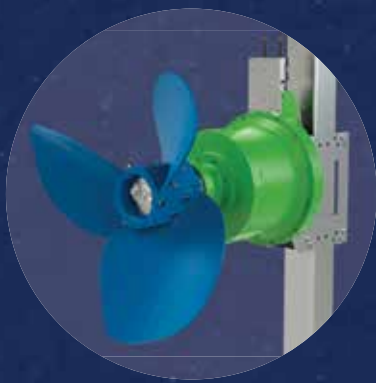


The team at the Corkscrew Water Plant includes, from left, Michael Frazzetto, water manager; Nick Horvath and Israel Guadarrama, operators; Juan Quintero, lead operator; Michael Rogers and Jose Gonzalez, operators in training; and Tom O’Brock, operator.





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Clearwell pump at The Lee County Utilities Corkscrew Water Plant.

AWWA. Matuska believes that was because the water sampled was the combined flow emerging from Airport Haul, a booster station shared by the Corkscrew and Green Meadows plants, half treated with reverse osmosis and half by lime.

“The lime water definitely has more flavor,” says Matuska. “When you put the two of those together, you almost get the best end product. That’s really what the majority of our customers are receiving.”

### SYNERGY AND SUPPORT

Corkscrew has achieved excellent results while remaining in regulatory compliance. Matuska attributes much of that to Andrea Browning, Lee County’s in-house compliance officer, covering all 11 county treatment facilities.

“She formerly worked for the health department,” says Matuska. “She knows what she’s looking for, and she does a very good job of making sure we stay on top of getting everything done. She is a huge help, giving us information and research, helping us adapt to new restrictions and regulations.”

“We have a lot of support from management. There are clear stepping stones you can take for a growth path. That helps retention.”

STEVE MATUSKA



Jonathan Perez, Pablo Pagan, Lucas Perez and Richard Craig perform maintenance on a slaker at the Corkscrew plant.

To provide Browning with the data she needs, the Corkscrew team uses the Lucy system to track maintenance and automatically generate work orders. This simplifies communication between management and the departments. Matuska also credits “a very effective preventive maintenance program; not just the software, but the team that does it day in, day out.”

He also acknowledges the importance of multiple layers of management review. “When I first got into being a manager, I questioned this until I realized how well it worked. Even my monthly operating reports; before I send them to my manager, I send them to the other four managers at my level.”

### TEAMWORK WINS

Matuska believes making himself available to staff, and pitching in to help with hands-on work whenever needed, helps build trust that contributes to consistently high performance. He also praises the county’s support for professional development, such as awarding a 5% pay raise for each new certification or licensure and creating an assistant lead position.

“I would not be in this role without that position,” he says. “When I started here, we didn’t have assistant leads. It’s a learning and developing tool. It’s a good stepping stone for someone who wants to get into management. It gives them a true taste of my job. They work alongside me for a year and see what I do. We have a lot of support from management. There are clear stepping stones you can take for a growth path. That helps retention.”

Lee County’s commitment to OneOrg, an operations principle that makes sure everyone is working toward the same goal regardless of department or position level, is one of Matuska’s favorite aspects of his job.

“We’re all one unit. Our senior management team definitely instills the OneOrg principles in everything they do. It creates camaraderie and teamwork. The dedication, the management support, and the OneOrg principles are a lot of what helped us win the award.” tpo

## WELL, WELL, WELL ...

Lead operator Steve Matuska is passionate about his work, and it shows in the attention he gives to every step of the Corkscrew Water Treatment Plant process.

Of particular interest is the way it handles raw water from 54 freshwater wells. “It’s about the water quality versus the deep-to-shallow ratio of the wells,” he says. “We do whatever will optimize chemical usage. My goal is to make the best possible water with the least amount of chemicals. It’s cost-effective, and why put extra chemicals in the water if you don’t need them?”

Twenty-one of the wells are sandstone, 150 to 300 feet deep, with mediocre water quality. Thirty-two shallower surficial wells, 100 to 150 feet deep, offer cleaner water closer to the aquifer top, but it comes with more restrictions and permitting limitations.

Two wells in the Lower Hawthorne aquifer, about 800 feet deep, have no permitting limits but have high salinity. “They can run about 1,200 gpm, but we have to throttle back to about 600 gpm and can only run one at a time. We have to process over 9 mgd to dilute the TDS enough to stay in compliance. But it’s pretty much free water, so we use them every time we can.”

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Bob Leible, superintendent of water production at the Aurora (Illinois) Water Treatment Facility

# Up the Ladder

THROUGH PRIVATE AND PUBLIC SECTOR EXPERIENCES, BOB LEIBLE MOVED STEADILY UPWARD TO AN AWARD-WINNING CAREER IN WATER TREATMENT LEADERSHIP

STORY: **James Careless** | PHOTOGRAPHY: **Rob Hart**

Robert “Bob” Leible began his path in the drinking water profession right out of college. After earning his bachelor’s degree in chemistry from Bradley University, he applied for a job with the St. Louis (Missouri) Water Division. He was hired as an analytical chemist at the city’s Chain of Rocks Water Treatment Plant, which was close to his home.

With 13 years of experience in drinking water and related fields, Leible was hired by the Aurora (Illinois) Water Production Division in 2005. He served as chemistry laboratory manager for two years before being promoted to assistant superintendent of water production. He stepped up to superintendent of water production in November 2022.

In Aurora, Leible has made substantial contributions to water quality and received a 2021 Operator Meritorious Award from the Illinois Section AWWA. In nominating him for the award, Aurora’s then-superintendent of water production, David Schumacher, P.E. wrote, “Mr. Leible has completed numerous improvement and efficiency projects for the drinking water supply infrastructure system as well as guiding, directing and managing the daily treatment decisions.”







His contributions include signing the city up for the Partnership for Safe Water, ensuring continuous fluoridation of treated water, monitoring all water treatment processes, improving lime slaker system efficiency, and others.

“I was certainly caught off guard when I was nominated and then again when I won,” Leible says. “I still can’t get over the effort Dave put into writing my nomination form.”

### A VARIED CAREER

Born in 1960, Leible grew up in a suburb of St. Louis in a modest two-bedroom home. “I’m an only child,” he says. “My mom was a stay-at-home mom. My dad worked for the General Motors car assembly plant in St. Louis. It was a pretty simple life.”

He attended Riverview Gardens High School. “I took chemistry in my senior year,” he recalls. “I liked it and did pretty well.” After high school and college, in his job with St. Louis, he performed gas chromatography, atomic absorption, wet chemistry and microbiological analyses. After four years there he joined the 7 Up soda company as a quality assurance analyst.

“St. Louis had a residency requirement that just didn’t work for me,” Leible says. “So, I went to the private sector, testing samples of 7 Up, and eventually Dr. Pepper as well. The samples were sent to corporate QA from bottling plants across America for testing to ensure that their quality and flavors were consistent.”

After leaving 7 Up because “The job got pretty repetitive,” Leible performed lab tests on Superfund contaminated site samples at a commercial environmental laboratory. During that time he earned an MBA from Maryville University.

Leible jokes, “Since my wife had her MBA, I thought, ‘I gotta keep up with you.’ So I went and got my MBA, too.” An opportunity to re-enter the drinking water industry led him to Indiana American Water, where he supervised water quality and treatment for several water plants. Then he was hired as an assistant superintendent of water production in Phoenix, Arizona.

Although he liked that job, living in the hot Phoenix desert as a transplanted Midwesterner was “kind of a culture shock. It was just too different from what I had grown up with climate-wise. That’s why I took the job in Aurora when it became available.”



Leible in the control room with Joel Salz, labor supervisor.

“It’s a real luxury to have people on staff with such a wealth of institutional knowledge. It really pays off.”

**BOB LEIBLE**

# Bob Leible

Aurora (Illinois) Water Treatment Facility

POSITION:  
**Superintendent of Water Production**

EXPERIENCE:  
**In water treatment since 2005**

EDUCATION:  
**Bachelor's degree, chemistry, Bradley University; MBA, Maryville University**

CERTIFICATION:  
**Class A Drinking Water Operator**

GOAL:  
**Keep the plant performing at a high level, driven by the Partnership for Safe Water Presidents Award status.**



## ACTIVE OUTSIDE OF WORK

When he's not working at the Aurora Water Treatment Facility, Bob Leible enjoys good restaurants with his wife, Lori.

"I've also turned into an intense bike rider," he says. "That's my main form of exercise. Where I live in suburban Chicagoland, I have access to the Great Western biking/jogging trail right by my house. It's 34 miles long and was built on an abandoned railbed. I can hop on my bike, ride to the end and back, and I've logged 27 miles."

Leible also serves on the board of the nearby Wasco Sanitary District: "My neighbor approached me back in 2014 because he was on the board and he said, 'You might want to consider this.' I agreed, got on the ballot, got elected with him, and served my first four-year term. I liked it so much that I ran for re-election and won in 2018. Now I'm running again. It's fun, and I get to do some good in my community, as well as when I'm at work."



The team at the Aurora Water Treatment Facility includes, from left, Joel Salz, labor supervisor; Megan Luers, laboratory manager; Bob Leible, superintendent of water production; Trent Huber, water operations supervisor; Chris Olson, maintenance supervisor; and Rick Munson, manager of water systems engineering.

## A PROGRESSIVE HISTORY

The Aurora Water Treatment Facility where Leible has spent the last 17 years serves a population of about 200,000. The city's first water distribution system was founded by Samuel Carty in the late 1840s, using a natural spring to fill a gravity-fed wooden water main.

In 1886, the Aurora City Water Works opened on an island in the Fox River. Water was drawn from a 20-foot-deep channel carved into the island's gravel bed, which was used as a natural filtering system. In 1889 the average water draw was 0.8 mgd.

The city abandoned that system in 1892, switching to a 1,400-foot-deep well to supply an 1895 daily average of 1.96 mgd. By 1929 the city had 12 deep wells. Four years later, a water tower was built (demolished in 2012 in a project Leible managed). In addition, a 9 mgd pumping station was built, and several miles of 12-, 14- and 16-inch water mains were laid. Further upgrades and expansions were done in 1963, 1989 and 2002.

Fast forward to today. The Aurora Water Treatment Facility has a 42 mgd capacity, although the peak draw on the system, in summer, is only 22 mgd. The water is processed using five 60-foot-diameter CBI Walker ClariCone units (McDermott), 12 filters and 6.3 million gallons of clearwell capacity. About 60% of the raw water supply comes from the Fox River; the rest from 15 deep and six shallow wells.

The raw water is treated with powdered activated carbon, aeration, cationic polymer, and ferric chloride before entering the ClariCone clarifier/softener units, where lime and anionic polymer are added. The lime is slaked with a PLC-controlled batch system (RDP/Tekkem).

Peristaltic pumps (ProMinent) dose the slaked lime to start the lime softening process. The water then



Leible, shown with the ClariCone clarifier/softener units (McDermott), praises his staff members for their dedication and vast institutional knowledge.



flows into helical flow recarbonation tanks to reduce the pH, and then the water is filtered through 12 dual media filters comprised of granular activated carbon and sand. The GAC is leased from the Calgon Carbon Corporation.

The water then receives infusions of fluoride and chlorine for disinfection as it enters the clearwells. Anhydrous ammonia is added to convert the chlorine to chloramines before the finished water is pumped via nine Flowserve/Byron Jackson 100 or 200 hp vertical turbine pumps into elevated towers, and finally to thirsty Aurora customers.

Numerous online Hach analytical instruments monitor all stages of the treatment process. The data is collected by programmable logic controllers (Rockwell Automation) that are part of the existing SCADA system.

### A CAPABLE STAFF

Leible is one of 29 water professionals at the Aurora facility, all of whom play key roles. "I am not an engineer, so I manage water production operations at this facility, but we have several engineers who manage the engineering duties for the entire team to be successful," he says.

Schumacher, his predecessor as superintendent, is an environmental/civil engineer with a professional engineering license and a Class A water treatment certification. Trent Huber is water operations supervisor, and Chris Olson is maintenance supervisor. They have Class A certificates and worked their way up from operator positions. The lab manager is Megan Luers.

"All of them are very dedicated team members, which is why the city has won many water quality awards over the years," Leible says.

One thing that Leible values about his staff is their depth of institutional knowledge: "Both Trent and

“It has been a good career that I’ve enjoyed so far, even though I never planned to get into water when I was young.”

**BOB LEIBLE**

Chris have been working at this plant since it opened in 1992. It’s a real luxury to have people on staff with such a wealth of institutional knowledge. It really pays off when you need to find out details that may not be easy to figure out, from certain valves that may be hard to find, to how the system has evolved over the years. It helps me do my job better.”

### FUTURE PLANS

At this point, Leible has no plans to retire, even though he marked his 62nd birthday in September. He intends to continue doing his best to keep Aurora’s drinking water safe, clean, and pleasant to drink. He remarks, "It has been a good career that I’ve enjoyed so far, even though I never planned to get into water when I was young." **tpo**

“Since my wife already had her MBA, I thought, ‘I gotta keep up with you.’” **BOB LEIBLE**

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# Filling a Need in the Heartland

THE NEWLY FORMED MIDWEST BIOSOLIDS ASSOCIATION LOOKS TO FOSTER EDUCATION, RESEARCH, AND COLLABORATION AMONG DIVERSE INDUSTRY PARTICIPANTS

By Ted J. Rulseh

**M**idwestern utilities arguably land-apply more biosolids than those in any other region of the country. So it only makes sense that the Midwest would join the ranks of regional biosolids associations.

There's the Northeast Biosolids and Residuals Association, the Mid-Atlantic Biosolids Association, Northwest Biosolids and, as of last January, a Southeast Biosolids Association in the formative stage. Now comes the Midwest Biosolids Association.

The Midwest organization's mission is similar to those of its counterparts: promote environmentally sound and sustainable biosolids management, foster cooperation among the various industry participants, and promote and share research results, and technical and general information about biosolids and the benefits of organics recycling.

The association recently formed through the efforts of a broad spectrum of people and organizations, representing universities, municipalities, service providers, state regulators, consultants and others involved in biosolids management. Stacia Eckenwiler, P.E., secretary of the organization and assistant administrator in the Division of Sewerage and Drainage in Columbus, Ohio, talked about the new group in an interview with *Treatment Plant Operator*.

**tpo:** How was this association conceived and created?

**Eckenwiler:** A small group of representatives from various utilities got together at the WEF/IWA Residuals and Biosolids Conference in Columbus in May 2022. We talked about the need for a regional association focused on biosolids in the Midwest. We identified the need and decided to get the boots on the ground to fill it.

**tpo:** For your organization's purposes, how do you define the Midwest?

**Eckenwiler:** The region extends across the Great Lakes states of Minnesota, Wisconsin, Illinois, Michigan, Indiana and Ohio, and across the upper Mississippi River valley to include Iowa, Missouri and South Dakota. We also invite the participation of other states, as well as Canadian provinces in the region. We don't have any active participants from Canada as yet, but we want to be open to that because some provinces are adjacent to our region, and some of the other regional associations reach up into Canada.

**tpo:** Were you inspired by the experiences of other regional biosolids associations?

**Eckenwiler:** Yes. For example, the Northeast Biosolids and Residuals Association has played a significant role for 25 years in educating its member communities and shaping public policies on biosolids. Northwest Biosolids and the Mid-Atlantic Biosolids Association have also been major contributors in education and addressing policy issues in their regions.

**tpo:** How would you envision the makeup of the membership base?

**Eckenwiler:** The biggest group consists of generators and processors of biosolids, notably municipal treatment facilities and NPDES holders, but also private-sector generators. Processors include third parties that take biosolids from generators, process it and find an end use for it. They also include land-apppliers. The rest will be agricultural and environmental organizations

that dovetail into the industry, businesses that sell products or services to the industry, plus students, regulatory officials, scientists and others.

**tpo:** What factors provided the motivation to form the organization?

**Eckenwiler:** The impetus sprang from increasing pressures on state and federal governments for support of biosolids management. More specifically, it was the current legislative and regulatory climate around emerging contaminants, notably PFAS and the related focus on biosolids. We feel the beneficial product we all create is under attack. Maine, for example, has enacted a statewide ban on biosolids land application that is not based on sound science. We aim to be a resource for industry information, for educational tools and for research, with the aim to provide data to counteract the negativity surrounding the biosolids industry.

**tpo:** Would you envision doing original research or simply disseminating results of research already completed by others?

**Eckenwiler:** We would be looking in the future to identify research opportunities, find collaborative partners, solicit funding, and actually perform research or at least be a partner in it. And then we would take advantage of educational opportunities based on that research, or on other information drawn from subject matter experts in our industry. We would



Stacia Eckenwiler

## How It's Structured

The Midwest Biosolids Association is a not-for-profit organization supported by membership dues. As of January, the association had elected an executive committee and was looking to form a board of directors and fill volunteer roles on membership, communications and outreach, and emerging issues committees. An executive director is to be hired this year. The executive committee members are:

- President Albert Cox, Ph.D., environmental monitoring and research manager with Metropolitan Water Reclamation District of Greater Chicago
- Vice President John Norton, Ph.D., P.E., director of energy, research and innovation with Great Lakes Water Authority, Detroit
- Secretary Stacia Eckenwiler, P.E., assistant administrator, Division of Sewerage and Drainage, Columbus, Ohio
- Treasurer Pam Kirklin, environmental resource coordinator, Marion (Indiana) Utilities

You can find out more about the association at [www.biosolids.org](http://www.biosolids.org).



“ It doesn't make sense to set PFAS regulatory levels in biosolids that are lower than background levels that exist in everyday life and in the environment in general.”

STACIA ECKENWILER

distribute information through email and our website, and eventually hold an annual conference.

**tpo: What is the advantage of having regional associations as opposed to a national approach?**

**Eckenwiler:** The Water Environment Federation has a national biosolids focus within its organization. However, regional associations also make sense because the issues around biosolids are different based on what region you're in. For example, here in the Midwest we have lots of sprawling, flat farmland where biosolids are applied. Working regionally also enables us to collaborate more closely. The first step I take for learning what others in our industry are doing is reach out within my state, and to bordering states.

**tpo: Do you see networking as an important role for this association?**

**Eckenwiler:** Yes. We see the association serving as a collaborative network for the biosolids community to share resources, learn from one another, and bridge the gap between biosolids managers and end users, such as the farming community. We also see it providing services to communities that otherwise might lack the necessary experience or resources to manage biosolids programs successfully.

**tpo: In your opinion, how does the biosolids industry need to approach PFAS?**

**Eckenwiler:** PFAS is everywhere. So it doesn't make sense to set PFAS regulatory levels in biosolids, or in drinking water or wastewater effluent, that are lower than background levels that exist in everyday life and in the environment in general. A guiding message I envision coming out of our organization is that we need to be reasonable about the limits we set. We also have to work across regulatory boundaries. The clean-water industry is regulated by the EPA, the food industry by the FDA, and consumer products by other entities. There has to be collaboration, and there has to be logic applied to the limits and the goals we set as a country.

**tpo: How would you summarize the key educational needs surrounding biosolids?**

**Eckenwiler:** In the end there are three ways to handle biosolids: landfill, incineration and beneficial use. Our goal is provide information that helps educate the public, and also to educate biosolids processors on the best ways to utilize those methods and collaborate with one another. For example, we in Columbus, Ohio, might be doing what we've done for years. But there might be somebody in Minnesota who has developed a better way of doing what we do, or is doing something different that we have an opportunity to learn from.

**tpo: Why is now a good time to form an organization like the Midwest Biosolids Association?**

**Eckenwiler:** It is important now more than ever

for people in our industry to be talking and collaborating. The water and wastewater industry is changing, and in some ways we are suffering. For one thing, we're losing people from the baby boomer generation who are retiring, and we're not getting an influx of new blood. So we need to be working together to find ways to run our utilities and handle our biosolids in the most efficient, economical and responsible manner. An association like ours is one way we can offer that kind of opportunity to utilities and other industries within our region. There is a huge benefit to collaborating, learning from one another, and building alliances. We need that now more than we've ever needed it. **tpo**

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KC Water uses green infrastructure, including rain gardens planted in the parkways between the sidewalk and street, to help attenuate stormwater flows.

# Capturing the Flows

GREEN STORMWATER INFRASTRUCTURE PROJECTS HELP KC WATER MAKE PROGRESS TOWARD GOALS FOR REDUCING CSO FREQUENCY AND VOLUME

By Steve Lund

**K**C Water has turned to landscaping to help cope with combined sewer overflows.

The water utility that serves Kansas City, Missouri, operates under a U.S. EPA consent decree to reduce combined sewer overflows and separate sewer overflows.

The decree has been amended three times, most recently in 2021. While the original decree called for building a system of tunnels to retain stormwater, the latest iteration gives the utility freedom to use alternative control measures that are potentially less expensive, including green infrastructure.

“Working with the EPA, we have implemented an adaptive management plan,” says Brian Hess, head of KC Water’s Smart Sewer Division. “That allows us to look at different means of capturing stormwater before it enters and overwhelms our combined sewer system. So basically, with the green infrastructure, we attenuate those flows.”

Green infrastructure alone typically doesn’t attenuate peak flows for the less-frequent, high-intensity, 10-, 25- and 100-year storms. Instead, it is used to manage stormwater from routine events that occur every year. Pilot programs with green infrastructure have shown potential to help keep flows within the pipes’ capacity and mitigate CSOs.

## SPACES LARGE AND SMALL

Green infrastructure can include bushes, grasses, trees and other landscaping designed to hold water and allow it to infiltrate the ground, or to hold water temporarily so it enters the system slowly after peak flows have passed.

The infrastructure can comprise a small space, like a rain garden, or large area such as a community park. Utility engineers use a hydraulic model of the sewer system to determine where to deploy the green resources.

“We model the impacts of certain types of projects and determine what benefits we can gain from each,” says Hess. “We look at a basin and do a plan that helps us understand what areas we can focus on and what we can expect from implementing green infrastructure or other control measures.”

The newer parts of the KC Water system have separate sanitary and storm sewers, but the older parts, some of which date to the 1850s, have combined sewers, which include 120 relief points called diversion structures, designed to overflow in wet weather. “Our objective is to minimize the number of times they overflow, or to eliminate overflows if possible,” says Hess.

“We model the impacts of certain types of projects and determine what benefits we can gain from each.”

**BRIAN HESS**

## THE CRITICAL METRIC

KC Water calculates the effectiveness of green infrastructure using the metric of percent capture: the percentage of wet-weather flow that the combined sewer system captures and sends to the treatment plants.

In 2010, the percent capture was calculated at 45%, according to Srinivasa Vallabhaneni, a former KC Water Smart Sewer officer. “The remainder

was going untreated into the waterways, and that amounted to 6.38 billion gallons a year,” Vallabhaneni says. “That’s where the journey really started with the consent decree.”

Ten years later, the percent capture was 62%, but that still meant 4.38 billion gallons a year are overflowing. “Our target is capturing 85% of wet-weather flow by 2040,” says Vallabhaneni. *(continued)*



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“Our journey continues, and we are now on the scale toward the next milestone, which is 66% capture by the end of 2024.” The next milestones are 74% by 2030 and 77% by 2035.

### GREEN WORKS

KC Water has a multiple-solution toolbox to reach its milestones. Sometimes a solution is to separate an area’s combined sewer. Sometimes it’s putting in bigger pipes to capture more of the water and then add treatment plant capacity to handle the additional volume. Sometimes it has been pump station improvements.



Green infrastructure projects help KC Water capture a higher percentage of wet-weather flows before the water overwhelms the collection system.

But for managing some parts of the stormwater system, such as highly developed areas with extensive parking lots and other impervious surfaces, green infrastructure is the preferred solution. “At the source-control level, green infrastructure works well,” Vallabhaneni says.

KC Water installs monitoring devices downstream of large projects to measure their impact. For example, the Middle Blue River pilot project, a green infrastructure installation that includes bioretention, rain gardens, permeable pavement and underground detention, the peak flow was reduced by 76% in a 1.4-inch rain event and flow volume was reduced by 36% from the project area.

“Once the projects are built, it is written in the consent decree that we do post-construction monitoring of the facilities,” Vallabhaneni says. “We build on the data to validate the hydraulic model further and then confirm that the projects we’ve built are providing the capture needed to tie in with the milestones that we have.”

### SMALLER BITES

The impact of small green infrastructure projects such as curbside bumpouts with rain gardens can’t be measured individually. Many of them are tested to verify that they are performing as intended. but collectively their impact shows up in the percent capture calculations. Kansas City has 230 green infrastructure sites, maintained by city crews, contractors and partner organizations, such as nonprofit agencies.

In late 2022, KC Water had 13 greener infrastructure projects in various stages of development. Some of the larger ones, including the Middle Blue River project, have monitoring devices downstream.

“A number of projects are under design or have just recently been implemented,” Hess says. “We are actively flow-monitoring those areas to be able to include them into our hydraulic model, so we can get a picture of before and after. It’s best to say we’re in the infancy of trying to figure out how effective those solutions are.” tpo





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# Getting Control in Gear

A BLOWER UPGRADE HELPS A KENTUCKY CLEAN-WATER PLANT OPTIMIZE AERATION BASIN AIRFLOW AND SIGNIFICANTLY REDUCE ENERGY CONSUMPTION

By Tim Dobbins

For years the Paducah McCracken County Joint Sewer Agency dealt with too much or not enough air supply in its clean-water plant's aeration basins.

However, the utility, in Paducah, Kentucky, recently found a solution that strikes the perfect balance. The treatment facility previously relied on three multistage blowers to feed oxygen to its six 250,000-gallon aeration basins.

"Our old blowers were installed in 1977, so it was time for an upgrade," says Chris Hatton, maintenance supervisor for the plant. It wasn't simply the age of the blowers, but the lack of control and energy inefficiency that spurred the plant to seek a more modern solution, in the form of gear-driven high-efficiency blowers on a feedback loop for dissolved oxygen control.

## SEEKING HAPPY MEDIUM

Previously, on hot summer days, the plant needed to run all three multistage blowers; in winter months there were times when one would suffice. The problem was the in-between. "We'd get to a point where one wasn't enough, but running two was too much," Hatton says. "There was no middle ground."

The old blowers in their original form ran either on or off, leaving operators with limited control. It also took a tremendous surge of energy to start the blowers, driving up peak power demand and therefore higher elec-

“I've been with the plant for 22 years and this whole thing has been one of the better upgrades I have been involved with.”

CHRIS HATTON

tric utility bills. In an effort to exert more control, the plant team ordered Allen-Bradley variable-frequency drives (Rockwell Automation).

"We put two of the blowers on VFDs to help reduce energy consumption and gain airflow control," Hatton says. "They gave us a little adjustment, but not a whole lot." Also limiting the VFDs' effectiveness was the cooling design of the old blowers: "They needed to run fast enough to keep themselves cool. If we slowed them down too much, they would overheat."

## AN AIRTIGHT SOLUTION

Looking to optimize aeration, the team hired an engineering firm to research new options. Their search pointed the agency toward blower man-



The stacked blowers (Inovair) in place and operational.

ufacturer Inovair. "They actually brought a small unit here to show us their product, and right away we liked what we saw," Hatton says. "It was simple, and I like it to be simple and functional."

Straightforward functionality is something Inovair emphasizes, notes Glen Roderique, sales engineer: "We try to design the packages to use as many industry standard components as possible to help keep costs down and help plants with quick repairs." Along with an appealing design, the decision came down to efficiency and capital cost, both of which favored Inovair.

The treatment plant's air flow is now supplied by a pair of 125 hp Inovair IM-30 high-efficiency blowers, arranged in a stacked configuration and plumbed to operate independently, or collectively if needed.

"We don't have to have the same horsepower for each unit, so we can size them specific to the application," Roderique says. "For example, a 50 hp on top and a 100 hp on the bottom would give the whole package a range of 500 to 3,000 cfm. Paducah chose two 125 hp units. They were looking for a maximum flow around 5,200 cfm and a minimum flow around 1,400 cfm. We were able to hit that flow range without a problem."

To achieve those wide ranges, IM-30s use an integrally geared compressor to step up speeds from industry standard 1,800 rpm or 3,600 rpm motors, as opposed to using high-speed motors. Roderique says. That technology, along with modular design, enables the blowers to deliver a greater range of air supply in a much smaller footprint than the previous blowers.

## GETTING SET UP

Hatton praises his maintenance team. Their ability, along with the design and some instruction from Inovair, enabled them to install the blowers themselves.

"We are a hands-on facility," says Hatton. "There are four maintenance guys under me, and between us we pretty much do all of our own mainte-

(continued)



The stacked units are plumbed to operate individually or collectively. The facility team was able to plumb into the existing air manifold.



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SV<sub>10</sub> comparison of aerobic granular sludge (left) and conventional activated sludge (right)

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The facility team left one of the existing multi-stage blowers positioned next to the new Inovair units for extreme backup purposes.

nance and repairs. The hardest part was getting the units through our existing doorway. But once we got it through, everything went really well, and it was actually pretty easy.”

Another bonus was that the previously purchased VFDs were compatible with the new blowers. Once everything was installed, Inovair sent a technician to finish the setup, install a master panel and turn the blowers on.

### AUTOMATICALLY BETTER

The units have been running since January 2021 and, according to Hatton, they have been flawless. Most of the time the plant runs only one

blower, using the other as a backup, or for support if the first unit isn't providing enough airflow.

That automated adjustment is made possible by DO meters connected to the control panel. In the past, DO measurement was done by hand, followed by manual adjustments. Things are easier now.

“The IM-30s came with Hach DO meters,” says Hatton. “We have three of them installed in our aeration bay, and this system is driven by those meters. We have a desired 1.5 ppm DO concentration. The sensors take readings and transmit the information to the VFDs which control the rpm of the blowers.”

The control goes beyond keeping a desired DO range. Hatton and his team have the ability to set the percentage at which each blower is operating, allowing them to choose the share of work each blower is providing.

To keep both blowers operating for similar hours, Hatton alternates them: “Every 336 hours, or two weeks, they automatically rotate. No. 1 will be the main blower for two weeks, while No. 2 serves as backup. After two weeks, they switch roles.”

### RUNNING SMOOTHLY

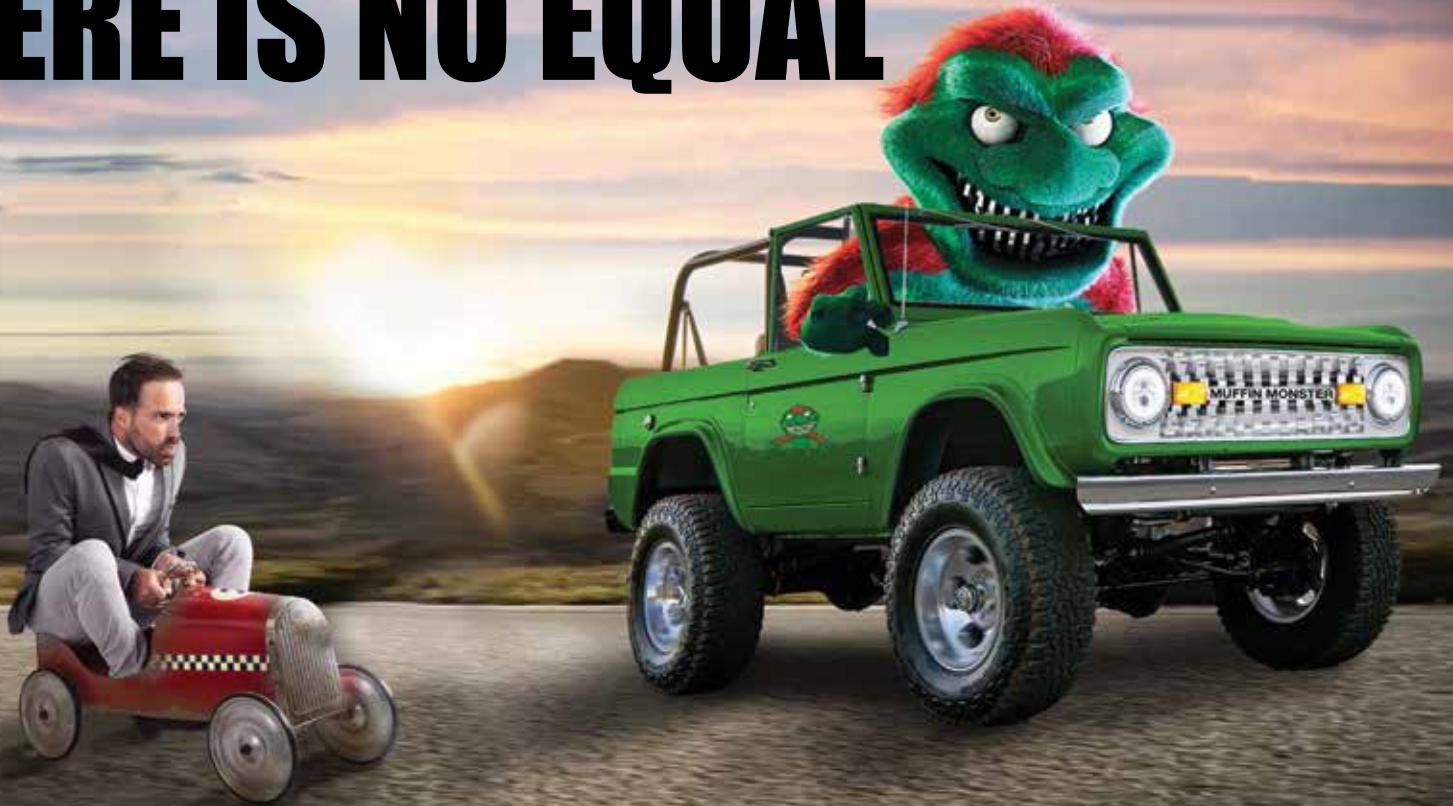
The results of the blower upgrade speak for themselves. “It has always been about gaining control of our air supply, and that is by far the biggest thing they provide,” Hatton says. “Now that we have it, we are definitely seeing energy savings,” already estimated at roughly 20% and possibly heading higher.

“We are still learning the best route with these blowers,” Hatton says. “But we have learned some good tricks. For instance, we now have general winter and summer settings. During the winter, we can back off the air supply, and in summer, we are cranking it up.” Operators could not easily do that before.

Says Hatton, “I’ve been with the plant for 22 years and this whole thing has been one of the better upgrades I have been involved with.” **tpo**



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1. A rotating drum contains plastic media that accumulate fixed-film growth. The drum rotates at 2 to 2.5 rpm.
2. Microorganisms are exposed to nutrients when immersed in the water, and have access to oxygen when exposed to the air.

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PASSIVE AERATION AND FIXED-FILM MEDIA HELP MAKE THE ECOSIM BIOLOGICAL TREATMENT SYSTEMS ATTRACTIVE FOR ON-SITE DECENTRALIZED APPLICATIONS AND SMALL COMMUNITIES

By Ted J. Rulseh

Small communities need simple, cost-effective wastewater treatment processes. The ideal system delivers reliably compliant effluent in a package that requires minimal on-site operation and maintenance while having low energy consumption.

For these applications, Veolia Water Technologies offers the Ecosim treatment unit. It was developed by way of an alliance between two of the company's subsidiaries: AnoxKaldnes and PMT. The unit consists of a rotating drum containing a volume of moving-bed bioreactor media.

This configuration provides a large biological treatment surface area, enabling substantial capacity in a compact footprint. In operation, the unit is essentially silent and odorless. It can be integrated with a variety of upstream and downstream processes to meet users' specific treatment requirements.

The system treats wastewater effectively without blowers or other mechanical aeration devices. Ashley Waples, product manager for Veolia's PMT and Ditch Technologies, talked about the unit and its capabilities in an interview with *Treatment Plant Operator*.

**tpo:** What is the basic market for this system?

**Waples:** It is intended for smaller decentralized onsite treatment, as well for small municipalities, or areas in larger communities where treatment is needed, but tie-in to the centralized system is not available.

**tpo:** Why is this technology a good fit for such applications?

**Waples:** It is a good fit because it has very low energy consumption and a small footprint. There is no aeration from a blower. It is passive aeration achieved by the turning of a drum, which alternately exposes fixed-film media to the influent and to oxygen through immersion and emersion. The process uses just a single motor.

**tpo:** What is the capacity range or the unit?

**Waples:** A single unit can treat a flow as low as 5,000 gpd, or as high as 50,000 gpd.

**tpo:** How does this process differ from other integrated fixed-film systems?

**Waples:** It combines the benefits of a rotating biological contactor with our AnoxKaldnes media, which provides the benefit of additional treatment surface area.

**tpo:** How are immersion and emersion accomplished?

**Waples:** The process water covers about 40% of the drum. Inside the drum are compartments that contain the media. There is fixed-film bacterial growth on the AnoxKaldnes media. The drum rotates at 2 to 2.5 rpm. When the media is in the process water, it's exposed to nutrients. When exposed to the air, it has access to oxygen without any form of blower.

**tpo:** What equipment is needed upstream of this system?

**Waples:** There are a variety of options from clarifiers to some type of settling process or flow equalization. We recommend screening at about 6 mm. From there it depends on the influent characteristics and whether the flow is fairly constant or variable.

**tpo:** How are solids handled in this process?

**Waples:** We can design Ecosim systems in a variety of ways. The biological process can discharge directly to some kind of effluent collection and disinfection process, and then sludge just comes out of the process water. We also offer an integral lamella settler system or an integral drum filter to separate the solids from the effluent. The sludge then can go to drying beds or to a settler digester.

**tpo:** What effluent quality can Ecosim units produce?

**Waples:** For the biological process alone, we achieve a range of 70-90% BOD removal, along with nitrification to 1 to 5 mg/L ammonia in the effluent. With the addition of a drum filter we can achieve 10-20 mg/L effluent TSS, and with the lamella settler 20-30 mg/L TSS. BOD will be in the range of 10-30 mg/L depending on the downstream processes. With the Ecosim unit alone, BOD might be 30 mg/L or higher. We design biological process with the hydraulic retention time dependent on the user's needs. We can easily design it to achieve BOD lower than 30 mg/L with the addition of a drum filter or lamella settler.





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**tpo: Where would this system discharge effluent?**

**Waples:** The effluent would generally be discharged to a drainfield or a stream, depending on what the regulations are and where the system is located.

**tpo: Where would this system discharge sludge:**

**Waples:** The sludge could simply be collected and trucked out, or it could be discharged to a reed bed, a drainfield or sludge holding, depending on the owner preference.

**tpo: What accounts for the low operation and maintenance cost of this technology?**

**Waples:** A key advantage is the single motor for the entire system. Even with the addition of an integral drum filter, it's a single small motor that rotates the drum, and small pump that intermittently cleans the drum filter using effluent from the system as backwash water. There is very low operation and maintenance cost compared to an aerated system with blowers or other supplemental air.

**tpo: How much operator attention is required?**

**Waples:** There is no need for a full-time operator. Only a weekly maintenance check is required.

**tpo: How does the product design incorporate durability?**

**Waples:** The tank construction material is polypropylene reinforced with stainless steel. It is lightweight and highly chemical resistant. The drum and shaft are stainless steel.

**tpo: How are units installed?**

**Waples:** Systems come lidded and can be buried or mounted on a pad or on gravel. For indoor installations, system can be installed without a lid and so be a little more cost-effective. **tpo**

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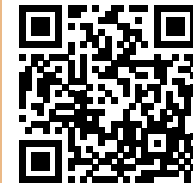
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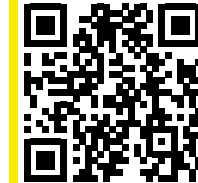
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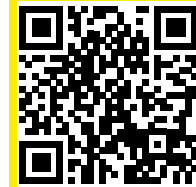
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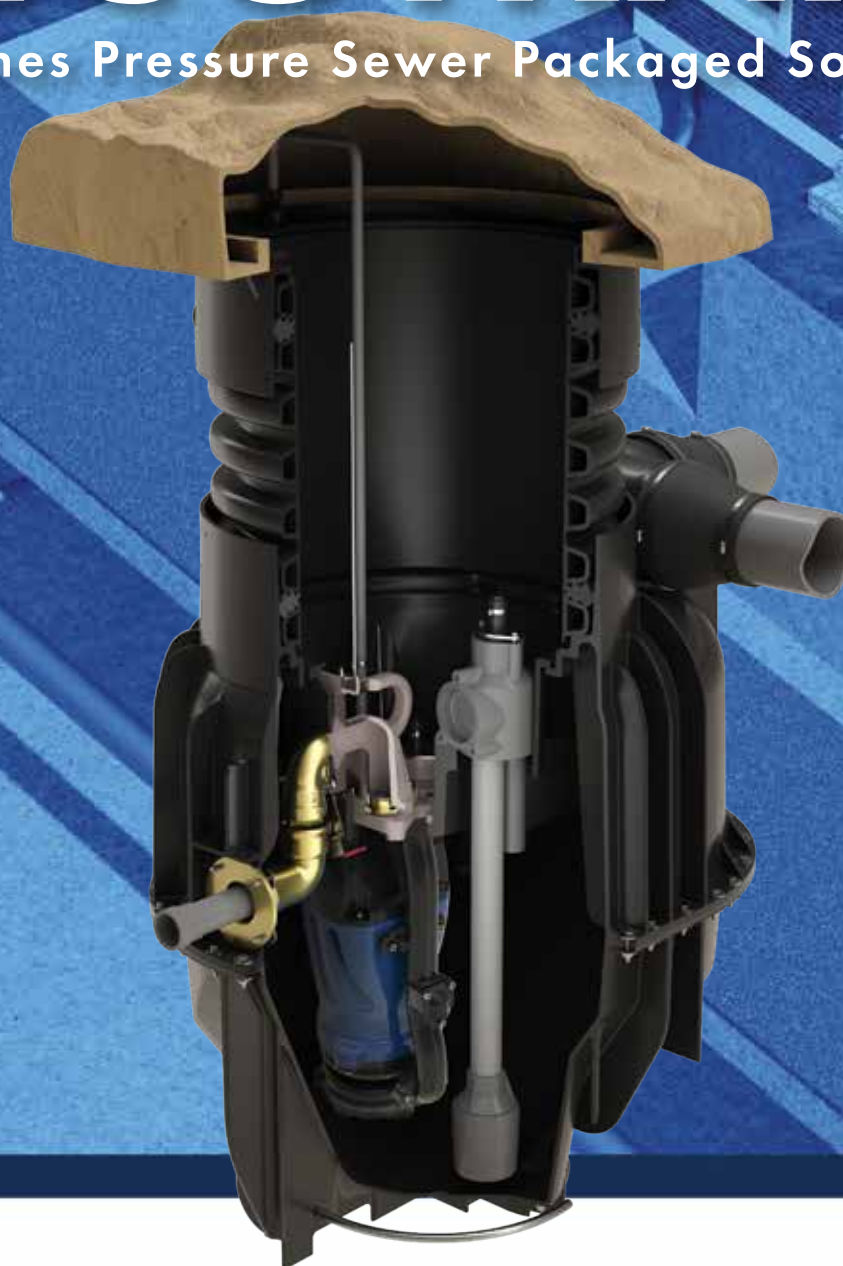
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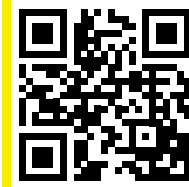
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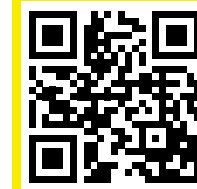
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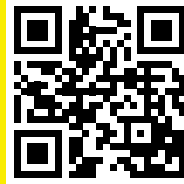
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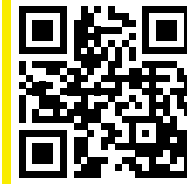
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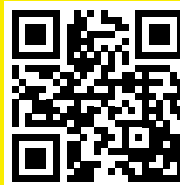
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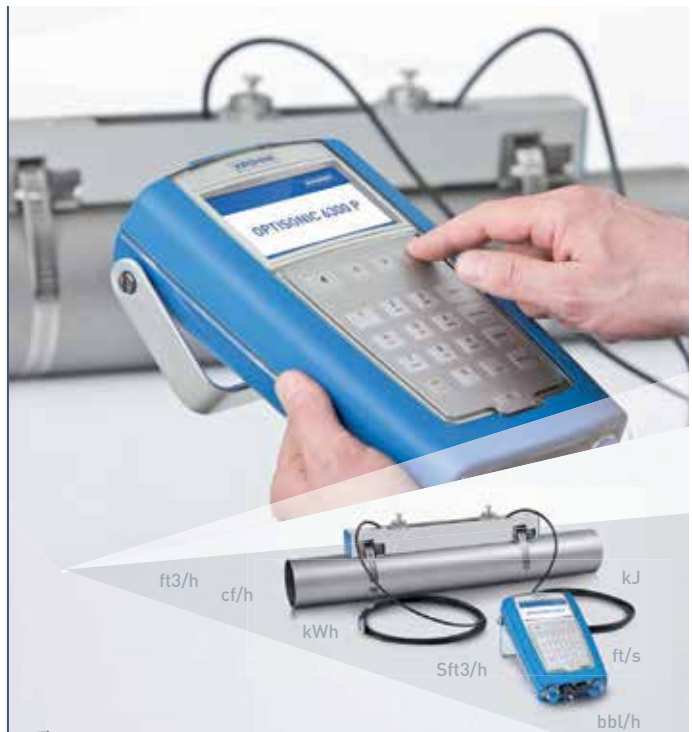
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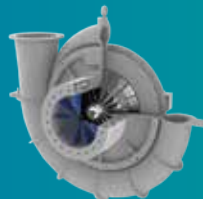
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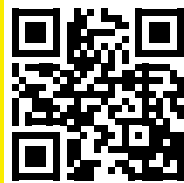
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Doug Pimlott  
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Doug has been with Evoqua Water Technologies for over 20 years and has held various roles. He is currently the Director of Global Aftermarket and has served the water industry as an ASME certified welder, a site inspector, a materials manager, and a sales manager. In Doug's current position, he leads Evoqua's Aftermarket team to find solutions to help extend the useful life of water and wastewater treatment assets, improve performance, and reduce maintenance to keep treatment plants up and running.

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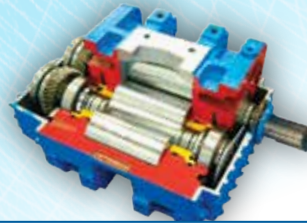


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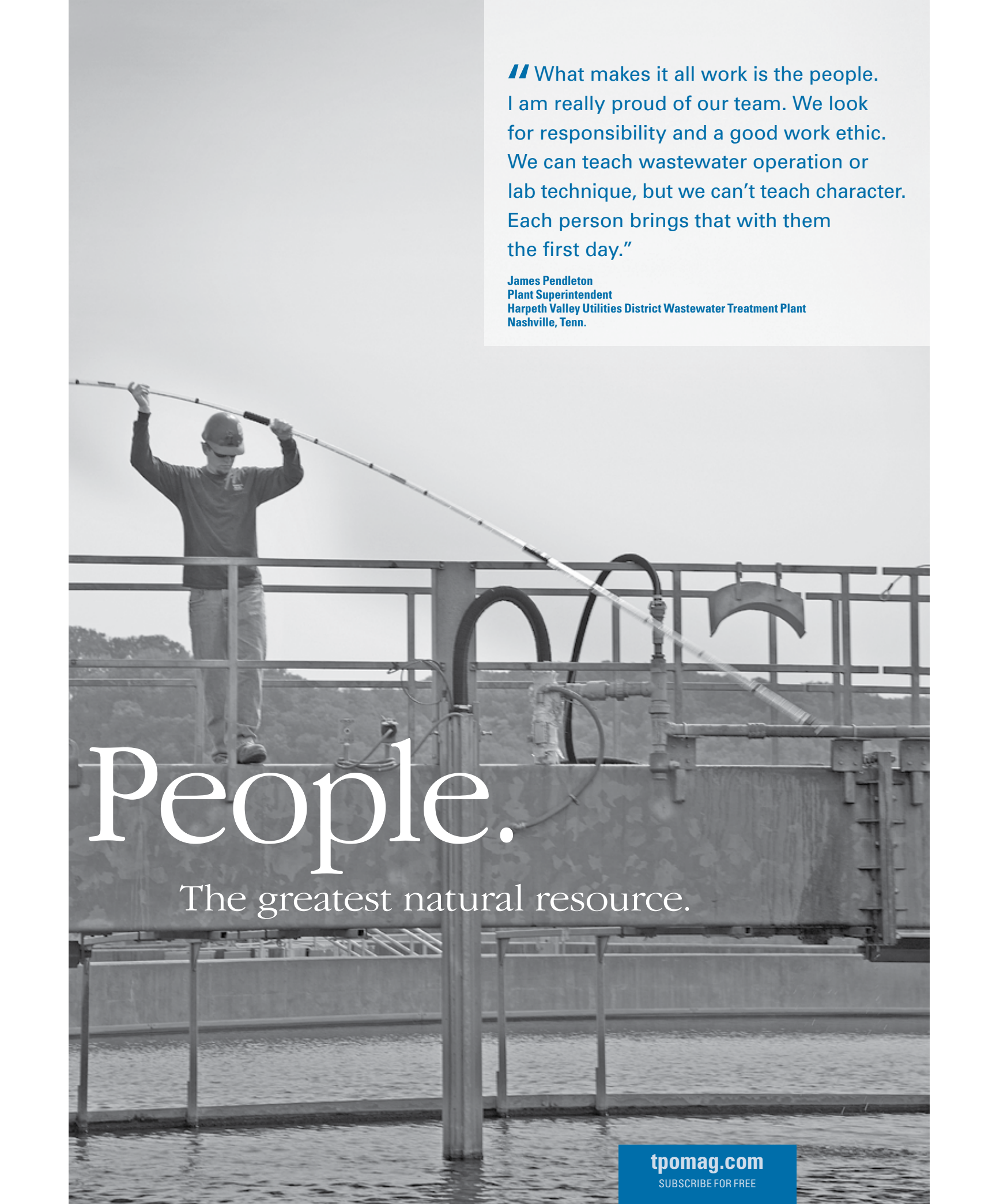
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### Franklin Electric welcomes new team members

Franklin Electric welcomes three new customer-facing team members to its Industrial & Engineered Systems business unit. Andrew



Andrew Ross   David Gray   Marty Lehmann

Ross will take on the role of senior business unit manager — aftermarket, while David Gray and Marty Lehmann will serve as business unit sales managers for the Industrial Distribution and OEM business units, respectively.

Ross will lead the company's growing aftermarket parts business, working with fleet and industrial distribution teams to provide critical parts and help customers maintain and increase the lifespan of their equipment. Lehmann joins the IES team with more than 25 years' sales and business development experience, and will focus on bringing Little Giant's growing product line to OEM customers. Utilizing his 20 years' industry experience, Gray will take over responsibility for the company's industrial distribution customers across the Southwest region.

### Asahi/America welcomes Mike West as new sales manager

Asahi/America added Mike West as district sales manager for the Midwest sales region, which includes Illinois, Wisconsin, Minnesota, Iowa, North Dakota and South Dakota. He comes to the company with a background in water and wastewater treatment plant installations, and will assist distributors and engineers with sales and specification efforts for Asahi/America's family of thermoplastic fluid flow products.



Mike West

### Anaergia's COO wins Innovator Award

Anaergia's Chief Operating Officer Yaniv Scherson was honored with the Innovator Award from Waste360. Scherson was selected as part of its Waste360's 40 Under 40 competition. The Innovator Award recognizes innovators and forward thinkers who use technology to better the industry.

### Blue-White elects two new officers

Blue-White's board elected two new officers in their 2023 first quarter meeting. Bill McDowell was appointed to the position of chief operating officer, and Patrick Murphy was named vice president of operations.



From left, Bill McDowell, Blue-White CEO Rob Gledhill and Patrick Murphy

### Flowserve to acquire Velan

Flowserve and Velan announced that they have entered into a definitive agreement where Flowserve will acquire Velan in an all cash transaction valued at approximately \$245 million. The transaction is expected to close by the end of the second quarter of 2023. Founded in Montreal in 1950, the family-controlled Velan is a manufacturer of industrial valves with a team of 1,650 people and manufacturing facilities in nine countries. **tpo**

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### OZ Lifting XR Series davit cranes

OZ Lifting Products has launched its XR Series of davit cranes for wastewater and water operators. The Winona, Minnesota-based manufacturer has released the model in 500- and 1,000-pound capacities, but the long reach of the range is a standout benefit for operators. Where other davit cranes typically have reduced capacity when it is in the longest reaching position, this series maintains its maximum capacity rating in all configurations. This means wastewater and water professionals can lift more weight, further out, which presents many benefits for numerous lifting and material handling applications. The smaller crane weighs only 57 pounds and the larger crane weighs 95 pounds. Both have a maximum 62-inch reach and maximum hook height of 87 inches.

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### Dwyer Instruments Series PI Piston in-line variable area flowmeter

The Series PI flowmeter from Dwyer Instruments utilizes a spring-loaded piston with a circular opening to move along the axis of the precision-tapered shaft, creating a variable opening in direct proportion to the flow rate. The piston is mechanically linked to a readout pointer and actuates switches or a transmitter. Straight pipe runs are not required before or after the meter, allowing for installation in areas with minimal space. The three-wire

## product spotlight

### water

### Technology enables plants to utilize more data

By Craig Mandli

Plant downtime and unplanned maintenance activities are major challenges. That's why connecting field instruments unleashes enormous potential to improve plant performance. **#empowerthefield, the Industry 4.0 program** from **Endress+Hauser**, raises digitalization projects to a new level.

Industry 4.0, which encompasses IIoT and smart manufacturing, marries physical production and operations with smart digital technology, machine learning, and big data to create a more holistic and better-connected ecosystem.

"As a technology leader in plant and process automation with seven decades of experience, we work together with our customers and technology partners to tap into the new value chain opportunities that Industry 4.0 affords," says Matthias Altendorf, CEO of the Endress+Hauser Group. "We help customers utilize their process and instrument data in order to improve availability, reliability and efficiency at their plants."

Intelligent measurement instruments collect considerable amounts of data at the field level. Nevertheless, 97% of this information remains unused, although it serves as the raw data for Industry 4.0. **#empowerthefield** ensures that plant operators can exploit the potential of this data. The Netilion cloud-based ecosystem provides a simple way for operators to initiate their digitization projects. Field-proven solutions packages create a digital twin of the installed base and make it remotely available. Users monitor



#empowerthefield from Endress+Hauser

the condition of the instruments with Netilion, making predictive maintenance possible, thus leading to process optimization, increased plant availability and reduced costs.

"In the future, we want to be able to support our customers along the entire chain, from R&D and product and process development to production and quality control," says Altendorf. "With the new optical analysis instruments, the same instruments and technologies can be employed from the lab to process, thus providing comparable measurement values."

The laser analysis technology from Endress+Hauser, based on Raman spectroscopy, supplies precise analysis data in real time regarding the chemical composition of the media. The Raman analysis instruments and probes for the chemical and life sciences industries are optimized for solids, liquids and gases. A global network of highly qualified service technicians is responsible for the maintenance, technical support and performance optimization of the Raman analysis systems. Additionally, Cerabar and Deltabar pressure and differential transmitters are designed for charting a path to Industry 4.0, providing documented verification and creating a basis for predictive maintenance.

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version is equipped with a solid state relay that can be configured in the field for alarm output. The alarm on this version is selectable between a high or low alarm.

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### Emerson Ovation Green portfolio

Emerson's Ovation Green portfolio is designed to help power generation companies meet the needs of customers navigating the transi-

tion to green energy generation and storage. Uniting the Mita-Teknik software and technology with its own Ovation automation platform, renewable energy knowledge base, cybersecurity solutions and remote management capabilities, Emerson created an extension of its power-based control architecture. The portfolio focuses on the emerging clean energy market to provide simplified renewables automation to help power producers build and scale sustainable operations. The Ovation Green portfolio delivers a single set of purpose-built software and solutions that supports different technologies in one standardized, intuitive system.

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### IDEC Corp. BTBH-H surface-mount terminal blocks

IDEC Corp.'s new BTBH-H easy-stack product line of surface-mount terminal blocks provide any number of connection poles without special tools or fittings. BTBH-H blocks are available in four different amp ratings — 10A, 15A, 30A and 50A — and can be ordered as individual components, or as complete assemblies by amp rating for 2 to 30 poles. The terminal blocks are assembled



in a twist- and snap-together fashion, without the need for special tools, connecting rods, or DIN rails, resulting in a very low installation height. Users can easily add or remove terminals at any time, as required by specification changes or maintenance work. Terminal blocks with different current values can be combined for applications with different wire diameters, and the blocks are mountable to the surface of any electrical or control back panel with standard M4 self-tapping screws.

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## product spotlight

### wastewater

## Air-filled pump motor designed to create premium efficiency

By Tim Dobbins

The fear of dry running a submersible pump is not an issue with **Crane Pumps & Systems Envie3 air-filled pump motors**.

Elizabeth Weiler, senior multimedia graphic designer for Crane, says the company saw a rising demand for an efficient submersible pump that could attain IE3 motor ratings, which is an international standard indicating the product meets premium efficiency.

“Envie3 pumps took Barnes’ and Deming’s proven nonclog and chopper wet ends and outfitted it with a premium, efficient IE3 motor,” Weiler says.

The new series provide lower energy cost in a platform that can be run in wet applications and in dry pits. “These pumps can be used in collections systems, treatment plants, stormwater systems, agricultural waste streams, among others,” Weiler says. “Because these pumps can operate both submerged and unsubmerged, horizontal or vertical, and are available in nonclog and chopper configurations, the applications for them are almost endless.”

Designing the product started with customer contact and listening to what they like and dislike, what works well for them, and what they look for in a submersible pump. After that, it went to the drawing boards, followed by prototype building and testing before eventually launching the final product.

“We do performance testing on site,” Weiler says. “This consists of laboratory testing and field prototype testing to introduce the pumps into real applications to find failures before launch.”

The product of that research and testing is a flood proof design and integrated cooling system to run the motor cooler, resulting in longer motor life. It is built with a stainless steel outer shell, carrying handle and hard-



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Envie3 from Crane Pumps & Systems

ware. The rest of the pump body is finished with Resicoat R4 powder coating and each unit comes standard with a plug and play quick connect cord.

Envie3 pumps are explosion proof, use a tapered keyed shaft and commercially available high-capacity sealed bearings and mechanical seals for easy maintenance.

“The design of Envie3 pumps enables lower continuous minimum submergence where the water can be pumped down to the top of the volute that helps prevent debris buildup and keeps the lift station cleaner reducing vacuum truck visits,” Weiler says. “So far, our feedback has been positive. Customers like the easy installation and the chopper option that solves tough clogging problems.”

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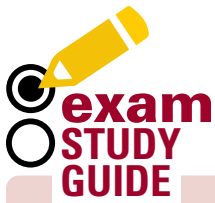


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## WASTEWATER

By Rick Lallish

**Aeration reactors using buoyant free-floating biofilm carriers in an activated sludge process are known as what sort of treatment?**

- A. Rotating biological contactors
- B. Moving bed biological reactors
- C. Trickling filters
- D. Sequencing batch reactors

**ANSWER:** B. Moving bed bioreactors are relatively new treatment options. They consist of aeration basins or activated sludge tanks in some cases retrofitted with small plastic free-floating buoyant media (about 25-67% of the tank volume). This is a hybrid of activated sludge and fixed-film treatment. The most common use is in plants looking for increased nitrification and total nitrogen removal. More information may be found in the WEF textbook: *Wastewater Treatment Fundamentals III: Advanced Treatment*, Chapter 4.

## DRINKING WATER

By Drew Hoelscher

**What soil type is most likely to cause a cave-in during excavation work?**

- A. Stable Rock
- B. Type A
- C. Type B
- D. Type C

**ANSWER:** D. Type C soil is less cohesive than Type A or Type B; it is more granular material that does not stick together. However, Type A soil is automatically classified as Type C when water is present because it is no longer as stable. Precautions and protective systems should always be provided when the depth of a trench is greater than 5 feet or a competent person has identified a potential hazard. OSHA 29 CFR Part 1926, Subpart P, can provide additional excavation safety standards and practices.

### 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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## people/awards

**Derek Albertson** was named Town of Montville, Connecticut, Water Pollution Control Authority superintendent and administrator.

The U.S. EPA's New England Office awarded four 2022 Regional Wastewater Treatment Awards to New Hampshire wastewater facilities and individuals:

- Regional Wastewater Treatment Plant Excellence, **Sunapee Wastewater Treatment Facility**.
- Regional Industrial Pretreatment Program Excellence, **City of Manchester**.
- Regional Wastewater Trainer of the Year, **Anthony Drouin**, New Hampshire Department of Environmental Services.
- Regional Wastewater Treatment Plant Operator of the Year, **David Lovely**, chief operator, Pease Wastewater Treatment Facility.

**Travis Calhoun** was hired as Columbus, Indiana, City Utilities Wastewater Treatment Plant superintendent.

**Jim Herberg**, general manager of the Orange County, California, Sanitation District, received the 2023 National Environmental Achievement Award from the National Association of Clean Water Agencies for utility leadership.

**Dale Bennett**, water treatment operator for Siloam Springs, won a Northwest Arkansas Water Equality Assistance award from the Arkansas Water Works Association.

**Tuscan Village**, a sustainable mixed-use development, received the Green Steps Award from the New England Water Environment Association for innovation and sustainability.

The **City of Rock Island Water Department** won the Illinois Section AWWA District 1 Water Taste Test Competition.

**Northern Kentucky Water District** received a KEMI Destiny Award for workplace safety for the 11th time from Kentucky Employers' Mutual Insurance.

**Rick Kinkelaar**, wastewater treatment plant operator in Effingham, Illinois, retired after more than 35 years of service to the city.

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

## events

### May 1-19

AWWA High-tech Operator Course 3, online. Visit [www.awwa.org](http://www.awwa.org).

### May 2

Connecticut WEA Wastewater Forum and Expo, AquaTurf in Plantsville. Visit [www.ctwea.org](http://www.ctwea.org).

### May 2-3

AWWA Effective Utility Management Seminar, Colorado State University SPUR Complex, Denver. Visit [www.awwa.org](http://www.awwa.org).

### May 3

AWWA Microplastics Monitoring: The Mandate and the Messaging webinar. Visit [www.awwa.org](http://www.awwa.org).

### May 8-10

Ohio Rural Water Association Annual Training Conference, Embassy Suites, Dublin. Visit [www.ohioruralwater.org](http://www.ohioruralwater.org).

### May 8-12

New Jersey WEA Annual John J. (Jack) Lagrosa Conference and Exposition, Harrah's Atlantic City. Visit [www.njwea.org](http://www.njwea.org).

### May 9-11

AZ Water Association Annual Conference and Exhibition, Phoenix Convention Center, South Building. Visit [www.azwater.org](http://www.azwater.org).

### May 10-11

Vermont Rural Water Association Annual Conference, Lake Morey Resort, Fairlee. Visit [www.vtruralwater.org](http://www.vtruralwater.org).

### May 15-18

North Carolina Rural Water Association Annual Conference and Exhibition, Benton Convention Center, Winston-Salem. Visit [www.ncrwa.org](http://www.ncrwa.org).

### May 16-19

WEF/IWA Residuals and Biosolids Conference 2023, Charlotte Convention Center, North Carolina. Visit [www.wef.org](http://www.wef.org).

### May 17

AWWA Educational Series on Pipeline Inspection and Condition Assessment – Part I: Metallic Pressure Pipe for Water and Wastewater, webinar. Visit [www.awwa.org](http://www.awwa.org).

### May 18

Tennessee Association of Utility Districts 2023 Operator Expo, Farm Bureau Center/James E. Ward Ag Center, Lebanon. Visit [www.taud.org](http://www.taud.org).

### May 22-24

2023 American Public Works Association of Oklahoma/Oklahoma WEA Joint Technical Conference and Trade Show, Embassy Suites Conference Center, Norman, Oklahoma. Visit [www.owea.org](http://www.owea.org).

### May 24

AWWA Educational Series on Pipeline Inspection and Condition Assessment – Part II: Bar-Wrapped (Concrete Cylinder) Pipe, webinar. Visit [www.awwa.org](http://www.awwa.org).

### May 29-June 1

Mississippi Rural Water Association Annual Exhibition and Conference, MS Coast Coliseum and Convention Center, Biloxi. Visit [www.msrrwa.org](http://www.msrrwa.org).

### May 31-June 3

2023 Florida WEA Water Resources Conference, Gaylord Palms Resort & Convention Center, Kissimmee. Visit [www.fwea.org](http://www.fwea.org).

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