

TREATMENT PLANT OPERATOR

# tpo™

DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS

tpomag.com  
JUNE 2020

LET'S BE CLEAR:  
Communicating about risk | 8

PLANTSCAPES:  
Xeriscape gardens  
in Greeley, Colorado | 20

Todd Potter  
Plant Supervisor  
Mulberry, Florida

# 100% Recycled

A FLORIDA PLANT SENDS ALL ITS EFFLUENT  
TO REUSE, AND DOES SO AT LOW COST | 22

HEARTS AND MINDS:  
*Discovering Water* book  
in Portland, Maine | 12



Keep Chemical Cost Under Control With The

# Residual Sulfite Monitor

The Q46S/66 prevents costly chemical overfeed by controlling the amount of chemical added for process dechlorination. Unique design prevents sensor fouling, which reduces system maintenance.

## FEATURES

- Gas Phase Sensing - No Contact between Sensor & Sample
- Internal Sequencing & Relay for Auto Sample Line Cleaning
- Cut Chemical Costs by Eliminating Costly Overfeeds



## Total Chlorine Monitor



### Reagent Free Measurement

The Q46/79PR is ideal for controlling chlorine addition in disinfection chamber.

## FEATURES

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

## Dissolved Oxygen Monitor



### Automatic Sensor Cleaning

Optical Sensor with **Q-Blast**

## FEATURES

- Self-contained, High Pressure Autocleaner
- Optical Luminescence or Membraned Sensors
- Factory Assembled for Easy Installation

## Sludge Blanket Monitor



### Interface Level Analyzer

Continuous sludge level measurement supports effective process control.

## FEATURES

- Prevent sludge washout
- Control blanket loss from over-pumping
- Maintain underflow sludge density



## FLEXIBILITY IS ONLY ONE ADVANTAGE OF OUR CLOSED LOOP REACTOR PROCESS.

**We have more than 50 years of experience in oxidation ditch technology and more than 2000 installations.** Lakeside's CLR process offers a variety of wastewater treatment options, including several operational modes, nitrogen and phosphorus removal, and an adaptable configuration, providing maximum flexibility with consistently high quality effluent. The CLR process is simple to operate and can be configured in several shapes, including the conventional racetrack, folded U-shape or concentric multichannel designs. Lakeside's staff delivers full service from initial concept through construction to plant operation. The result: reliable results with minimal operator attention and maintenance. When performance counts, count on the industry leader for more than 90 years!

Speak to one of our experts at 630.837.5640, email us at [sales@lakeside-equipment.com](mailto:sales@lakeside-equipment.com), or visit [www.lakeside-equipment.com](http://www.lakeside-equipment.com) for more product information.



Cleaner Water for a Brighter Future®



### CLR Process Components

- Magna Rotors
- Velocity Control Baffles
- Rotor Covers
- Level Control Weirs
- E.A. Aerotor
- Process Monitoring and Control Systems

# Work Smarter Not Harder



Work faster, smarter and easier  
with our data management and  
reporting software.



www.allmaxsoftware.com  
sales@allmaxsoftware.com  
800-670-1867



GET  
EMAIL NEWS  
ALERTS FOR  
TREATMENT PLANT OPERATOR  
**tpo**  
Go to  
[tpomag.com/alerts](http://tpomag.com/alerts)  
and get started today!

## advertiser index June 2020

 AllMax Software, Inc. ....	4	 Komline-Sanderson .....	47
Analytical Technology, Inc. ....	2	 Lakeside Equipment Corporation	3
Anue Water Technologies .....	43	 Lovibond .....	43
Badger Meter .....	7	 Myron L Company .....	27
 BDP Industries, Inc. ....	21	Paxxo .....	9
 Blue-White Industries .....	back cover	Pulsed Hydraulics, Inc. ....	47
BOHN BIOFILTER .....	37	RJN Group, Inc. ....	41
Bright Technologies, Division of Sebright Products, Inc. ....	47	 SAF-T-FLO Chemical Injection .....	39
Carollo Engineers, Inc. ....	19	 Vaughan Company, Inc. ....	17
ChemScan, Inc., an In-Situ Company .....	45	 Watson-Marlow Fluid Technology Group .....	11
DO2E Wastewater Treatment LLC	51	YSI, a Xylem brand .....	33
Force Flow .....	8		
Howden .....	45		
 JDV Equipment Corporation .....	41		
 KELLER Keller America Inc. ....	5		



EVERY day is  
EARTH DAY.

Look inside the  
world of treatment  
plant operators.

FREE SUBSCRIPTION at [TPOMAG.COM](http://TPOMAG.COM)



**+** KELLER

*Grace under pressure*

LEVELGAGE - General purpose level transmitter

- NSF-61/372 approved for drinking water applications
- Lifetime guaranteed lightning protection
- Custom pressure ranges and cable lengths
- Industry standard analog output options
- Ships in 3 business days ARO
- 2 year warranty

877-2-KELLER  
kellerafrica.com

# contents June 2020

- 8 **LET'S BE CLEAR: OF VIRUSES AND PFAS**  
Talking to customers about risky topics is challenging. Effectiveness starts with establishing trust and showing the other person genuine compassion.  
**By Ted J. Rulseh, Editor**
- 9 **LETTERS**
- 10 **@TPOMAG.COM**  
Visit daily for exclusive news, features and blogs.
- 12 **HEARTS AND MINDS: SUCCESSFUL PUBLISHING**  
Portland Water District prints and distributes *Discovering Water* book written and designed by high school students from its service area.  
**By Sandra Buettner**
- 13 **SMALL BUSINESSES TO GET COVID-19 PAID LEAVE HELP**  
New rules to help employers keep workers on the payroll.  
**By Kyle Rogers**
- 20 **PLANTSCAPES: MORE BEAUTY, LESS WATER**  
Demonstration xeriscape gardens help a Colorado city encourage residents to replace grass with water-conserving vegetation.  
**By Jeff Smith**
- 28 **HOW WE DO IT: MODERN CHALLENGES, MODERNIZED PLANT**  
Upgraded aerators and new headworks equipment help an Ohio clean-water plant deal with high ammonia levels and a growing population.  
**By Chris French**
- 34 **IN MY WORDS: THE PFAS CONUNDRUM**  
These so-called forever chemicals are having significant impacts on water and wastewater agencies. But do the risks justify the stringency of the emerging regulations?  
**By Ted J. Rulseh**
- 36 **SUSTAINABLE OPERATIONS: STIRRING THINGS UP**  
A linear digester mixer and other sustainability improvements help a growing Idaho city keep rates down and make use of resources.  
**By Steve Lund**
- 38 **TECHNOLOGY DEEP DIVE: THAT ONE CRITICAL PIPE**  
A waterline assessment technique helps utilities take a proactive approach to heading off troublesome breaks in key infrastructure.  
**By Ted J. Rulseh**
- 40 **PRODUCT FOCUS: ODOR CONTROL AND DISINFECTION**  
**By Craig Mandli**

## top performers



14 **WATER OPERATOR: HUMILITY AND EXCELLENCE**  
Terence Byrd isn't in the business of seeking credit. He's focused on empowering and improving his staff and delivering high-quality water.  
**By Jim Force**

22 **WASTEWATER PLANT: 100% RECYCLED**  
A Florida plant sends all its effluent to reuse and does so at low cost, thanks to innovations in design and operation.  
**By Jim Force**

*cover story*

**ON THE COVER:** Todd Potter and his team at the Southwest Regional Wastewater Treatment Facility in Mulberry, Florida, operate a 100% customer-based reuse system. The plant received the 2018 David W. York Reuse Award from the Florida Water Environment Association, and a 2018 Plant of the Year award from the Florida Department of Environmental Protection. (Photography by Heidi Kurpiela)

30 **WATER OPERATOR: A SECOND CAREER**  
Not content in retirement, Doug Heistand found a second career in water treatment. It has served him well while he has served others.  
**By Steve Frank**

- 44 **CASE STUDIES: ODOR CONTROL AND DISINFECTION**  
**By Craig Mandli**
- 46 **PRODUCT NEWS**  
Product Spotlights:  
Wastewater: Biogas-boosting biocatalyst enables anaerobic digestion  
Water: Skid system enables systematic chemical feeding  
**By Craig Mandli**
- 49 **INDUSTRY NEWS**
- 49 **EXAM STUDY GUIDE**  
**By Rick Lallish and Drew Hoelscher**
- 50 **WORTH NOTING**  
People/Awards

## coming next month: July 2020 FOCUS: **Conveyance and Distribution Systems**

» Let's Be Clear: Wipes: A perplexing pipeline problem » Top Performers: Racine (Wisconsin) Wastewater Treatment Plant | Ed Hayner, Stafford County, Virginia | Hobbs (New Mexico) Wastewater Reclamation Facility » How We Do It: Ballasted flocculation in Town of Gilbert, Arizona » Sustainable Operations: Renewable natural gas in Lincoln, Nebraska » PlantScapes: 2019 Tnemec Tank of the Year » Hearts and Minds: Award-winning outreach in Lake Elsinore, California » Technology Deep Dive: Skid-mounted rental treatment for short-term needs

# KEEP YOUR OPERATIONS FLOWING.

**Lift Stations • Booster Pump Stations • Water Mains**

At Badger Meter, we know water and wastewater operational processes are complex and involve a wide range of flow measurement tasks. Flow meters are essential to maintaining long-term accuracy and reliability within your applications. We offer a wide variety of metering technologies, including ultrasonic, electromagnetic and positive displacement flow meters. Badger Meter has the proven tools and expertise to help you manage your critical resources and keep your operations flowing.



**Badger Meter**

**Discover how our flow meters can  
improve operational efficiencies in  
your water and wastewater applications:**

[www.badgermeter.com/Treatment](http://www.badgermeter.com/Treatment)

IBC Tote Scales™ & Drumm-Scales™:

# STOP WASTING EXPENSIVE POLYMER!



- ◆ Accurately monitor amount of polymer being fed
- ◆ Maximize solids yield with minimal polymer use
- ◆ Feed Rate alarms warn when off target

For more information,  
Call (925) 686-6700 or  
visit [www.forceflowscales.com](http://www.forceflowscales.com)



let's be clear

## Of Viruses and PFAS

TALKING TO CUSTOMERS ABOUT RISKY TOPICS IS CHALLENGING. EFFECTIVENESS STARTS WITH ESTABLISHING TRUST AND SHOWING THE OTHER PERSON GENUINE COMPASSION.

By Ted J. Rulseh, Editor



I had waited months for a March trip to Florida to meet my brother for some fishing on the Gulf of Mexico. I had my plane ticket. My brother had booked a couple of charter outings. Winter was dragging on. I could hardly wait to head south.

Then, a few weeks before the day of departure, the coronavirus was detected in the U.S. Various countries imposed travel restrictions. People were being quarantined, large gatherings canceled, schools shut down. But none of this near where I live, in northern Wisconsin, and none where I was going. I thought I was in the clear.

Then the news reported two cases of the virus on Florida's East Coast. And my wife asked: Should you really be traveling now? Sitting confined in airplanes — four of them for the round trip — with strangers from who knows where? Walking through two airports on both outbound and homebound trips? Risking serious illness just to go fishing?

When I was younger and felt bulletproof, I would have shrugged her off: Ridiculous. What are the odds? Nothing will happen to me. As it was, I decided to stay home. Being mostly healthy, I guessed that if I got the disease, I'd end up fine. I was more worried about contracting the virus, coming home symptom-free, and passing it to my wife, our kids and our grandsons. And in the bargain, potentially aiding the societal spread of the disease.

So I "ate" a \$560 nonrefundable plane ticket. My brother was disappointed but not greatly inconvenienced since he was going to Florida with his wife regardless; I was just going to bunk with them for a few days. Did I make the right decision? Should I have put my wife's concerns aside? Did I (and she) overreact? I don't know.

### THE EAR OF THE BEHOLDER

And that's the trouble with assessing risk, whether from coronavirus or from PFAS in groundwater, drinking water, wastewater and biosolids. There's a lot we don't know about the risks. Are state and federal regulators going too far with PFAS limits? Are utility customers needlessly concerned?

Some evidence suggests that in both cases the answer is yes, but many times evidence has little to do with how we humans respond to risk — with how, for example, a drinking water customer responds on finding out that PFAS has been detected in the community water supply.

Talking to people about topics that involve risk is tricky. Handling it the wrong way can cause a backlash of outrage. It's natural to want to tell some-



DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS

Published monthly by COLE Publishing, Inc.

1720 Maple Lake Dam Rd., P.O. Box 220, Three Lakes, WI 54562

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

Website: [www.tpomag.com](http://www.tpomag.com) / Email: [info@tpomag.com](mailto:info@tpomag.com) / Fax: 715-546-3786

**SUBSCRIPTION INFORMATION:** A one year (12 issues) subscription to *TPO*™ in the United States and Canada is FREE to qualified subscribers. A qualified subscriber is any individual or company in the United States or Canada that partakes in the consulting, design, installation, manufacture, management or operation of wastewater and water treatment facilities. To subscribe, return the subscription card attached to each issue, visit [tpomag.com](http://tpomag.com) or call 800-257-7222.

Nonqualified subscriptions are available at a cost of \$60 per year in the United States and Canada/Mexico and \$150 per year to all other foreign countries. To subscribe, visit [tpomag.com](http://tpomag.com) or send company name, mailing address, phone number and check or money order (U.S. funds payable to COLE Publishing Inc.) to the address above. MasterCard, VISA and Discover are also accepted. Include credit card information with your order.

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

Our subscriber list is occasionally made available to carefully selected companies whose products or services may be of interest to you. Your privacy is important to us. If you prefer not to be a part of these lists, please contact Holly at [holly.gensler@colepublishing.com](mailto:holly.gensler@colepublishing.com).

**ADVERTISING RATES:** Call 800-994-7990 and ask for Phil or Kim or email [phil.hahn@colepublishing.com](mailto:phil.hahn@colepublishing.com) or [kim.bruss@colepublishing.com](mailto:kim.bruss@colepublishing.com). Publisher reserves the right to reject advertising which in its opinion is misleading, unfair or incompatible with the character of the publication.

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

**REPRINTS AND BACK ISSUES:** Visit [www.tpomag.com](http://www.tpomag.com) for options and pricing. To order reprints, call Jeff Lane at 800-257-7222 (715-546-3346) or email [jeff.lane@colepublishing.com](mailto:jeff.lane@colepublishing.com). To order back issues, call Holly at 800-257-7222 (715-546-3346) or email [holly.gensler@colepublishing.com](mailto:holly.gensler@colepublishing.com).

**CONTROLLED CIRCULATION:** 60,500 per month

© 2020 COLE PUBLISHING INC.

No part may be reproduced without permission of publisher.



one concerned about PFAS: “Don’t worry.” It’s also pretty much futile. Most times, with someone deeply concerned, a stark statement like that won’t make the worry go away.

One of the worst mistakes in risk communication is to tell people to relax because, for our own selfish reasons, that’s what we want them to do. If they relax, our life will be easier. If they quit worrying, our utility won’t have to spend a lot of money on a new treatment process.

Imagine the reaction, when my wife voiced concern about my trip, if I had simply said: “Don’t worry,” case closed, because all I cared about was going fishing. That approach would be equally unproductive for a utility team member trying to reassure someone about PFAS.

### FROM AN EXPERT

A leading practitioner of risk communication is Dr. Peter Sandman ([www.psandman.com](http://www.psandman.com)), a consultant who has been active in the field since the mid-1980s and who I once heard speak at a seminar. His website is a must-visit if you’re faced with talking to people in your community about an issue involving risk to public health, the environment or both.

One of his basic ideas is that communicating about risk effectively depends on trust and credibility, both of which have to be earned. Some of his advice seems merely intuitive, but it’s still easy to forget in emotionally charged situations. Among his recommendations:

- Be honest, forthright and prompt in providing risk information; don’t try to keep secrets.
- Don’t simply expect to be trusted. Instead, be accountable. Be ready for people to challenge you, and be prepared to prove any claims you make.
- If you make a mistake, admit it, apologize, promise to do better and keep that promise.
- Treat adversaries respectfully, even when they don’t return the favor.
- Listen carefully to people’s concerns. Don’t assume that you know what they are, and don’t assume that they don’t matter. Especially, don’t openly dismiss them.

Above all, try to walk in other people’s shoes. Don’t just rely on facts and data — they won’t have much effect until you demonstrate genuine understanding and compassion for the folks you’re dealing with. The most memorable lesson I’ve learned from Sandman is: People don’t care how much you know until they know how much you care. For someone charged with communicating about risk, those are words worth posting on the wall. **tpo**

One of the worst mistakes in risk communication is to tell people to relax because, for our own selfish reasons, that’s what we want them to do.



Every day  
is Earth Day.™

Read about it. **FREE subscription at [tpomag.com](http://tpomag.com)**

**Longopac® Fill**  
— cap the risk

**The closed bag system for screenings, grit and sludge screenings.**

- Mounts to existing equipment.
- Increased odor control.
- Minimized mess.
- Very robust, 90m (295’) long continuous feed, non-porous, polythene bag.
- Over 20,000 installations worldwide.

Visit [www.paxxo.us](http://www.paxxo.us) for more information.



**PAXXO**

**PAXXO (USA) INC. 1924 Millard Farmer Road, Newnan, GA 30263**  
**[www.paxxo.us](http://www.paxxo.us) Tel +1 770 502 0055 Fax +1 770 502 0088**

letters

### Words and Meanings

In reference to your March column (Let’s Be Clear, “It’s About the Product”), I hope you will walk with me. Words have different meaning to different people (that’s the reason judges, lawyers and politicians stay in business).

So on that note, is “wastewater” a dirty word that really needs to disappear and/or be replaced? I don’t think so. To paraphrase Forrest Gump: Wastewater is like a two-way street. Yes, wastewater is dirty, and people need to realize this. The only thing dirty about the word “wastewater” is the word “waste.”

If people truly realized that the byproduct waste (attached onto the word “water”) is produced by all of us, they might also understand that wastewater can become clean again, not by magic but by water professionals who work their magic day in and day out to provide clean water to all of us. The two-way street thing again — not a one-way street with no yield — dirty down one lane, clean in the other lane.

Bottom line, just because it’s clean doesn’t mean it’s safe. Perhaps a better choice would be a combination of words: clean-safe water.

Respectfully,  
**Richard Downing “Rob” Robbins Jr.**  
Wilson, North Carolina

**Like something? Hate something? Agree? Disagree?**

Share your opinions about TPO articles through our Letters to the Editor.

Send a note to [editor@tpomag.com](mailto:editor@tpomag.com) | **tpo**

Visit the site daily for new, exclusive content. Read our blogs, find resources and get the most out of *TPO* magazine.



## LONG-TERM BUILDING CLOSURES

### A Water Quality Concern

While restaurants, gyms, schools and other buildings are closed indefinitely to prevent the spread of COVID-19, the quality of water left sitting in pipes could change. That stagnant water could contain excessive amounts of heavy metals and pathogens that are concentrated in pipes, according to researchers who have begun a field study on the impact of the pandemic shutdown on buildings.

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

## REPURPOSING A FACILITY

### Making Hand Sanitizer

When hand sanitizer started running low at Epoxytec's south Florida headquarters, no one at the company imagined they'd soon repurpose their entire facility and work around the clock to manufacture the product in bulk to fill a local demand. But that's exactly what happened after company officials learned of the local demand for hand sanitizer from nurses and first responders.

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



## OVERHEARD ONLINE

"The current national crisis has made clear the essential nature of clean water services and Congress must act in a bipartisan manner to provide much-needed support and funding for the sector."

*Virtual Event Brings Water Sector Together for Water Week Advocacy Work*

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



## COVID-19 RESPONSE

### Water Sector Cooperation

As COVID-19 sweeps across the globe, agencies and organizations like the Water Environment Federation (WEF) have been working to provide current and accurate information about how the virus will affect the water sector. In this online exclusive interview with WEF Executive Director Walt Marlowe, he says he's proud of the work the federation is doing.

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



**Emails  
& Alerts**

Visit [tpomag.com](https://tpomag.com) and sign up for newsletters and alerts. You'll get exclusive content delivered right to your inbox, and you'll stay in the loop on topics important to you.



**Join the Discussion**

[Facebook.com/tpomag](https://Facebook.com/tpomag) [Twitter.com/tpomag](https://Twitter.com/tpomag)

# Choose better technology

Accurate, versatile chemical pumps

**qdos**  
Peristaltic Metering

Flow rates from 0.001 to 32 GPH at 100psi

Simple drop-in installation eliminates ancillary equipment

One minute tool-free maintenance



[wmftg.com/qdos](http://wmftg.com/qdos) | 800-282-8823

**WATSON  
MARLOW**

Fluid Technology Group

# Successful Publishing

PORTLAND WATER DISTRICT PRINTS AND DISTRIBUTES *DISCOVERING WATER* BOOK WRITTEN AND DESIGNED BY HIGH SCHOOL STUDENTS FROM ITS SERVICE AREA

By Sandra Buettner

For more than 20 years, the Portland (Maine) Water District has had an in-school education program delivering lessons to about 1,000 middle school science students each year.

The utility provides teachers with lesson plans and curriculum on water pollution, stewardship and water quality. As part of the program, the students use a softcover book created by high school students and printed and distributed by the district.

“We want the students to understand how the lake is the source for their drinking water and the role they play in keeping it clean,” says Sarah Plummer, environmental education coordinator. “A lot of the students live close to and around the lake, and it is our mission to raise awareness of how they can protect the lake and its ecosystem.”

## ENGAGING STUDENTS

While working with various school districts, Plummer met Jeff Riddle, an earth science teacher from Windham High School. About seven years ago, Riddle had a smaller-than-average advanced placement class of juniors. Riddle always found it important to expose students to outside professionals and careers and to engage them in projects that use their creativity and help them develop skills for later in life.

To that end, he proposed that his class put together a book to augment what they were learning about water as part of the earth science curriculum. “He wanted the students to create a book that would be used for a long time, not just for that year,” Plummer says.

Enthusiastic about the challenge, the class planned what the book should look like and contain. Every student contributed to the research and writing; some also worked on its design, illustration, photography and other details. The book took two years to complete. Several juniors who worked on the book stayed with the project through their senior year. Middle and high school librarians worked with the students to make sure the content would be relatable and at the appropriate reading level.

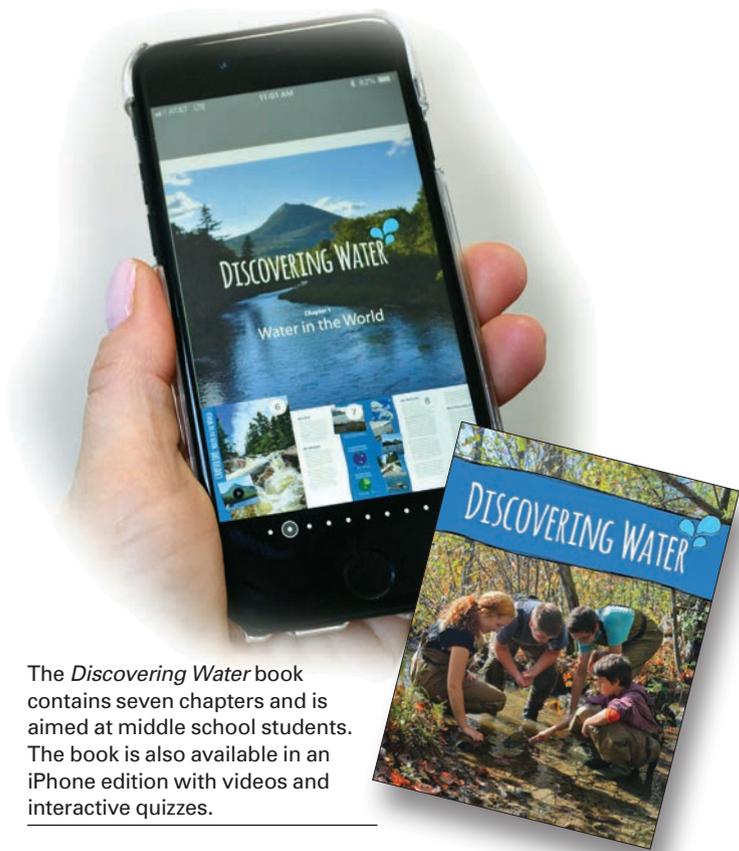
## FINISHED PRODUCT

The book, *Discovering Water*, is 47 pages in softcover and contains seven chapters: Water in the World, The Water Cycle, Water-



Windham (Maine) High School students and support staff presented the first draft of the book, originally named *Water Maine*, at a statewide conference for school librarians. Shown from left are students Olivia Verrill, Dakota Ennis and Haley Stedt; Sarah Plummer, environmental education coordinator for the Portland Water District; Amy Wells Denecker, Windham High School librarian; Jeff Riddle, Windham High School teacher; Dorothy Hall-Riddle, middle school librarian project advisor; and students Julia Rand, Bailey Card and Emily Algeo.

The Portland Water District draws water from Sebago Lake and supplies 16% of Maine’s population. The utility also operates four wastewater treatment plants serving the cities of Cape Elizabeth, Cumberland, Gorham, Portland, Westbrook and Windham.



The *Discovering Water* book contains seven chapters and is aimed at middle school students. The book is also available in an iPhone edition with videos and interactive quizzes.

“A lot of work and a lot of heart went into this book, and it has left a lasting memory for the students and everyone involved in its creation.”

**SARAH PLUMMER**

sheds, Water Quality, Water Pollution, Maine’s Trout and Stewardship. The water utility funds the printing, graphic design, updates and distribution. It has been used for five years in the middle schools, several high schools and some adult education programs.

Well-received by middle schoolers, it is continually updated and is now also out in an iPhone version, also a product of the Windham High School students, that includes videos and interactive quizzes for every chapter. Electronic and iPhone versions are available online, but the softcover is only available to students in the utility’s service areas and the Sebago Lake watershed. Several thousand copies have been distributed. The electronic version is at [www.discoveringwater.org](http://www.discoveringwater.org).

After the initial printing, the students presented the book and their work in creating it at a library conference in Augusta. They talked about their experience and what they learned from this project. One student and author, Dakota Ennis, interned at the district for a summer and is now in college studying environmental science.

Plummer observes, “A lot of work and a lot of heart went into this book, and it has left a lasting memory for the students and everyone involved in its creation.” **tpo**

### What’s Your Story?

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

# Small Businesses to Get COVID-19 Paid Leave Help

NEW RULES TO HELP EMPLOYERS KEEP WORKERS ON THE PAYROLL

By Kyle Rogers

**A**s the coronavirus pandemic and worker layoffs have challenged small businesses, the federal government is offering assistance to keep workers on the payroll.

The Families First Coronavirus Response Act, which applies to businesses with fewer than 500 employees, lets workers receive paid sick leave, while employers get tax credits to handle that paid leave. Here’s how it works, according to the U.S. Department of Labor and the Internal Revenue Service.

## FOR EMPLOYEES

Employees can receive up to 80 hours of paid sick leave at 100% of their regular pay if unable to work due to quarantine or if experiencing COVID-19 symptoms and seeking a diagnosis.

Paid leave at two-thirds of regular wages may be available for employees caring for a person under quarantine, caring for a child whose school is closed, or in a substantially similar situation. A person unable to work due to the child care provision could receive an additional 10 weeks of paid leave at two-thirds of regular pay.

## FOR EMPLOYERS

Two new tax credits are available to businesses. The paid sick leave credit gives employers a refund at regular pay up to \$511 per day for up to 10 days for employees in quarantine or with COVID-19 symptoms.

For paid leave related to child care, employers can be reimbursed for two-thirds of regular pay up to \$200 per day for 10 days. They can get an additional tax credit to maintain health insurance for the employee during the leave.

The second credit provides relief for covering paid leave for workers using the additional 10 weeks for child care. The rate is two-thirds of pay up to \$200 per day, to a maximum of \$10,000.

To use the credits immediately, businesses can use funds for the paid leave that otherwise would be paid in payroll taxes. This includes withheld income tax and the employee and employer shares of Social Security and Medicare. If those do not cover the cost of paid leave, employers can ask the IRS for an expedited advance. The IRS plans to process those claims within two weeks.

Employers can claim the tax credits between April 1 and Dec. 31, 2020.

Businesses with fewer than 50 employees can receive exemptions from the child care paid leave if those requirements would jeopardize their ability to continue.

All paid leave amounts are also available to self-employed people under similar circumstances. Credits are claimed on the income tax return. **Find out more at [www.irs.gov/coronavirus](http://www.irs.gov/coronavirus).** **tpo**

# Humility and Excellence

TERENCE BYRD ISN'T IN THE BUSINESS OF SEEKING CREDIT. HE'S FOCUSED ON EMPOWERING AND IMPROVING HIS STAFF AND DELIVERING HIGH-QUALITY WATER.

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



Terence Byrd, operations supervisor, J.H. Fewell Water Treatment Plant

You'd be hard-pressed to find a more humble water treatment professional than Terence Byrd. As operations supervisor at the J.H. Fewell Water Treatment Plant in Jackson, Mississippi, Byrd received the 2017 Alabama/Mississippi American Water Works Association Operator of the Year award, but he deflects any pats on the back. "It's an honor to be recognized, but lots of people do the same job and don't get recognized," he says.

Cynthia Hill, who is now retired but was Byrd's supervisor for many years, says: "He never takes credit for himself. He'll discover an issue and solve it, then sit back and refuse to take credit for it. He was assigned to the plant but wanted to learn distribution, too. He felt he would be better equipped to serve the customer. He has helped with the lab. He's professional and self-motivated and goes above and beyond. I wish there were more like him."

## STEADY RISE

Byrd's interest in water started when he studied environmental technology in community college. "My professor was a staff member at the Mississippi Department of Environmental Quality," he remembers. "She noticed my interest and told me about a job in water treatment.

"I was 21 years old and the youngest hire at the time. But I realized the career was recessionproof, and I felt that the environment was something bigger than myself."

A man with a beard, wearing a blue t-shirt and dark blue pants, stands on a concrete walkway with metal railings. He is looking towards the left. Behind him is a large, cylindrical brick water tower. The tower has a white door with a "HIGH VOLTAGE" warning sign and a window. A ladder is attached to the side of the tower. In the background, a river and a bridge are visible under a clear sky.

“The better  
the staff, the  
better the water.”  
**TERENCE BYRD**

Byrd keeps his eye on the ball  
of meeting safe drinking water  
standards and satisfying  
customer demands.

In the 15 years since, Byrd has risen from operator to operations supervisor, receiving the promotion when the previous supervisor retired. He has learned a lot: “It’s a constant learning process. What you know is just a portion.”

The 106-year-old Fewell plant is one of two water treatment facilities serving 165,000 customers in Jackson and the metro area. The other water treatment facility, the O.B. Curtis plant in Ridgeland, has expanded from 25 to 50 mgd over the years.

The Fewell plant produces on average of 10 mgd of high-quality drinking water, drawing from the Pearl River and six wells drilled into the Sparta Aquifer. Design capacity is 20 mgd. The conventional process includes microscreens (Screening Systems International), rapid mix for coagulant chemicals, aluminum sulfate solution as the main coagulant, hydrated lime addition for pH control, polymer to aid coagulation, flocculation and sedimentation.

Sand filters (Leopold - a Xylem Brand) polish the treated water, and UV light units (TrojanUV) disinfect it. Ammonia gas is added to keep a lasting disinfection throughout the distribution system. A sludge removal mechanism (Leopold - a Xylem Brand) removes waste solids from sedimentation basins. CSI provided the SCADA system and offers technical support. A radio system (Micro-Comm) coordinates communication with the utility’s 16 aboveground storage tanks.

## BROAD RESPONSIBILITIES

Byrd’s duties include supervising the Fewell plant operations, distribution system and tanks. He also reviews purchases, makes budget recommendations, and interviews and recommends potential new hires for the water plant.

In the nomination for the AWWA award, nominators cited his help with the startup, troubleshooting and operation of the new Maddox Road booster station and the installation of equipment as part of an infrastructure upgrade

at the Fewell plant. The project comprised new chemical feed equipment including chlorinators, chlorine dioxide generators and a chlorine cylinder apparatus (Wallace & Tiernan, an Evoqua Water Technologies brand).

“Those projects were started before I took over,” Byrd says. “My responsibilities were to make sure the equipment was installed properly and the projects were cost-effective. Day to day, my responsibilities include super-

“ I like to inform younger and older applicants on the possibilities in a career in water, letting them know it’s more than just a job — it’s a fulfilling career.”

TERENCE BYRD

vising our operators to make sure the equipment is running properly, that it’s maintained and that we are meeting our parameters from the state health department and the U.S. EPA.” His staff includes:

- Chris Ward and Keidron Porter, senior operators
- James Jackson and Silas Anderson, operator II; and Charles Williams, Anthony Brownlow and Dave Love, operator I
- Roy Bennett, instrument technician; Aree Williams, electrician; and Greg McGee and Tommy West, utility mechanics
- James Perry, maintenance supervisor, and Charles Harvey and Jonathon Minter, maintenance workers
- Kathy Moore, office coordinator

## SEEKING NEW TALENT

Byrd shares the concern of most water professionals who worry about the shortage of incoming operators. “People don’t realize we need qualified operators to get water to customers,” he says. “I like to inform younger and older applicants on the possibilities in a career in water, letting them know it’s more than just a job — it’s a fulfilling career.”

In the past, the utility has reached out to local colleges to have staff members speak with classes in the science department. The outreach also includes booths at the city’s job fair.

The age of the treatment facility means Byrd and his staff practice rigorous preventive maintenance to cut down on unexpected costs. “Some of our oldest equipment includes our filter consoles,” he says. Since surface water conditions can change, the city’s engineering staff is at work on alkalinity, studying various cases to find the best methods of producing water that leaves the plant at a pH above 8.6.

Meeting safe drinking water standards and customer demands is Byrd’s highest priority: “That’s where I’m trying to go — be fully staffed and provide better water. We’re trying to get things to where the system as a whole is in a better place.”

## COLLABORATIVE STYLE

A big part of doing his best is Byrd’s leadership style: fair and inclusive. He describes it as “democratic, meaning we hear all the voices of the

(continued)



Anthony Brownlow, left, water operator I, takes a sample of product water with Terence Byrd.

“ He never takes credit for himself. ... He’s professional and self-motivated and goes above and beyond. I wish there were more like him.”

CYNTHIA HILL



# WIPE OUT CLOGS

Flushable wipes are clogging sewer systems across the country. Vaughan has the clear solution. Since 1960, Vaughan Chopper Pumps have delivered guaranteed performance in the toughest applications. Our Chopper Pumps easily handle difficult solids like disposable pads, wipes, duster cloths and diapers.

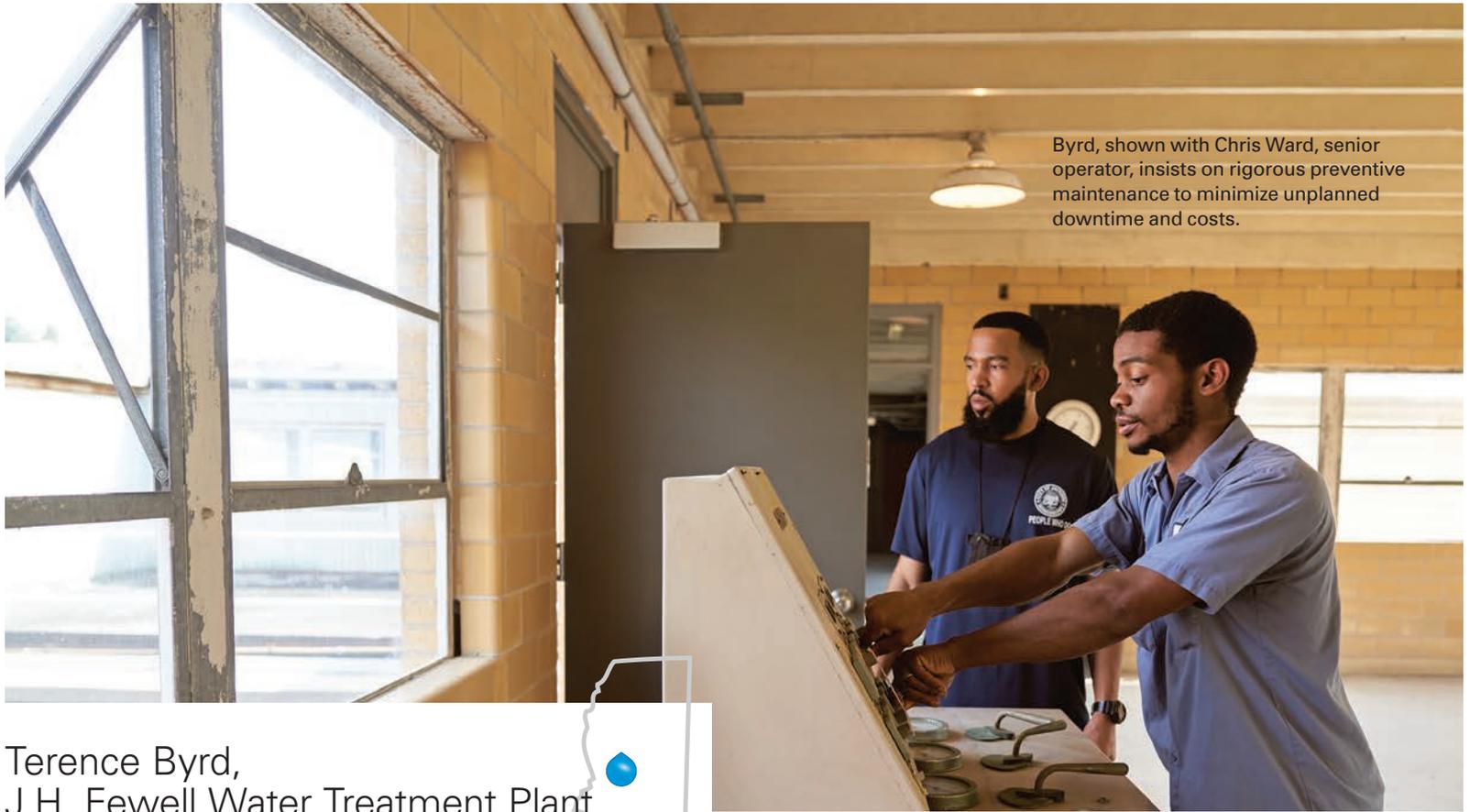
- Expedited pumps and parts delivery
- Self-Priming Chopper pump models available
- Flows over 13,000 gallons per minute
- Pumps easily maintained with external adjustments
- Discharge sizes from 3" to 16"
- Heat-treated and hardened components
- Try and buy program available upon request
- Non-clogging guarantee on all Chopper pumps



**★ MANUFACTURED  
IN THE USA**

Wipe out your clog worries, contact Vaughan for more information.  
ChopperPumps.com | 360.249.4042 | info@chopperpumps.com





Byrd, shown with Chris Ward, senior operator, insists on rigorous preventive maintenance to minimize unplanned downtime and costs.

## Terence Byrd, J.H. Fewell Water Treatment Plant Jackson, Mississippi

**POSITION:**  
**Operations supervisor**

**DUTIES:**  
**Manage staff of 13 at 20 mgd facility and storage/distribution systems**

**EXPERIENCE:**  
**15 years in the industry**

**EDUCATION:**  
**Community college studies in environmental technology**

**CERTIFICATION:**  
**Class A water treatment**

**AWARDS:**  
**2017 Operator of the Year, Alabama/Mississippi American Water Works Association**

**GOALS:**  
**Work to improve status of entire water system**

all the employees. And it's not just me or the individual; it's for the greater good of the facility."

He's known for helping people and conducting the planning process with his staff. He has helped others get their Class A certification, believing, "The better the staff, the better the water." With a bigger staff, he would hold regular meetings to facilitate communications, but with his relatively small crew, he sees and talks with each person at least once a day.

He talks with staff member as they come and go. There are regular safety meetings, and Byrd is increasing their frequency from quarterly to twice monthly to help keep safe operations on everyone's mind.

"I've worked with a variety of people, both good and bad," Byrd says. "I've learned what I want to do and what I don't want to do as a leader. Honestly, everyone I've ever worked with has helped me to do what I do today." **tpo**

### featured products from:

**Evoqua Water Technologies LLC**  
800-524-6324  
www.evoqua.com

**Leopold - a Xylem Brand**  
855-995-4261  
www.xylem.com/treatment

**TrojanUV**  
888-220-6118  
www.trojanuv.com

## READER, PHOTOGRAPHER, OBSERVER

Terence Byrd is single and manages to find free time away from his job as operations supervisor at the J.H. Fewell Water Treatment Plant in Jackson, Mississippi.

He fills it reading volumes of books, traveling and taking photographs. "During his downtime, it seems like he's always reading," says Cynthia Hill, his supervisor for many years before her retirement.

He reads nonfiction; Ray Dalio's *Principles: Life and Work* and Robert Greene's *The Laws of Human Nature: The 48 Laws of Power* are among his favorites. Both explore self-control, freedom and creativity, empathy and insight, resisting conformity, relationships and the surrounding world.

"I'm currently reading a book called *Working with Emotional Intelligence*," Byrd says. "It has to do with success in the workplace as business and industry change over time." The information and concepts he discovers help him as he faces challenges and works with his staff.

For photography, he uses his cellphone and a Nikon digital 35 mm camera for landscapes and cityscapes, with an emphasis on water. He has photographed natural scenes like the Smoky Mountains and the Pearl River near the plant, as well as urban scenes like Austin, Texas.

Some of the photos hang in his office. He's thinking about visiting Yosemite National Park and capturing the impressive beauty there. And if he has any time left over, he says he likes to exercise and "Shoot threes on the court."



OUR WORLD IS CHANGING.  
**OUR PASSION REMAINS THE SAME.**

  
*Engineers...Working Wonders With Water®*

**WATER**  
OUR FOCUS  
OUR BUSINESS  
OUR PASSION

Change is happening at a pace we've never seen before. Climate change, sea level rise, cyber threats, aging infrastructure...and now an unprecedented health crisis from a global pandemic. Anticipating change and managing our most precious resources through these conditions has become a daunting task. For more than 85 years Carollo has delivered innovative solutions to meet today's challenges while being adaptive to an unknown future. By never wavering from our singular, passionate focus on water, we can meet the challenge of change head on, and help build a better world for generations to come.

1.800.523.5826 | [carollo.com](http://carollo.com)



# More Beauty, Less Water

DEMONSTRATION XERISCAPE GARDENS HELP A COLORADO CITY ENCOURAGE RESIDENTS TO REPLACE GRASS WITH WATER-CONSERVING VEGETATION

By Jeff Smith

Despite receiving just 15 inches of precipitation each year, the Colorado city of Greeley has found a way to promote gardening to its residents while emphasizing water conservation.

Since 1997, when Ruth Quade was hired as a part-time water conservation specialist, the city has planted more than a dozen xeriscape gardens, and citizens have planned and planted many others at their homes.

“Our first challenge was to dispel the idea that xeriscape gardening is just gravel, rock and cactus,” Quade says. “We had to get people to recognize the beauty they could create and the benefit it would provide.” The cornerstone of that effort is a nearly three-quarter-acre demonstration garden along a heavily traveled roadway, between the curb and a 20-foot berm that leads to the city’s four treated water reservoirs.

## DIVERSE VEGETATION

“We started by digging up the existing bluegrass, then used a master plan designed by a landscape architect to guide us in planting native and low water-need plants, flowers and grasses,” Quade says. “We added trees for shade and contrast and throughout applied the seven principles of xeriscape gardening, as we do in all our gardens in town.”

Referred to as the Oasis garden, the site includes a complementary blend of annuals, such as petunias, marigolds, geraniums and pansies, and perennials, such as gaillardia, Jupiter’s beard, yarrow and Mexican hat.

One section features various colors of day lilies, including Stella de oro,

PHOTO ABOVE: The focal point of the xeriscape garden is the public art piece on the berm of the reservoir, integrated into the colorful mix of blooming flowers and contrasting grasses, shrubs and trees which surround the sandstone pond.

which blooms longer than others. Another section sprouts early-spring-blooming tulips and daffodils, while Veronica, purple coneflower and Russian sage fill in later during spring. Still another section blazes with pink, white and yellow potentillas.

## FLASH OF INSPIRATION

Several well-placed trees, such as linden, oak, Canadian choke cherry, serviceberry and sumac create shade and visual balance to the garden, roughly 600 by 60 feet. Theme gardens consisting of ornamental grasses such as miscanthus, feather reed and clumping blue fescue create contrast.

Other areas are pollinator and rock gardens with three types of warm-season turf. Benches and an information kiosk add to the garden’s parklike atmosphere. Seasonal employees maintain the gardens with help from community volunteers.

The idea for the xeriscape garden came in mid-1990s from Paul Wood, reservoir and instrumentation and control superintendent, and his staff. Inspired by the vision of an attractive garden that would still conserve water, Wood, Quade and staff built a meandering walkway of stamped concrete through the garden area.

# Custom Dewatering & Composting Solutions.



DSP Screw Press



Rotary Drum Thickener



Agitated and Aerated In-vessel type Composting System (ICS)



3DP Belt Press



Enclosed Gravity Belt Thickener



Skid-Mounted 3DP

- Belt Presses
- Screw Presses
- Rotary Drum Thickeners
- Gravity Belt Thickeners
- Equipment Restoration
- On-Site Service & Mobile Demos
- Complete Compost Facility Design



Sales: 518-796-1440

Factory: 518-695-6851

Email: [info@bdpindustries.com](mailto:info@bdpindustries.com)



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

“We set the forms for all of it, brought trucks in with colored concrete and then released the stamps that make the 650-foot path look like cobblestone,” Wood says. “But Ruth made it attractive with her selection of the plants, trees and flowers.”

## AUGMENTED WITH ART

The focal point of the garden, and the source of its name, is a sculpture installed in 2000 as the first item financed by Greeley’s 1% for Public Art initiative. Located on the berm in front of the reservoirs, the art includes a larger-than-life image of Greeley’s early water pioneers and leaders. Painted on Lexan and mounted on an 11-foot-tall security fence, the image has a wire-mesh background that shows the Rocky Mountains, the city’s water source.

The other portion of the public art sculpture, in front of the image and in the garden being overseen by the pioneers, is a circular sandstone structure containing a pond. Inside the 8-foot-diameter pond are a dozen 12-inch-diameter stainless steel plates mounted at staggered heights on poles. Each plate represents a month of the year.

The depth of the plates varies according to the average rainfall received for that month. The shortest plate, representing February in Greeley’s semi-arid climate, is 0.43 inches. The plate representing May, the wettest month, is 2.4 inches deep. A pump recirculates treated water to keep the trays full and cascading back into the pond.

## CONSERVATION WORKS

Wood is proud of the xeriscape garden, his staff, his facility and the entire water treatment operation. He observes, “In 2017 we won the Best of the Best Tap Water in the nation award from the AWWA.”

The source of that water is Rocky Mountain snow that melts into the Cache la Poudre River. “Our Bellvue plant is located at the source and treats an average of 37 mgd before it gravity-flows nearly 40 miles to our floating-roof reservoirs behind the Oasis garden,” Wood says.

“Our first challenge was to dispel the idea that xeriscape gardening is just gravel, rock and cactus. We had to get people to recognize the beauty they could create and the benefit it would provide.”

RUTH QUADE

Community support for water conservation is strong, Quade says. The water department has a robust program to promote conservation. Each January through October, a lecture series helps residents learn about xeriscape gardening principles. A major program promotes rebates to residents who replace turf with xeriscape and demonstrate the savings. Tours are conducted at the Oasis garden.

“Believe it or not, as Greeley’s population has almost doubled and is still growing, our water conservation program has kept demand flat,” Wood says. “So, the conservation program must be working, and we are very proud of that.” **tpo**



Some of the flowers in bloom at the Greeley xeriscape garden.

Operators Nathan Silveira (left) and Carlos Brito collect samples from a clarifier at the Southwest Regional Wastewater Treatment Facility.



# 100% Recycled

A FLORIDA PLANT SENDS ALL ITS EFFLUENT TO REUSE AND DOES SO AT LOW COST, THANKS TO INNOVATIONS IN DESIGN AND OPERATION

STORY: **Jim Force** | PHOTOGRAPHY: **Heidi Kurpiela**



**M**illions flock to the Sunshine State each year for exactly that: the plentiful sunshine.

But those sun rays are not so popular at the Southwest Regional Wastewater Treatment Facility in Polk County, Florida. There, the staff uses a floating UV ball system to shield the chlorine contact chambers from the sun, reducing algae growth and evaporation and saving thousands of dollars in chlorine costs each year.

It's just one of a number of innovations and improvements at the facility, winner of the 2018 David W. York Reuse Award from the Florida Water Environment Association and the 2018 Plant of the Year award from the Florida Department of Environmental Protection.

"We're a 100% customer-based reuse system," says Todd Potter, plant supervisor. "The awards recognized the work we're doing here. We're feeling pretty good about it."

### MULTIPURPOSE REUSE

The plant, in Mulberry, serves a number of communities in Polk County, which includes Winter Haven and Lakeland. Every drop of its crystal-clear effluent is recycled through a 41-mile piping system for irrigation at more than 1,800 homes, two golf courses and a park. The plant also sells at least 0.6 mgd for power plant cooling water.

During wet weather, the plant can store up to 14 million gallons in an on-site reservoir.

Four operators run the system during the week; one is on site during weekends. Operators are on

call via the plant's SCADA and callout system. Operators are William Altman, James Hall, Andy Martin and Carlos Brito.

Wastewater influent is screened through a Parkson Corp. bar screen, followed by a Fluidyne grit system. Then the flow passes to two channels of a four-basin Eimco oxidation ditch (Ovivo) operated in the extended aeration mode. The ditches function as a modified carousel process: The plant can control the flow to a dedicated anoxic zone.

Four secondary clarifiers follow. Then, three Evoqua Water Technologies automatic backwash traveling bridge filters polish the effluent, and three chlorine contact chambers equipped with the

“We’re a 100% customer-based reuse system. The awards recognized the work we’re doing here. We’re feeling pretty good about it.”

**TODD POTTER**

Ultraviolet balls serve as the floating cover for the chlorine contact chamber (Environmental Controls Co.). The system limits sunlight reaching the water, allowing the plant to save money on chemical treatment.



## Southwest Regional Wastewater Treatment Facility, Polk County, Florida

www.polk-county.net

**BUILT:**  
1993; expanded 2007

**SERVICE AREA:**  
Unincorporated areas of 3 counties

**FLOWS:**  
4 mgd design, 2 mgd average

**TREATMENT PROCESS:**  
Oxidation ditch, traveling bridge filter

**TREATMENT LEVEL:**  
Tertiary

**EFFLUENT:**  
100% to irrigation, wetland recharge, power plant cooling

**BIOSOLIDS:**  
Landfilled

**ANNUAL BUDGET:**  
\$2.2 million (operations)





### Southwest Regional Wastewater Treatment Facility PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	EFFLUENT DESIGN
<b>CBOD</b>	213 mg/L	2.8 mg/L	10 mg/L
<b>TSS</b>	202 mg/L	<1.0 mg/L	5 mg/L
<b>Total nitrogen</b>	46.8 mg/L	3.7 mg/L	10 mg/L

UV balls disinfect the effluent with sodium hypochlorite and maintain the chlorine residual. Sodium hypochlorite also prevents algae growth on the filters.

Solids are aerobically digested, then processed through a portable centrifuge (Centrisys/CNP). Cake at 20% solids is loaded into a 25-yard roll-off container and hauled to a county landfill. “This is a huge savings for us since we do not have to pay tipping fees,” Potter says.

#### BIG DATA

Data monitoring is critical to effluent quality. The chlorine residual values are recorded and stored in iFIX HMI/SCADA’s central historian systems (GE Digital). The plant staff reviews trends daily and enters the data into a Hach water information management solution for later reporting.

The reclaim water pH is monitored continuously and recorded. Turbidity is monitored by two in-line MicroTOL HF scientific turbidity analyzers at the effluent discharge in the filter effluent common wells. All data is connected to the plant’s PLC system.

The staff of the Southwest Regional Wastewater Treatment Facility in Mulberry, Florida, includes, from left, Carlos Brito, operator II; Nathan Silveira, lead operator III; James Hall Jr. and Andrew Martin, operator I; Todd Potter, supervisor; Dave McGrotty, lead electrician; Tiger Godwin, mechanic; and Ireneo Rosete, instrumentation technician. Not pictured is William Altman, operator II.

The system dates to 2007 when the plant was expanded from 2 to 4 mgd. At that point, the county shut down all but three old package plants and tied their service areas into the central system.

“Expanding our distribution system and converting the package plants to regionalize our flows was a huge cost,” Potter says. “We had to make agreements with cities to take their flow. We manage and maintain our infrastructure up to where it ties into their systems.” The remaining three package plants are landlocked and too far away to treat cost-effectively.

“We’re saying that we wouldn’t have clean water except for us. We’re here to protect the environment.”

TODD POTTER

#### SUBSTANTIAL SAVINGS

The UV balls, also known as shade balls, have saved money and improved operations. The hollow ball system, supplied by Environmental Controls Co., floats on the surface of the chlorine contact chamber and limits the sunlight reaching the water. The county had successfully used overhead shades at its Northwest Regional plant, so there was a proof of concept. The Southwest facility purchased the balls in 2014.

Results have better than anticipated. By reducing sunlight and water temperature, while limiting evaporation via chlorine off-gas, the facility has reduced chlorine demand from 18.8 to 13.2 mg/L, saving more than \$30,000 per year, with no impact on the flow pattern and only minor structural changes. Chlorine consumption dropped by 4 mg/L almost immediately at the normal chlorine dose setpoint, Potter says.

The county is using the balls at all three regional plants and has saved some \$450,000 on chlorine over the past five years. There is no maintenance cost; the balls are cleaned when the tanks are cleaned. "This only cost us \$4,500 for all three contact chambers, and we made that money back in the first year," Potter says.

The Southwest facility has had similar success transitioning from dissolved oxygen to oxidation reduction potential controls, saving energy and improving ammonia control. "It has been about three years since we switched from DO control to ORP," Potter says. "We were trying to achieve a DO setpoint under DO control; that resulted in aerators running higher than they needed to."

Now the team can use the negative ORP values to measure and control the anoxic zones. "This allows the

---

Supervisor Todd Potter (right) checks in with operator Andrew Martin as he cleans the clarifier tanks. Potter enjoys hands-on work with members of the plant team.

## A SPARK OF EXCITEMENT

Kids are usually excited when they look into the microscope and see critters moving around like people on a crowded street.

Todd Potter, plant supervisor at the Southwest Regional Wastewater Treatment Facility in Polk County, Florida, was amazed when he first observed those rotifers and protozoa as an adult, and it propelled him into the clean-water profession. "When I saw what they did, it blew my mind and I wanted to do this," he remembers. "If you're not in the field, you'd never know this."

Potter went into the plumbing profession out of high school, then switched to municipal work, managing the ballfields and performing meter services for the city of Lakeland. When a job opened up at the Winter Haven wastewater treatment plant in 2001, he applied and got it. He has been a clean-water advocate ever since.

"I started in the field in 2001 as a trainee and received my license in 2002," he says. He worked full time for Winter Haven and did part-time work for the city of Auburndale. Eventually he moved on to Polk County, where he was promoted to supervisor after completing his Class A license in 2007.

"I have no regrets," he says. "I like to do things right, and I've learned a lot." His hands-on experience includes conventional activated sludge, plug-flow operations, sequencing batch reactors, oxidation ditches and package plants.

"Two of our guys have 25 years of experience; two others have more than 10. They take it upon themselves to do what needs to be done. How things work and look is a reflection on them."

Potter thanks Polk County management for emphasizing best management practices. "This enables our team to make decisions and operate the facility as needed. It takes a team effort — from the trainee to the highest-paid person on the payroll, working together — to make a quality product at the lowest cost possible for the customer and the environment."

His leadership style is not to "stay up here and bark orders." Rather, he gets out in the plant and works with his team. "I'm not afraid to get dirty," he says. Or look through a microscope.





The Southwest Regional Wastewater Treatment Facility serves a number of communities in Polk County. All of its effluent is recycled for irrigation at more than 1,800 homes, two golf courses and a park.

aerators to run at a lower speed to achieve the targeted nitrate levels while conserving energy,” Potter says. “And, we have tighter control over the process in general.”

The results show it. With the flexibility of tighter controls, the facility consistently puts out effluent with low nitrogen and almost no ammonia. The plant hasn’t had a composite or grab sample out of compliance since May 2013.

### COMPLETE REUSE

Potter points to another success story: making the reuse system totally customer-based. The facility recently collaborated with Tampa Electric Co., or TECO, to supply cooling water. “With the help of many others and a lot of permitting, TECO was able to take as much water per day that we could give them,” Potter says. That has eliminated the need for wet-weather discharge and the associated discharge permits.

“Although we did keep one discharge site permitted for flexibility, we have not had to use that in more than two years,” Potter says. “We’re 100% reuse, reducing the demand on the potable water system, recharging wetlands and providing habitat for wildlife.”

An efficient plant is also a safe plant, and the Southwest facility has racked up an exemplary record. The plant received 2018 safety awards from the Florida WEA and the Florida Water and Pollution Control Operators Association.

Potter credits safety meetings conducted daily, weekly, monthly and quarterly, and he salutes the county for stressing safety. “The county has made the investment and enrolled the staff in an online monthly safety course called Pure Safety,” he says. “It allows us to get training that keeps us mindful of safety procedures and allows us to obtain CEUs toward our licenses.

“We also do monthly fire extinguisher inspections, diesel tank inspections and truck inspections; quarterly safety sign inspections; and yearly trip hazard repainting. Plus, our safety manager teaches a defensive driving class.”

### VISIBLE COMMITMENT

Visitors experience the environmental commitment of the Southwest facility’s team on arrival at the property. The grounds feature a waterfall and a fishpond, illustrating the work done at the plant. “It shows the public what we do,” Potter says. “The whole staff pitched in, dug the holes and did the work. We’re saying that we wouldn’t have clean water except for us. We’re here to protect the environment.”

The Southwest facility won’t be a repeat winner of the York Reuse Award this year because the honor is given only once every four years. So, stay tuned for 2023. **tpo**

### featured products from:

**Centrisys/CNP**  
262-654-6006  
[www.centrisys-cnp.com](http://www.centrisys-cnp.com)

**Evoqua Water Technologies LLC**  
866-623-0429  
[www.evoqua.com](http://www.evoqua.com)

**Fluidyne Corporation**  
319-266-9967  
[www.fluidynecorp.com](http://www.fluidynecorp.com)

**GE Digital**  
800-433-2682  
[www.ge.com/digital](http://www.ge.com/digital)

**Hach**  
800-227-4224  
[www.hach.com](http://www.hach.com)

**HF scientific**  
888-203-7248  
[www.hfscientific.com](http://www.hfscientific.com)

**Ovivo USA, LLC**  
512-834-6000  
[www.ovivowater.com](http://www.ovivowater.com)

**Parkson Corporation**  
888-727-5766  
[www.parkson.com](http://www.parkson.com)

# 900 Series MULTI-PARAMETER MONITOR/CONTROLLER™

*Available  
Now!!!*



Conductivity, Resistivity,  
TDS, pH, ORP, Salinity,  
ISE, Flow, Pressure,  
with Touch Screen LCD

+more!



Download on the  
**App Store**



GET IT ON  
**Google Play**



[www.myronl.com](http://www.myronl.com)  
760-438-2021

**MYRON L®  
COMPANY**  
Water Quality Instrumentation

Since 1957  
Accuracy

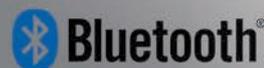
Reliability

Simplicity



**Ultrapen**

- PTBT1
- PTBT2
- PTBT3
- PTBT4
- PTBT5
- PTBT6



New Magna Rotor aerators from Lakeside at West Unity, Ohio, have reduced energy consumption.

# Modern Challenges, Modernized Plant

UPGRADED AERATORS AND NEW HEADWORKS EQUIPMENT HELP AN OHIO CLEAN-WATER PLANT DEAL WITH HIGH AMMONIA LEVELS AND A GROWING POPULATION

By Chris French

Since 1990, toilets in new construction projects have been required to use no more than 1.6 gallons of water per flush — a measure designed to save water.

Some newer low-flow toilets use just 1.3 gallons per flush, while some newer urinals use just half a gallon per flush, or no water at all. While successful as a water conservation measure, these changes have created some issues downstream. For example, buildings in numerous communities have unpleasant odors, as the deficiency of water released to the sewer system causes sludge to build up inside the pipes.

In the Ohio village of West Unity, 50 miles west of Toledo, the wastewater treatment plant found itself in violation from a heavy ammonia load. The village solved the problem with a major plant improvement that included upgraded aerators and new screen and grit collection system in the headworks.

## LONG SERVICE

The West Unity treatment plant was designed in 1970. Treatment challenges arose in 2010 when the village began supplying water to and receiving wastewater from an Ohio Turnpike toll road service plaza close to the Michigan and Indiana state lines, where three major highways converge.

As more and more people with camper vans and RVs used the plaza's waste dump stations, restrooms and food service facilities, the low-flow toilets and urinals began triggering ammonia levels to reach all-time highs.

"It's fair to say we only had rudimentary bar screens and grit collection," says Josh Fritsch, village administrator. "But we were struggling to get enough dissolved oxygen in. We tried all sorts of things, but the oxidation ditch



rotors, installed in 1997, weren't designed for such a load and couldn't cope. It was particularly bad in the heat of the summer.

"We were also having to cope with endless rags and therefore having to perform lots of maintenance. We had reached a point where we needed an upgrade to get the plant back to meeting its consent limits."

## UP WITH PERFORMANCE

The original treatment plant was equipped with cage rotor aerators (Lakeside); these were upgraded in 1997. Two decades on — to meet increasingly stringent permit limits, serve a growing population and deal with the service plaza wastewater — the village replaced those aerators with larger Magna Rotor aerators (also Lakeside).

Those high-performance rotors are designed to provide oxygen to the biomass and mix microorganisms uniformly to prevent solids from settling in the biological treatment system. They also make it possible to sustain high microorganism populations so the system can absorb variations in organic loading and shock loads.

Washing, dewatering and compacting the screenings significantly reduces volume and disposal costs.



Josh Fritsch, West Unity (Ohio) village administrator (left), with Randy Mahlman, water and wastewater treatment plant superintendent

“The plant is now running so much better. And despite the new rotors being larger, we have seen a decrease in horsepower, so we are saving on power consumption.”

**RANDY MAHLMAN**

The wide range of oxygen transfer gives plant operators maximum flexibility to match demands on the system. Oxygen enrichment efficiency is enhanced by flow-control baffles.

The plant upgrade project also included a new headworks with a Raptor microstrainer screen and SpiraGrit system (both from Lakeside) in a masonry building. In addition, the project included a new administration building, replacement of the UV disinfection equipment, flowmeters, variable-frequency drives, a SCADA system, piping upgrades and electrical work. A \$2.68 million principal forgiveness loan from the Ohio EPA State Revolving Loan Fund covered the project cost.

## COST REDUCTIONS

Randy Mahlman, West Unity water and wastewater treatment plant superintendent, observes, “We wanted equipment that would stand the test of time and so insisted on highly efficient stainless steel rotors for aeration. Lakeside’s oxidation ditches have a track record here that goes back more than 40 years, so we were confident that we were also investing in superior-quality engineering with the new screen and the grit collector.”

Well-suited for smaller treatment facilities, the Raptor microstrainer screen uses a semicircular basket with apertures from 0.04 to 0.25 inches to capture small debris that passes through coarser screens. Screenings are washed, compacted and dewatered to 40% solids as they are transported up an inclined screw for disposal. This step reduces volume by 50% and weight by 67%, significantly reducing disposal costs.

The grit system removes inorganic grit in a mechanically induced vortex environment. Rotating paddles maintain the flow velocity in the vortex chamber, keeping organics suspended while grit settles to the chamber floor before dropping into a hopper.

## NOTABLE IMPROVEMENT

“The plant is now running so much better,” Mahlman says. “And despite the new rotors being larger, we have seen a decrease in horsepower, so we are saving on power consumption.”

Fritsch states, “Lakeside and agent Paul Matrka at Smith Environmental have worked very closely with us, helping optimize the equipment with some adjustments. We thought we would see piles and piles of rags, but the equipment washes them and compresses them efficiently, meaning we don’t need a big dump container.”

“Before the improvements, we might see DO levels of 0.2 mg/L, but now we’re up at 1.5 mg/L and higher. We saw an immediate improvement in the plant’s performance, and as a result, we now easily meet our effluent permit limits.” **tpo**



The Raptor microstrainer screen (Lakeside) is well suited for smaller clean-water facilities.

## Share Your Ideas

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

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



Doug Heistand, water treatment  
plant operator, Hillsborough County  
(Florida) Public Utilities Department

# A Second Career

NOT CONTENT IN RETIREMENT, DOUG HEISTAND  
FOUND A SECOND CAREER IN WATER TREATMENT.  
IT HAS SERVED HIM WELL WHILE HE HAS SERVED OTHERS.

STORY: **Steve Frank**  
PHOTOGRAPHY: **Heidi Kurpiela**

“Once I got into this, I said, ‘This is pretty good. Where was it when I was young?’”

**DOUG HEISTAND**

A lot of people dream of retirement days spent fishing, hunting and traveling. Doug Heistand did, too — until he grew bored.

After four years in the Navy, Heistand worked in the grocery business for 25 years. For 19 of those years, he and his wife owned five stores in and around Tampa, Florida. Each was different, and each served a highly localized customer base.

“The grocery business is a hard one to be in,” Heistand says. “You’ve got ‘em beating up on you seven days a week with things like whether the help came in, whether the produce got in on time, or did the milk truck bring the whole milk part of your gallon milk order?”

After he retired from the grocery trade in 2002, he found a second career as a water plant operator with the Hillsborough County (Florida) Public Utilities Department. He has enjoyed it greatly, and many of his team members are better for having worked with him.

### BOREDOM SETS IN

Upon retiring, Heistand worked on his house until it was in “tiptop shape” and mowed the grass a lot. He also had a friend who owned a boat business, and he spent time there. And he hunted, fished and traveled. “I’ve been all over the U.S., and I’ve gotten to the point where I can’t shoot game anymore,” he says. “I’ve about lost interest in hunting and fishing.”

Five years into retirement, he wanted to go back to work: “The big thing was the health insurance. We were paying a big number for it.” While he was deciding what to do next, a neighbor told him she worked in the Hillsborough County water utility. They needed a water plant operator trainee at the Lithia Water Treatment Plant.

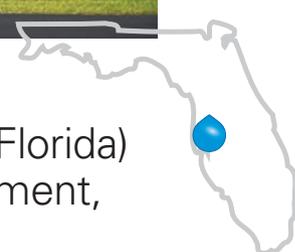
Heistand kept asking her questions and liked what he heard. He continued his research at a nearby junior college, where he found out about the water and wastewater correspondence courses offered by California State University, Sacramento ([www.owp.csus.edu](http://www.owp.csus.edu)). Thinking that might be the best route for him, he signed up.

### BACK TO SCHOOL

“I didn’t know if I would be able to do it or not,” he recalls. “When I got that first book, I was reading it and told my wife, ‘I’m not sure I understand how the authors are thinking.’ She said, ‘Just try it. Send some of those tests in and get them graded. See what you get.’” He did so, and when he got his scores back, he saw that he’d done very well.



The facility’s bulk chemical storage area.



Doug Heistand,  
Hillsborough County (Florida)  
Public Utilities Department,  
Central Water Treatment Plant

POSITION:  
**Water treatment plant operator**

EXPERIENCE:  
**25 years in grocery business;  
12 years in water treatment**

CERTIFICATION:  
**Class A water treatment operator**

EDUCATION:  
**California State University,  
Sacramento correspondence**

**courses (water treatment operator); U.S. Navy Radioman A School**

AWARDS:  
**2018 Florida Section of American Water Works Association Operator’s Meritorious Service award**

“That gave me the confidence to go on. I kept taking the Sacramento courses until I’d gone all the way through.” It was difficult going back to school after being away for 30 years, but he must have caught on pretty well. He earned the Florida water treatment operator Class A license: “Those are hard to get.”

In 2008, he got an operator trainee job at the Lithia water plant. (The county has four water treatment plants and five wastewater treatment plants). After working at the Lithia plant for a couple of months, he transferred to his present assignment at the 19 mgd Central Water Treatment Plant, which then was brand new.

## LEARNING THE ROPES

Heistand was a member of the commissioning crew at the Central plant: “I was here the day they opened it up. It was a lot of work, but it was fun and it was something new. It wasn’t the same thing every day.

“I learned a whole lot about how the department operates and what we have to do. It was a learning process for me, a big one. I wasn’t used to doing all the things we had to do to operate properly, like building SOPs (standard operating procedures) and MSDSs (Material Safety Data Sheets) — things of that nature.”

## DOING SOMETHING FOR OTHERS

All treatment plants should be lucky enough to have a team member like Doug Heistand. Besides working his shifts and training new operators, Heistand just likes coming to work and challenging his cohorts to do something for the community.

Heistand has contributed personal time and money to the United Way Bicycle Drive. His objective was to get Hillsborough County (Florida) Public Utilities team members to buy bicycles for Christmas for less-well-to-do kids in the Tampa area.

“The bikes are all brand new,” he says. “We got 24 bikes for the kids this year. We like to challenge the other plants.” There are four water treatment plants and five wastewater treatment plants in the Hillsborough County system. Before Christmas, the bikes are delivered to Metropolitan Ministries for distribution.

Heistand has also helped cook barbecue to raise money for Water For People. “I thought there was an art to cooking barbecue, but apparently there isn’t,” he philosophizes “Although we didn’t win any awards for our cooking, the people ate up all of our chicken, pork and ribs.”

Someone else usually wrote the procedures, and he and the other operators formatted them and assembled them into books. “Every bit of this was new to me. For example, I had to learn how to run these new pumps. I came out of the grocery business. I’d never seen this kind of equipment. But I made a point of learning how to do it.”

The plant was almost 100% complete when the staff got there to commission it. “I might have come over once or twice while we were waiting for it to open to learn how to operate certain equipment, but it was already up and running when they sent us over here to stay.”

## TAKING TO TRAINING

One of Heistand’s greatest contributions to the plant and the department is his work as a trainer. During his tenure, he has trained about 10 operators. “I like the training part a lot,” he says. “I like working with these young people. I’ve been real lucky. The process the county uses to hire people has worked well. They’re very good at it. I’ve been able to make licensed operators out of all the trainees I’ve worked with.”

Two operators he has trained have gone on to earn A licenses. When training, he works against a thorough checklist: Everything gets covered. “My job is to get them trained on how we do things here. I get them ready for their own shift and make sure they know how to do everything they’ll be

“ [Doug is a] passionate and dedicated employee who has established a strong, positive environment for new and veteran employees to be confident, eager, creative and multiskilled.”

**NORRIS SHELLMAN**

Douglas Heistand, right, shown with Jose Luera, industrial mechanic, has trained a number of operators, two of whom have gone on to earn top-level Class A Water Operator licenses.





a xylem brand

# You ALWAYS HAVE A CHOICE

Process Monitoring with YSI IQ SensorNet

**You have a choice in process monitoring.**

YSI has been developing and manufacturing water quality monitoring instrumentation in the U.S. for over 70 years.

**It's time to partner with YSI.**



▲ IQ 2020 Controller

TO LEARN MORE ABOUT PARTNERING WITH YSI:



877.926.9753



info@YSI.com



YSI.com/IQSN

**xylem**  
Let's Solve Water

doing. I teach them how to run the plant.” Trainees also have weekly progress conferences to go over everything that’s being covered.

Heistand’s boss, Norrise Shellman, describes him as a “passionate and dedicated employee who has established a strong, positive environment for new and veteran employees to be confident, eager, creative and multiskilled.”

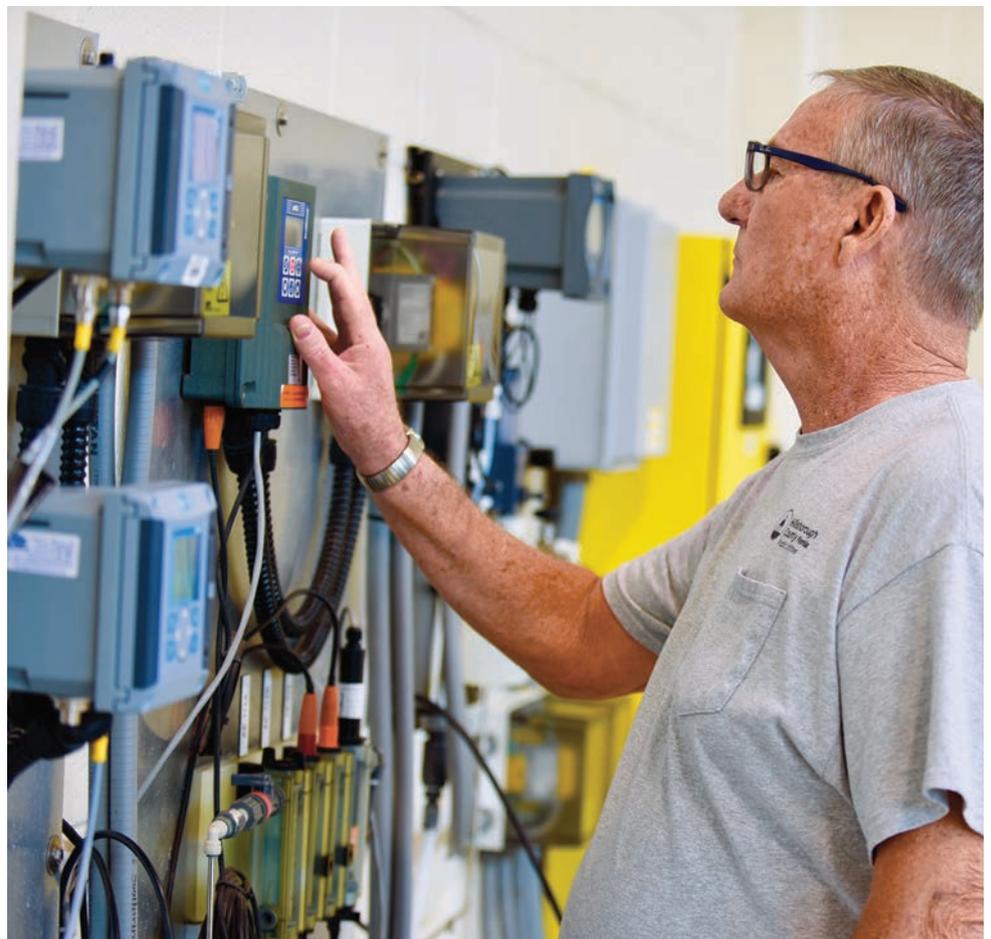
### A GREAT CAREER MOVE

In a recommendation to the Florida Section of American Water Works Association for the 2018 Operator’s Meritorious Service award (which he won), Heistand’s supervisors noted that he “has used his firsthand knowledge through the startup of the Central Water Treatment Facility to provide plant operator trainees with one-on-one advice and guidance to gain new skills, improve performance and enhance the quality of their careers.”

Heistand clearly enjoys his work. “It makes my job easier if the trainees know what they’re doing. They’re all going to be operators in the end. The pay is there. All they have to do is go for the license, so I encourage them to take the tests and get all they can get out of this job, because it’s such a good career.

“Once I got into this, I said, ‘This is pretty good. Where was it when I was young?’” **tpo**

Retirement from the grocery business didn’t satisfy Heistand, who adapted easily to a new career in the water business.





Janine Burke-Wells and Ned Beecher

# The PFAS Conundrum

THESE SO-CALLED FOREVER CHEMICALS ARE HAVING SIGNIFICANT IMPACTS ON WATER AND WASTEWATER AGENCIES. BUT DO THE RISKS JUSTIFY THE STRINGENCY OF THE EMERGING REGULATIONS?

By Ted J. Rulseh

**F**ew acronyms raise as much consternation these days as PFAS. The acronym stands for poly- and perfluoroalkyl substances, and they've become a major nuisance to clean-water and drinking water utilities.

These organic compounds, used in fire-suppression and flame retardant products and various household items, are suspected of posing the risk of cancer and assorted other health problems. Because they've been so widely used, they are present almost everywhere in the environment.

How much risk do they present? To whom? In what amounts or concentrations? Under what circumstances? Those are essential questions, and as of now, researchers have not found clear-cut answers. And so, out of an abundance of caution, state governments are setting various advisory and regulatory standards, often at extremely low levels. This is creating great concern for drinking water plants and for wastewater facilities and their biosolids programs.

For the past three years, the North East Biosolids and Residuals Association has followed PFAS issues and has compiled information about impacts on wastewater treatment and biosolids in its region and nationally. Ned Beecher, special projects manager for the association, and Janine Burke-Wells, executive director, talked about their observations in an interview with *Treatment Plant Operator*.

**tpo:** Where have regulators tended to focus attention in relation to PFAS?

**Beecher:** In PFAS regulation, which is mostly at the state level, the focus has been on setting limits in drinking water, groundwater and, in a couple of cases, even surface water. In May 2016, the U.S. EPA set a public health advisory — not a regulatory number — of 70 parts per trillion. That became a de facto regulatory limit in some states. Now some states are setting ppt limits in the twenties or teens, and even single-digit ppt limits. PFAS are the only drinking water contaminants widely used in commerce that are being regulated down to ppt.

**tpo:** Why does the concern extend to biosolids?

**Beecher:** Some of these chemicals are quite mobile in soil and groundwater — traces of PFAS can leach from soils and rural home septic systems.

They can leach in tiny amounts, but given the low state standards, they can reach those levels, and that's what is causing the concern. Is the application of biosolids and even recycled wastewater impacting groundwater and drinking water at levels in the low ppt's? The answer is yes in some instances. But so are other activities and home septic systems.

**tpo:** What levels of PFAS are typically seen in biosolids?

**Beecher:** The general practice is to look at PFAS levels in biosolids and soils in parts per billion, a thousand times more than ppt. We're finding PFAS in biosolids in the single digits to low tens of ppb for the two most common PFAS chemicals, which are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). In soils where biosolids have been applied for years, we see that single-digits ppb have accumulated over time. These are from biosolids that don't have major industrial inputs.

**tpo:** What are the sources of these measurements?

**Beecher:** Different state agencies have done the studies. Michigan, Maine and New Hampshire have done the most testing of biosolids, but there

“The liquid land application program in the Town of Presque Isle, Maine, was shut down. They had to bring in dewatering presses to create semisolid material that went to landfill.”

NED BEECHER

is also academic research that has been done over the last 20 years. I haven't seen a biosolids test where no PFAS is detected, even from small rural community systems in rural areas with purely domestic sources. In addition, some testing of septage in Maine shows the presence of PFAS. These substances are everywhere — coming from our carpets; our clothing; and everyday cleaning, personal care and other products.

**tpo:** What PFAS levels have been found in soils?

**Burke-Wells:** The Vermont Department of Environmental Conservation contracted with the University of Vermont and the Sanborn, Head &

Associates engineering firm to test shallow soil samples all across the state with random distribution. They found background samples on average ranged from less than 1 to 5 ppb. No sample came back free of PFAS.

**tpo:** So in most cases biosolids are being applied with PFAS at levels not much higher than the background levels in the soil?

**Burke-Wells:** That's correct.

**tpo:** What levels of PFAS are typically found in wastewater?

**Beecher:** Levels in effluent are in the single digits to the tens of ppt. There is no incoming or outgoing wastewater that I have seen that does not show PFAS at some level.

**Burke-Wells:** They're finding PFAS in rainwater too. In Massachusetts, a national atmospheric deposition study found 5 ppt PFAS in rain.

**tpo:** What basic types of PFAS are causing the most concern?

**Beecher:** PFAS are basically chains of carbon atoms with fluorine atoms attached to the carbons. The length of the carbon chain determines behavior. The longer chains are those with seven or eight carbons; six or fewer carbons are considered short chains. The most commonly used were PFOA and PFOS, which are long chains with eight carbons. They have been the most concerning. They were phased out in the U.S. and Canada from 2002-15. Associated with the phaseout, blood levels of those two in people in the U.S. have gone down 70%, and levels have gone down in biosolids and wastewater as well.

**tpo:** How do PFOA and PFOS behave in the soil?

**Beecher:** They tend to bind strongly in the soil, so leaching to groundwater doesn't happen very much. Even with industrially contaminated biosolids, those two and the other longer-chain PFAS tend to stay in the soil. Product manufacturers are replacing PFOA and PFOS with shorter-chain versions, and we're seeing more of them in wastewater and biosolids. They are not as well studied, but they are considered probably less concerning because they don't stay in the human body as long. However, they are more mobile in water and soil.

**tpo:** What have been the impacts of PFAS on biosolids in the New England region?

**Beecher:** Maine imposed a moratorium on biosolids use last March and required testing of all biosolids products. That included compost products that were ready for spring distribution. They used a screening value for PFAS that we argued was inappropriate: 2.5 ppb for PFOA and 5.2 ppb for PFOS. There are background levels in soils in Vermont that exceed those numbers. At the time, they were not aware that all biosolids would fail those tests.

**tpo:** What happened when the biosolids were tested?

**Beecher:** In Maine, we had one or two compost products out of 50 samples that did not exceed the screening values. Biosolids producers had to do calculations based on application rates to limit the amount of PFAS they would contribute to soil. In the end, those calculations allowed all the composts and other Class A products to be used last year and going forward for now.

**tpo:** What happened with Class B biosolids for land application?

**Beecher:** The liquid land application program in the Town of Presque Isle, Maine, was shut down. They had to bring in dewatering presses to create semisolid material that went to landfill. Their costs for biosolids management have skyrocketed. The Lewiston-Auburn Water Pollution Control Authority in Maine, which has a great sustainable program, got slammed hard. It could not apply on about two-thirds of the fields it used to apply on. The disruptions are significant and costly.

**tpo:** Have there been disruptions in other New England states?

**Beecher:** Last fall New Hampshire imposed enforceable drinking water

standards and became the first state to go as low as teens of ppt. Its standards are between 11 and 18 for four individual PFAS. A biosolids program or even a wastewater management program may be affecting groundwater and drinking water at those levels because the standard is so low.

**tpo:** What are some potential consequences of this level of regulation?

**Beecher:** Six facilities in New Hampshire discharge effluent to groundwater through sand filter beds. All of those facilities have become noncompliant. The state has given them exemptions because they are discharging PFAS above the groundwater standard. But how does that play out over the long term? If PFAS turns up in neighbors' wells above the state's levels, is that wastewater facility now liable for putting in a charcoal treatment system for those homeowners and keeping that going in perpetuity? Those are the kinds of questions that have come up.

**tpo:** Has there been any pushback against these limits?

**Beecher:** The Plymouth Village Water & Sewer District and a biosolids management company, along with 3M, filed a lawsuit against the state that put the new drinking water standards on hold; it's going to the New Hampshire Supreme Court for review. The concept is that the state did not conduct a cost-benefit analysis before imposing the regulations.

“There are some legitimate PFAS hot spots that we need to focus on. ... The resources should go to those places, at least initially.”

JANINE BURKE-WELLS

**tpo:** What is happening with PFAS around the rest of the U.S.?

**Beecher:** More than half the states use the EPA's 70 ppt as the screening standard. Michigan has focused a good deal on wastewater and biosolids. It established a surface water screening value some years back for PFOS, which biomagnifies into fish. Michigan set its surface water standard at 11 ppt. Many places exceed that level, as do many wastewater effluents. Biosolids programs have also been affected. Many facilities have been required to stop land-applying biosolids, and those are going to landfill. In Wisconsin, the city of Marinette biosolids program has been stopped because of PFAS concerns related to a major industrial source.

**tpo:** Are there any notable situations on the drinking water side?

**Beecher:** California instituted public drinking water notification levels of 5.1 ppt and 6.2 ppt for PFOA and PFOS. A drinking water system that has PFAS above one of those numbers needs to notify the community. In practice, they are telling people that their wells are polluted, and so they're going to have to take action.

**tpo:** What is the solution for PFAS treatment in water systems?

**Beecher:** What makes sense and is effective is granulated activated carbon filtration of drinking water. For example, a water system serving 34,250 people in Maine put in a carbon treatment system for about \$5 million. They did that proactively because a well of concern was at 50 ppt for PFOS, and Maine is using the 70 ppt screening value. They thought that was concerning enough to warrant treatment.

**tpo:** Where do you see efforts being focused on PFAS in the near future?

**Beecher:** Nationwide, the effort has been and will continue to be focused on treating drinking water. A lot of money will be spent on that. Then you have the effects on wastewater, biosolids and solid waste management. How much money will society spend in trying to manage those?

**Burke-Wells:** There are some legitimate PFAS hot spots that we need to focus on, such as firefighting and manufacturing facilities that have polluted their areas. The resources should go to those places, at least initially. Until the science catches up and defines what should be regulated, clearly those are big problems that need to get addressed. **tpo**



The Caldwell Wastewater Treatment Plant handles an average flow of 8.5 mgd.

# Stirring Things Up

A LINEAR DIGESTER MIXER AND OTHER SUSTAINABILITY IMPROVEMENTS HELP A GROWING IDAHO CITY KEEP RATES DOWN AND MAKE USE OF RESOURCES

By Steve Lund

When the Idaho city of Caldwell replaced two old digesters with a new and larger one, Salvador Arreola had to make a decision about mixing technology.

All the mixers he knew about seemed to have problems with scum lines forming at the top, sand and grit settling at the bottom, and dead spots where the solids wouldn't break down fast enough.

Consulting engineer Larry Rupp of Keller and Associates in Boise suggested that a linear motion mixer might be a good fit. After some investigating, Arreola decided to go with it, and he hasn't been sorry. "Every other kind of mixer I have experienced has had its flaws, but I haven't found a flaw with this yet," says Arreola, plant superintendent, who has worked in the wastewater treatment industry since 1989.

## MORE GAS PRODUCTION

Arreola describes the mixer as working like a soda fountain milkshake mixer, but instead of the container moving around the spinning disk, the disk moves up and down inside the container. At Caldwell, the container is a 986,000-gallon digester.

“It takes a spike of energy to get that total volume to move. Once it is moving, the power use goes way back down and it's really efficient.”

**SALVADOR ARREOLA**

The mixer is working as well as or better than Arreola had hoped. It is also saving the city money by producing more methane, reducing the volume of solids sent to landfill and being more efficient to operate. Arreola expects it to go much longer between cleanings — another significant savings.

“Anytime you drop a digester for maintenance, it's a big undertaking,” he says. “In wastewater plants, we count down how many digester cleanings we have before we retire.”

At the Caldwell Wastewater Treatment Plant (18.5 mgd design, 8.5 mgd average), the wastewater goes through screening and grit removal, to an aeration basin, into final clarifiers and then through sand filtration and UV disinfection before discharge to the Boise River.

The plant serves a population just over 50,000; it has a staff of six. The new mixer, an Ovivo LM, went online in 2016. After it operated long enough to demonstrate its effectiveness, the Caldwell plant won the 2019 Pacific Northwest Clean Water Association Sustainability Award.



The Ovivo LM mixer on top of a digester at the Caldwell facility.

## PERFORMANCE DOCUMENTED

In Arreola's experience, routine maintenance on digesters usually reveals areas where mixing is incomplete or inefficient: “Usually when you take a digester down, every three to five years, you see where the sand and grit buildup is and you see where the dead spots are in the digesters. It's long been assumed that that's just the way it is.

“Well, I'm always looking for something better, something more efficient, something that will mix thoroughly and keep the scum layer broken and be more efficient, and this really blew away my expectations.”

## Bohn has the solution...

A leader in odor control biofilters since 1986. We have a powerful single-stage solution with unmatched reliability.

**BOHN BIOFILTER** CORP  
Odor and Air Emissions Control

[bohnbiofilter.com](http://bohnbiofilter.com)

His staff took the digester with the linear motion mixer offline for inspection after about eight months, and they did not find dead spots or buildups of sand and grit. Arreola says the mixer takes significant energy to get started, but the overall power use is way down.

“Can you imagine a million gallons being mixed at once?” he says. “It takes a spike of energy to get that total volume to move. Once it is moving, the power use goes way back down and it’s really efficient. Our power bills have been reduced dramatically.”

He finds the mixer is effective at keeping the temperature consistent throughout the digester and at keeping sand and grit suspended. More efficient mixing has resulted in 12% more biogas produced. The gas is scrubbed to reduce moisture and hydrogen sulfide and then burned in the boilers that heat the digesters.

“We capture the gas inside a gas sphere, which is just a big bubble with a bladder on the inside,” he says. “We use that methane to power up our boilers, and it gives us a very reduced cost for natural gas.” Previously, the biogas was flared. While some is still flared, so much is used in the boilers that the plant saves \$2,200 to \$3,000 a month on its gas bill.

### LOOKING DEEPER

The more efficient mixing has also reduced the volume of and improved the quality of the biosolids that are dewatered and sent to landfill. “When it goes to our belt filter press, it uses a lot less polymer, and we get a good 18% solids cake,” Arreola says. “That’s very dry. Before, we were getting 12%-15% solids.”

The success of the mixer led Arreola to think about other ways of boosting sustainability. One is to retrofit a linear mixer in an existing digester that now uses a nozzle mixer. He expects that project to be done in the next two or three years. The digester tank will need extra support because of the movement of the different type of mixer.

Eventually Arreola would like to set up three or more digesters in series; the final product would then be Class A biosolids that would be valuable to local farmers as a soil supplement and could create a revenue stream. It would also eliminate the cost of landfilling, about \$225,000 per year.

Caldwell, which is part of the Boise metropolitan area, has seen significant population growth in recent years. The city’s master plan expects the plant to be expanded to 30 mgd within 20 years. Arreola says the sustainability efforts are essential to expanding without raising rates.

“As Idaho grows, we’ll grow, but everybody’s worried about bills going up,” he says. “With new revenue streams, we can add to the infrastructure without raising rates.” He finds the public more understanding now that wastewater can be turned into valuable products such as biosolids, water for irrigation and clean energy.

“People are more aware about sustainability,” he says. “For years wastewater treatment plants have had this abundance of energy and were just burning it off. Now people are looking for ideas. We’re always looking for better, more innovative ways.” **tpo**



This “bubble” tank stores biogas at the plant.



A wider view atop a digester; the mixer is shown at the upper right.



A technician performs a broadband electromagnetic inspection on an exposed section of a water pipe.

“ We evaluate all the technologies available in the marketplace and use the best one for the application.”

PAUL COSTA

# That One Critical Pipe

A WATERLINE ASSESSMENT TECHNIQUE HELPS UTILITIES TAKE A PROACTIVE APPROACH TO HEADING OFF TROUBLESOME BREAKS IN KEY INFRASTRUCTURE

By Ted J. Rulseh

Water main breaks are a costly problem for water utilities and a major annoyance to customers. And yet, many water utilities still rely on a break-fix approach to dealing with their lines.

A solution is inspection and condition assessment of water mains, especially the lines that will cause the greatest expense and the most service disruption if they break. Inspection technologies are constantly evolving, and that can make it difficult for utilities to select the ones best suited to their needs.

Now RJN Group has introduced a One Critical Pipe approach to condition assessment. It's a systematic form of predictive pipeline assessment that can apply any of several technologies to suit a utility's needs and goals. The process includes an assessment of risk tolerance and a comparison of repair versus replacement costs. Paul Costa, executive vice president and chief sales and marketing officer with RJN Group, talked about the offering in an interview with *Treatment Plant Operator*.

**tpo:** How would you describe the nature of your company's business?

**Costa:** RJN Group is an engineering and specialty field services firm that works with municipalities to solve problems with underground infrastructure. We were founded in 1975, and for many years we built our reputation on condition assessment of wastewater systems. That naturally led us into force mains, which have a lot of similarities with water in terms of inspection tools. So we evolved into drinking water systems as well.

**tpo:** What is different about your approach to water pipe assessment?

**Costa:** One difference is our technology independence. We evaluate all

the technologies available in the marketplace and use the best one for the application. Another difference is that while we perform inspections, often our goal is to not perform an inspection, because inspections are expensive and often disruptive. We want to minimize inspections, and that's part of our early goal-setting discussions with our clients.

**tpo:** How would you describe your basic methodology?

**Costa:** Our One Critical Pipe approach is a rather simple methodology. It starts with talking to the municipality or utility about its goals and to discover its one critical pipe. Every client knows what pipe that is. The client might not know what to do with it but will say, for example, "That 1-mile area right near Main Street — if we lose that, we're in trouble." That's what we start with.

**tpo:** Is that critical pipe typically a large transmission main?

**Costa:** It certainly could be, but it also could be a major line that feeds into a really important area, such as an industrial park or a hospital. These water systems were built without a lot of redundancy. The critical pipe doesn't have a backup, and if it fails, it can be catastrophic.

**tpo:** What happens after the critical pipe is identified?

**Costa:** We conduct a health check where we walk the line. We're not assessing any technology at that point. We're looking at the line, the access points, and whether there are other things we could do before we use any kind of invasive technology. Then we work with the client and determine whether we need to do an internal or external inspection.

**tpo:** Given that the pipe is underground, what can you tell just from walking the route?

**Costa:** We automatically get an idea of what the inspection access point is. Access is one of the most challenging aspects of a condition assessment in a water system. It's a pressurized system, and those systems weren't typically built with convenient access points. When these systems were built 50, 60 or 70 years ago, they had no idea what technologies would be available today.

**tpo:** Other than access, what does the walking health check tell you?

**Costa:** There are a number of other things we can do when on site to determine the pipe's condition and survivability. Does it cross beneath railroad tracks? Does it pass under or over a river or around a bridge? There might be internal corrosion, and certain factors are conducive to external corrosion, such as soil chemistry or power lines that create stray currents. All of that plays into the health check.

**tpo:** What is the next step after the initial health check?

**Costa:** We look at the client's goals: What is our client really trying to accomplish? Then we determine what the best technology is. There are internal inspection technologies that are like scanning tools that give a rapid assessment — a rough idea of whether the pipe is good or bad. Or the client might be looking for something a lot more detailed, such as exact pipe wall thickness. It depends on what the goals are, and we work on that with the client at the very beginning.

**tpo:** What are some of the inspection technologies you look to?

**Costa:** We use just about all of them. Xylem has Pure Technologies, which include half a dozen tools like SmartBall and PipeDiver that can be used for different purposes. We've partnered with MTA from Austria using its Pipe Inspector technology, a nontethered device about the size of a soda can. It has high-definition CCTV and captures pressure, acoustic and temperature measurements. It has the capability to be inserted into a fire hydrant.

**tpo:** Are there ways to measure wall thickness from outside the pipe?

**Costa:** That would be like an Echologics broadband electromagnetic, or BEM, inspection. Here we need access to the pipe from a test pit or a location where the pipe is exposed. You would use BEM at typical failure points, such as high points in the line.

“There are internal inspection technologies that are like scanning tools that give a rapid assessment — a rough idea of whether the pipe is good or bad. Or the client might be looking for something a lot more detailed, such as exact pipe wall thickness.”

PAUL COSTA

**tpo:** What are some circumstances where you would choose not to do an inspection?

**Costa:** There could be challenging access issues with the pipe where, if you cost that out, it might be cheaper just to rehabilitate the line or build a parallel line. That's the engineering side that is part of our holistic approach.

**tpo:** What happens after an inspection?

**Costa:** We analyze the results, set priorities, develop a playbook and put the line into a capital improvement plan.

**tpo:** Once that critical pipe has been taken care of, do the clients want to look at others?



SAF-T-FLO retractable injection quills are designed to provide a maintenance friendly way of maintaining injection feeds prone to scale and clogging.

Rarely are any two injection points the same. Our wide range of sizes, materials, and unique features allows each quill to be configured for the intended application. No compromises, just the right tool for the job.

#### Key Features

- 1/2" to 3" Connection Sizes
- Restraint ratings of both 150psi and 250psi.
- Integrated check valves on select sizes.
- Does not require the main to be depressurized for insertion/removal.
- SAF-T-Seal Elastomeric Tip for excessive scale prone feeds.

Learn More

call: 800-957-2383

visit: [www.saffflo.com](http://www.saffflo.com)

view: [youtube.com/saffflo](https://youtube.com/saffflo)

**Costa:** That one pipe is not the only critical pipe in the system. Unfortunately, municipalities always have more than one. We inspect that one critical pipe, complete that program and then move on to the next critical pipe.

**tpo:** As you look at additional pipes, how do you go about setting priorities?

**Costa:** We prioritize based on some desktop engineering analysis. One factor is age of the pipe, although this is not always the best indicator of whether we should do an inspection. The health checks are really important — looking at soil conditions and locations. All of that plays into setting priorities. **tpo**

# Odor Control and Disinfection

By Craig Mandli

## Biofiltration

### ADEGE WATER TECHNOLOGIES BIOTTTA

The biotTTa biological filtration system from AdEdge Water Technologies leverages nature to offer a sustainable solution for wellhead treatment of inorganic and organic contaminants. Its fixed-bed, dual-stage biotreatment cultivates an environment for microbiological organisms to destroy contaminants or reduce elements to simple, unarmful forms. The fixed-bed treatment process consistently addresses contaminants at low levels, intermittent or fixed operation, and the dual bed assimilates a complete packaged biotreatment plant. It has regulatory approval for the reduction of nitrate and perchlorate, and it demonstrates hexavalent chromium, VOCs, iron, manganese and sulfide elimination in a single process. The low-volume discharge is easily managed as a non-hazardous waste stream. **866-823-3343; www.adedgetech.com**



**BiotTTa biological filtration system from AdEdge Water Technologies**



**AirAHybrid odor control system from Anua**

### ANUA AIRAHYBRID

The Anua AirAHybrid odor control system is a multistage system designed for treating high levels of hydrogen sulfide, as well as more complex reduced sulfur compounds and VOCs for complete odor removal. The first-stage AirAGlass biotrickling filter media is designed for hydrogen sulfide removal. It is made from 100% post-consumer recycled glass and is lightweight.

The second stage can be set up with either AirACarb or AirAShell media. AirACarb activated carbon media polishes a wide range of odors while extending media life. AirAShell biofilter media is made from repurposed seashells acquired from the U.S. commercial seafood industry. The AirAShell media constantly buffers the pH level, ensuring effective removal of remaining odors and VOCs, and it's designed to last 10 years before needing replacement. **800-787-2356; www.anuainternational.com**

### BIONETIX INTERNATIONAL BCP22

BCP22 from Bionetix International contains a blend of aerobic and facultative anaerobic bacteria that reduce odors and accelerate biodegradation of wastewater with high FOG content. It can be used throughout the waste treatment cycle to boost startup of aerobic biological treatment systems; loosen and liquefy heavy grease deposits and prevent



**BCP22 treatment from Bionetix International**

scum in tanks, sewers, drains and aeration basins; and reduce foam and sludge production. It can be applied directly at the wastewater treatment plant or added to effluent before discharge at its source, as was done by a restaurant in Russia. By applying it down the drain and to the grease trap in conjunction with ECO-TRAP L, the restaurant was able to solve grease trap odor problems, as well as frequent blockages and the clogging of sewerage. **514-457-2914; www.bionetix-international.com**

### EVOQUA WATER TECHNOLOGIES BIOTRICKLING FILTER

The biotrickling filter biological odor control system from Evoqua Water Technologies is an advanced, nonhazardous biological air treatment system that integrates equipment, media and the nuclear circuit process for optimal performance and flexibility. The nuclear circuit process skid allows operation in recirculation or once through modes, delivering accelerated acclimation ideal for odor control and removal. Systems are available in both single- and two-stage options. Single-stage recirculated systems are suited for treating raw sewage odors found in pump stations, headworks and primary sedimentation. Two-stage systems can handle entire plant odors. The system is designed to perform at efficiencies of greater than 99% of hydrogen sulfide removal without the need to add chemicals. **858-487-2200; www.evoqua.com**



**Odor control system from Evoqua Water Technologies**

## Chemicals/Chemical Feed Equipment



**Tote Bin Scale from Force Flow**

### FORCE FLOW TOTE BIN SCALE

The Tote Bin Scale from Force Flow allows plant operators to accurately monitor the amount of polymer being fed from IBC-type totes for dewatering. Simply place the tote on the platform and monitoring begins, as there is nothing to install inside the tote. Monitoring systems prevent costly overfeed conditions and enable

the documentation of the actual amount fed, which keeps the plant in compliance with federal and state reporting requirements. Users can remotely monitor from SCADA or PLC. The unit is available with the SOLO G2 digital display or with the advanced Wizard 4000 Chemical Inventory Monitoring System. **800-893-6723; www.forceflow.com**

## Chlorination/Dechlorination

### HACH CL17SC

The CL17sc colorimetric chlorine analyzer from Hach is designed to help water professionals effectively manage disinfection processes and accurately collect data to meet compliance reporting regulations. It improves on Hach's original CL17's legacy of reliability, accuracy and ease of use. New features address the needs of field operators, maintenance teams and managers, who must find ways to make water analysis better and easier. Users can reduce routine maintenance



**CL17sc colorimetric chlorine analyzer from Hach**

# PREDICTIVE PIPELINE ASSESSMENT

## One Critical Pipe at a Time

### EVALUATE SYSTEM FITNESS

- Understand service goals
- Assess maintenance histories
- Prioritize high risk pipes

### TARGET ONE CRITICAL PIPE

- Conduct pipe health check
- Weigh risk tolerance and costs
- Inspect with the right technology

### CATALOGUE A PLAYBOOK

- Validate results and outcomes
- Deliver engineering solutions
- Prioritize capital strategies



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



## JDV LEVEL LODOR™

*Design for Even Distribution  
&  
Odor Control*

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



and touch time with user-programmable alerts, simplified tubing maintenance and mobile sensor management software. Diagnostic features — including a colorimeter window and multicolor status light — provide at-a-glance confidence that the instrument is operating as intended. Compatibility with the Hach SC controller platform provides users with more flexibility to store, transfer and interact with their process chlorine data. It can share measurement data and status information with Claros, Hach's water intelligence system. **800-227-4224; [www.hach.com](http://www.hach.com)**

### SWAN ANALYTICAL USA AMI TRIDES ANALYZERS

SWAN Analytical USA AMI Trides Analyzers provide reagentless chlorine measurements in clean water. Self-cleaning reference and flow validation functions ensure reliable results. A complete panel-mounted system makes installation easy. Software, hardware and sensor self-checks, and electronic drift stabilization ensure high confidence in the measurement accuracy. Digital and analog communication options are available. **847-229-1290; [www.swan-analytical-usa.com](http://www.swan-analytical-usa.com)**



USA AMI Trides Analyzers from SWAN Analytical

## Covers/Domes

### CLEARSPAN FABRIC STRUCTURES

ClearSpan Fabric Structures are a solution for odor mitigation, making them a suitable addition to any treatment plant or wastewater facility. Their durable, 12.5-ounce polyethylene fabric covering lets light and air

permeate throughout the structure, allowing for practical energy efficiency and proper odor control. They are available in several temporary and permanent foundation options, including blocks, shipping containers and a helical anchoring system, allowing customers to build their structure nearly anywhere, even on existing foundations. Every building can be individually customized to the needs of any business or operation. **866-643-1010; [www.clearspan.com](http://www.clearspan.com)**



ClearSpan Fabric Structures

### INDUSTRIAL & ENVIRONMENTAL CONCEPTS HEAT RETENTION COVERS

Heat retention covers from Industrial & Environmental Concepts can be essential for wastewater treatment plants where wintertime temperatures affect nitrification. Covers are available from R-4 to R-17 and have proven effective, reliable and low maintenance. Insulated covers can be used in both aerobic and anaerobic processes. An additional benefit of the covers is algae control and management of offensive odors. **952-829-0731; [www.ieccovers.com](http://www.ieccovers.com)**



Heat retention covers from Industrial & Environmental Concepts

*(continued)*

### JDV EQUIPMENT LEVEL LODOR

The Level Lodor cover system from JDV Equipment helps contain odors by covering standard dump containers used for hauling processed material. The design allows for even distribution, increasing the fill percentage without having to manually even out material. Enclosing containers allow outdoor installation without exposing material to the environment or pests. **973-366-6556; www.jdvequipment.com**



Level Lodor cover system from JDV Equipment



Longopac Fill continuous bag system from Paxxo

### PAXXO LONGOPAC FILL

The Longopac Fill continuous bag system from Paxxo can connect to the discharge point of machines used to move, dewater or compact screenings, grit and biosolids. Material is then deposited in a 90-meter-long continuous bag for odor containment and spillage control. The cassette bag can be sealed with ease, and the material and odors are trapped inside, cutting down development of bacteria and fungus spores.

**770-502-0055; www.paxxo.com**

### Scrubber

#### SIMPLE SOLUTIONS DISTRIBUTING RMS-800

The RMS-800 recirculating molecular air scrubber from Simple Solutions Distributing is a two-stage filter that is self-contained and requires no external ventilation. It is suitable for a large array of odor control needs, including wastewater applications like sludge press rooms and screen rooms, but it can also be utilized to remove any odor associated with a volatile organic compound in any enclosed room. It offers a combination of a high airflow of 800 cfm and volume of carbon (7.5 cf). This increases the life of the carbon and results in a high contact time of 0.56 seconds. The scrubber uses a pressure blower instead of a centrifugal fan, making it more durable to backpressure. The unit can provide two air exchanges per hour when used in a 50- by 50- by 10-foot room. **973-846-7817; www.industrialodorcontrol.com**



RMS-800 air scrubber from Simple Solutions Distributing

## UV Disinfection Equipment

### REAL TECH UVT M SERIES

The UVT M Series monitor from Real Tech provides continuous measurement of UV transmittance at 254 nm, suitable for UV disinfection applications to monitor system performance, aid in dose pacing and control, as well as system sizing and design. The monitor continuously compensates for lamp drift and fluctuations, improving accuracy and reliability of results.

Water flows continuously through the bypass instrument with measurement readings every 10 seconds, enabling rapid detection of changing water quality. The timesaving custom calibration feature makes zeroing the instrument simple by updating the calibration with a known UVT sample — no deionized water required. It comes standard with 4-20mA output for quick and simple integration with SCADA or PLC systems. An optional automatic chemical cleaning system further reduces system maintenance and improves overall performance. **905-665-6888; www.realtechwater.com**



UVT M Series monitor from Real Tech

### SALCOR 3G UV WASTEWATER DISINFECTION UNIT

The 3G UV Wastewater Disinfection Unit from SALCOR is used for residential, commercial and municipal applications, and it is UL-certified NEMA 6P floodproof and NSF/Washington State Protocol six-month tested (with 21 upstream treatment systems). It inactivates bacteria/virus pathogens, including superbugs.

Rated at 9,000-gpd gravity flow, it is meant as a reliable building block for large water recovery/reuse systems. When installed in 12-unit parallel/series arrays with ABS pipe fittings, systems can disinfect more than 100,000 gpd. Gravity flow equalizes without distribution boxes. Each unit has a foul-resistant Teflon lamp covering, two-year long-life lamp with efficient installation, minimal annual maintenance and energy use of less than 40 watts. **760-731-0745; www.salcor.world tpo**



3G UV Wastewater Disinfection Unit from SALCOR

Connect  
with us



[Facebook.com/TPOmag](https://www.facebook.com/TPOmag)

[Twitter.com/TPOmag](https://twitter.com/TPOmag)

[Youtube.com/TPOmagazine](https://www.youtube.com/TPOmagazine)

[Linkedin.com/company/treatment-plant-operator-magazine](https://www.linkedin.com/company/treatment-plant-operator-magazine)

EAT.  
SLEEP.  
SAVE THE  
ENVIRONMENT.  
REPEAT.

tpo IT'S YOUR MAGAZINE.  
TELL YOUR STORY.

SEND YOUR IDEAS FOR FUTURE ARTICLES  
TO [EDITOR@TPOMAG.COM](mailto:EDITOR@TPOMAG.COM)

**NEW**

# ANUE GEOMEMBRANE ODOR CONTROL COVERS

## ...WITH CARBON FILTERS!

Anue's customizable odor control covers have integrated carbon filters, creating a highly-effective, breathable odor control system.

Suitable for a wide range of applications, this system can be designed for practically any shape or size area.

**Contact Anue today for a complimentary site assessment.**



**ANUE**  
WATER TECHNOLOGIES

[anuewater.com](http://anuewater.com)

**+1-760-727-2683**

[sales@anuewater.com](mailto:sales@anuewater.com)

## Lovibond® Water Testing

### Tintometer® Group

## Process Turbidity Measurement Simplified

### Smart Interface

- Intuitive Mobile App & Local Display
- Superior Data Management

### Low Maintenance

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

### Innovative Design

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



Scan For  
More Info



## Bottling plant eliminates odor with carbon-impregnated geomembrane

### Problem:

In 2017, a bottling plant in Brazil received frequent complaints about odors from its wastewater facility, especially from a neighboring hotel. At the same time, operators were looking to improve the safety of the wastewater tanks and seeking cost savings. The treatment plant had two rectangular reactors with rigid covers that still released odors even when odor-reducing chemicals were used.

### Solution:

The plant owners decided to install a reinforced membrane odor control system with integrated activated carbon filters. At the same time, a new glass-lined steel homogenization tank was to be built, and it made sense to cover that as well. **Anue Water Technologies geomembrane covers**, suspended above the liquid, are made to fit each tank precisely, providing a tight seal around the edges so that all gases are forced toward the filters. The filters' porosity keeps pressure from building up under the covers to avoid dangerous gas buildup in confined spaces. The covers on the reactors were installed in a few days and the homogenization tank covers a month later.



### RESULT:

Odors from the reactors were no longer detected. Since the homogenization tank covers were preinstalled, no odors from it were ever detected. **760-727-2683; www.anuewater.com**

## Disinfection system enables plant expansion

### Problem:

The Santan Vista Water Treatment Plant serving Gilbert and Chandler, Arizona, gets its water from the Colorado River through a 14-mile, 48-inch pipeline as part of the Central Arizona Project canal. On-site sodium hypochlorite generation was selected for disinfection, mainly for safety. With on-site generation, the only chemical stored or transported is food-grade salt.

### Solution:

The plant installed two **ClorTec units** from **De Nora Water Technologies** that each produce 1,500 pounds of chlorine per day. One is always in use, and the other is for backup. When Phase II of the plant was completed in May 2018, capacity was increased to 48 mgd and a third ClorTec unit was added.



### RESULT:

"The decision to use the De Nora ClorTec generator was a simple one," says Mike Schlabach of Sundt Construction, the installer. "The operators have been pleased with the performance, Sundt has extensive experience installing the components, and the value proposition offered through De Nora was significant." **215-997-4000; www.denora.com**

## Ozone treatment used to clear up tinted well water

### Problem:

When the Four Way Special Utility District drilled a 750 gpm well in Angelina County, Texas, color and odor management became a priority. The well water was tinted to 30 pcu (platinum-cobalt units) by tannic acid at 3.0 mg/L, contained 4.0 mg/L hydrogen sulfide, and also contained sulfur-reducing bacteria. The conventional treatment being used — aeration and chlorine injection — left potential for formation of disinfection byproducts, so managers turned to ozone.

However, there was a concern that long ozone contact time and excess ozone in the contact tower could allow bromates to form.

### Solution:

A precisely delivered dose of no more than 3.0 mg/L of ozone through a **Mazzei 3090 GDT ozone sidestream venturi injection system** with pipeline flash reactor provided the ozone mass transfer needed to remove color and odor while minimizing bromates.



### RESULT:

With an ozone generator producing 730 grams of ozone per hour, the GDT system achieves its objectives with a rate of 2.8 mg/L of ozone. Pathogen control has allowed the district to reduce its chlorine dosage and discontinue the energy-consuming air stripping process used for VOC removal. The utility and its customers are pleased with the results. **661-363-6500; www.mazzei.net**

## Plant-based odor atomization system ensures suburban wastewater facility is odor-free

### Problem:

The City of Crystal Lake, a Chicago suburb, is surrounded by commercial and residential neighbors, including a high school. Wastewater treatment plant managers wanted to reduce or eliminate odor issues.

### Solution:

Plant managers chose **Ecosorb, a plant-based odor eliminating product**, from **OMI Industries**.

Two high-pressure atomization systems were installed.

With 20 nozzles each for distributing Ecosorb liquid, one system is in the influent flume area and the other is in the aerated grit removal area. Vapor ducting feeds from the machine into the side of the building and creates a continuous loop surrounding the building. The equipment runs when the sludge centrifuge is run and sludge is being hauled outside of the facility.



### RESULT:

With Ecosorb products and customized equipment from OMI Industries, the plant was able to mitigate odor concerns. **800-662-6367; www.omi-industries.com**

# The wastewater industry relies purely on performance

Aeration technology and control systems for wastewater plants

Howden has been supplying blowers and compressors to wastewater treatment plants for over 100 years. By combining our high efficiency blowers and compressors, with our sophisticated downstream control systems – developed specifically for the wastewater treatment market, we can offer the most advanced and efficient aeration systems available.



SG Integrally-Geared Compressor    Roots® Overhung Impeller With Bearing Housing    Roots® Horizontally Split Compressor    Roots® Integrally Geared Compressor    Roots® RAS-J    Roots® Rotary Package



**Now offering Turblex® as part of our compressor portfolio**  
Learn more, visit: [www.howden.com/turblex](http://www.howden.com/turblex)

For more information contact:  
**Howden Roots, 900 West Mount Street, Connersville, IN 47331, USA**  
t: 1-800-55-ROOTS (76687) e: [roots.enquiries@howden.com](mailto:roots.enquiries@howden.com) w: [www.howden.com/compressors](http://www.howden.com/compressors)



Revolving Around You™

## On-site sodium hypochlorite generation maintains consistent disinfection at remote tank

### Problem:

Purissima Hills Water District provides chlorinated water to two-thirds of the town of Los Altos Hills, next to Palo Alto, California. With remote tank locations, low population density and low water demand (1.61 mgd), the utility is challenged to maintain consistent disinfectant residuals while balancing safe delivery of chemicals to its tank sites at an affordable cost.

### Solution:

Working together with **PSI Water Technologies**, the utility introduced the **Microchlor on-site sodium hypochlorite generation system**. The input (salt) does not degrade over time or lose potency, and it can be safely transported through neighborhoods. Purchasing bulk salt also avoids the two- to three-week lead times for ordering bulk liquid hypochlorite.



### RESULT:

The utility was impressed with the system, which uses passive hydrogen evacuation for system safety. The electrolytic cell design means there are no internal baffles to trap hydrogen and no gaskets to wear. The skid-mounted design and easily accessible union connections allow quick access for routine cell maintenance and replacement.  
888-774-4536; [www.4psi.net](http://www.4psi.net) tpo



**MEASURE, CONTROL, RELAX...**

Contain costs and optimize performance with reliable equipment designed to keep you in control.

Learn more about our multiprobes, analyzers, controllers and software at [chemscan.com/wwtp](http://chemscan.com/wwtp).

**ChemScan**  
An In-Situ Brand



### Flomatic wafer-style check valves

Flomatic's Model 888VFD wafer-style check valves can be close-coupled with a butterfly valve, allowing for operation of the butterfly valve in an open or closed position with no interference. Its unique poppet design operates quietly and efficiently across a wide range of flow velocities, which makes it ideal for varying flow rates in VFD-controlled pumping systems. The design helps minimize flow losses and hydraulic shocks in the pump system. The spring-loaded poppet system is guided in an oversized sleeve for stability, resulting in quiet and efficient operation regardless of flow rate. The valve begins to close as flow is reduced and fully closes at zero velocity stopping reverse flow, helping to reduce water hammer shock. It is suitable for direct-mounting of butterfly valves, eliminating the need for a 2- to 6-inch spool piece. The valves save energy and maintenance costs, are rated NSF/ANSI 61 and NSF/ANSI 372, and meet MSS SP-125.

800-833-2040; [www.flomatic.com](http://www.flomatic.com)



### Badger Meter Dynasonics TFX-5000 ultrasonic clamp-on meter

The Dynasonics TFX-5000 ultrasonic clamp-on meter from Badger Meter accurately measures the volu-

## product spotlight wastewater

### Biogas-boosting biocatalyst enables anaerobic digestion

By Craig Mandli

Biogas production has become a viable way for wastewater treatment facilities to not only decrease the amount of solid waste produced and in need of disposal, but also create energy that can be used to power the treatment process. With increased efficiency in mind, **Drylet** offers **Bio React AD engineered substrate** — a product designed to enhance biogas production and reduce natural gas costs. The technology enables the enhanced degradation of undigested solid waste through hydrolysis, increasing biogas generation and solids reduction. The application protocol is tailored to each facility, after analysis of influent characteristics and of historical performance average data. The company says the product can produce up to 30% greater biogas generation in anaerobic digesters.

"We have been able to apply the product in a wide variety of applications that go from the traditional wastewater treatment process where we're using it to reduce biosolids to applications for improving settling in clarifiers," says Dr. Malcolm Fabiyi, Drylet's chief operating officer. "We take targeted microbes with beneficial characteristics and embed them inside of a silicon media that allows us to ensure the viability of the reaction."

The company's biocatalyst solution is built on material science and microbiology. The technology requires no commitment to new equipment and no capital expense. The material is added daily as part

metric flow of clean liquids and those with small amounts of suspended solids or aeration, such as surface water or raw sewage. It is ideal for water and wastewater applications such as lift stations, booster pump stations and water mains. The meter provides accuracy up to plus or minus 0.5% and flow rates ranging from 0.07 to 33,000 gpm on pipes from 1/2 to 48 inches. Designed to clamp onto the outside of pipes, the TFX-5000 meter does not contact the internal liquid, allowing for installation without shutting down operations in new and retrofit applications. It is equipped with an internal clock and built-in 8 GB data-logging capabilities to log water flow down to one second. The TFX-5000 meter is also compatible with BEACON Advanced Metering Analytics and AquaCUE Flow Measurement



Bio React AD from Drylet

of routine biodigester maintenance. A daily dose of 1 to 2 pounds per million gallons of wastewater flow is typically recommended.

Bio React AD is a dry-to-the-touch engineered material formulated with micro bioreactor particles, seeded with mixed microbial cultures that are beneficial for anaerobic digestion systems.

"Each pound of product provides about 700,000 square feet of area seeded with billions of beneficial microbes," Fabiyi says. "The particles provide an environment where bacteria can reproduce at significantly accelerated rates, enhancing microbial activity."

Accordingly, Bio React AD contains no chemical ingredients or genetically modified organisms, meaning that the product is safe for human, animal and aquatic life. The formulations contain only biosafety level Class 1 microbes that have been confirmed by independent testing to be nonpathogenic.

According to Drylet, Bio React AD delivers more than 100 times higher microbial counts than what is traditionally found in other microbial products, making sure millions of micro bioreactors, which contain billions of microbes, come in contact directly to the sludge layer. It can be added daily as part of a routine biodigester maintenance program. 346-980-9570; [www.drylet.com](http://www.drylet.com)

Manager from Badger Meter.  
877-243-1010;  
[www.badgermeter.com/clamp-on](http://www.badgermeter.com/clamp-on)



### ClearSpan Structures HD I-beam building

The new HD I-beam building from ClearSpan Structures is a combination of the sturdy I-beam frame and strong armor shield cover. As one of ClearSpan's most versatile buildings, the HD I-beam can be built to any size and customized to live up to any industry's standards. The building is constructed using the I-beam frame, and the framing

and purlins are all crafted from galvanized steel to ensure a long-lasting life and superior stability. The I-beam frame also features a 4-to-12 ratio pitched roof with a 12-foot nominal eave height and 10-foot clearance at the eave, ensuring easy and seamless movement in and around the building.

866-643-1010; [www.clearspan.com](http://www.clearspan.com)



### Best Purging Systems Model YZ102 purge unit

Best Purging Systems Model YZ102 is a Type Y or Z purge unit

designed to protect electrical equipment in Class I hazardous areas. When connected to a supply of protective gas and utilized in conjunction with a Model PV-2 spark-arresting purge vent, the Model YZ102 will supply, regulate and monitor the protective gas supply to a protected electrical enclosure and accomplish purging of the protected enclosure in an expedited manner. The maximum enclosure volume is 15 cubic feet, and the unit has three mounting options: universal, vertical and horizontal. The unit has an operating temperature range of 20 degrees below zero to 120 degrees F.

844-787-4348; [www.purgeit.com](http://www.purgeit.com)



### Flow Technology QCT Series ultrasonic flowmeter

Flow Technology's QCT Series of in-line ultrasonic flowmeters are for use in low-viscosity liquid applications. Typical applications include water treatment for boilers and cooling towers, clean-in-place systems, mechanical seal flushing/cooling, high purity water systems, process water, cooling loops, reverse osmosis systems and small line injection systems. The QCT Series has non-wetted sensors and no moving parts, and there is nothing in the flow stream that will cause an obstruction to the flow path. The meter is available in sizes of 1/8- to 1-inch, accurate to plus or minus 0.5% of reading, plus zero stability and repeatability is plus or minus 0.2% over 10:1 calibration range. It has a 0.035 to 70 gpm flow range, 14 to 176 degrees F temperature range, and analog, scaled frequency and Modbus RTU outputs. 480-240-3400; [www.ftimeters.com](http://www.ftimeters.com)



### Franklin Miller Dimminutor channel disintegrator

The Dimminutor from Franklin Miller provides effective, automatic screening and grinding of wastewater solids in straight-through channels and wet wells. The unit reduces plastics, wood, rags and other solids to fine bits, enhancing plant operation and improving the reliability of pumps and other downstream equipment. The Dimminutor employs a smooth, continuously rotating design with high torque. As its three bidirectional rotary cutters intermesh at close clearance with stationary cutters, solids are finely reduced to a size small enough to pass through a sizing screen. A unique, cantilevered design eliminates seals or bearings near the gritty channel floor.

800-932-0599;  
[www.franklinmiller.com](http://www.franklinmiller.com)



### Asahi/America Type-21a flow control ball valve

The Type-21a seat support technology flow control ball valve from Asahi/America is available in 1/2 through 2 inches. The valve features a precision-machined PVC ball with center provisions to support PTFE seats from 0% to 100% of capable flow. It produces equal percentage flow characteristics for fine throt-



Belt filter presses featuring innovative features that provide high performance in a compact high value package.



Bright Technologies offers complete Belt Filter Press dewatering systems that are skid or trailer mounted. We design and manufacture the skid equipment package for high throughput, low maintenance, superior cake solids and ease of operation.



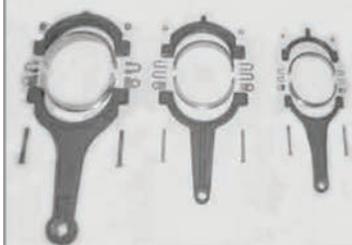
Contact Us Today!  
800-253-0532

127 N. Water St., Hopkins, MI 49328

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

## MARKETPLACE ADVERTISING

# Rebuilds Parts



# Belts



**Komline-Sanderson**

1 800 225 5457

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



**PHi**  
Pulsed Hydraulics, Inc.

Big Bubbles  
No Trouble Mixers

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

ting. The valve requires directional installation and comes equipped with a flow direction label. Manually operated SST ball valves include a 0- to 100-degree indicator plate and an indicator line on the handle, which doubles as a carrier adjustment tool. An ISO 5211 top flange bolt pattern and integrally molded base pad for panel mounting are standard on all Type-21a SST ball valves, and the valve body is PVC with either EPDM or FKM O-rings.

**800-343-3618;**  
**www.asahi-america.com**



### Endress+Hauser Liquiphant vibrating fork level instruments

Liquiphant FTL51B and FTL41 vibrating fork (vibronic) level instruments from Endress+Hauser reliably detect the point level of liquids in storage tanks, containers and pipes. The FTL51B features Industry 4.0 and Industrial Internet of Things capabilities, including access via wireless Bluetooth technology, automatic proof tests and verification, and easy commissioning via a mobile device. Operational clarity is provided by a high-visibility LED. The FTL51B's vibronic sensor is not affected by changing media proper-

ties, flow, turbulence, gas bubbles, foam, vibration or buildup. The instrument works in process temperatures of 58 degrees below zero to 302 degrees F and pressures up to 1,450 psi. It can be used in SIL2 and SIL3 hazardous locations and has built-in automatic maintenance and verification functions.

**888-363-7377; www.us.endress.com**



### Shimadzu Scientific Instruments ion chromatograph

Shimadzu Scientific Instruments' new ion chromatograph features a built-in electro-dialytic suppressor. The suppressor minimizes band spreading and achieves high sensitivity for the quantitative determination of anions. The suppressor is rugged, providing stable functionality over long periods of operation. In addition, the system's compact design requires less bench space. The unit features a unique, volume-minimized folded flow path, combined with optimized dialytic, enabling it to achieve high efficiency and stability. The design reduces peak spreading, which increases the sensitivity for components with low retention, such as fluoride, and improves separation from the water dip.

**800-477-1227;**  
**www.shimadzu.com tpo**

## product spotlight water

### Skid system enables systematic chemical feeding

By Craig Mandli

In the municipal segment of the water treatment industry, systems help unify complex processes that require precision and reliability throughout multiple stages of treatment.

**ProSeries-M CHEM-FEED polyethylene engineered skid systems from Blue-White Industries** are complete solutions designed to dose liquid chemicals from a tank to an injection point in the process.

The systems can be equipped with the ProSeries-M pump of the user's choice, and both diaphragm-type and peristaltic-type pumps are offered. If requested, the metering pumps can be installed on the skids before shipment.

"These systems are specifically designed for municipal water treatment applications," says Bill McDowell, vice president of operations for Blue-White Industries. "These SCADA-ready pumps have feed rates from 0.0002 to 158 gph, with a 10,000-1 turndown ratio and discharge pressures to 125 psi."

Single- and two-pump units are available on skids constructed of chemical-resistant polyethylene with a drop-in-place design. Components include a visual flow indicator and an optional chemical feed flowmeter. Plast-O-Matic components include vented ball valves, gauge guard and pressure relief valve. They also feature Flex-A-Prene tubing designed to stay flexible and leak-free in chemical environments.

ProSeries-M pumps are designed for water and wastewater treatment, and use smart technology to communicate together seamlessly. Flex-Pro M-2, M-3 and M-4 peristaltic metering pumps are built to deliver precise doses of chemicals. The automated dosing helps to ensure consistently accurate chemical delivery.

A tube failure detection system alerts users to failures and shuts down the pump if a failure occurs. A variable-speed brushless DC motor and washdown enclosure minimize maintenance and enhance reliability. Diaphragm-type pumps offer feed rates to 40 gph and include a DiaFlex single-layer PVDF diaphragm designed for zero breakdown or delamination. According to McDowell, the diaphragm pumps offer increased discharge pressures.

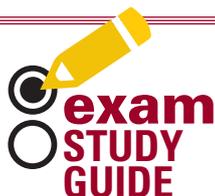
"These pumps can offer up to a 175 psi pressure rating," he says. "In addition, they come with a variable-speed DC motor and a 200-1 turndown ratio."

According to McDowell, the skid system is also compatible with the CHEM-FEED MS-6 precision chemical feed flowmeter, which accurately measures the chemical being dosed to critical water and wastewater treatment applications.

"These systems are flexible enough to be catered to many applications," he says. "They are designed to make the dosing process easier for operators." **714-893-8529; www.blue-white.com**



ProSeries-M CHEM-FEED from  
Blue-White Industries



**Get help on  
sticky questions.**  
In this issue and at **tpomag.com**

### FCI announces Schleyhahn as director of sales

Dan McQueen, president of FCI - Fluid Components International, announced the appointment of Adam Schleyhahn as the company's new director of sales. He steps in to lead the FCI sales organization after the retirement of Glen Fishman, who completed a 38-year career at FCI as the leader of the sales team. Prior to joining FCI, Schleyhahn was a member of the corporate staff at Swagelok's headquarters in Cleveland. He was previously the general manager of sales for San Diego Fluid System Technologies, representing Swagelok products. Schleyhahn is a graduate of Pomona College and has an MBA from UCLA Anderson School of Management.



Adam Schleyhahn

### Industrial Wastewater Technologies joins CETCO's Environmental Products division

CETCO announced that Industrial Wastewater Technologies, formerly part of CETCO Energy Services, is now part of CETCO's Environmental Products division. The new structure will allow CETCO to better leverage the capabilities of the Industrial Wastewater Group and build on the growth of Environmental Products with FLUORO-SORB adsorbent.

### Teledyne ISCO welcomes new member to Europe, Middle East and Africa sales team

Teledyne ISCO announced the recruitment of Matt Brownhill to be the company's U.K. country manager and to support the Europe, Middle East and Africa sales team. He began his career with EMS, an ISCO distributor in the U.K., installing monitoring applications and providing technical assistance for ISCO flowmeters and samplers. Most recently, Brownhill was employed by Hach. In addition to a mechanical engineering and manufacturing background, he brings more than 15 years of sales and service experience to the team.

### Tnemec names Keilbey director of sales

Tnemec named Scott Keilbey director of sales, water tank market. In his new position, Keilbey will assist Tnemec customers and representatives working within the water storage industry. Prior to his current position, he served as a Tnemec representative in Kansas City and western Missouri. Before this, he held various positions throughout the company, including plant employee, director of sales and national sales manager.



Scott Keilbey

### Asahi/America expands building information modeling and CAD library files

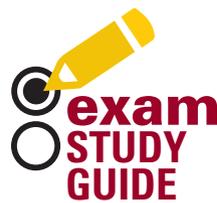
Asahi/America has expanded its building information modeling library on its website. The library now contains CAD files for the company's Air-Pro compressed air piping, Asahitec PP-RCT commercial HVAC and plumbing piping, Proline single wall industrial piping and Purad ultra-high-purity PVDF piping systems, in addition to its manual valves. CAD files can be downloaded through the company's online catalog at cad.asahi-america.com.

### SEEPEx promotes Donegia to product manager

SEEPEx announced the promotion of Josh Donegia to product manager. He joined SEEPEx more than three years ago as a sales and marketing analyst. Donegia will be working on new product development activities, product launches, company product training, product messaging, pricing and market intelligence. **tpo**



Josh Donegia



Licensing exams can be challenging. Our **Exam Study Guide** helps you prepare by presenting questions similar to those on an actual exam. You can find many more sample questions on the *TPO* website at [www.tpomag.com/study](http://www.tpomag.com/study).

## WASTEWATER

By Rick Lallish

**What is the most common type of lagoon currently in use to treat municipal wastewater?**

- A. Anaerobic
- B. Aerated
- C. Polishing
- D. Facultative

**ANSWER:** D. The most common lagoon treatment system in use today is the facultative lagoon. These lagoons are typically 3 to 8 feet deep. They have dual layers: an aerobic layer on top and an anaerobic layer below. The algae in the aerobic layer supply the dissolved oxygen. Light penetration determines the aerobic layer's depth. The waste byproducts from the aerobic layer trickle down to the anaerobic layer, where digestion takes place. The two layers supplement each other. Controlled discharges of these lagoons may provide detention times of up to 180 days. The ability to identify different types of lagoons is key for the operator certification studies. More information may be found in the Office of Water Programs California State University, Sacramento textbook: *Operation of Wastewater Treatment Plants*, volume one, eighth edition, Chapter 8.

## DRINKING WATER

By Drew Hoelscher

**To develop a disinfection profile for the reduction of *Giardia lamblia*, an operator needs to know:**

- A. The dimensions of the basins in each disinfection segment, baffling factor, water pH, peak hourly flow rate, water temperature and chlorine residual
- B. The dimensions of the basins in each disinfection segment, peak hourly flow rate, water temperature and chlorine residual
- C. The dimensions of the basins in each disinfection segment, water pH, water temperature and chlorine residual
- D. The dimensions of the basins in each disinfection segment, baffling factor, peak hourly flow rate and chlorine residual

**ANSWER:** A. Disinfection profiles are developed to ensure that log inactivation requirements are achieved. To calculate log inactivation credits, the operator needs to know the disinfectant residual concentration and the time for which the concentration is in contact with the water. Once this is established, the operator uses the log reduction tables created by U.S. EPA to determine the inactivation credit for *Giardia lamblia*. A technical guidance manual is accessible by visiting:

<https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=20002649.txt>.

### ABOUT THE AUTHORS

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

## people/awards

The **Newport (Rhode Island) Wastewater Treatment Facility**, Cranston (Rhode Island) Wastewater Treatment Facility, and **Presque Isle (Maine) Utilities District** received 2019 Regional Wastewater Treatment Plant Excellence Awards from the U.S. EPA New England office.

The **Vallejo (California) Flood and Wastewater District** received the Government Finance Officers Association's Distinguished Budget Presentation Award. It also earned the Investment Policy Certification from the California Municipal Treasurers Association.

The **Perry Wastewater Treatment Facility** received three awards from the Georgia Association of Water Professionals: the George W. Burke Jr. Facility Safety Award, Outstanding Wastewater Collection System Excellence Platinum Award and Best Tasting Tap Water award, which it won for the second year in a row.

The **City of Hermitage**, Pennsylvania, received a 2020 Governor's Awards for Local Government Excellence. Its food-to-waste program exemplified the theme of Innovative Community/Governmental Initiatives.

**American Structurepoint** of Indianapolis earned a National Recognition Award for exemplary engineering achievement from the American Council of Engineering Companies for new phosphorus removal and aeration systems at the Noblesville (Indiana) Wastewater Treatment Plant.

**Illinois American Water's Pontiac District** received a Partnership in Conservation Award from the Livingston County Soil and Water Conservation District.

**Fort Bliss Water Services**, a subsidiary of American States Water Co.'s American States Utility Services, received an Outstanding Activity Award from military leadership at Fort Bliss American by States Water Co. for its support to the 1st Armored Division, Fort Bliss Directorate of Family and Morale, Welfare and Recreation, and the El Paso (Texas) community.

The **Hollister Water Reclamation Facility**, operated by Veolia North America, received a 2020 Safety Plant of the Year Award from the Monterey Bay section of the California Water Environment Association.

The **Westborough (Massachusetts) Wastewater Treatment Plant** received a Wastewater Treatment Plant of the Year award from the U.S. EPA New England Division.

The **Laconia (New Hampshire) Water Department** received an award for drinking water fluoridation from the U.S. Centers for Disease Control and Prevention.

**Harrisonburg** received a 2019 Excellence in Waterworks Operations/Performance Award from the Virginia Department of Health.

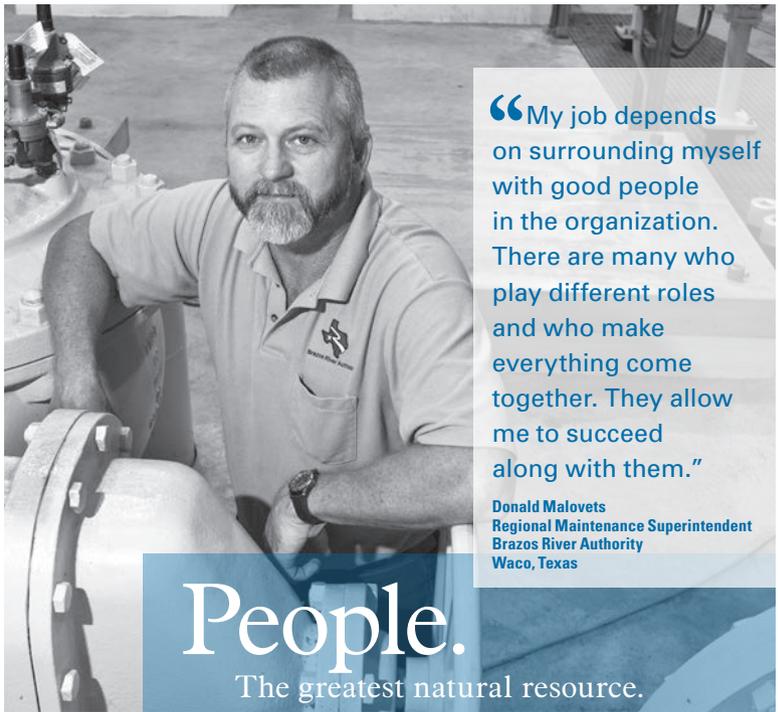
The **City of Deerfield Beach**, Florida, won the Water Project of the Year award for its West Water Treatment Plant Lime Contact Tank Rehabilitation Project and the Stormwater Project of the Year award for the Kingfisher Canal Outfall Treatment Structure Project from the American Public Works Association.

Superintendent **Steve Lamale** retired after 41 years with the Fremont (Ohio) Water Treatment Plant.

**Ben Crawford** was appointed Laconia (New Hampshire) Water Department superintendent, succeeding Seth Nuttelman, who retired.

**Jennifer Reynolds**, former deputy commander for South Florida for the Army Corps of Engineers, was named director of ecosystem restoration and capital projects for the South Florida Water Management District.

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



“My job depends on surrounding myself with good people in the organization. There are many who play different roles and who make everything come together. They allow me to succeed along with them.”

Donald Malovets  
Regional Maintenance Superintendent  
Brazos River Authority  
Waco, Texas

People.  
The greatest natural resource.



inspiring  
stimulating  
motivating

Savored by water and wastewater treatment professionals everywhere.

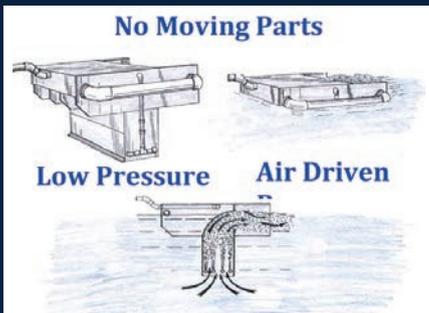
Get your fill for free. Subscribe at [tpomag.com](http://tpomag.com)

# "ADVANCED Lagoon Aeration with INNOVATIVE GREEN Technologies"



## REVOLUTIONARY CHANGES IN AERATION & MIXING

The DO2E High Volume State of the Art "Patented Aerator/Mixer System" injects High volume low-pressure air through a specially designed multi chambered air manifold located at the bottom of the unit. This unit creates a surface current up to 4 knots for a distance up to 100 ft. Using a unique combination of coarse air and fine air bubble aeration, we are able to maximize oxygen transfer throughout the water column. The fine air bubbles maximize the oxygen transfer while the coarse air bubbles provide the waters velocity.



## BENEFITS

### OF THE DO2E FLOATING AERATOR / MIXER

- Removes Blue Green Algae
- Increases Dissolved Oxygen
- High Volume Water Flow
  - Reduces BOD & COD
  - Reduces H<sub>2</sub>S Gas
- Reduces Ammonia Levels
- Oxidizes Hydro-Carbons
- De-stratifies the Water Column
- Reduces Energy Usage By Up to 80%
- Reduces Maintenance Costs By Up to 85%
- Replaces Outdated Commercial Mixers & Aerators
- Reduces Sludge Build Up By Up to 80%



### DO2E Waste Water Treatment, LLC

36220 Highway 59, Stapleton, AL 36578

p. 251-937-8200

e. randy@do2e.com

[www.do2e.com](http://www.do2e.com)

# ProSeries-M<sup>®</sup>

PRECISION PERFORMANCE JOINS FUNCTION & INNOVATION

Quality Metering Pumps and Flowmeters for  
Water & Wastewater Treatment



## MD-3

### DUAL DIAPHRAGM DESIGN

Provides smooth, gentle pumping action resulting in near continuous flow, making it suited for use even when dosing gaseous chemicals, such as peracetic acid.



## ALL NEW CHEM-FEED<sup>®</sup> MS-6

**PRECISION CHEMICAL FEED FLOWMETER**  
Accurately measure chemical feed in critical  
Water & Wastewater Treatment applications.



Blue-White is  
ISO 9001:2015  
Certified

PRECISION CHEMICAL METERING FOR OVER 60 YEARS  
**Blue-White** [www.proseries-m.com](http://www.proseries-m.com) • [www.blue-white.com](http://www.blue-white.com)  
5300 Business Dr., Huntington Beach, CA 92649 USA • 714-893-8529 • [info@blue-white.com](mailto:info@blue-white.com)