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SEPTEMBER 2018

**SUSTAINABLE OPERATIONS:
Going big for energy savings**

PAGE 24

Guardians of the Gates

Vernia Hawthorne
Utility Operator
Richmond, Virginia

**THREE WOMEN OPERATORS MAKE
THEIR MARK THROUGH DETERMINATION
AND CONSISTENT EXCELLENCE**

PAGE 38

**HOW WE DO IT:
Preparing for disaster**

PAGE 32

**TECH TALK:
Getting the most
from co-digestion**

PAGE 52



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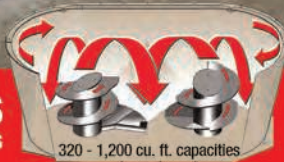
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advertiser index SEPTEMBER 2018

FREE INFO		FREE INFO		FREE INFO		FREE INFO	
ABB Drives & Controls	15	ClearSpan Fabric Structures	77	JDV Equipment Corporation	42	Roto-Mix, LLC	85
ABB Inc. - Instrumentation	35	Eagle Microsystems, Inc.	85	Keller America Inc.	45	SAF-T-FLO Chemical Injection	63
AdEdge Water Technologies, LLC	19	Edgewood Media Solutions, LLC	87	Komline-Sanderson	75	SEEPEX. ALL THINGS FLOW	
AERZEN	41	EleMech, Inc.	55	Kuhn North America, Inc.	4	SEEPEX Inc.	44
AlliMax Software	61	Enviro-Care Company	25	Lovibond Tintometer	81	Sensaphone	65
American Water Works Association	54	FCI - Fluid Components International	36	Lutz-JESCO America Corp.	back cover	Shand & Jurs	57
Analytical Technology, Inc.	5	Flottweg Separation Technology, Inc.	3	MELTRIC Corporation	89	Southern Valve & Fittings USA, Inc.	89
Andritz Separation, Inc.	56	FLOWROX Flowrox, Inc.	23	Myron L Company	90	SUEZ - Water Technologies & Solutions	21
AQUA-AEROBIC SYSTEMS, INC.	37	Fluence Corporation	42	Park Process	89	Sulzer Pumps Solutions Inc.	91
ASA Analytics	89	Gardner Denver Inc.	16	Penn Valley Pump Co., Inc.	51	TrojanUV	29
Badger Meter	7	Hach	11	Praxair, Inc.	85	Vaughan Company, Inc.	31
BDP Industries, Inc.	34	HUBER Technology, Inc.	9	Pulsed Hydraulics, Inc.	89	VEGA Americas, Inc.	79
Blue-White Industries	2	Hydro International	43	REXA, Inc.	81	Walker Process Equipment, A Div. of McNish Corp.	8
Boerger, LLC	80	International Products Corporation	17,33	Robuschi USA	71	WWETT Show	88
Centrisys/CNP	47					YSI, a Xylem brand	59
						CLASSIFIEDS	87

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on the cover

Vernia Hawthorne and colleagues Barbara Jackson and Jewel Minor at the Richmond (Virginia) Department of Public Utilities, entered the wastewater profession from different areas, but they had one thing in common: determination to succeed. (Photography by Ash Daniel)

top performers:

WATER / WASTEWATER OPERATOR Page 48

A Servant's Heart

Focus on faith, family, and community helps Chris Patterson build an award-winning career managing water, wastewater, and operations in Jacksonville, Alabama.

By Jack Powell

WATER PLANT Page 26

Doing It the Island Way

The reverse osmosis membrane water plant in Sanibel, Florida, thrives on autonomy in operator training, process improvements, and planned maintenance.

By Jim Force

WASTEWATER PLANT Page 12

Wheel and Spokes

An Alabama authority provides cost-effective treatment with an innovative mix of decentralized facilities and two major clean-water plants.

By Jim Force

WASTEWATER OPERATORS Page 38

Guardians of the Gates

Three women at the Richmond Department of Public Utilities have made their mark through determination and consistent excellence on the job.

By Trude Witham

LET'S BE CLEAR Page 8

Safety Is Boring

Few things seem more mundane than obsessing over the details of safe work practices. And that's exactly why the obsessing is so important.

By Ted J. Rulseh, Editor

@TPOMAG.COM Page 10

Visit daily for exclusive news, features and blogs.

HEARTS AND MINDS Page 18

Towering Tall

A model competition in Florida gives elementary to high school students hands-on experience in form-follows-function engineering.

By Scottie Dayton

PLANTSCAPES Page 22

A Boundary That Tells Stories

Fence-mounted Learning Centers on a newly upgraded pump station convey messages about water stewardship in Alexandria, Virginia.

By Jeff Smith

SUSTAINABLE OPERATIONS Page 24

Texas-Size Savings

Fort Worth goes big with a \$35 million energy savings performance contract and is ahead of schedule with payback on the investment.

By Steve Lund

HOW WE DO IT: WASTEWATER Page 32

The Value of a Dress Rehearsal

A mock storm drill helps the facility team in a Massachusetts town adopt a proactive emergency management plan and build resiliency.

By Bill Boornazian and John Struzziery

TECHNOLOGY DEEP DIVE Page 46

The Right Mix

A compact submersible mixer gives operators precise and automated control to improve process performance and reduce energy consumption.

By Ted J. Rulseh

TECH TALK Page 52

Keys to Success in Co-digestion

An industry workshop explores strategies for designing site-specific co-digestion programs that are mutually beneficial for utilities and the communities.

By Kelsey Beveridge

EXAM STUDY GUIDE Page 56

By Ron Trygar

Instrumentation Directory Page 58

IN MY WORDS Page 64

A Remedy for the Retirement Wave

The BAYWORK collaborative in the San Francisco area reaches out to attract new blood to the profession while helping existing operators sustain and expand their skills.

By Ted J. Rulseh

WEFTEC PRODUCT PREVIEW Page 66

New Technology Slated for WEFTEC 2018

By Craig Mandli

PRODUCT FOCUS Page 72

Digital Technology

By Craig Mandli

INDUSTRY NEWS Page 80

PRODUCT NEWS Page 82

Product Spotlights:

Wastewater: Instrument makes turbidity measurement clear

Water: Channel mixing on a large scale

By Craig Mandli

WORTH NOTING Page 86

People/Awards; Events

coming next month: October 2018

FOCUS: Tanks, Structures and Components/ WEFTEC Show Issue

» Let's Be Clear: Plant open house? Think like a Realtor.

» Top Performers:

Wastewater Plant: All in for irrigation in Collier County, Florida

Water Plant: Membrane ultrafiltration in Highland Park, Illinois

Water Operator: Wendy Schultz, lab analyst, Ann Arbor, Michigan

Wastewater Biosolids: AthenaGro Class A biosolids in Athens, Tennessee

» How We Do It: Centrifuge success in London, Ontario

» Sustainable Operations: Water plant cool roofs in Rockdale, Georgia

» In My Words: New training center opens in Maine

» PlantScapes: From eyesore to asset in Camden, New Jersey

» Hearts and Minds: Houston water festival marks 25 years

» Technology Deep Dive: FiltraFast compressible media filter



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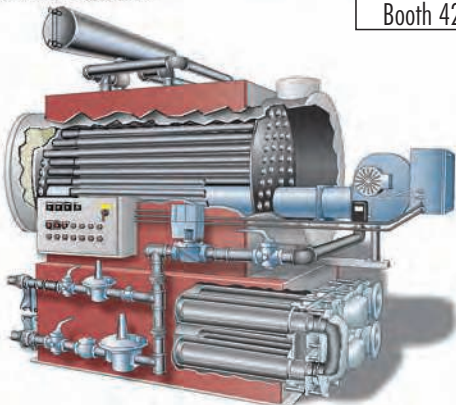
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let's be clear

Safety Is Boring

FEW THINGS SEEM MORE MUNDANE THAN OBSESSING OVER THE DETAILS OF SAFE WORK PRACTICES. AND THAT'S EXACTLY WHY THE OBSESSING IS SO IMPORTANT.

By Ted J. Rulseh, Editor



Now and then a *Treatment Plant Operator* reader calls or writes to say we printed a picture that shows someone working in an unsafe manner: not wearing safety glasses, wearing the wrong shoes, standing in a precarious place.

Our first response to such comments is: *Thank you!* We might not enjoy the embarrassment of having failed to notice a safety violation before giving a picture the green light. But we're glad to have the mistake pointed out, as a reminder to be more diligent. Now, if we are less than perfect about vetting

our pictures — and we do vet them — imagine all the imperfections that occur in daily, hectic life at a treatment plant.

So one has to ask: When the importance of safety is as basic as making sure everyone goes home from work in one piece, why is it so hard to sustain a safety culture? Why do people ignore rules created for their own protection? And why do employers sometimes enforce them less consistently than they should?

'IT WON'T HAPPEN HERE'

One theory I have is that for many of us, safety preaching aimed in our direction is boring. It sounds like nagging. Put on that protective gear? *Yeah, yeah.* Lock out and tag out that machine you're servicing? *Hey, it's a small job. It'll only take two minutes.*

Little petty rules just get in the way, right? Nothing bad ever happens when we neglect to put on a hard hat, or fail to shore a trench that's "only" 4 feet deep, or ignore frayed insulation on a power cord. Nothing ever happens — until it does. And then, well ...

Clean-water and drinking water treatment plants aren't notorious for being dangerous places, at least not when compared to coal mines or construction sites. But hazards still abound in the form of electrical equipment; wet floors; stairways, ladders, catwalks and railings; handling of chemicals; and more.

CREATING A CULTURE

Staying safe in any workplace isn't about individual people being extra careful. It's about culture. It's about leaders

insisting on safe practices — nevermind if the team members sometimes think it's all a bunch of nit-picking. It's also about leaders designing processes with safety as the paramount concern.

There's another thing leaders of safe facilities do, and that's avoid taking too much pride in statistics. Because what does an 11-year perfect safety record mean if next week someone gets injured or killed through carelessness or a bad process?

I once knew a mining company executive who had been in charge of a South American coal mine a number of years, during which time his site compiled a safety record — based on workplace injury statistics — that was far better than global norms for the industry.

"You must be proud," I once said to him. He replied, "I am ashamed to say that two workers were killed during the time I was in charge." In his view, the only acceptable injury

Little petty rules just get in the way, right? Nothing bad ever happens when we neglect to put on a hard hat, or fail to shore a trench that's "only" 4 feet deep, or ignore frayed insulation on a power cord. Nothing ever happens — until it does.

rate was zero. He felt that around any workplace mishap, there was always something that could or should have been done to prevent it. He refused to accept that "accidents happen."

ALL ON BOARD

That attitude starts from the top in any safety culture. And somehow it gets conveyed in ways that are not boring. Simply pestering people about safety — insisting that they "be more careful" — isn't enough. And yet there needs to be an obsessiveness about the mundane details of keeping the workplace safe.

The expectation — clearly and repeatedly communicated — is that first of all, everyone will go home each day without an intervening visit to a hospital. And that expectation is undermined unless every team member is on board with it.

In other words, yes, there are safety rules here, and yes, following them is a condition of working on this team. On that point there is no negotiation. In such a context, safety lessons become less mundane, less like nagging, less boring. That's part of how long spells of injury-free work get started, and continue. **tpo**

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OVERHEARD ONLINE

“A golf ball on a long skinny tee, a witch’s hat, a flashlight or a spaceship — these are all ways people have described water towers.”

The Shape of Water Towers: An Engineering History
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RENEWING THE WORKFORCE

A Pipeline to Opportunity

Building off previous workforce research, the Brookings Metropolitan Policy Program recently released an analysis of jobs involved in the construction, operation and maintenance of the country’s water infrastructure. The report emphasizes the vast scope of the U.S. water workforce, which employs workers across 212 different occupations. Get a look at the report’s key findings in this online exclusive article.

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COMMUNITY INVOLVEMENT

Effluent-Raised Salmon

Bangor, Maine, is experiencing a spike of tour requests and public interest due to its salmon release program. Since 2007, the city has worked with Fish and Wildlife Services to raise salmon in effluent from its wastewater treatment plant. Groups are then invited to the plant for the release, exposing them to plant services in the process. The event also highlights Class A Biosolids compost that the facility produces.

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MINI TREATMENT PLANTS

A Freshwater Mussel Hatchery

Living organisms have always been a part of water treatment, but a unique facility in Philadelphia is advancing that concept from microscopic organisms to filtering water with freshwater mussels. The city is building on its legacy of innovation with the nation’s first city-owned mussel hatchery, built with the end-goal of improving the quality of water drawn from the Delaware and Schuylkill rivers.

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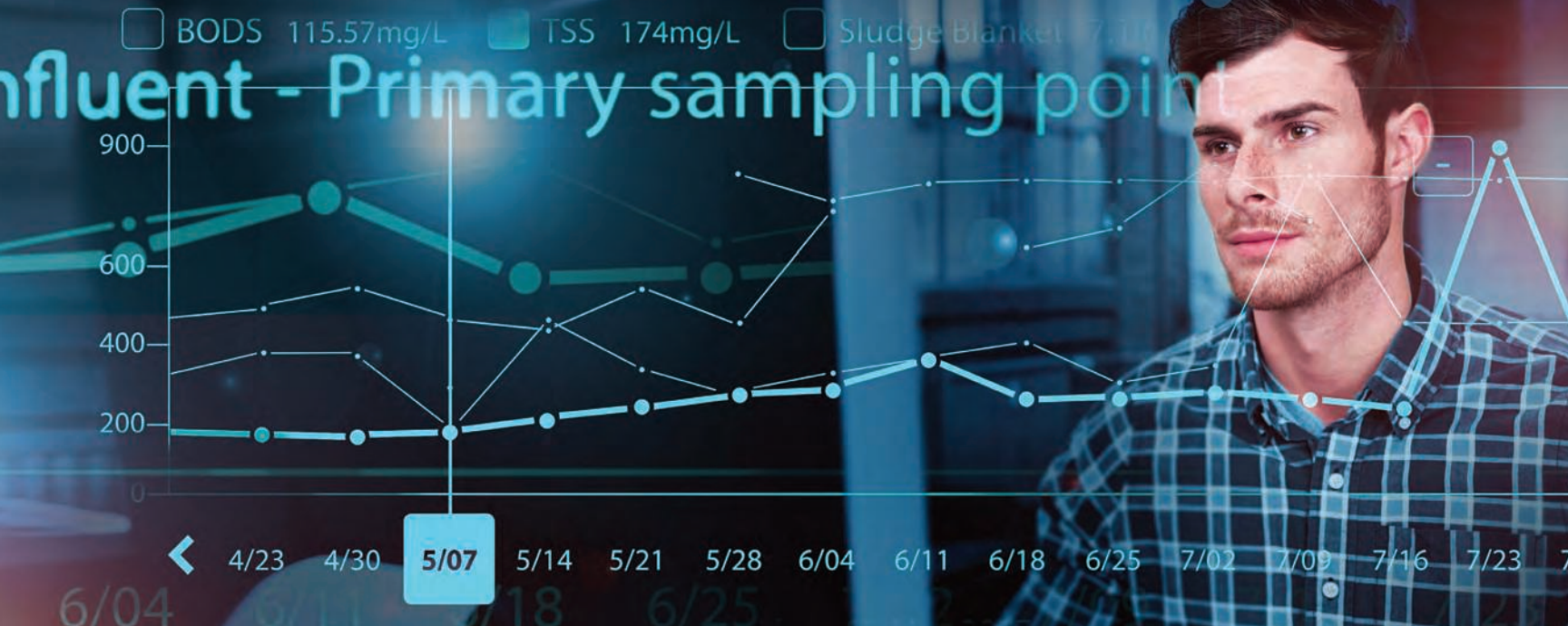


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Wheel and Spokes

AN ALABAMA AUTHORITY PROVIDES COST-EFFECTIVE TREATMENT WITH AN INNOVATIVE MIX OF DECENTRALIZED FACILITIES AND TWO MAJOR CLEAN-WATER PLANTS

STORY: **Jim Force** | PHOTOGRAPHY: **Martin Cherry**



The Harvest-Monrovia team includes, from left, Shawn Baker, wastewater operator II; Eric Edwards, wastewater II-MBR lead; Brent Kulavich, chief operator; Adam Smith, wastewater operator IV; Bobby Benefield, wastewater operator II / decentralized lead operator; and Byron Romine, wastewater operator IV.



Brent Kulavich checks on any overnight water usage spikes on the computer while Eric Edwards looks on.



THINK OF THE HARVEST-MONROVIA (ALABAMA) WATER AND SEWER AUTHORITY INFRASTRUCTURE AS A BIG WHEEL.

The Burwell Road and Jeff Road wastewater treatment plants form the hub; two small package plants and 19 recirculating sand filters in residential and commercial developments form the perimeter.

And the spokes? The seven multitasking members of the Harvest-Monrovia wastewater treatment team, who staff and maintain the treatment plants, service the filters, and maintain connections with customers. “Our operators don’t just pass the test; they can take care of everything you can think of,” says Brent Kulavich, chief wastewater operator. “They have a can-do attitude. We’re blessed to have them.”

A NOVEL APPROACH

While centralized treatment is in vogue at many utilities, it’s just the opposite at Harvest-Monrovia, near Huntsville in northern Alabama. There, the most effective approach is a series of small treatment facilities, strategically placed around the sprawling district, anchored by a pair of larger membrane bioreactor plants.

“It’s not ‘one size fits all’ here,” Kulavich says. The district has tailored the treatment plan to fit the rapidly developing community, applying the best and most cost-effective technologies.

After slowing because of the 2008-09 recession, development is speeding up again. The area serves as a bedroom community to Huntsville. “We’re adding rooftops,” says Mike Oliver, P.E., general manager.

Instead of building expensive sewer systems to reach outlying homes and businesses, Harvest-Monrovia uses 1,500-gallon partitioned tanks that developers install at each property. Liquid from the tanks is pumped to the recirculating sand filtration, or RSF, units. The effluent percolates into the groundwater through pressure-compensated drip tubing. Green space for the soil treatment areas is set aside at each filtration site.

PUMP AND GRAVITY

In these septic tank effluent pump (STEP) and septic tank effluent gravity (STEG) systems, the wastewater is pumped or gravity fed out of the tank based on usage. The solids remain in



Eric Edwards checks and documents permeate flow in the pipe gallery.

TORNADO ALLEY

Wastewater treatment is challenging enough without violent weather, like tornadoes. But that's what the team at the Harvest-Monrovia Water and Sewer Authority has contended with in recent years.

Alabama and the Harvest-Monrovia area have experienced many tornadoes in the last 40 years and have suffered serious damage from some. In April 1974, a pair of F5 tornadoes hit within a half-hour of each other, destroying most of Harvest and claiming 59 lives.

In May 1995, the Anderson Hills subdivision was destroyed by an F4 tornado. The worst storm hit on April 27, 2011, during what weather experts called a "Super Outbreak." The twister caused significant damage in Harvest and destroyed the Anderson Hills subdivision once again. Seventy-two people died.

On March 2, 2012, Harvest was hit again. Although there was no loss of life, the storms hit the same areas damaged the year before. "Most of my staff was here when those storms happened," says Brent Kulavich, chief of wastewater operations. "We were blessed in that we all survived, but we had catastrophic problems. There were houses all torn to pieces."

Mike Oliver, general manager, recalls, "It was a struggle — sheer misery. We didn't have power in the wastewater system for seven days." The Burwell Road and Jeff Road treatment plants ran on emergency power. At the recirculating filter sites, power came from generators on trucks connected to the filters.

One sand filter disappeared altogether. "No building, no fencing, just pipes sticking up out of the ground," Oliver says. "But we rallied. Our customers had service throughout the period."

the tanks, where anaerobic biological processes consume them. "The tanks, solids and all the maintenance of the systems belong to the authority," Kulavich says. "The customers pay a flat rate for the service. We provide 24/7/365 service calls on all the systems."

There are 19 RSFs in operation, and another is on the drawing board. They handle an average flow of 15,000 to 70,000 gpd and serve 30 to 200 homes. Backwashed solids from the filters remain in the tanks and are periodically cleaned out by vacuum trucks. Orenco Systems provides the filter controls; Atlantic Ultraviolet supplies the UV disinfection units.

Harvest-Monrovia (Alabama) Water and Sewer Authority

FOUNDED: | 1965

AREA SERVED: | 49 square miles

POPULATION SERVED: | 45,000

INFRASTRUCTURE: | Two wastewater treatment plants, two package plants, 19 decentralized recirculating sand filters, 17 miles of collections system, 30 lift stations

TREATMENT PROCESS: | Biological nutrient removal

TREATMENT LEVEL: | Secondary

RECEIVING WATERS: | Indian Creek, dripfields

BIO-SOLIDS: | Hauled offsite, dewatered, land-applied

ANNUAL BUDGET: | \$850,000 (operations)

WEBSITE: | www.hmwater.org

GPS COORDINATES: | Burwell Road Wastewater Treatment Plant:
Latitude: 34°49'51.68"N; longitude: 86°42'16.17"W
Jeff Road Wastewater Treatment Plant:
Latitude: 34°46'59.22"N; longitude: 86°42'56.67"W



“The tanks, solids and all the maintenance of the systems belong to the authority. The customers pay a flat rate for the service. We provide 24/7/365 service calls on all the systems.”

BRENT KULAVICH

“We have no major river to discharge to, and the community continues to grow with commercial and residential developments popping on the outskirts,” Kulavich says. “It would cost an astronomical amount to connect those developments to the main sewer system.”

The package plants serve two subdivisions and may eventually be tied into the overall system. One at Stoney Creek uses extended air biological treatment technology (McNeill Water & Wastewater) and handles 20,000 gpd. The other, at Hunter’s Crossing, is an STM-Aerotor nutrient-removal unit (WesTech Engineering) with 72,000-gpd average flow.

THE HEAVY LIFTING

At the center of the system are the Burwell Road and Jeff Road wastewater treatment plants, which use KUBOTA Membrane USA submersible membranes for biological treatment and nutrient removal. The absence of clarifiers helps the process fit into small footprints.

The Burwell Road plant (250,000 gpd design, 150,000 gpd average) has fine screens in the headworks. A flow equalization step includes an anoxic zone, followed by the MBR and a UV disinfection system (TrojanUV). The scheme at Jeff Road is iden-

tical except that the flows are larger (500,000 gpd design, 200,000 gpd average). Effluents from both plants discharge to Indian Creek.

Kulavich says the effluents contain essentially no ammonia or CBOD: “We put out the best water we can every day. We don’t have violations.” Biosolids from both plants are trucked at about 3 percent solids to nearby Madison Utilities for dewatering by centrifuge. The cake is land-applied on farms.

The two plants have the only submerged MBRs in Alabama, but that novelty hasn’t kept them from award-winning performance. The Burwell Road plant received an Award of Excellence from the Alabama Water Environment Association in 2014, 2016, and 2017 and the Best Operated Plant



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Burwell Road Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
TSS	310 mg/L	ND	6 mg/L
CBOD	140 mg/L	0.987 mg/L	1.2 mg/L summer
NH₃-N	N/A	0.5 mg/L	0.25 mg/L summer

Jeff Road Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
TSS	125 mg/L	0.03 mg/L	30 mg/L
CBOD	85 mg/L	0.74 mg/L	16 mg/L
NH₃-N	N/A	0.04 mg/L	4 mg/L summer

Award from the Alabama Water and Pollution Control Association in 2016, 2017, and 2018. The Jeff Road plant won the Alabama Water Environment Association Award of Excellence for 2018.

CROSS-TRAINED TEAM

With such a mixture of treatment systems, and with close customer contact through the STEP-STEG units, staffing and communications are critical. Consistency helps. “Except for two, all our people were hired and trained within,” Kulavich says. “We have about a five-year learning curve. Every staff member has been the primary operator for every piece of equipment in the system. They’re cross-trained every couple of years through rotation.”

Bobby Benefield and Eric Edwards, lead operators, are responsible for all the biological treatment operations at Burwell Road and Jeff Road, as well

as the package plants. Operators Andrew Sokolik, Adam Smith, and Byron Romine handle the house calls and RSF scheduled maintenance. Shauwn Baker is responsible for collections and lift stations.

“We all come to work at the same time every morning,” Kulavich says. “We talk for about 15 minutes and then get together and talk again in the afternoon. Our two lead operators help to oversee the normal operation and prioritize things. We have highly motivated folks here.

“The team has a good understanding of how everything operates — seeing pressure differentials, for example, and understanding what that number means. Is it a critical problem or something that’s hydraulically induced?” The staff members also understand and appreciate safety; they’ve had no lost-time accidents for the past three years.

TAKING CARE OF CUSTOMERS

The decentralized system requires operators to respond to alarms and maintain close contact with customers. “Each operator is on a call schedule,” Kulavich says. “They respond to emergency after-hours calls during the week and during the weekends. Screens need cleaning; pumps require maintenance.”

Customer complaints require attention as well. “We take responsibility at the tank in the customer’s yard,” Kulavich says. “We’re a very visible authority, and to some operators, it’s a culture shock because they’re not used to dealing that closely with customers.”

Each house has an alarm system, and customers have the authority’s phone number. “It rings through to the water plant,” Kulavich explains. “We go back to the house and figure out the problem and resolve any issues. We try to leave a situation where everybody feels good. We appreciate our customers. They’re our boss!”

The authority’s Wonderware (AVEVA) SCADA system plays an important role: “It serves as one central hub. We can see all the operating sites: all of the sand filters and the data at the package plants, as well as the bigger plants. It brings all the information to one point in real time.”



To learn more about the Harvest-Monrovia (Alabama) Water and Sewer Authority, take a look at its video profile at www.tpomag.com.

The Harvest-Monrovia operator teams are cross-trained to work with every piece of equipment. The Burrell Road plant uses Kaeser rotary blowers to aerate the effluent.

Teamwork and idea-sharing pay off. As an example, Kulavich remembers a few years ago when a large submersible waste activated sludge pump began to act up. Rather than purchase a new one at considerable cost, the staff realized that an air header was available in the mixing tank, so they tapped off it and converted the problem pump into a 4-inch airlift pump. "It's a simple, old technology," Kulavich says. "It does the job, saves on power, and cost us about \$150, versus \$5,000 for a new pump."

STILL GROWING

Development in the area shows no sign of diminishing; Kulavich says the growth rate could hit 30 percent per year. A proposed automobile plant providing 4,000 jobs would boost the population and create even more "rooftops."

"Growth is coming, north and south," Kulavich says. "Our job will be to maintain the water quality in our area." **tpo**

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Towering Tall

A MODEL COMPETITION IN FLORIDA GIVES ELEMENTARY TO HIGH SCHOOL STUDENTS HANDS-ON EXPERIENCE IN FORM-FOLLOWS-FUNCTION ENGINEERING

By **Scottie Dayton**



PHOTOS COURTESY OF SHELBY HUGHES

Newsome Wolves team members Audrey Hill (left) and Lauren Steenland, 10th-graders at Joe E. Newsome High School, chose a bowl with aquatic decorations as their tower design.

Filling the void created by retiring water professionals is a nationwide challenge. So is the question of how to expose young people to rewarding water industry careers.

The Florida Section of the American Water Works Association has an answer — and it’s fun. It’s a competition in which elementary to high school students build model water towers that fill, hold, and drain water without leaking or collapsing. They’re visually interesting, too.

Conceived in 2004 by Tod Phinney, former Bradenton water engineer, the Model Water Tower Competition has expanded to eight of the 12 Florida AWWA regions and into Virginia, Georgia and Missouri.

“Most students who participate are passionate about science, and they often compete for more than a year,” says Shelby Hughes, civil engineer with Kimley-Horn and Associates and Region IV competition chair. Teachers choose four students per team; then a class competition determines the best five entries. “By limiting the number of entrants per school, judges can evaluate 70 to 100 towers in six hours,” Hughes says.

Water professionals judge the models based on cost-efficiency, hydraulic efficiency, structural efficiency, and design/materials ingenuity. Contestants receive a Certificate of Participation, and awards of \$300, \$200, and \$100 go to the top-three finishers in all school categories.

“The prize money is definitely the first incentive for students,” Hughes says. “Then they discover what it is like to build something with their hands, and they become very creative. I’ve seen many inspired designs, including the Lorax, spaceships, Alice in Wonderland, Minions, and actual water towers.”

SHARING SUCCESS

To encourage more regions and states to take part, Hughes and the AWWA Public Affairs Council assembled a packet with rules, competition information, templates, presentations, work documents, scoring sheets, and a section on how to handle discrepancies and problems. “We keep everything on Google Drive for accessibility,” Hughes says. *(continued)*

“We want students to use milk jugs, wire clothes hangers and everyday household goods. They lose points for purchased items.”

SHELBY HUGHES



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Group 2.9 (left) and RP Dragon 1, two 2016 eighth-grade teams from Roland Park Middle School, pose with their models. Tanks must fill and drain using supplied 3/8-inch connectors.

For those who wish to form a competition planning committee, Hughes recommends joining their AWWA section to find like-minded people. For help getting started, planners can contact her or the chair from any region that has hosted a competition.

The first order of business is to persuade schools to participate; coordination and an early start are the keys to success. To reach many educators as quickly as possible, Hughes targets the state's annual STEM Leadership Summit.

"We give a presentation and bring a model water tower to show how simple it is to make," Hughes says. "An early introduction enables teachers to include the competition in that year's lesson plans. All you need are a few passionate advocates moving between schools and different regions to expand the competition."

Besides early coordination, good information is crucial. "Many teachers feel overwhelmed or uncomfortable instructing students on how to build a water tower, but they rise to the challenge if given the tools and adequate time," Hughes says. "Finding an open Saturday to schedule the competition is probably the hardest part."

Region IV holds its competition at centrally located Walker Middle Magnet School in Odessa. "Schools are ideal locales because everything we need is available and they are happy to host it," Hughes says. The competition requires running water, tables, a covered outside space, an auditorium for judging and award presentations, free parking, and a cafeteria. "We want it as easy and affordable as possible so the entire family can attend," Hughes says.

FAMILY FRIENDLY

To entertain contestants and siblings, the event includes a disc jockey, a Popsicle stand, drinks, snacks, and pizza for lunch. Interactive booths are also available. At one booth, students build clay boats to learn about buoyancy. At another, an enviroscope demonstrates the water cycle and water and wastewater treatment. Students visit the booths to earn raffle tickets for small prizes.

Competition day draws 30 to 40 volunteers from the Florida Section and all facets of the industry to run it. Judges pump a gallon of water into the 1.5- to 2.5-foot-tall towers and then drain them by gravity — twice.



A Royal Water Tower eighth-grade team from Roland Park Middle School won the 2016 Most Decorative award.

To keep participants from buying their way in, cost-efficiency scores are based on recycled materials used.

"We want students to use milk jugs, wire hangers and everyday household goods," Hughes says. "They lose points for purchased items."

Volunteers make the event happen, and Hughes discovered that even people in her office were eager to help. "All it takes is a champion to start the competition," she says. "Then it creates its own momentum. The way it took off in Florida, I'm certain we'll see a state and national competition eventually." **tpo**



Eighth-grader Anish Dhanashekar from Terrance Community Middle School represents the One World One Sport team. Her tower honors the teams competing in a European soccer championship.

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ready for the resource revolution



A decorative fence at an Alexandria pump station includes displays that convey educational messages like this one.

A Boundary That Tells Stories

FENCE-MOUNTED LEARNING CENTERS ON A NEWLY UPGRADED PUMP STATION CONVEY MESSAGES ABOUT WATER STEWARDSHIP IN ALEXANDRIA, VIRGINIA

By Jeff Smith

Making a formerly invisible wastewater treatment operation highly visible is an unspoken theme of construction projects at Alexandria Renew Enterprises (AlexRenew).

Nearly four years ago, the utility buried its new Nitrogen Management Facility under a soccer field (*Treatment Plant Operator*, June 2016). Now, the field is heavily used and is managed by the Alexandria (Virginia) Recreation, Parks and Cultural Activities Department.

In spring 2017, the organization installed 10 interactive Learning Center exhibits along a new architectural-style 8-foot-high fence around a pumping station that conveys wastewater to the 54 mgd treatment facility. “It’s all about being a good neighbor and telling people about what’s going on behind the fence,” says Lisa Van Riper, director, enterprise communications.

EDUCATIONAL MESSAGES

Each Learning Center delivers a message about the pumping station and the process cycle, ranging from “How Water Gets Dirty” to “Resource Recovery.” Each is connected to the next by a graphic display on the fence of water flowing through pipes.

Creative panels fabricated from aluminum plate or acrylic phenolic resin are attached to the fence with continuous square channel standoffs

and stainless steel bolts. Graphics and text are silk-screened. Elements of each exhibit are painted with Newport blue, AlexRenew’s official paint color, and then clear-coated.

Five of the Learning Centers are so hefty that they sit on concrete slabs bordered by a decorative brick miniplaza. The “How Water Gets Dirty” unit is a 6-foot-long, 24-inch-diameter simulated concrete pipe supported in a cradle with steel legs mounted to the slab. A 4-foot-long clear acrylic viewing port reveals a simulation of wastewater flowing through the pipe. Painted cast resin objects embedded in the flow present a realistic image.

GREAT GRAPHICS

A part of the Learning Center named “This Is a Pump Station” includes a 3-foot-long, 24-inch welded steel pipe mounted vertically on the concrete slab. An acrylic clear cover, mounted at a 30-degree bias on the pipe’s end, allows viewers to peer into the pipe. A welded 6-inch pipe assembly extends 2 feet from the side with a 90-degree elbow supporting an eccentric plug valve. A clear acrylic viewing port is bolted to the valve flange.

“Resource Recovery” presents a realistic rain barrel with a brass drain-faucet emptying into a secured watering can. Steel pipe simulating a downspout is strapped to the fence and flows into the barrel. A solar-powered rain



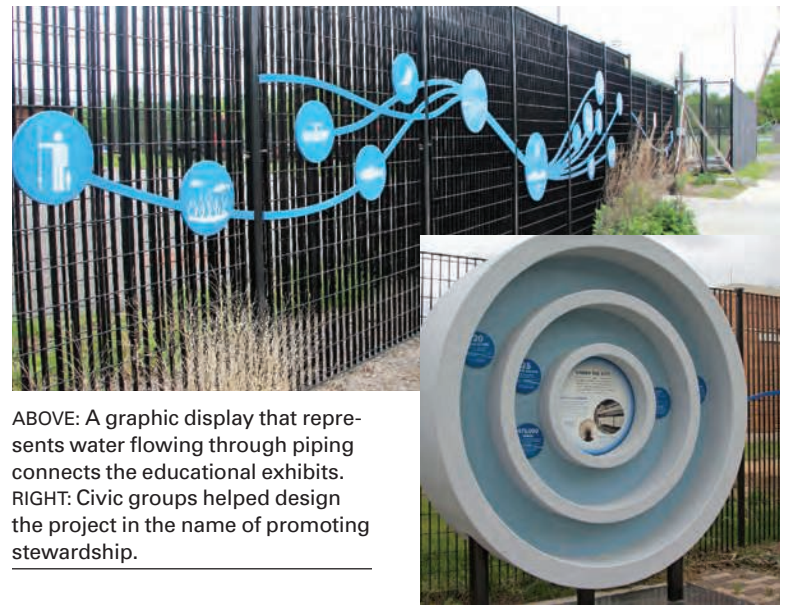
The fence exhibits were part of a pump station upgrade that included new grinders and submersible pumps, an electrical building, and an odor-control system.

gauge is mounted nearby. Several graphic panels are strategically mounted and explain each exhibit. Other exhibits are entitled “Stormwater Management,” “Good Neighbors,” “Under the Scene” and “What You Can Do.”

“Mechanics of Pumping” has a 4-foot-high, 4-inch-diameter aluminum pipe that contains an aluminum plunger that can be moved with a handle. Viewing slots in the “pump” body allow visitors to observe the progress of a 2.5-inch acrylic blue ball as it is lifted by the plunger to a return tube.

LANDSCAPE ENHANCEMENTS

The interactive exhibits were part of a \$7.4 million upgrade to the Four Mile Run pump station. New grinders and submersible pumps were installed, an electrical building was constructed, and an odor control system was added to the station, which is more than a century old.



ABOVE: A graphic display that represents water flowing through piping connects the educational exhibits. RIGHT: Civic groups helped design the project in the name of promoting stewardship.

Landscape enhancements provide the finishing touch to the fence and exhibits. Attractive grass has been planted as a border along a concrete sidewalk that parallels the fence. Eastern redbud trees are strategically placed near the Learning Centers.

During the project’s planning phase, AlexRenew solicited input from the public. Help and direction came from civic groups such as the Four Mile Run Restoration Task Force and the Arlandria Action Plan Advisory Group, which includes stakeholders from the neighborhood. Van Ripper says, “The whole idea is to inspire water stewardship and provide education about clean water infrastructure in our city.” **tpo**



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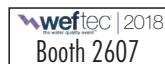
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Texas-Size Savings

FORT WORTH GOES BIG WITH A \$35 MILLION ENERGY SAVINGS PERFORMANCE CONTRACT AND IS AHEAD OF SCHEDULE WITH PAYBACK ON THE INVESTMENT

By Steve Lund

The Fort Worth, Texas, Village Creek Water Reclamation Facility is big — it is rated at 166 mgd.

So to be meaningful, an energy savings program also has to be big. Fort Worth officials decided a \$35 million investment would do the job. It appears they were right: The program launched in 2010 is already several million dollars ahead of schedule on savings.

The utility entered a performance contract with Johnson Controls for \$35 million with an energy savings guarantee of \$41 million over 13 years. Major parts of the project included improvements in the aeration system

“We’re looking at the cost of power generation and what our needs are and what’s that sweet spot between our power production efforts and what we buy off the grid.”

JERRY PRESSLEY

such as new diffusers and switching to dissolved oxygen control; a heat recovery steam generation system and installation of steam-driven blowers; SCADA system replacement; digester mixer upgrades; and construction of a high-strength waste co-digestion facility.

HEAT RECOVERY

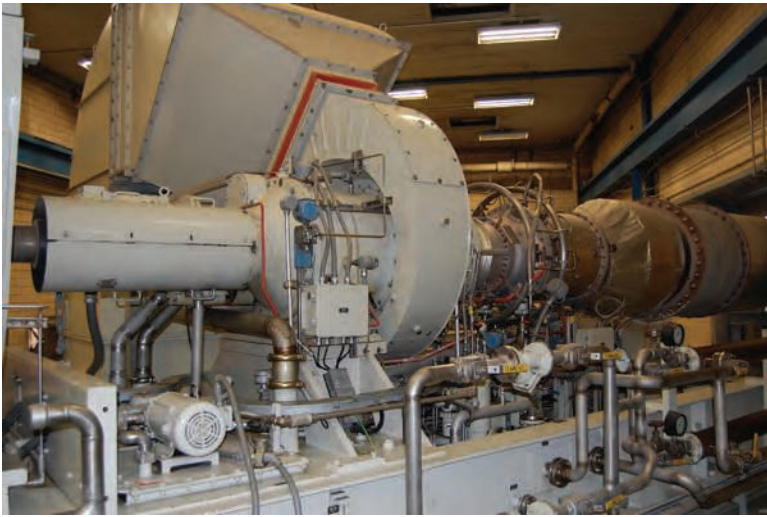
The Village Creek plant, with 110 employees, serves nearly 900,000 residents in 23 communities. The plant’s average flow is about 100 mgd; its size creates some unique opportunities. Among these is the use of steam to operate blowers for the aeration process.

Jerry Pressley, plant superintendent, believes Village Creek is the first wastewater treatment plant to use the process. “The combustion turbines we use to burn our methane gas are not very thermally efficient,” Pressley says. “There’s a lot of waste heat. Our consultants found a way to take that waste heat, enhance it and add to it to generate the amount of steam that would be necessary to run the steam-driven turbines.”

The steam powers blowers that can replace two 25,000 cfm electric blowers. The plant also uses methane from its 14 anaerobic digesters to generate electricity. The methane, burned in two 5.2 MW Solar Taurus 60 turbines paired with Kato Engineering generators (Nidec Motor Corp.) can meet 65



The co-digestion building facility received high-strength liquid food from a variety of sources.



Biogas is burned in two 5.2 MW Solar Taurus 60 turbines paired with Kato Engineering generators (Nidec Motor Corporation).

to 70 percent of plant power requirements. Before the steam system came online, the plant produced about 50 percent of its electricity.

Village Creek enhances methane production by adding high-strength liquid food waste to the digesters. The material comes from a variety of sources, including soft drink bottlers, food waste processors, and a biodiesel producer. Ovivo USA linear mixers in six of the 1.2- to 1.4-million-gallon digesters blend the food waste in. The plant produces about 85 dry tons of biosolids per day — low for a facility its size, according to Pressley. Nearly all the biosolids are land-applied on farms in seven surrounding counties.

DRIVING DOWN DEMAND

While ramping up power production, Village Creek made changes to reduce the need for electricity. “They really are two sides of the same coin,” Pressley says. “We reduced our baseline power demand by a variety of fairly straightforward efforts: changing air handling, some motor exchanges, and lighting upgrades to more energy-efficient LED systems. We installed an automated ROAM system (Acuity Brands Lighting) that enables us to turn off lights throughout the plant.”

A major part of the project with Johnson Controls was an upgrade of the aeration system with more than 75,000 9-inch fine-bubble membrane diffusers from SSI Aeration. Other smaller-scale changes are ongoing.

“We’ve made a conscious effort to reduce power demand throughout the plant as we have the opportunity,” Pressley says. “As our operations and maintenance budgets allow, we continue to replace older lighting with LEDs.” The team is also replacing older pumps and motors with more efficient models.

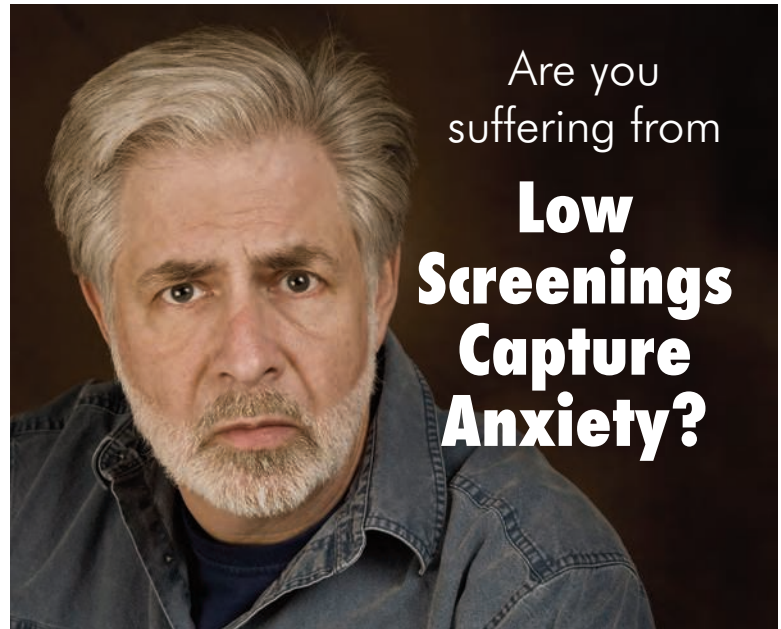
TOWARD NET ZERO

As recent investments in energy production and conservation pay off, Fort Worth officials are wondering how far they should go down the path to net-zero energy. One vision that guided energy investments was that the plant would eventually be off the grid.

“We’ve stepped back from that a little bit,” Pressley says. “We’re trying to make the best decisions about where we would like to be in terms of our cogeneration and onsite power production. We’re looking at the cost of power generation and what our needs are and what’s that sweet spot between our power production efforts and what we buy off the grid.”

Net zero isn’t off the table: “We’re conducting some additional studies to determine long-term viability. It’s not easy. It’s not cheap. We have to make a business decision on the investment that it would take to get there.

“Maintaining the connection to the grid is important for a lot of reasons. Our size puts us at a level that affords us some priority if power is lost. We get power from two different substations with three different feeds into the facility. That’s nice for redundancy.”



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THE CORE BUSINESS

Ana Pena-Tijerina, engineering manager for the Fort Worth Water Department, added a couple of other concerns: “As large as we are and as old as this facility is, we face challenges every day with aging infrastructure. We have to put a lot of thought into how we use the funding that’s available. We are evaluating everything and making sure we make the best decisions.”

Given that the price of electricity from local utility Oncor Electric is relatively low, investing in energy production may not always be the best use of resources. “There are many lessons learned through the years. Energy systems are complicated. We should not forget our core business, which is treating water.” tpo

Doing It the *Island* *Way*

THE REVERSE OSMOSIS MEMBRANE WATER PLANT IN SANIBEL, FLORIDA, THRIVES ON AUTONOMY IN OPERATOR TRAINING, PROCESS IMPROVEMENTS, AND PLANNED MAINTENANCE

STORY: **Jim Force**

PHOTOGRAPHY: **Darron R. Silva**

THEY DON'T HIRE LICENSED OPERATORS WHEN there's an opening at the Island Water Treatment Plant in Sanibel, Florida.

"We take new people and train them ourselves," says Pat Henry, production manager. "It takes a newcomer about three years to learn the water plant, depending on their mechanical ability. We'd rather have it done the Island Water way."

The results speak for themselves. The 5.99 mgd Island Water plant, owned and operated by The Island Water Association, has used reverse osmosis membranes on brackish water for nearly 40 years. It turns out a pristine product for its 14,600 customers and regularly wins the Florida Department of Environmental Protection Operations Excellence Award for communities its size. It serves as a model for RO desalting and hosts the Southeast Desalination Association Conference every four years.

BRACKISH WATER

Island Water, a nonprofit, member-owned potable water utility faces raw water that is high in salt and minerals. It comes to the brackish Hawthorn and Suwannee aquifers through a series of 15 wells drilled 500 to 700 feet deep. The plant draws from nine wells at any given time, rotating them monthly.



The Hawthorn aquifer can supply about 300 gpm and the Suwannee about 600 gpm. Total dissolved solids, or TDS, average about 3,000 ppm. In-line monitors from Great Lakes and GF Signet (GF Piping Systems) track pH and turbidity into the plant. Henry notes that his staff first feeds an anti-scalant to the water to keep the salts and metals in solution so they won't precipitate onto the membrane surfaces.

After that, the raw water passes through a series of Parker Bioscience Fulflo Avasan cartridge filters to remove solids ahead of the membranes. "These are 1-micron polypropylene melt-blown filters," Henry says. "We have 354 of them and change them out every seven to nine months." Exiting the cartridges, the water is pumped into the RO system. The Sanibel plant has six RO trains, each containing 120 ultrathin spiral-wound Filmtec membrane modules from Dow Water & Process Solutions. Operating pressure is 176 psi.

LOWER PRESSURE, LESS ENERGY

Henry says, "Originally, we ran at 300 psi, but by working with Dow and developing new technology, we've been able to reduce the pressure and save energy. We had a Dow test unit on one of our trains for about 10 years and collected data for them." By running the water through the membranes in a

two-pass system, Island Water can remove more and more of the dissolved solids, until the TDS in final permeate water is about 145 ppm.

Each membrane train has a two-pass 14/6 array, which means there are 14 vessels on the first pass and six on the second. The feed into each membrane train is 626 gpm, and the first pass-through does the brunt of the work, producing about 450 gpm of permeate water. The second pass produces about 50 gpm.

"The elements are hooked together so that the concentrate (reject) water from the first element feeds the second element, and so on," Henry says. "After the first pass, the interstage TDS is about 9,500 ppm in the concentrate; the TDS in the final increases to 14,200 ppm."

EFFICIENT RECOVERY

"Our recovery rate is 80 percent," Henry says. "Eighty percent of the brackish feed water is recovered as high-quality potable water, while 20 percent is collected as concentrated brine water." The concentrate is pumped to a deep well where it is injected along with excess reclaimed water from the Sanibel Island wastewater treatment plant. Well depth is 3,300 feet.

The operation produces an average of 500 gpm of drinking water per train. The membranes can produce up to 600 gpm, "although we haven't needed to do that in years because of plentiful rainfall," Henry says. Actually, the membranes do too good of a job removing contaminants. The plant blends about 6 percent of the raw water back in to stabilize the RO water, which is too aggressive and corrosive: "The membranes remove too much calcium and alkalinity."

The final product water is pumped into a clearwell and disinfected with chlorine gas so that a residual of 1.6 ppm is maintained throughout the 101.5-mile distribution system. Just before that, a corrosion inhibitor is added that coats any copper piping in the distribution system with a zinc film for compliance with the 1991 Lead and Copper Rule. From the clearwell, the product water is pumped to two 5-million-gallon storage tanks on site and then into the distribution system at 65 to 76 psi.

"Our demand peaks around March/April, the height of the tourist season, when pools are being filled and lawns watered," Henry says. "During the summer rainy season, we can't give it away." Sanibel is on year-round watering restrictions issued by the South Florida Water Management District.

To oxidize the hydrogen sulfide in the water, Island Water feeds chlorine gas into a looped system of product water that is fed back to the permeate stream. The loop goes from the plant out to the chlorine building and then back to the plant.

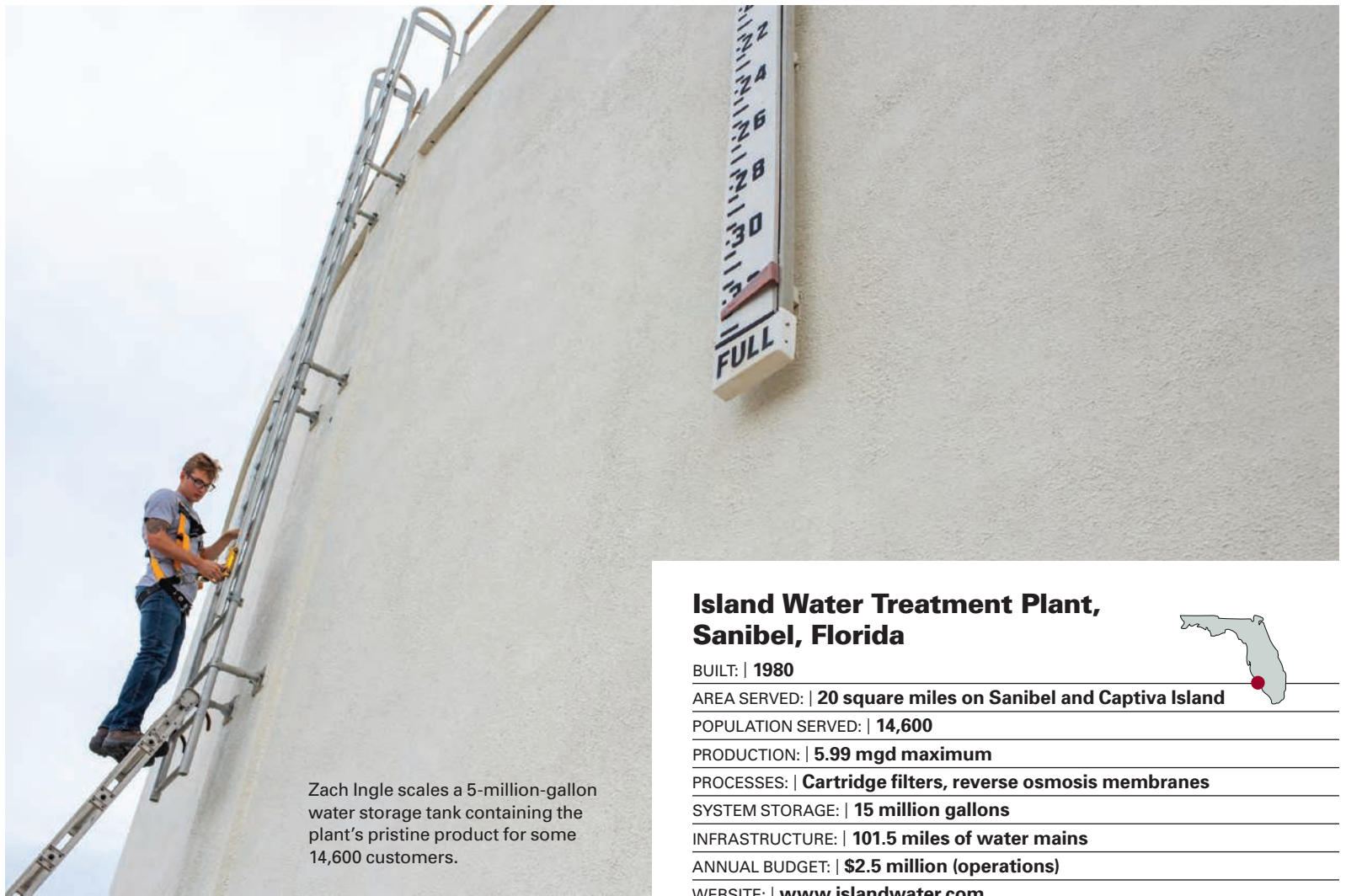
In addition to reducing membrane feed pressure, Island Water saves energy by recovering the pressure from the brine valves on each membrane train. "Each train's brine pressure is fed back to an energy recovery turbine hooked up to our spare pump," Henry says. That procedure reduces the power draw from the pump motor by about 50 percent.



“We’re not like a normal plant where operators just come in and sit in front of a monitor. We don’t slam them with everything at once.”

PAT HENRY

Plant operator trainee Zach Ingle demonstrates a chlorine test at the Island Water Association reverse osmosis water treatment plant on Sanibel Island.



Zach Ingle scales a 5-million-gallon water storage tank containing the plant's pristine product for some 14,600 customers.

Island Water Treatment Plant, Sanibel, Florida



BUILT: | 1980

AREA SERVED: | 20 square miles on Sanibel and Captiva Island

POPULATION SERVED: | 14,600

PRODUCTION: | 5.99 mgd maximum

PROCESSES: | Cartridge filters, reverse osmosis membranes

SYSTEM STORAGE: | 15 million gallons

INFRASTRUCTURE: | 101.5 miles of water mains

ANNUAL BUDGET: | \$2.5 million (operations)

WEBSITE: | www.islandwater.com

GPS COORDINATES: | Latitude: 26°26'34.18"N; longitude: 82°6'40.99"W

TRAINING AND SAFETY

As for the business of hiring and training new operators, "In those first two to three years, we train an operator to obtain a Class C license and be able to help us run the plant," Henry says.

"We're not like a normal plant where operators just come in and sit in front of a monitor. We don't slam them with everything at once, and we don't just have them come in here and read manuals. We sit them down with the safety data sheets first. Then they run the boosters with one of the licensed guys. They are on probation for 90 days.

"They have to complete two home study courses using the California State University, Sacramento, Volumes 1 and 2. They must sit for their C level state exam within one year, their B level by the third year, and their A level by the fifth year."

Even though the plant is a Class B operation, the staff is strongly encouraged by the Board of Directors and the general manager to obtain the Class A level license. "We want them to continue their education," Henry says. The utility helps pay for the extra training as an incentive.

Also, in their first year, new operators get accustomed to shift work, rotating every month from days to nights. "They also learn all plant processes, paperwork, lab procedures, how to handle chemicals safely, and a lot of cleaning and painting," Henry says.

Safety is a high priority, and Henry and staff pay special attention to handling chlorine components, and plant security. In fact, all staffers are trained to become certified hazmat team members. "We get everybody up to the 40-hour hazmat commander level within two to three years," Henry says. "Island Water pays for all the hazmat training. We're all qualified to change out our chlorine cylinders. If we get a leak, we can contain it."



Plant operator trainee David Coleman and colleagues are strongly encouraged by the board of directors and the general manager to progress to higher-level licensing.

A PRODUCTIVE PARTNERSHIP

It's a partnership that goes back decades: Dow Water & Process Solutions and Island Water. Over that time, the relationship has produced valuable experience and data to help both parties learn more about and improve the performance of reverse osmosis.

"They're a great group and a great plant," says Craig Granland, senior account manager with Dow, maker of the Filmtec membranes in use at Island Water. "I've been to plants where treatment is just a job. But at Island Water, it feels like more. They're very conscientious in how they operate."

Pat Henry, Island Water production manager, returns the compliment: "They are fantastic people to deal with. If there's an issue, they fly right down here." Dow installed the first batch of RO membranes at the plant more than 30 years ago. The original membranes were recently replaced with Dow's new XLE units, substantially improving energy efficiency.

"They were operating at 300 psi pressure in the beginning, and now the operating pressure is around 176 psi," Granland says. He notes that the work with

Island Water has produced data that helped advance RO knowledge and the technology of salt removal.

"It's a good example because the source water there is fairly good quality, meaning it doesn't change a lot but has a relatively high salt content," Granland says. Dow has used the data from Island Water in internal papers, case studies and published articles: "We've always provided our latest and greatest to Island Water and have been able to generate good information on feed pressure, salt rejection, and long-term stability of our products."

“Our demand peaks around March/April, the height of the tourist season, when pools are being filled and lawns watered. During the summer rainy season, we can't give it away.”

PAT HENRY

The plant is staffed by a pair of operators, 24 hours a day, with two 12-hour shifts, even though state requirements specify a minimum of 16-hour operator coverage per day. Henry explains that it's better to have two pairs of eyes. "One 'Oh, crap' will cancel out 1,000 'Attaboys,'" he says.

DOING IT IN-HOUSE

The thorough training and staff expertise enable Island Water to operate efficiently and cost-effectively; the plant doesn't have to rely on outside contractors for most work. Ron Freitag, chief operator, estimates the Island Water staff saved about \$250,000 a couple of years ago by re-piping the entire chlorine system. "The old PVC pipe was getting pretty brittle," he says. "We used new 1-, 2-, and 3-inch pipe throughout the system — in the plant, underground, and inside the chlorine building."

The rebuild took more than three years and consisted of over 2,000 feet of piping. The staff used equipment from the engineering department, and staffers from there also handled the marking of the

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replacement line. “Their help was a nice part of doing this project in-house,” Freitag says.

Operators also save money and learn a lot by changing out the RO membranes. “By opening the end caps and replacing the membranes, we learn all the parts and see inside the vessels,” says Brandon Henke, assistant chief operator. Doing it in-house saves about \$10,000 per train, and Island Water can offset its own costs by reselling the used membranes.

In another project, the staff replaced the entire plant air pressure system piping with OSHA-approved polypropylene pipe reinforced with an aluminum core. “It’s great hands-on learning,” Henke says.

Freitag supervises the plant’s extensive preventive maintenance program. It uses a spreadsheet to track 70 to 80 items and tasks weekly, monthly, semiannually and annually. The source of the program? In-house, of course.

MULTIPLE AWARDS

These improvements, along with outstanding treatment performance, have earned the Island Water plant a wall filled with operations excellence awards since the membrane plant was built in 1980. “As of today, 38 awards,” Henry says. The facility wins the Florida Department of Environmental Protection Operations Excellence Award for medium-sized communities just about every other year, most recently in 2016 and 2017: “They normally don’t award it to the same plant two years in a row.”

Why so much recognition? “We go the extra mile,” Henry says. “If you looked at the plant, you’d understand. It looks and runs like new. And our paperwork is always in order.” That reflects what he has learned after starting from scratch working nights and weekends at the utility’s old electrodiagnosis plant 31 years ago: “It’s better to be correct than fast.” **tpo**



The Island Water team includes, from left, Don DuBrasky, general manager; Brandon Henke, assistant chief plant operator; Ron Freitag, chief plant operator; and Pat Henry, production manager. They’re shown with the plant’s reverse osmosis membrane system (Dow Water & Process Solutions).

“We go the extra mile. If you looked at the plant, you’d understand. It looks and runs like new. And our paperwork is always in order.”

PAT HENRY

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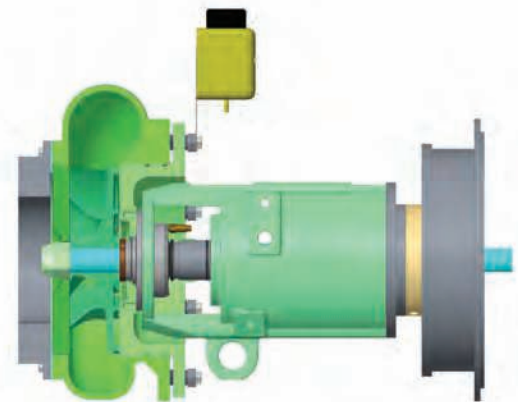
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With a front door elevation of 12 feet, the Hull facility is particularly at risk from storm surge and flooding events.

The Value of a Dress Rehearsal

A MOCK STORM DRILL HELPS THE FACILITY TEAM IN A MASSACHUSETTS TOWN ADOPT A PROACTIVE EMERGENCY MANAGEMENT PLAN AND BUILD RESILIENCY

By Bill Boornazian and John Struzziery

By their nature, wastewater treatment plants that service coastal communities are vulnerable to storm surges and floods.

The town of Hull, Massachusetts, on a peninsula at the southern edge of Boston Harbor, is particularly at risk. Surrounded by the Atlantic Ocean on two sides with a front door elevation of 12 feet, the Hull Water Pollution Control Facility has been affected by several major storms over the last 40 years, including major townwide floods.

Upon entering a 10-year contract to operate Hull's treatment plant in 2015, Woodard & Curran sought to change the facility's mindset about storms and wet-weather events. With a few key initiatives centered around a mock storm drill, the facility has shifted its reactive approach to a proactive program that uses every storm as an opportunity to improve its resiliency and emergency response plans.

GETTING READY

The town of Hull, a community of about 10,000 with some 15,000 seasonal residents, lies between Hingham Bay and Massachusetts Bay on the south shore of Massachusetts. The sewer system includes about 42 miles of separated gravity sewers, seven wastewater pumping stations and more than 175 publicly owned grinder pumps within the low-pressure sewer system. The water pollution control facility receives flow from the neighboring towns through a sewer utility Inter-Municipal Agreement and discharges to Massachusetts Bay, regulated under a National Pollutant Discharge Elimination System permit.

Storms and nor'easters have flooded portions of the plant, causing mechanical issues that led to lost power and partial or complete treatment bypass

for several days. While operators have become experts in responding to wet-weather events, they were often too consumed with urgent repairs after major storms to reflect on how to better prepare for the next one. As a result, the same failures experienced during the last storm would often flare up during the next one. Woodard & Curran's objective on taking over operations was simple, yet daunting: Make the vulnerable facility not just responsive, but resilient to high-flow events.

TO THE TEST

Woodard & Curran team members updated the town's high-flow management plan as it began to implement comprehensive storm event planning. To evaluate the plan's effectiveness, they decided to run a mock storm drill instead of waiting for a real storm. The drill setup was simple, but it brought

While a mock storm drill may seem complicated to plan and execute, the act of playing out plans before a crisis hits will improve a facility team's response to any potential hazard, whether storm, earthquake, or wildfire.

forth inefficiencies and gaps in the plan, giving operators a chance to refine their preparedness before the upcoming hurricane season.

The first step of the drill was to bring all the stakeholders together to discuss each of the key shared facilities, shared resources and key contacts that were fundamental to the high-flow management plan. During this step,

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the group discussed previous storms and potential damage future high-flow events might bring.

While Hull had plenty of previous storms to use as historical guidance, it is important for facilities to think big about storm outcomes while developing management plans. To help identify the critical concerns to be addressed, team members asked such questions as:

- What if the entire town loses power?
- What if we can't access the typical regional sources?
- What can we store on site in advance?
- Which community members will need us to support them?

A few weeks after the initial meeting, the wastewater treatment staff and other support staff from the region met at the Hull facility to kick off the mock drill. It began with a morning tailgate meeting where participants were assigned partners and duty checklists.

The mock storm scenario was a Category 5 hurricane making landfall at the facility. The teams dispersed to their assigned areas to run through the drill. To make it feel as immediate as possible, all tasks that could be simulated without disrupting normal operations were actually performed. For



The plant manager works on generator testing standard operating procedures with the generator service contractor.



Staff made changes to a backup process pump so it can be used to send mixed liquor suspended solids directly to a chlorine contact chamber if necessary during a high-flow storm event.

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example, where the procedures called for physical inspection of a manhole, the team assigned to that task found the asset and performed the inspection.

Radios were the main form of communication for questions during task assignment, and floater assistance staff took photos of the activities. Midday, participants executed their tasks; over lunch, everyone came together to deliberate about the ease of task execution. The afternoon was spent walking through recommendations and concerns observed by visiting operations team members.

MAKING IMPROVEMENTS

Small changes can make big impacts in an emergency, and through the mock storm drill, Hull picked up on several process improvements and gaps in the initial plan. Here are some of the improvements made after the storm drill:

Assembling stakeholders

The simple act of bringing everyone together, whether during the preplanning meeting or the drill itself, strengthened the response plan. It pulled relevant parties in to play active roles in implementing the plan before a crisis hit. Having unfamiliar staff take part in the drill led to better outcomes and better perspectives on obvious improvements. Through the storm, the treatment facility staff developed a much closer relationship with the Fire Department, opening the door for knowledge sharing between these two critical emergency response departments.

Team-sized information delivery

The original plan provided one master checklist for activities before, dur-



The Hull facility is a conventional activated sludge plant with a design capacity of 3.07 mgd. The collections system serves about 4,000 residential and business connections.

ing, and after the storm, but during the drill, it became clear that this format was not helpful in the field. In practice, people on the ground wanted to divide and conquer the steps outlined in the plan, but it was more effective to break up essential tasks into smaller, team-sized procedures with photos and safety tags. Several storm response team members were not regular facility employees, and they highlighted how the checklists and standard oper-

(continued)



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ating procedures should be written so that anyone helping the facility could confidently handle the assigned tasks.

Make critical field elements easily identifiable

During the drill, it became apparent that some critical assets that needed to be maintained and monitored during a storm were not as identifiable as they should be. After the first drill, the facility staff made simple changes to some of the assets. For example, they painted the electrical manholes red and the process manholes green so that emergency staff could easily distinguish between the two.

SHIFTING THE UTILITY MINDSET

To move any hazard mitigation plans from tabletop to the teams on the ground, facilities must start somewhere. While a mock storm drill may seem complicated to plan and execute, the act of playing out plans before a crisis hits will improve a facility team's response to any potential hazard, whether storm, earthquake, or wildfire.

Since the storm drill, the Hull facility has adopted a culture of continuous improvement by empowering operators to identify and implement constructive changes after every storm. The relationship established between the Fire Department and the treatment facility staff has led to the departments joining forces, hosting joint training exercises. The facility team adopted a more formal observation program during storms that has helped document vulnerabilities and areas of improvement.

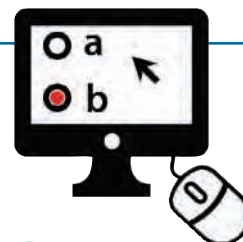
As Hull's mindset for storms and wet-weather events has shifted, and so has its approach to funding and upgrades: It has made resiliency a priority. The Massachusetts State Revolving Fund recently awarded the town \$10 million in loans to make capital improvements for safety and facility resiliency at pump stations and the treatment facility.

About \$2 million has been reserved to complete a reliability centric-maintenance assessment of the facility and resiliency planning. These planning projects — along with \$8 million in collections system resiliency improvements for infiltration/inflow/exfiltration prevention — demonstrate the town's focus on building more resilient facilities and improving return-to-operation time after major storms occur.

A community's response and resiliency during natural disasters will increase when facilities and their stakeholders take time to find the cracks in their emergency response plans and fill them in together. By practicing and perfecting the response, the Hull team will be prepared to keep its community and the water pollution control facility safe under the most intense conditions.

ABOUT THE AUTHORS

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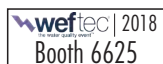
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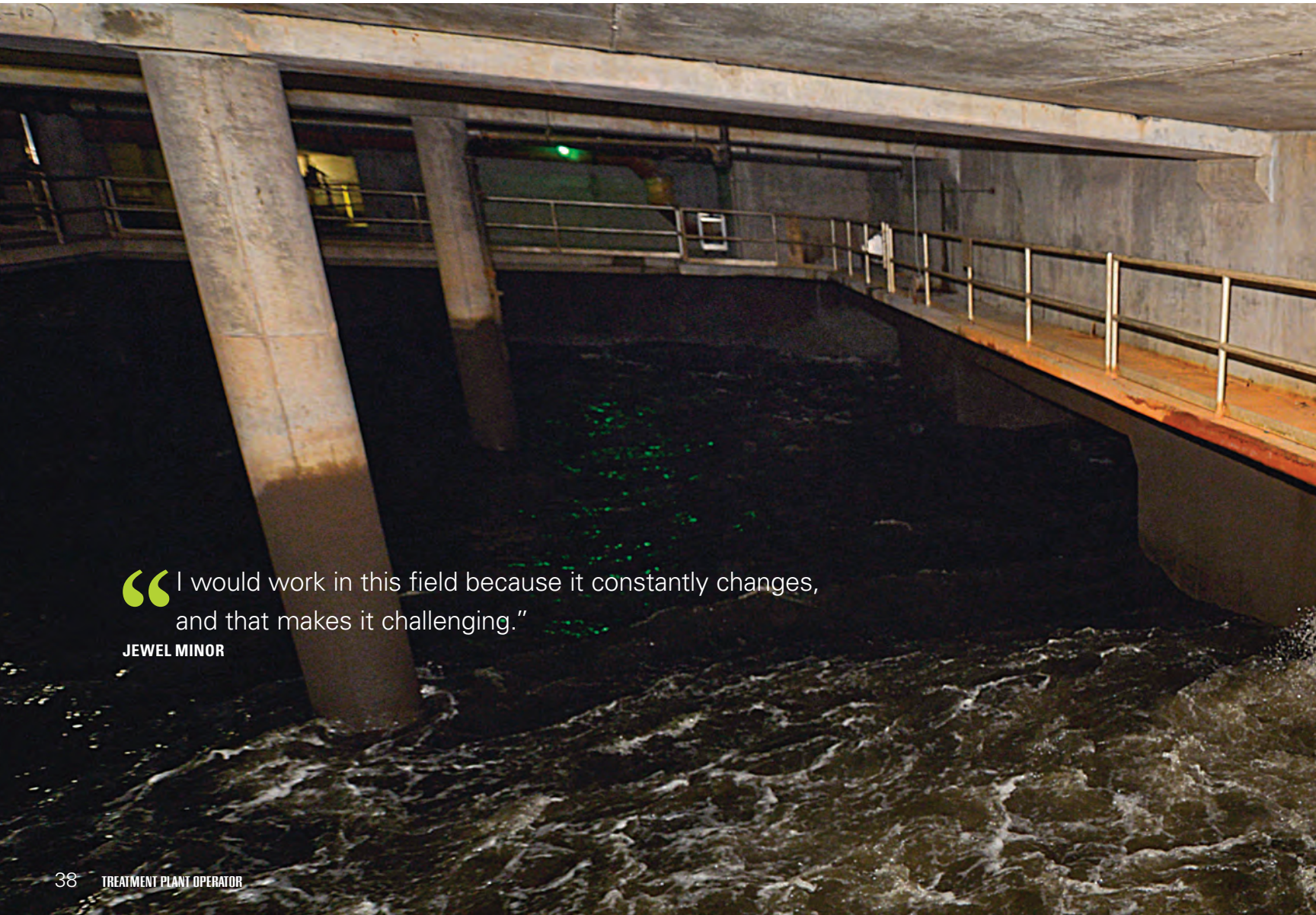
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Guardians of the Gates

THREE WOMEN AT THE RICHMOND DEPARTMENT OF PUBLIC UTILITIES HAVE MADE THEIR MARK THROUGH DETERMINATION AND CONSISTENT EXCELLENCE ON THE JOB

STORY: **Trude Witham** | PHOTOGRAPHY: **Ash Daniel**



“ I would work in this field because it constantly changes, and that makes it challenging.”

JEWEL MINOR

BARBARA JACKSON, VERNIA HAWTHORNE AND Jewel Minor entered the wastewater profession from different areas, but they had one thing in common: determination to succeed.

It wasn't always easy. There were few women at the utility where they worked, and those who were there didn't stay. The three stayed with it and now have many years to show for it. Today, they operate the Shockoe Retention Basin for the Richmond (Virginia) Department of Public Utilities.

The 35 mgd basin captures stormwater during heavy rains and can prevent untreated water from entering the James River. If there is a flow surge, the retention basin teams have to monitor and regulate the flow with pump controls and gate closures.

All three women are certified wastewater operators. Jackson supervises the staff and oversees day-to-day operations. Hawthorne and Minor operate and maintain. They work as a team to maximize basin performance and efficiency. Challenges include highly variable weather and the occasional hurricane. The swing shift schedule also takes its toll, as does working outdoors in all weather.

Jackson's achievements have been recognized with honors that include the William D. Hatfield Award. The women's supervisor, Ed Edmondson,

utility operations superintendent, observes, "They have the know-how and persistence to get the job done, day to day and year to year."

CONTROLLING THE FLOW

The Shockoe Retention Basin was built in 1983 to capture the initial surge (first flush) of runoff from a rainstorm. It lies 5 miles from Richmond's wastewater treatment plant, built in 1958.

This activated sludge secondary treatment plant with tertiary sand filters is the largest of its kind in Virginia and serves more than 200,000 people. It has a design dry-weather capacity of 45 mgd and wet-weather capacity of 75 mgd. It takes in flows from 1,500 miles of sanitary sewer, 38 miles of interceptor sewers and the Shockoe basin. Effluent is discharged to the James River.

The Richmond Department of Public Utilities collections system can store 50 million gallons. The retention basin is one of three storage facilities; the others are the 7-million-gallon McCloy Tunnel and diversion structures with 2-million-gallon capacity. The remaining storage is in the collections system and sewer interceptors.

The retention basin provides flow control to the wastewater treatment plant along with flood control. Flow to the plant is regulated by sluice gates



Jewel Minor, utility operator; Barbara Jackson, utility supervisor; and Vernia Hawthorne, utility operator; in the retention basin above the discharge pipes for the combined sewer system.



From left, Jewel Minor, Barbara Jackson, Vernia Hawthorne.

and pumps in the diversion structures, and by drain gates at the basin. In dry weather, operator control is critical. “Dry-weather overflows are prohibited by the discharge permit, so the wastewater treatment operators must make sure that no overflows occur,” Edmondson says.

HANDLING PEAKS

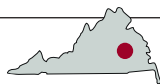
During wet weather, the storage structures fill. The first flush contains the highest concentration of bacteria, solids, carbon and nutrients. When the diversion structures and retention basin are full, the treatment plant works at maximum capacity. Flows beyond that exit the combined sewer overflows. About 80 percent of the collections system’s wet-weather flow exits the Shockoe combined sewer outfall structure.

The Shockoe facility also protects low-lying areas of downtown Richmond when the James River rises above flood stage. Gates keep the river from entering the combined sewer system, and one-way valves allow flows to be pumped to the

wastewater treatment plant. “When the wastewater plant needs to increase the flow, they notify Shockoe basin staff, who immediately open the sluice gates so the flow goes to the treatment plant,” Edmondson says.

Jackson and her colleagues do far more than open and close gates. “They have to develop relationships with the wastewater plant operators, and it takes a lot of effort to make sure they coordinate as a group,” Edmondson

Richmond, Virginia, Department of Public Utilities



Barbara Jackson, Utility operations supervisor

EXPERIENCE: | 41 years

EDUCATION: | Associate degree, applied science, Mountain Empire Community College

RECOGNITION: | Water Environment Federation Quarter Century Operator Club 2017, Virginia Water Environment Association 5-S Society 2015, Virginia Water Environment Association William D. Hatfield Award 2013, City of Richmond Rise Achievement Award 2012

GOAL: | Earn promotion to superintendent |

Vernia Hawthorne, Class II utility operator

EXPERIENCE: | 28 years

EDUCATION: | Wastewater certification

GOAL: | Possibly explore other positions within wastewater

Jewel Minor, Class III utility operator

EXPERIENCE: | 39 years

EDUCATION: | 3-year wastewater treatment plant operators short courses, Virginia Tech; environmental science courses, J. Sargeant Reynolds Community College

RECOGNITION: | Water Environment Federation Quarter Century Operator Club 2017

GOAL: | Continue in wastewater utilities until retirement

FUN WITH HOBBIES

Wastewater utility operators Barbara Jackson, Vernia Hawthorne and Jewel Minor enjoy a variety of hobbies when they’re not working at the Shockoe Retention Basin. Jackson likes to take the last two months of the year off and travel with her family. She also collects M&M’s merchandise: “I like things with M&M’s on them, like curtains and other objects.”

Operators Hawthorne and Minor are also collectors — it’s old coins and paper currency for Hawthorne and replicas of lighthouses for Minor, who also loves spending time with her six grandchildren. “There are four boys and two girls, and we go to the park, the beach, or the movies. I also love fishing and being out on the water.”

Hawthorne likes to tinker with projects around the house. She installed new faucets to dress up the bathroom and kitchen and installed an above-the-stove microwave oven, with help from her son: “I just like to see if I can get it done myself rather than paying someone. It’s relaxing, and I love to save money.”

says. “Their preventive maintenance, preparation for annual U.S. Army Corps of Engineers floodwall inspections, and equipment exercises are just as essential as wet-weather operations.”

VARIED BACKGROUNDS

Jackson has been with Richmond for 41 years. She began as a temporary employee in the Department of Public Works in leaf collection. When her supervisor recommended that she apply for an operator position at the waste-

“I have a real good crew. Each one knows what they have to do and they do it. We’re like a family, and we all get along. When we’re in a crunch, we stick together.”

BARBARA JACKSON

water plant, she saw an opportunity. Jackson ultimately earned wastewater operator certification and an associate of applied science degree with an environmental science major from Mountain Empire Community College.

After 29 years in operations, she was promoted to biosolids supervisor at the plant, where she was in charge of the environmental management system. In 2012, Jackson was promoted to utility operations supervisor at the Shockoe site. There she oversees the operation and maintenance of five gatehouses and floodwall gates.

She also plans, organizes, and supervises the operations staff; assigns and coordinates facility maintenance; submits performance appraisals; offers input on the budget; and oversees consultant contract compliance. “I’m also responsible for floodwall exercises,” she says. “Every August, the Army Corps of Engineers visits and makes sure the floodwall gates are operating properly, so we can close them if necessary.”

Hawthorne began with the city 28 years ago as an entry-level wastewater treatment plant operator and ultimately earned her wastewater certification: “The city provided me with all the training and resources I needed to obtain my license.” She went to work at the retention basin in 2006; her duties include collecting grab samples during wet-weather events, recording data, monitoring the gatehouses, submitting monthly water reports, monitoring conditions at the diversion structures, and coordinating operations with the treatment plant.

Minor, with the city for 39 years, started as a lab technician job at the treatment plant. She then moved to a utility operator position, earned her wastewater operator certification, and also took environmental science classes at J. Sargeant Reynolds Community College. In 2014, she transferred to the Shockoe basin. She monitors and controls processes with the SCADA system and observations, performs preventive maintenance at the gatehouses, and assists in floodwall inspections.

STICKING TOGETHER

Before Jackson, Hawthorne, and Minor began working at the retention basin, the facility was staffed by maintenance employees only. Jackson explains, “When some of these employees retired, the Depart-

ment of Public Utilities realized it needed operators as well as maintenance workers. So now, all employees at the retention basin are expected to do both operations and maintenance tasks.”

The city employs 35 operators — 20 at the treatment plant and 13 at the retention basin. The Shockoe facility operates around the clock with four 12-hour rotating shifts. Each shift has at least two operators and one maintenance technician. Jackson fills in at the basin at times when it is short-staffed: “I’m there whenever they need me. We all pitch in and do what needs

to be done. I have a real good crew. Each one knows what they have to do and they do it. We’re like a family, and we all get along. When we’re in a crunch, we stick together.”

Hawthorne agrees. “We have a vested interest in being the best team out there.”

They have made Shockoe a home away from home. “I was the first one there between the three of us — and the



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Jewel Minor, Barbara Jackson and Vernia Hawthorne look out over the James River toward the main wastewater treatment plant. The retention basin is on the banks of the James. The treatment plant is on the opposite side of the river.



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first female,” Hawthorne says. “Then Barbara and Jewel came in. We looked around and said, ‘This needs to change.’”

They made housekeeping changes that have allowed the basin to operate at peak performance. These included scheduling clean-outs behind the basin drain gates after nearly every rain event to minimize trash buildups. Regular housekeeping inside the basin area allows them to catch small problems before they become larger ones.

“By staying focused on the little things, we ensure timely draining to the wastewater plant in the shortest possible time,” Hawthorne says. “Because storms sometimes happen back to back, our basin needs to operate at peak condition at all times.”

TAKING OWNERSHIP

As supervisor, Jackson stresses working smarter, not harder: “When I moved to the supervisory position, I encouraged teamwork and self-governance. The employees have a say in how things are done because they know their job better than anyone else. This lets them know they are appreciated, and they are willing to take ownership of the facility.”

Edmondson appreciates them as well: “Ms. Jackson and the Shockoe crew are engaged, proactive, and essential members of our team. Their attention

(continued)

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to detail and constant communication between the plant and the Shockoe facility ensure that we meet our obligations to the state regulators and the Army Corps.”

The team's greatest challenge is the weather, Hawthorne says: “It keeps us busy year-round as it changes day to day. But we get ample warning of impending storms that may be troublesome as to how much stormwater to expect.”

Hurricane Gaston, in August 2004, was a bad one. Jackson remembers it well: “Gaston dumped a foot of rain in just a few hours, sending a wall of

“ Their attention to detail and constant communication between the plant and the Shockoe facility ensure that we meet our obligations to the state regulators and the Army Corps.”

ED EDMONDSON

water raging through the Shockoe Bottom neighborhood and causing severe flooding across the area.” The flooding did not adversely affect the retention basin or main plant.

The threat of storms and floods requires the team to stay on top of the day-to-day maintenance and make sure all pumps and gates are operable. Edmondson says, “Because we keep equipment repaired and operating, we are prepared for wet-weather events and unseen emergencies. This is analogous to what firefighters do. You're preparing and training and you've been at work for eight or nine hours, and here comes a wall of water; you have to make a decision in five minutes.”

FUTURE PLANS

Edmondson says the utility is planning some upgrades to the Shockoe facility in the next year or so: “We will install new trash screens that remove

debris from the bar racks. The Bascule (Rodney Hunt) gates and emergency arch sewer gates will be refurbished by strengthening their structural supports and by replacing the gate operation controls.”

Jackson, Hawthorne and Minor plan to stick around for a while. Jackson says, “I see myself as superintendent I.” Hawthorne says, “I am not a fan of the toll that working a swing shift has taken on my sleep or lack thereof. So, at some point, I may want to explore other positions within wastewater.” Minor plans to stay with the utility until she retires. She likes her work sched-

ule because it gives her more time to enjoy her personal life.

They all say they would choose the same career if they had to do it all over. “I would work in this field because it constantly changes, and that makes it challenging,” Minor says. Jackson likes meeting people at stormwater conferences, exchanging

ideas, and then going back to the plant and seeing how it works out.

Hawthorne has appreciated her schedule's flexibility: “It has allowed me to run errands and go to doctor appointments without having to miss work.”

They all agree it was tough going in the beginning. Hawthorne says, “When I started at the wastewater plant, I was the only female. I was paired with a male operator, and I remember him saying, ‘You won't last long.’ I saw that as a challenge, and I was determined to stick it out and succeed.”

Jackson adds, “We had to prove ourselves to earn respect. And now they definitely take us seriously!” **tpo**

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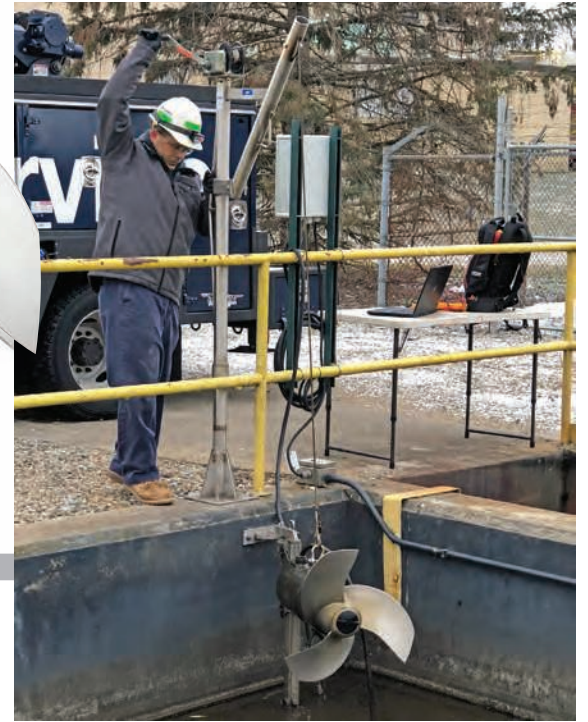
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1

1. The Flygt 4220 mixer saves energy usage by responding to changing mixing conditions.
2. The mixer was tested at a wastewater plant in Albion, Michigan, where it produced the same results as the plant's previous mixer while using significantly less energy.



2



The Right Mix

A COMPACT SUBMERSIBLE MIXER GIVES OPERATORS PRECISE AND AUTOMATED CONTROL TO IMPROVE PROCESS PERFORMANCE AND REDUCE ENERGY CONSUMPTION

By Ted J. Rulseh

Proper mixing is a key to high-quality wastewater treatment and consistent permit compliance.

Mixers of different designs deployed in aeration basins, sludge storage tanks and other treatment processes have varying degrees of effectiveness. They can also be significant consumers of energy, especially if operated in an “always on” mode.

Now Xylem offers a compact submersible wastewater mixer with easily adaptable output and the potential to reduce mixing energy usage by up to 50 percent. The company says its Flygt 4220 adaptive mixer lets operators manage variable mixing conditions by simply adjusting the mixer output. Since the mixer then delivers no more than the power actually required, energy is saved.

Operators can modify the output by way of a tank-side control panel, a programmable controller or plant-wide SCADA system to match mixing needs. The unit also delivers comprehensive information about the mixer's performance and status: speed, power, alarms, runtime and energy consumption.

The device is designed to accommodate a variety of common mixer applications and is well-suited for retrofits. Matthew Szurgot, global product manager with Xylem, talked about the offering in an interview with *Treatment Plant Operator*.

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

Szurgot: The ethos of the Flygt brand is low total cost of ownership, and that was our starting point for this product. Having worked closely with

customers, we saw a great opportunity for energy efficiency. Mixers, unlike pumps, tend to operate 100 percent of the time, 8,760 hours per year. So energy savings even at fractional kilowatt levels can add up quite quickly.

tpo: Was there also potential to improve process performance through optimized mixing?

Szurgot: Yes. Mixing is a bit of a black art compared to pumping. In determining how much mixing is required, there is a lot of uncertainty, and safety factors tend to get built up as well. In visiting plants, we often observe

“What makes the new mixer so powerful is the Flygt Dirigo technology platform, which marries a super-premium, high-efficiency motor and an integrated motor control system.”

MATTHEW SZURGOT



that at a given time, the amount of mixing being done in a tank is too much, and there is an opportunity to turn that down and to adjust for temporary or long-term changes in demand for mixing performance.

tpo: Where would mixers like the Flygt 4220 be applied in a wastewater treatment plant?

Szurgot: The No. 1 application would be within the biological treatment process. For example, in a conventional activated sludge plant doing biological nitrogen or phosphorus removal, there would be mixers in the

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nonaerated tanks. Another application would be in any of a variety of sludge holding tanks. Less common applications would be around retention basins, stormwater basins and pump stations.

tpo: From a design perspective, how is this mixer different from others on the market?

Szurgot: From the outside, the Flygt 4220 looks similar to a traditional single-speed mixer, but inside, things are quite different. Single-speed mixers have a single duty point. Once a mixer is configured at the factory, it will always deliver the same output. With our product, we're moving from fixed output to one that is variable — from a duty point to an interval.

tpo: In general terms, how is this accomplished?

Szurgot: Thrust is industry standard for measuring mixer output. What makes the new mixer so powerful is the Flygt Dirigo technology platform, which marries a super-premium, high-efficiency motor and an integrated motor control system. So between the hardware components and the software, we provide a complete platform to help clients take control of mixing.

tpo: Beyond electronics, is anything different about the physical attributes of the mixer?

Szurgot: The propellers are optimized for geometry and blade angle. We've also increased the size of the propeller, which leads to greater efficiency. So we have optimized the hydraulics to be the absolute best they can be. Another advantage is in overload protection. A conventional mixer is very binary: If the motor is overheating, it shuts down. You don't get any warning, and the mixer doesn't react in a smart way. Our mixer, with Dirigo technology, monitors itself. When it senses a near overload condition, instead of shutting off, it slows itself down, so the process is still up and running. That's a great benefit in terms of process resiliency and compliance.

tpo: How does this mixer respond to different mixing conditions?

Szurgot: There are three levels. The first is no regulation of thrust. Like a conventional mixer, it has a fixed speed, but it has its built-in efficiency because of the premium motor and optimized hydraulics. The second level is occasional regulation of thrust, which is handled manually by the operator at tank-side through a control panel. The operator can dial in a new duty point, a new thrust. A great place for that to happen is at startup of a tank after the design phase, to adapt and fine-tune for the real-world conditions. The third level is continuous regulation of thrust, which is handled by connecting the mixer into a plantwide SCADA system. This enables the mixer to respond to changing process parameters by adjusting the thrust in real time.

tpo: How do you account for the claimed 50 percent potential energy savings?

Szurgot: The bulk of that comes from the out-of-the-box efficiency. A second aspect is the super-premium efficiency motor. The remaining fraction is around the fine-tuning at startup. Often in the industry, there is a propensity to be conservative with design, and understandably so, because meeting effluent discharge permit levels is essential. But there is often an opportunity to turn that down and optimize the mixer output at startup.

tpo: Are there any other advantages from the flexibility of this mixer?

Szurgot: Yes. The mixer's ability to deliver a wide range of duty points enables a single unit to replace multiple conventional mixers. That reduces the amount of spare mixers and replacement parts a plant needs to stock. Moving from an operating point to an operating interval also allows flexibility to relocate mixers from one tank to another. **tpo**

top performer

water/wastewater:

OPERATOR



The Jacksonville team includes, from left, Chuck Simmons and Bobby Hunt, operators; Chris Patterson, manager; Roger Mills, chief operator; and Jacob Cadle, operator.

“Once you get past the persona of wastewater, it’s a fascinating field. As I’ve said many times, I didn’t choose this career; this career chose me. I love what I do.”

CHRIS PATTERSON

A SERVANT'S HEART

FOCUS ON FAITH, FAMILY, AND COMMUNITY HELPS CHRIS PATTERSON
BUILD AN AWARD-WINNING CAREER MANAGING WATER,
WASTEWATER, AND OPERATIONS IN JACKSONVILLE, ALABAMA

STORY: **Jack Powell** | PHOTOGRAPHY: **Kaylinn Gilstrap**

CHRIS PATTERSON IS RIGHT WHERE HE'S MEANT TO BE:

gas, water and wastewater manager for the city of Jacksonville, Alabama.

His job is to ensure only the best service for his quiet community of 12,500, about an hour and a half east of Birmingham and home to Jacksonville State University. A 42-year-old father of three, Patterson has brought a "servant's heart" to the job for the last 21 years, learning the business, expanding his skills and mentoring others.

His story is truly inspirational. He graduated from Jacksonville High School not knowing what he wanted to do, got hired as a summer laborer at the gas and water utility, and over time fell in love with the profession. His job includes providing clean drinking water and returning treated wastewater to Little Tallahatchee Creek, a tributary of the 280-mile-long Coosa River.

A GREAT FIELD

"When I came on full time, I still wasn't all that interested in water and wastewater," Patterson says in a soft southern drawl.

"Then one day I said to myself, 'This is a path.' Once you get past the persona of wastewater, it's a fascinating field. As I've said many times, I didn't choose this career; this career chose me. I love what I do."

A Jacksonville native, Patterson has made community service a hallmark of his work for the Water Works, Gas & Sewer Department. Along the way, he has earned kudos from his boss, employees and fellow operators around the state. He was named 2017 Water Operator of the Year by the Alabama Rural Water Association and earned his city's Employee of the Month honors in June of last year.



Chris Patterson, gas, water and wastewater manager,
Jacksonville (Alabama) Water Works, Gas & Sewer Department

The Alabama Rural Water Association award announcement cited Patterson for implementing new ideas and operational methods to help the system, for always putting the customer first, and for his tireless work ethic and devotion to duty. For example, in 2010 after the rupture of a fluoride tank beside a spring that feeds the water system, he spent 36 hours working nonstop, fixing the leak and flushing the system until the fluoride level returned to normal. Strictly routine, Patterson claims, steadfastly shunning any and all praise.

"I was surprised to win the Operator of the Year award," says Patterson, who holds a Grade IV wastewater certification and Grade III water certification. "I'm not out there trying to win awards. This field is all about helping people and serving the community. That's what we all do."

PRAYERFUL DECISION

In 2005, Patterson's hard work and diligence paid off when he was named the city's chief water operator. A few years later he became water/wastewater plant manager. Then

in November 2017 he was promoted to utility system management, adding supervision and administrative work to his gas, water and sewer responsibilities.

Patterson now maintains 80 miles of water main and six water tanks, 50 miles of sewer main with six lift stations, and 30 miles of gas main with a 16-member team. He is also in charge of the city's Grade II Germania Springs and Big Springs water plants, which have a combined average flow of 1.5 mgd and are known for outstanding water quality.

On the wastewater side, Patterson manages Jacksonville's 3.5 mgd (design) activated sludge treatment plant, which is undergoing a \$10.8 million reno-

vation. It's a big job that he did considerable soul-searching before taking on.

"I seriously questioned whether management was right for me," Patterson says. "I even prayed about it. When I got my answer, it was this: More than water and wastewater, I want to help the people I supervise, and this job will allow me to be a positive force in their lives. Being a manager isn't about bossing people; it's about helping them reach their potential and be successful. I think of it as being a servant."

HIGH ENERGY

Such a mindset serves Patterson well. He gets in at 6 a.m., never really clocks out, and is always on call. Usually he first meets with the operators at the wastewater plant and then the water plants to make sure everything for the day is charted and online. The seven wastewater and water operators run wastewater labs three days a week. They check chlorine and fluoride levels at the water plants daily and make sure pumps are operating as they should to ensure adequate water pressure.

Patterson then meets with the water distribution supervisors to ensure that all fieldwork is being done as efficiently as possible. In all meetings, he communicates what needs to be done, with special focus on "Do your best, one day at a time." More than a motto, those words describe Patterson's outlook and define how he handles the job and everyone he deals with.



Chris Patterson, shown checking the dissolved oxygen level in the aeration tank with a YSI 550A sensor (YSI, a Xylem brand), leads a team of 16 members who maintain 80 miles of water main, six water tanks, 50 miles of sewer main with six lift stations, and 30 miles of gas main.

CHALLENGES AND ACHIEVEMENTS

Chris Patterson has had his share of accomplishments. They include managing a \$500,000 project to replace lead-joint pipe with ductile pipe, overseeing a 20,000-foot sewer rehabilitation that included new pipe lining, and providing guidance for refitting all lift stations with submersible pumps.

His biggest challenge has been managing a \$10.8 million wastewater treatment plant upgrade and expansion to increase efficiency and reduce operating costs. Launched in December 2016, the project is to be completed near the end of 2018.

"It's a huge undertaking," says Mayor Johnny Smith, who spearheaded the effort to fund the project. "Chris is responsible for every piece of equipment that goes into the facility. In addition, he and the operators have to keep the plant running as they work on the upgrade. That takes a lot of doing for everyone concerned."

Built in 1955, the 3.5 mgd (design) plant underwent its first upgrade in 1971 and a second in 1992. Plans call for upgrading the existing mechanical treatment process for activated sludge. That includes new headworks and a biosolids dewatering system with a new belt press (BDP Industries). The plant is also getting a new screw press and pumps (Fleck Systems), a pre-anoxic basin, an aerobic digester, a UV disinfection system, and a major SCADA system upgrade.

"There are a lot of changes in technologies and processes that should last us 20 or 25 years," Patterson says. "Sure it's a headache with half the plant being shut down, but we believe the upgraded facility will make us more efficient, keep us in compliance and contribute to a better environment."

Chris Patterson, Jacksonville (Alabama) Water Works, Gas & Sewer Department

POSITION: | **Gas, water and wastewater manager**

EXPERIENCE: | **21 years**

DUTIES: | **Oversee utility operations, supervise staff of 16**

EDUCATION: | **Courses in water and wastewater treatment,
Jacksonville State University**

CERTIFICATIONS: | **Grade IV wastewater operator, Grade III water operator**

GOALS: | **Complete 25-year career (or longer), develop new water/
wastewater career**

GPS COORDINATES: | **Latitude: 33°48'50.10"N; longitude: 85°45'33.47"W**



One thing that has helped a lot is Patterson's 2016 upgrade of the city's geographic information system. Before the new GIS came online, department members had to go through city engineers to upgrade paper maps. Today, Jacksonville has a greatly improved mapping system and a network that operators can use on their tablets to pull up information anytime. Team members can quickly locate problems like broken valves and cracked pipes, fix them, and enter the result into the database immediately.

“The operators are involved in maintaining the GIS network,” Patterson says. “That gives them a larger purpose. They know what’s wrong on a map — maybe it’s the size of the line — and they can fix it right away because they have this new tool. For us, it means we can leave the job better than when we started, which is what we all want.”

HEAPS OF PRAISE

Among Patterson’s biggest fans is his boss, Johnny Smith, Jacksonville’s four-term mayor, with whom he has a mutual admiration society. Patterson calls Smith “a good guy to work for and one of the main reasons I’m where I’m at today. When I think about a leader, I think about him. He trusts me, and I take that trust very seriously.”

Now in his 13th year as mayor of a growing city whose population has climbed 69 percent since 2000, Smith calls Patterson “a great person to have as an employee. You can give him an assignment and not worry that it won’t get done. He’s so reliable.

“Chris is a hands-on person who loves to go into the field and work with the operators, whether it’s at the water and wastewater plants or fixing a broken water main. The operators like and respect him because he’s not afraid to get his hands dirty. He’ll do whatever it takes to get the job done right.”

Operators are equally enthusiastic. Roger Mills, lead wastewater operator since 2017, has worked with Patterson for more than 14 years and finds him to be “both a good person and a good boss. He cares about people and goes way beyond what’s expected to make sure his operators understand their jobs.”

A Grade II water operator and Grade III wastewater operator in his 50s, Mills is the city’s oldest operator. Like Patterson, he started as a laborer and had no interest in making wastewater a career. “However, with Chris’s help and encouragement, I learned more about wastewater and found out I liked it a lot. Chris helped me learn the job and get my certifications. I couldn’t have done it without him.”

Jacob Cadle, Grade III wastewater operator, who has worked for Patterson for about two years, observes, “They don’t come any better than Chris. He’s super smart and will let you do just about anything. All he asks is that you do the best you can do every day. If you need help, he’s right there to give it to you.”

FAMILY FIRST

Though grateful for the kind words, Patterson measures his success by accomplishments outside Jacksonville utility operations. He’s proud to serve as a deacon at Profile Baptist Church, one of 44 churches of various denominations in the area. His wife, Paula, works with youth there and has been a speech pathologist at Pleasant Valley Elementary School since 2003.

While he enjoys fishing, running, and grilling, spending time with his family is by far his favorite activity. The Pattersons take part in volleyball and softball because of their daughters’ participation. Leah is 13, Sarah is 10, and Ellie is 8; they attend Pleasant Valley Elementary. “I’m a family man, and that means whether I fish, bowl, go to church, or play softball and volleyball, my family is with me,” Patterson says.

Professionally speaking, Patterson plans to stay right where he is for the immediate future, at least until he can retire after 25 years. At some point, he

may look into starting another career in the water or wastewater field. Right now, he’s focused on being the best professional possible.

“One of the things I love the most about this job is that when I get up every day I know I’m serving the community,” he says. “Our department motto is: Community, Customers, Commitment. That’s what we live by. My family drinks the same water as everybody else, and I know that the water is the best we can produce.” **tpo**

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Keys to Success in Co-digestion

AN INDUSTRY WORKSHOP EXPLORES STRATEGIES FOR DESIGNING SITE-SPECIFIC CO-DIGESTION PROGRAMS THAT ARE MUTUALLY BENEFICIAL FOR UTILITIES AND THE COMMUNITIES

By Kelsey Beveridge

Co-digestion of food waste with wastewater residuals holds substantial promise as a way to increase renewable energy, reduce costs and create environmental benefits. The question is how to design co-digestion projects to maximize the benefits while working with existing wastewater treatment infrastructure.

Last October, the Water Environment & Reuse Foundation and the Water Research Foundation held a workshop called Advancing Anaerobic Digestion of Wastewater Solids and Food Waste for Energy and Resource Recovery: Science and Solutions – A Framework for the Practice of Co-digestion.

At the workshop, sponsored by the National Science Foundation, speakers and participants discussed existing co-digestion programs, ways to improve on their success, and recommendations and research needs for the industry.

Co-digestion is defined as the anaerobic digestion of two or more feed materials, including the addition of food and other organic wastes to wastewater solids. Workshop participants highlighted a pressing need to identify and characterize the drivers for co-digestion programs in specific communities or at individual water resource recovery facilities.

Co-digestion using existing infrastructure has great potential to generate more renewable energy (as biogas), divert organic wastes from landfills, and recycle food waste sustainably and at a competitive cost. Here is a summary of commentary and recommendations from the workshop.

SELECTING FEEDSTOCKS

Define types

Rather than be based on a standard design and implementation structure, a co-digestion program should be unique to the community's or utility's attributes. Feedstock quality may determine the level of processing necessary. Feedstocks suitable for co-digestion need to have high energy value, and the facility must have sufficient digester capacity. Fats, oils, and grease are favorable for co-digestion due to low solids content, high degradability and energy content, and generally greater consistency than other food wastes. There are three categories of suitability:

- Unsuitable under any conditions (waste that has no energy content).
- Suitable with preprocessing (waste containing certain compounds that could inhibit digestion, end up in residuals, or contain high levels of contaminants).
- Suitable under all conditions.



Co-digestion in digesters like these enables utilities to enhance energy recovery during wastewater treatment.

Characterization methods

Workshop participants agreed that some materials perform better than others but that the ideal feedstock also depends on the facility's capabilities. Feedstock choice can be influenced by digester capacity, gas handling capacity, landfill tipping fees, biosolids storage space, the digester's ability to handle the feedstock, pH control and more. There also can be risks downstream from digestion. Metrics and standards for acceptability need to be established for each facility. Facilities should locate waste sources close by and determine upfront what pretreatment is needed.

IMPROVING AND OPTIMIZING PERFORMANCE

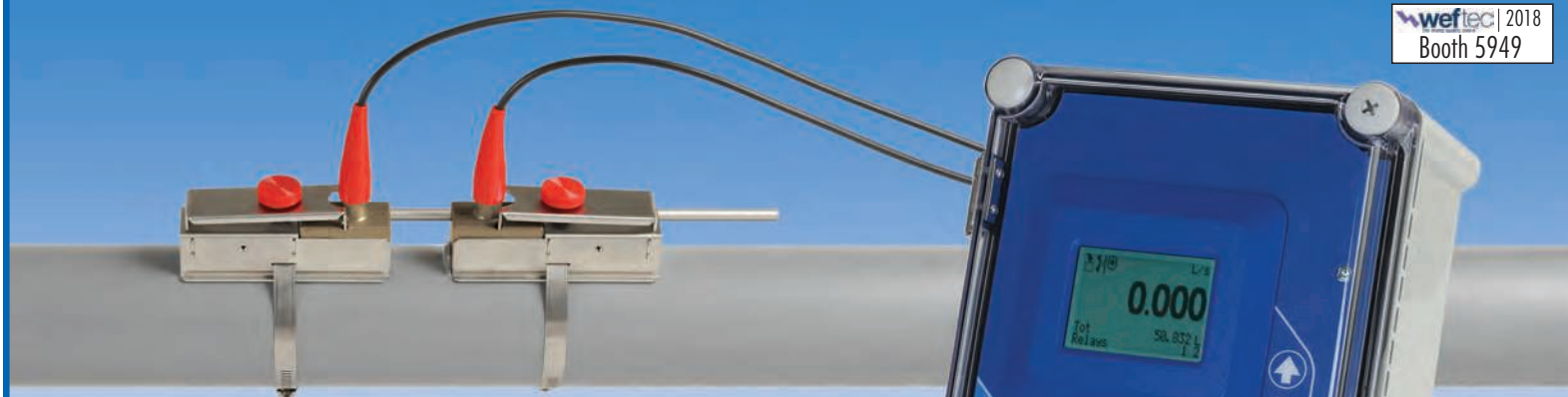
Factors that influence performance

Digester capacity, feedstock type, and delivery options all drive the size and arrangement of waste receiving and storage facilities. Preprocessing requirements depend on the capacity of the co-digestion system. Material can be preprocessed at a solid waste management facility by removing contaminants and blending materials to create a high-quality slurry.

The optimal feeding pattern depends on the facility's goals. For example, a facility may use different loading rates based on whether the aim is to maximize methane production or stabilize co-digestion. Utilities have found that a change in the feed rate can upset digesters, but that continuous feeding generally does not.

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Improving modeling

Participants noted that modeling and monitoring parameters can help characterize feedstock and maintain quality. Modeling of plant nitrogen and phosphorus load returns can suggest initial techniques and so can visiting other plants that have met their permitting requirements with co-digestion programs. Advance modeling can help in predicting upsets and optimizing performance. Online monitoring can provide immediate performance results, but that must be balanced with lab samples for better data and reliability, since co-digestion programs can have considerable variability.

Operational strategies

At a minimum, participants agreed that co-digestion programs should monitor total solids, volatile solids and chemical oxygen demand. Facilities can also implement practices to protect process integrity and identify potential problems. These could include adding waste screens, interviewing suppliers to characterize their wastes, requesting safety data sheets, and including feedstock characterization in the contract with the hauler.

Feed rates depend on pumping strategies, substrate makeup and co-digestion objectives. To help prepare operators and maximize stability, individual facilities must define what continuous feeding practices mean for their site. Consistency of feed is also important; feedstocks should be well mixed before digestion and cleaned of any contaminants.

CREATING GUIDELINES

Contracts for feedstock

Workshop participants stressed the need for an agreement with feedstock providers on minimum specifications and standards for suitable materials. Facilities can protect process integrity by including feedstock specifications in a contract, inspecting material as it is received, and reserving the right to sample trucks and take daily composite samples.

Feedstock providers and utility staff need a clear understanding of the

Co-digestion using existing infrastructure has great potential to generate more renewable energy (as biogas), divert organic wastes from landfills, and recycle food waste sustainably and at a competitive cost.

application and the contracting process. Agreements need clear metrics on what feedstock can be brought in, what the utility can accept and the defined tolerance levels for key site parameters.

Hauler agreements

A receiving program that is manageable and cost-effective is important to the success of co-digestion projects. Suppliers should be under contract for a consistent feedstock supply. Haulers need specific delivery times that align with the facility's need for feedstock. Twenty-four-hour access for haulers is preferred, but not all facilities have that capability. Proper training for delivery drivers and receiving station personnel is essential for programs to function efficiently.

Tipping fees

The cost to treat waste is an important consideration. Tipping fees function as a cost-recovery mechanism. The water industry has no standard tipping fees and no single tool for setting such fees. Some utilities use a tiered system based on waste strength, while others use a flat rate but keep flexibility to adjust on a case-by-case basis.

(continued)

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Viability funding sources

Public-private partnerships or other partnerships can help facilities leverage funding for co-digestion programs. This includes partnerships that have a design-build component.

Identifying benefits

An effective approach is to meet the facility's needs by working toward an integrated system that covers power generation, heat production, biosolids management and direct biogas use. Projects can be mutually advantageous to the facility and its community for benefits such as:

- Diverting material from landfills
- Improving efficiency at reduced cost
- Producing renewable energy and reducing dependence on fossil fuels
- Producing marketable commodities
- Reducing electricity or natural gas costs
- Reducing carbon emissions in line with community-wide greenhouse gas goals
- Delivering social benefits and public relations value.

EXAMINING DIFFERENT BUSINESS MODELS

The benefits of co-digestion can be maximized by promoting local businesses, expanding the tax base and increasing green jobs. The mission of a co-digestion program can include a business-case justification. Selecting the best end use for the produced biogas depends on factors like environmental sustainability, social justice and economics.

MANAGING COMPETING GOALS

There are often competing goals between energy projects and other utility initiatives, or within energy recovery projects themselves. Alignment of the co-digestion program's mission with overall utility goals, compliance and financial considerations will make such projects more appealing to deci-

sion-makers. This also means managing goals within existing facility operations. Operators need to understand why co-digestion is important to the utility; it requires a shift in mindset from discarding waste to taking in resources to create value.

ADVANCING REGULATIONS AND COMMUNITY GOALS

Workshop participants emphasized that products of co-digestion programs should be identified and valued based on an accounting of triple bottom line benefits and community sustainability goals. They noted that facilities find it useful to balance their co-digestion programs, the community's philosophy and sustainability objectives. Products may include energy, digestate, and credits for energy, carbon, and nutrients.

Co-digestion is one process that can be used to create marketable products from municipal wastewater and food wastes. Such programs can be mutually beneficial for utilities and their communities and customers.

ABOUT THE AUTHOR

Kelsey Beveridge, kbeveridge@waterf.org, is a technical writer with the Water Research Foundation. tpo



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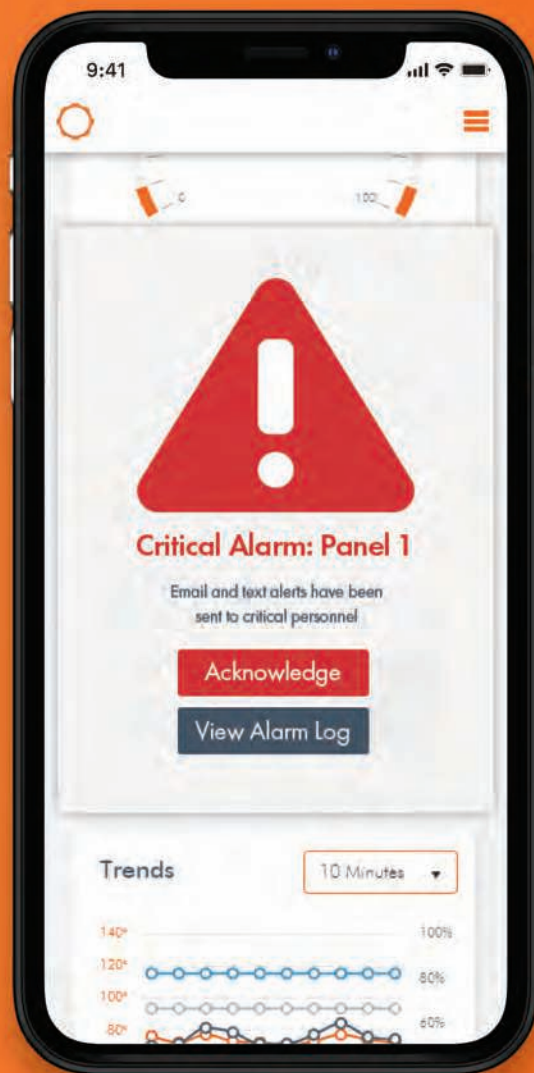
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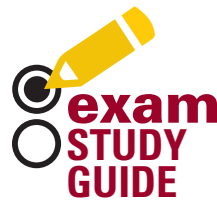
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By Ron Trygar

WASTEWATER

***Nitrosomonas* and *Nitrobacter* bacteria perform what function in the activated sludge process?**

- A. They are responsible for denitrification.
- B. They are required for restoring alkalinity to the process.
- C. They convert the nitrate into nitrous oxide and nitrogen gas.
- D. They convert ammonium into nitrite and nitrate.

ANSWER: D. *Nitrosomonas* and *Nitrobacter* are responsible for nitrification, the oxidation process where ammonium is first converted to nitrite, and then the nitrite is further oxidized to nitrate. Nitrification occurs mostly within an aerated basin like an aeration tank, but it can occur in other aerated locations like wetlands, rivers and streams, and within soils. We refer to these organisms as aerobic autotrophs. Answer choices A, B and C all refer to denitrification, where facultative heterotrophic bacteria reduce the nitrate to a final product of nitrogen gas. Other bacteria that convert ammonium to nitrate include *Nitrosococcus* and *Nitrospira*. However, *Nitrosomonas* and *Nitrobacter* are the best known and most commonly referenced nitrifying organisms.

DRINKING WATER

Which statement about treating colder water is accurate?

- A. The colder the water, the longer it takes for particles to settle out.
- B. Colder water requires less time for solids to float to the surface.
- C. The colder the water, the less speed is required of the flash mixing equipment.
- D. As water temperatures drop, less time is needed to accomplish settling.

ANSWER: A. Think about the change in density of water as it freezes in your kitchen freezer or ice maker. As the temperature falls, the activity of the water molecules slow down. The water becomes dense enough to change from a liquid state to solid. On the other hand, if we boil the same water on the stovetop, we can cause water to begin evaporating into steam, converting from liquid to vapor. In a settling basin, the settling velocity of particles is affected by the same changes in water density. Water molecules move slower as the water becomes denser, causing chemical reactions to become slower. The increased water density causes floc particles in the settling basin to settle more slowly, meaning it takes more detention time to achieve the target effluent turbidity and suspended solids goals. Most often, operators find that more energy is required to thoroughly mix the coagulants into the raw water, and increased flocculator speed is sometimes needed to ensure efficient particle collisions.

ABOUT THE AUTHOR

Ron Trygar, a certified environmental trainer, is the senior training specialist for water and wastewater programs at the University of Florida TREEO Center. He has worked in the wastewater industry for more than 30 years and holds Class A wastewater treatment operator and Class B drinking water operator licenses in Florida. **tpo**

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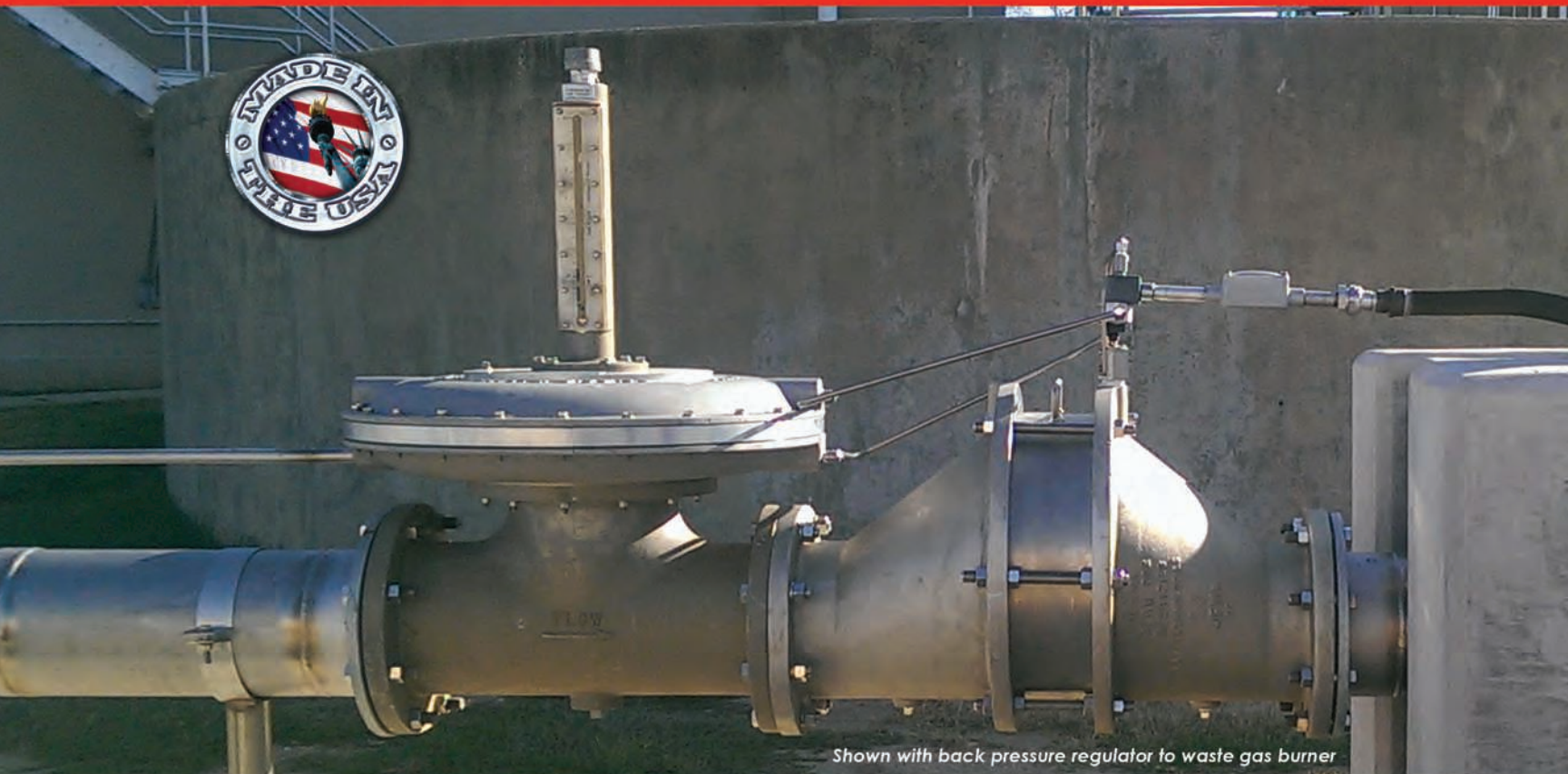
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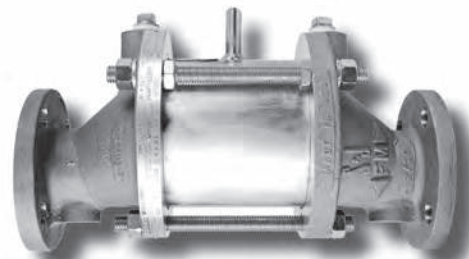
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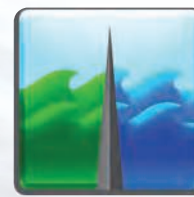
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By Ted J. Rulseh

We all know it: The industry needs bright, young operators to replace those retiring. Approaches to recruitment are many: internships, apprenticeships, military veteran outreach, job fairs and more.

BAYWORK, in the San Francisco area, is taking a regional collaboration approach to workforce development. Its name is short for the Bay Area Water/Wastewater Workforce Development Collaborative, created in 2009 and now with 34 utility signatories. It's available to all Bay Area water and wastewater utilities.

BAYWORK rests on the principle that operationally reliable utilities depend on adequate staff with sufficient preparation in mission-critical roles. Its functions include creating a unified voice among agencies for workforce development plans in the region, deploying programs and strategies to support the building of high-performance workforces, and setting up cost-effective programs to make sure utilities have enough qualified people to meet their responsibilities to customers, communities, and the environment.

The organization also strives to build relationships with partners like educational institutions, the Department of Labor, and workforce development boards. Ingrid Bella, chair of BAYWORK and supervising program administrator for business and customer services with the Santa Clara Valley Water District, talked about BAYWORK, its aims, and its accomplishments in an interview with *Treatment Plant Operator*.

tpo: What circumstances led to the formation of BAYWORK?

Bella: In meetings of utility operating managers, the issue of people retiring and taking with them 20-plus years' experience was always in the discussions. That was the catalyst for an American Water Works Association study to look at workforce reliability.

tpo: What did that investigation reveal?

Bella: We found that the water industry was like other industries in feeling the pressure of a major workforce that we will have to replace and not knowing whether we had a pool of new people ready to come in. We also saw that the schools weren't getting kids interested in the types of math and science they need to enter our fields. In addition, we were behind the eight ball in terms of what other industries have done. The health care, oil industries and others had partnered with education organizations to get the word out

about the great careers they have, and we had not done that for water.

tpo: What actions were taken based on the findings?

Bella: We set out to create a road map of what we needed to do to start filling the gap and catching up. People don't realize the great jobs behind the faucet or the flush of a toilet. It's all taken for granted. We need a new workforce to get excited about the great jobs we have.

tpo: What did the data show about the severity of the retirement wave in your region?

Bella: At a given utility, anywhere from 30 to 50 percent or more of the workforce may be eligible to retire. Essentially anyone 55 or over could walk out the door, based on our pension programs. That would be a huge cut since many of these are people with higher certifications. One of our BAYWORK executive committee members reported that 38 percent of Grade IV and Grade V operators in California are over 56 years old.



Ingrid Bella

“We’re looking to the future of the workforce through outreach and education. At the same time, we can’t forget about the workforce we currently have. So we are also investing in staff preparedness.”

INGRID BELLA

tpo: What are the main focus areas of BAYWORK at present?

Bella: We're looking to the future of the workforce through outreach and education. At the same time, we can't forget about the workforce we currently have. So we are also investing in staff preparedness. We have a committee that works on ways to do knowledge sharing among people already in the water industry.

tpo: What kinds of activities come under the heading of staff preparedness?

Bella: One of our most popular programs is the Workshop on Wheels, where we load 50 or so people from different agencies on a bus and visit five

or six facilities where the staff members share new technologies they're implementing. We also have an annual Training Buffet where guest speakers present on new technology, leadership skills and other topics. This is training that's free, and that's a big plus. Many utilities can't send their operators to the large conferences because of all the travel costs. We offer regional programs where they can get their contact hours and network with others.

tpo: What is being done toward raising awareness of water careers and attracting new people to the water professions?

Bella: About four years ago, West Valley College, a local community college, received a \$6 million state grant to build water career pathways based on the mission-critical jobs BAYWORK had identified. We've worked with them on efforts to get students into community college water resource programs. We've also worked together on printing collateral in the form of brochures and posters that we can take to classroom presentations and career fairs.

tpo: How do you structure your career fairs?

Bella: They're divided into two parts. We do a career exploration fair for students in the morning. The career pathways grant funds buses to bring students to the career fairs. Tables are staffed with water and wastewater operators and people in the other mission-critical jobs. We're really trying to get the word out about skilled trade positions, like electricians, instrument technicians and plant maintenance personnel. In the afternoon, we hold our job-seeker fair, which is open to the public.

tpo: What other kinds of activities have been offered for students?

Bella: We recently did a regional Water Challenge through the careers pathways grant where we worked with teachers on water-related curriculum and students created projects to win scholarship money. We had the closing in April at Levi's Stadium. We had a table there and talked about our careers, and then the students found out who won the scholarships.

tpo: Is it a challenge competing against other careers that tend to have higher profiles?

Bella: Here in Silicon Valley, we compete with the Googles and the Apples, so we have the challenge of raising the visibility of the water industry. We're opening students' eyes that, yes, there is a lot of excitement in our industry.

tpo: How exactly do you make the case?

Bella: It's about letting them know that we have great jobs that are challenging and offer competitive salaries and benefit packages. It's also a place where they can help restore our infrastructure and use new technology to deliver clean and safe water for our communities. It's a good industry to be in because people want to help. That's especially true for members of a new generation who are committed to protecting the environment and see ours as a green business that is going to help protect their futures.

tpo: Do you also undertake outreach to educators?

Bella: Under the grant, we recently partnered with a nonprofit organization called Ignited that works with teachers to get them externships with companies. We hosted groups of teachers in February and April to spend a week with us and go to different tours and presentations. At the Santa Clara Valley Water District, we gave presentations on groundwater and recycled water. We took them on tours of our treatment plants, our advanced water purification center, a reservoir and a dam being reconstructed. They left energized to talk about water and bring lesson plans into their classes related to what they learned.

tpo: How would you characterize the progress BAYWORK has made since inception?

Bella: Metrics are always a challenge. We used to do simple metrics such as how many schools we visited in a year and how much collateral we distributed. From that it's hard to see whether we're having the impact we want. We hope we're having impact in the number of students enrolled water

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resource management programs. We have seen an increase in those areas recently. At Santa Clara Valley, we partnered with a local community college to offer a year-round, part-time internship to their water resources management students. We accepted two students at each of our four plants who are working 10 to 20 hours a week. Another way we know we've been moving the needle at our district is in how many interns we have hired from a structured summer internship program we implemented through our involvement with BAYWORK. In the past five years, we have hired at least 15 of those students as regular employees.

tpo: Why is it important for utilities to address these issues jointly?

Bella: By pooling our efforts, we get a better product because we gain more ideas and more input and we get to leverage resources so that we accomplish more than we could alone. There is value in looking at things from the global perspective of the water industry.

tpo: What advice would you give to utilities in other regions that would like to form a collaborative like BAYWORK?

Bella: They should start slow like we did, maybe with members of a couple of organizations who have seen each other at professional meetings. They can say, "Let's have some coffee and lunch and talk about the most important things we could do for our region." On our website (www.baywork.org) we have a ton of resources and ideas they can choose from. One principle of BAYWORK is that we're an open forum. Everything on our website is pretty much capable of being replicated, and we encourage that. We share our information nationally and internationally. **tpo**



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New Technology Slated for WEFTEC 2018

By Craig Mandli

ABB Drives & Controls ACQ580

The **ACQ580** variable-frequency drive from **ABB Drives & Controls** can help enhance pump performance, simplify operation and improve flow in pumping and aeration applications. Its software, intuitive keypad and menu-driven programming simplify the operation of even the most complex applications. The keypad's optional Bluetooth capability provides flexibility and an extra level of safety for commissioning and troubleshooting. The product range includes 1 to 700 hp and 480 volts, to be followed by 100 hp 240-volt, and 300 hp 600-volt units. They are available in enclosure classes UL Type 1 and 12.

800-752-0696; www.abb.com/drives; Booth 2229



AdEdge Water Technologies ADIN CO2

The **ADIN CO2** injection system from **AdEdge Water Technologies** is an alternative to other methods of alkalinity control and pH reduction. It's ideal for the reduction of alkalinity prior to primary treatment components for optimizing contaminant removal. The system uses carbon dioxide gas, which when released in water, forms carbonic acid — a weak acid that immediately reacts with alkalis to reduce pH. With the use of the included monitoring equipment and injector, the control panel can be used in several different configurations to reduce pH. The automatic systems use a pH probe downstream of the system to regulate the amount of carbon dioxide being injected into the water.

866-823-3343; www.adedgetech.com; Booth 1458



Aerzen Turbo G5 Plus

The **Aerzen Turbo G5 Plus** is the most compact and efficient turbo in its class. It offers

WEFTEC, the Water Environment Federation's annual technical exhibition and conference, offers water and wastewater professionals from around the world exposure to the newest products, along with water-quality education and training. This year's event, slated for Sept. 29 to Oct. 3 in New Orleans, promises to show off some of the finest new products on the market for municipal and industrial water and wastewater professionals. Below is a preview of some of the newest products that will be highlighted at this year's show.

Aerzen airfoil bearings with double coating and multilevel frequency converter technology, which reduces the heat loss in the motor to a minimum and, consequently, improves the total efficiency significantly.

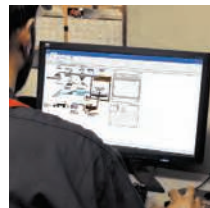
610-380-0244; www.aerzen.com/en-us; Booth 817



AllMax Software

AllMax Software combines software and service offerings to provide operations and maintenance solutions that make data management and reporting tasks easier and less time-consuming. Operator10 and Antero have been developed according to client requests and the requirements of the industry. A comprehensive offering of technical services are offered in support of the software. Setup, data conversions, and training are available, as well as custom report development. Annual technical support contracts offer users the ability to get help with troubleshooting and usage questions. Technical specialists are trained in water and wastewater concepts.

800-670-1867; www.allmaxsoftware.com; Booth 3947



Analytical Technology Entech EchoSmart

Entech EchoSmart sludge blanket monitors from **Analytical Technology** take the guesswork out of blanket measurements in clarifiers, thickeners and anywhere an underwater interface measurement is needed. Smart-Sensor technology provides for wireless networks of up to 16 sensors, reducing the per-tank price. In addition, the ability to remotely monitor the system via



cellular modem ensures support for even the most challenging processes.

800-959-0299; www.analyticaltechnology.com; Booth 7439

AP/M Permaform CentriPipe

CentriPipe from **AP/M Permaform** can be versatile and cost-effective for 30-inch and larger corrugated metal pipes, reinforced concrete pipes, and brick pipes of all configurations, including round, arched, elliptical, and box. Its materials, equipment, and application ensure high-quality structural, trenchless rehabilitation of storm and sanitary sewer pipes. Trained, experienced applicators use the best equipment, including a bidirectional spin-caster and specially designed fine aggregate concrete to ensure long-lasting, high-quality rehabilitation results.

800-662-6465; www.permaform.net; Booth 6539



Applied Felts AquaCure RP

AquaCure RP from **Applied Felts** combines fiberglass reinforcement with traditional felt to minimize wall thickness and maximize flow capacity in gravity sewers. AquaCure PS is specially designed for pressure sewer pipes and other nonpotable water applications. AquaCure PW is suited for potable water applications, designed to incorporate quality liners with an NSF-certified system.

276-656-1904; appliedfelts.com; Booth 4551



Aqua-Aerobic Systems AquaNereda

The **AquaNereda** aerobic granular sludge system from **Aqua-Aerobic Systems** replicates



the same effluent quality as a well-designed enhanced biological nutrient removal facility but without the use of chemicals. The technology, owned by Royal HaskoningDHV, dramatically reduces the footprint and energy requirements to provide a competitive alternative for high-performance plants. A full-scale system at the Rock River Water Reclamation District in Rockford, Illinois, demonstrates the technology and is a part of the company's technical seminar program. The facility will help accelerate the implementation of aerobic granular sludge technology in North America.

815-654-2501; www.aquanereda.com; Booth 6625

BDP Industries Rotary Drum Thickener

The **Rotary Drum Thickener** from **BDP Industries** effectively



thickens various water, wastewater and industrial biosolids. With its compact design, trouble-free operation, low maintenance, and enclosure for odor control, it is an ideal option for many thickening applications. The company has manufactured the same fundamental design with an internally baffled, center shaft support since 1978. The design includes a sealed first compartment for increased flocculation time, and trunnion supports on the center shaft, keeping them away from the process fluid.

518-695-6851; www.bdpindustries.com; Booth 1016

Blue-White Industries ProSeries-M M-3

ProSeries-M M-3 peristaltic metering/dosing pumps from **Blue-White Industries**



are built rugged to handle demanding municipal water and wastewater treatment operations. Feed rates range from 0.0002 to 33.3 gph with a pressure rating to 125 psi. They come with a brushless DC motor, built-in tube failure detection and easy access electronics. They are outfitted with Flex-A-Prene tubing for tube life of up to four times longer than conventional tubes, precise feed rates, and high chemical resistance. They are NSF Standard 61, ETL and CE listed, and NEMA 4X/IP66 rated.

714-893-8529; www.blue-white.com; Booth 3829

Centrisys/CNP THK Series

The **Centrisys/CNP THK Series** sludge thickener is not a modified dewatering centrifuge. It is specifically designed for sludge thickening.

By removing the conical section and increasing the cylindrical length, both changes increase G-volume and result in higher throughput. A hydraulic-solids baffle disc and air injection allow it to use little to no polymer under most conditions. Typically, it uses 0 to 2 pounds per dry ton of polymer for waste activated sludge, where an average modified centrifuge consumes approximately 10 to 12 pounds per dry ton of polymer. It also delivers 2 to 10 percent total solids with an energy usage as low as 0.05 kW per gpm, a quarter of the energy required for modified centrifuges.



262-654-6006; www.centrisys.com; Booth 4921

CUES SPiDER

The **SPiDER** scanner from **CUES** is a wireless and color manhole inspection technology in a lightweight and compact form factor. The scanner can calculate its position in the manhole shaft by using its sensor data to measure its incremental motion instead of the payout cable. It weighs less than 30 pounds and can be hand carried to easements or other previously difficult-to-access sites.



800-327-7791; www.cuesinc.com; Booth 711

Duke's Root Control Razorooter II

Diquat-based **Razorooter II** root-control herbicide from **Duke's Root Control** is registered by the U.S. EPA for controlling nuisance tree roots in sanitary sewer collections systems. It kills roots and eliminates mainline stoppages caused by live tree roots.



800-447-6687; www.dukes.com; Booth 4439

EleMech Elevate4.0

Elevate4.0 from **EleMech** is designed to retrieve and store critical information on the cloud, making it viewable on mobile devices or PCs. Data can be from points of interest like control panel temperature and humidity, to more advanced parameters such as operational characteristics of facility equipment. It offers a subscription-based interface, allowing facilities to monitor individual pieces of equipment or expand to include equipment across entire facilities or regions. Users will experience the convenience of having critical information delivered as text or

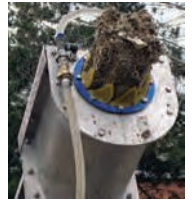


email, letting them know what they need to know exactly when they need to know it.

630-499-7080; www.elemechinc.com; Booth 3953

Enviro-Care SPEC0 CPS

The **SPEC0 CPS** conveying compactor from **Enviro-Care** can transport debris captured by screens and, in the process, achieve additional dryness, reducing the volume by 40 percent. The screened debris is conveyed through a transport tube by a shaftless spiral. The transport tube is lined with a perforated nonstick polymer that acts as a drainage screen. The outlet plug retention diaphragm is made from the same SINT polymer, but is available in various degrees of stiffness.



815-636-8306; www.enviro-care.com; Booth 5339

Flowrox GeoBag

The **Flowrox GeoBag** can help reduce the costs related to waste handling while assisting with the filtration and dewatering process by providing a watertight floor construction with a drain valve. It consists of a high-performance Packaged Pumping System and LPP-T transfer pump to

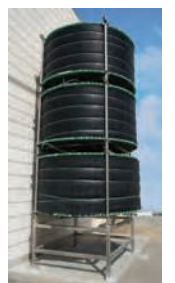


ensure accurate chemical dosing and high-performance pumping. It is compatible with any climate, and it can be insulated and heated for areas prone to colder temperatures. It is suitable for sewage sludge dewatering; tailings dewatering; concentration of oily sludge; filtration and dewatering of precipitated solids and impurities; and filtration and dewatering of clay, sand, and other fine particles.

410-636-2250; www.flowrox.com; Booth 2607

Fluence SUBRE

When a conventional activated sludge wastewater treatment facility has reached its limit, the **SUBRE** submerged membrane aerated biofilm reactor from **Fluence** can be a solution. The system is used to retrofit existing aerobic wastewater treatment plants to increase capacity without enlarging a plant's footprint. It helps improve effluent quality to meet EPA standards for reuse and uses up to 90 percent less energy than alternatives, allowing plants to progress toward energy neutral treatment.



763-746-8400; www.fluencecorp.com; Booth 4415

(continued)

Franklin Electric FPS PowerSewer

The **FPS PowerSewer System** from **Franklin Electric** is a low-pressure sewer system available in 60-, 72-, 84- and 96-inch basin sizes that is compatible with the entire line of FPS 2 hp grinder pumps. The basin's internal C-Channel assembly releases from the top of the unit, simplifying accessibility to and maintenance of its components. The updated tank design provides for easy access and replacement of all other internal components. The float tree is spring-loaded and easily removable, with a lift handle to simplify pump removal. **866-271-2859; www.franklinengineered.com; Booth 7927**



Gardner Denver CycloBlower H.E. Series

The **CycloBlower H.E.** from **Gardner Denver** offers airflows up to 6,200 cfm, pressures up to 36 psi, and vacuum up to 22 inches of mercury, making it ideal for a wide range of applications including wastewater treatment, dilute and dense-phase pneumatic conveying, cement, chemical processing, industrial processing, food processing, and plastic molding and mandling. It offers the flexibility to retrofit and upgrade existing packages. It offers an efficient 3-by-5 helical screw rotor profile, food-grade polytetrafluoroethylene-coated rotors, a split-cylinder design, and available discharge port designs that match the most efficient performance to application requirements, O-ring sealing, helical timing gears, and dual-splash lubrication with an eccentric slinger ring. **866-428-4890; www.gardnerdenver.com; Booth 7039**



Greyline Instruments TTFM 6.1

The **TTFM 6.1** transit-time flowmeter from **Greyline Instruments** includes powerful digital signal processing and advanced algorithms to provide easy and accurate flow measurement of clean and relatively clean fluids (water, oil, chemicals). It offers improved performance in a wider range of applications, operating conditions and pipe materials. The clamp-on technology is fast and easy to install. It monitors flow rate, volume total, run hours, and diagnostic information through only two wires with the optional MOD-BUS RTU serial communication option. **888-473-9546; www.greyline.com; Booth 5949**



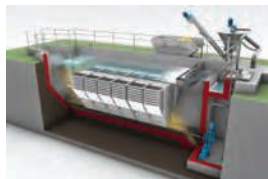
Hach Claros Water Intelligence System

The **Claros Water Intelligence System** from **Hach** focuses on instrument, data, and process management to help reduce uncertainty and increase operational confidence. Changing regulations, unpredictable influent levels and instrument downtime are all problems plant operators encounter. Without a clear picture of their water or data, operators face uncertainty about efficiency and compliance. Imagine the timesavings, cost reductions, and peace of mind that a complete water intelligence system could provide. **800-227-4224; www.hach.com/claros; Booth 3617**



HUBER Technology GritWolf

The **GritWolf** from **HUBER Technology** uses a two-chamber design and contact settling to reduce footprint and remove the finest of grit particles, as well as fats and grease. In the first smaller chamber, the wastewater is exposed to fine-bubble aeration where floatable particles accumulate and are removed by a paddle system. The second section uses crossflow contact settling, allowing it to remove up to 90 percent of the grit of grain size greater or equal to 75 μm . It offers high grit removal with a small footprint and at much reduced depths for ease of construction. **704-990-2053; www.huber-technology.com; Booth 4628**



Hydro International Hydro GritCleanse

The **Hydro GritCleanse** fluidized bed grit washing system from **Hydro International** significantly reduces volatile solids content and outputs cleaner and drier grit. It retains 95 percent of all grit 106 microns and larger. Reducing organic material in captured grit reduces volume, weight, water content and odors. It is backed by single-supplier system accountability using the company's Grit Management approach to grit system design. **866-615-8130; www.hydro-int.com; Booth 6339**



InfoSense Sewer Line Rapid Assessment Tool

The **Sewer Line Rapid Assessment Tool**, or SL-RAT, from **InfoSense** is a portable and easy-to-use technology that uses sound waves to assess blockage conditions in gravity sewer pipe.

It can be thought of as the first step in a collections system maintenance process, providing a fast low-resolution view of blockage conditions. An assessment is provided in three minutes or less, allowing a two-person crew to screen up to 10,000 feet per day. It is portable, offers no-flow contact, is GPS-enabled, and is EPA-validated.

877-747-3245; www.infosense.com; Booth 1039



International Products Micro-90

Micro-90 from **International Products** can help restore 100 percent flux to UF, RO, ceramic and NF systems. It removes organics and metals that blind membranes while eliminating the need for caustic cleaners. It provides savings through reduced energy use, reduced chemical use and less downtime. Most plants achieve 100 percent recovery after every wash, thus extending the life of their membranes. It is a nonhazardous, water-based concentrate. **609-386-8770; www.ipcol.com; Booth 6652**



JDV Equipment Nozzle Mix System

The dual-zone **Nozzle Mix System** from **JDV Equipment** provides uniform mixing patterns that produce even distribution and a stable environment. It optimizes solids suspension and contact to promote efficiency in a wide range of applications. The system is designed with pumps installed outside the tanks and are typically chopper pumps or pumps incorporating in-line grinders. The high-velocity nozzles mounted inside the tank completely mix the tank contents. Applications include anaerobic digestion, biosolids storage, blending tanks, excess flow tanks, septage or leachate, anoxic zones, combined sewer overflow handling, aerobic digestion, assisting secondary treatment, and biosolids holding ponds. **973-366-6556; www.jdvequipment.com; Booth 4001**



Keller America LevelRat

The **LevelRat** from **Keller America** is built to provide reliable, low-maintenance service in wastewater level measurement applications. It offers 0.5 percent full scale total error band accuracy,



dual outputs (one analog and one RS485 digital), and models equipped with a 4-20mA analog output include lightning protection. It is built to order in the U.S. with a lead time of three business days. **877-253-5537; www.kelleramerica.com; Booth 428**

Komline-Sanderson Biosolids Drying System

Biosolids Drying Systems from **Komline-Sanderson** are capable of handling in excess of 1,000 tons of wet cake per day. Excess heat from combustion engines or turbines can be used to heat thermal fluid or produce steam. The dryer's shaft, hollow paddles and trough are all heated. The robust design and low speed with minimal rotating parts result in reduced maintenance costs. Indirect drying using the airtight dryer results in minimal off-gas volume, which allows simplified odor control systems and safe operation resulting in reduced disposal costs for the beneficial reuse of biosolids as fertilizer and green fuel. **800-225-5457; www.komline.com; Booth 2429**



Lovibond Tintometer PTV Series Process Turbidimeter

By combining a state-of-the-art user interface with a robust design, **PTV Series Process Turbidimeters** from **Lovibond Tintometer** deliver accurate results without complexity. **941-756-6410; www.lovibond.com; Booth 8229**



Myron L Company 900 Series

The **900 Series** monitor/controller from **Myron L Company** combines flexibility, accuracy and reliability. Its 3.5-inch resistive touch-screen and intuitive graphical user interface make it simple to use. Measurement capabilities include conductivity, resistivity, salinity, TDS, pH, ORP, temperature, mV, flow and percent rejection. It includes a 4-20mA input and a variety of outputs, including zero to 10-volt DC recorder output, relay output, alarm output and optional outputs for 4-20mA, RS-485, two additional relays, and one additional alarm output. **760-438-2021; www.myronl.com; Booth 3006**



Penn Valley Pump Double Disc Pump

The **Double Disc Pump** from **Penn Valley Pump** eliminates the friction wear associated with progressive cavity and rotary lobe pump styles.

The pump can run dry without damage and incorporates a sealing trunnion that requires no maintenance, no seal water, no packing, and no lubrication and does not leak. The company offers a Swap Your Pump trial program that provides the opportunity to try the pump risk-free.



800-311-3311; www.pennvalleypump.com; Booth 929

Praxair In-Situ Oxygenation System

Praxair's In-Situ Oxygenation (I-SO) System is a mechanical oxygenator that can dissolve as much as 82 percent of the high-purity oxygen into water. Aerating with the system in addition to using high-purity oxygen can increase biotreatment capacity, significantly lower VOC emissions, reduce foam formation, reduce electrical power usage and allow for greater variations in oxygen demand. **800-772-9247; www.praxair.com; Booth 3045**



RapidView IBAK North America MainLite

The **MainLite** from **RapidView IBAK North America** is a sleek, easy-to-use system that won't strain a technician's back. Available in many different configurations, the systems can be used in portable applications or mounted in a vehicle, providing power and flexibility in one compact package. **800-656-4225; www.rapidview.com; Booth 7539**



REXA

REXA is a custom-designed actuator that offers reliable control of any valve or gate service. It employs Electraulic technology, operating like an electric actuator that employs a hydraulic transmission without the use of an actively pressurized reservoir system. This technology eliminates the maintenance burdens, liability concerns and high costs of ownership common to other hydraulic systems. The result is a hydraulically driven actuator designed to modulate accurately and reliably over long periods of time without attention, reducing cost of ownership. **508-584-1199; www.rexa.com; Booth 6823**



SAF-T-FLO Chemical Injection SAF-T-Seal

The **SAF-T-Seal** elastomeric duckbill tip from **SAF-T-FLO Chemical Injection** can be a timesaver when added to injection quills dosing sodium hypochlorite or ammonia. These chemicals are prone to forming deposits, which eventually lead to a clogged injection quill. The tip can be added to any 3/8- or 1/2-inch injection quill to help reduce tip clogging, extending maintenance intervals. **800-957-2383; www.saftflo.com; Booth 5847**



Sealing Systems Flex-Seal Utility Sealant

Flex-Seal Utility Sealant from **Sealing Systems** is a plural component aromatic urethane with 800 percent elongation and a tensile strength of 3,200 psi. It is designed to prevent inflow and infiltration and provide corrosion protection at the grade adjustment ring section or joint section. It provides an ideal seal and will pass a vacuum test according to ASTM standards. **800-478-2054; www.ssisealingsystems.com; Booth 3504**



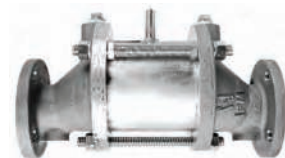
SEEPLEX Smart Conveying Technology

SEEPLEX progressive cavity pumps equipped with **Smart Conveying Technology** to offer easy access to the specially engineered stator and rotor for quicker maintenance, shorter downtimes, more energy efficiency and overall lower life-cycle costs. Repairs can be done by one person without special tools or the need to remove the pump from either suction or discharge piping. Pumps with the technology convey capacities up to 500 gpm and handle pressures up to 120 psi in a wide variety of wastewater applications. **937-864-7150; www.seepex.com; Booth 6939**



Shand & Jurs Deflagration Flame Arrester

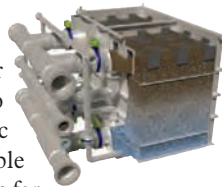
Shand & Jurs vertical and horizontal **Deflagration Flame Arresters** are designed to provide a positive flame stop in horizontal gas piping systems containing flammable vapors having a low flash



point. The units not only provide protection against propagation of fire, but also offer maximum flow capacity. They are designed with taps to accommodate temperature-monitoring devices to activate a quick closing valve when a flame is detected. **708-236-6000; www.sandj.com; Booth 2608**

SUEZ FiltraFast

The **FiltraFast** extreme-rate compressible media filter from **SUEZ** is designed to achieve a very high hydraulic loading rate. It is customizable to meet specific requirements for industrial water filtration and tertiary wastewater treatment. Its backwash sequence enables maximum recovery of water, extends media life and limits energy consumption. This process reduces the footprint, maintenance and replacement costs. **866-439-2837; www.suezwatertechnologies.com; Booth 4017**



Sulzer Pumps Solutions HST

The **HST** turbocompressor from **Sulzer Pumps Solutions** has an advanced design with digitally controlled magnetic bearing technology and a premium efficient high-speed motor driven through a built-in frequency converter. It has no mechanical wearing parts or lubricants, requiring minimal maintenance. This is made possible by an electronically controlled magnetic bearing technology, which levitates the integrated rotor/shaft/impeller single-piece assembly along the self-diagnostic features of the active magnetic bearing controller. The result is a compressor with no performance deterioration over time and no need for scheduled maintenance. They are widely used in wastewater treatment plants and in low-pressure industrial processes. **203-238-2700; www.sulzer.com; Booth 2515**



Superior Signal smoke generator

Smoke generators from **Superior Signal** locate sources of surface inflow resulting in wet-weather sanitary sewer overflows. It serves as a fast and easy way to find leaks and faults in collections systems, as smoke candles provide visible smoke to detect faults at longer distances in sizes to meet any need. Smoke candles, smoke blowers and smoke fluid systems are available. **800-945-8378; www.superiorsignal.com; Booth 2631**



Vac-Con Titan

The **Titan** dual-engine combination machine from **Vac-Con** offers the Aeroboost Q Drive that operates the vacuum and water functions while lowering noise emissions and substantially reducing overall fuel consumption. Enhanced twin cyclonic separators, one located on each side of the truck, optimize filtration and airflow. The Aeroboost three-stage fan balances airflow, resulting in less turbulence and more power. An upgraded water system features 1 1/4-inch plumbing and ball valves. It offers 44 percent fuel savings, a 43 percent decrease in vacuum system operating revolutions per minute, a 25 percent increase in airflow, 16 to 30 percent more horsepower, an 8 percent decrease in noise pollution and a 5 percent increase in overall vacuum pressure over previous models. **888-920-2945; www.vac-con.com; Booth 2036**



Vactor 2100i with RDB 1015

The **Vactor 2100i** combination sewer cleaner includes a 7-inch screen in the cab, with backlit tactile buttons and the IntuiTouch one-touch control system for quick startup and engagement. An optional RDB 1015 rapid-deployment boom telescopes 10 feet out and extends the debris hose down 15 feet, minimizing the need for additional debris tubes. The water-recycling model saves thousands of gallons of clean water every shift and offers absolute water filtration to 100-micron particle sizes, a five-stage filtration system, no moving parts in the body or tanks, and no need to enter the debris tank for cleaning or maintenance. **815-672-3171; www.vactor.com; Booth 1413**



Vaughan Portable Bypass Pump

Heavy-duty **Portable Bypass Pumps** from **Vaughan** can be used for tough solids-reduction applications or low-shear solids handling in temporary or permanent situations. These bypass trailers are available with a centrifugal chopper pump for tough solids reduction or Triton screw pump for more sensitive applications. Each pump is available on a trailer, skid mount, or as an open or enclosed, sound-attenuated platform and powered by either diesel, hydraulic, or electric drive motors. **360-249-4042; www.chopperpumps.com; Booth 1517**



VEGA Americas VEGAPULS WL 61

The **VEGAPULS WL 61** from **VEGA Americas** is a radar sensor designed for multiple water management needs. This radar is reliable, comes with mounting flexibility, and still works after being submerged. It continues to perform with buildup, condensation, and all the other challenges wastewater treatment plants deal with on a daily basis. Visit the booth to see live demonstrations showcasing just how flexible the sensor is, including a weir demonstration common in CSOs. **800-367-5383; www.vega.com; Booth 7013**



Wilo-Flumen OPTI-TR

The **Wilo-Flumen OPTI-TR** series is a direct-drive submersible mixer series with 5.5- to 15.75-inch-diameter propellers optimized for efficiency and durability. The series features cast stainless steel propellers (200 to 1,300 N thrust range) with the same hydraulically efficient backswept profile as found on the company's medium-speed planetary gear-reduced mixer series. Each propeller blade has a hydrofoil profile that achieves thrust-power ratios according to ISO 21630. Propeller clogging is minimized through computational fluid dynamics-based design and extensive testing. A moisture-sensing electrode located in the seal chamber and auto-reset winding thermal sensors come standard. **888-945-6872; www.wilo-usa.com; Booth 2209**



YSI, a Xylem brand IQ Analyzers

YSI, a Xylem brand, is expanding its IQ SensorNet solution with the release of two new analyzers for wastewater monitoring and control — one measuring orthophosphate and the second for ammonium analysis. **IQ Analyzers** are available as single or dual channel and have a mixing valve that significantly reduces reagent consumption and maintenance requirements — lowering the overall cost of reliable data. **937-767-7241; www.ysi.com; Booth 5989**



ROBUSCHI®



Blower Products for Wastewater Treatment

Featuring **ROBUSCHI** Robox Energy, Robox Screw
and Robox Evolution Blower Packages

Ideal for: Aerobic Digestion, Grit Aeration, Sludge Digestion,
Filter Backwash, Channel Aeration

weftec | 2018
Booth 7039

www.Robuschi.com

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Digital Technology

By Craig Mandli

Control/Electrical Panels

AEDGE WATER TECHNOLOGIES INGENIUS

InGenius control panels from AdEdge Water Technologies are custom-engineered programmable logic control panels designed to meet site specifications for monitoring and integrating treatment systems with auxiliary equipment and controls for water systems. The panels integrate the process in one place for safety, monitoring, ease of service and installation. They are NEMA 1-4, 4X, 12, and 13 certified and constructed from thermoplastic, stainless steel, painted steel, and fiberglass. They have a hand on/off selector, backwash indicator, LED lamps, a security key latch, and probe-mounted displays for flow, pH, chlorine, TDS, and turbidity. They include level and relay controls, auxiliary power supplies, power converter (110- to 24-volt or 12-volt and AC to DC), surge protection, Ethernet networking, audible/visual alarm indicators, and a SCADA interface. **866-823-3343; www.adedgetech.com**



InGenius control panels from AdEdge Water Technologies



Chromalox C4 Multi-Zone SCR Power Controller

CHROMALOX C4 MULTI-ZONE SCR POWER CONTROLLER

The Chromalox C4 Multi-Zone SCR Power Controller manages both single- and three-phase industrial heating load applications, which require zero cross firing modes. It is capable of up to four independently controlled single-phase loads, two three-phase/two-leg loads, or one three-phase/three-leg load (with or without an additional single-phase load). With four universal main process inputs, four configurable outputs (relay, logic, TRIAC, continuous), two digital inputs, and two configurable alarm outputs, it can accommodate a wide number of installations. With each zone outfitted with an independent current transformer input, full thermal and electrical diagnostics can be performed from loop break alarm, heater break, SSR short circuit, short circuit, and over-temperature alarm. Equipped with MODBUS RTU communication capabilities, it has the ability to host a number of additional fieldbus communication options including MODBUS TCP, Profibus, Profinet, Real Time Ethernet IP, DeviceNet, EtherCat, or CANopen. **800-443-2640; www.chromalox.com**

GORMAN-RUPP INTEGRINEX

The Integrinex line of lift station controls from Gorman-Rupp is designed to ensure system performance through precise matching of controls to pumps and motors. Customers have four choices in liquid level controls when they select a Gorman-Rupp ReliaSource solids-handling pump package. Basic offers simple, reliable plug-and-play perfor-



Integrinex line of lift station controls from Gorman-Rupp

mance and is designed for accurate start/stop operation in a duplex alternation pump system. Standard includes duplex and triplex alternation, level sensors, pump delay and alarms. Advanced control systems include soft starters and variable-frequency drives to manage electric inrush, hydraulic shock, and matching starting and stopping torque-based management and monitoring. Remote View includes all the functionality of the advanced system with remote tablet-based management and monitoring. **419-755-1011; www.grpumps.com**

SIEMENS INDUSTRY PROCESS INSTRUMENTATION SITRANS LUT400

The SITRANS LUT400 from Siemens Industry Process Instrumentation includes pump control parameters that can be set to minimize pumping activity during on-peak pricing and maximize savings. The Siemens Cost of Water – Economy Pumping calculator lets users see just how much they can save by incorporating economy pumping strategies into their plant. Learn how to save thousands in energy costs through economy pumping. Water and sewage processing demand surges during times of peak electricity use, which leads to peak pricing and higher costs for energy consumed by pumping systems. However, this allows pump routines to be scheduled for off-peak times. **800-365-8766; www.usa.siemens.com/cost-of-water-calculator**



SITRANS LUT400 from Siemens Industry Process Instrumentation

SMITH & LOVELESS QUICKSMART SYSTEM CONTROLS

QUICKSMART System Controls from Smith & Loveless provide advanced control of a variety of wastewater headworks and pumping functions. A maintenance-log feature displays periodic recommended operation and maintenance instructions and makes lubrication suggestions based on actual system runtimes; an I/O status screen displays controller digital and analog I/O status. Using a simple touch-screen interface, the system simplifies control modification, screen navigation and viewing of system status, with screen function buttons and a status bar accessible from each screen. Help and troubleshooting support is available, along with a Spanish language option. The 7-inch 65,000-color TFT LCD touch-screen HMI controller is UL-listed; NEMA 4 rated when installed in an enclosure, and protected by a surge-protective device. **913-888-5201; www.smithandloveless.com**



QUICKSMART System Controls from Smith & Loveless

WEIL PUMP PLC

PLC control panels from Weil Pump provide a platform for the control of just about any pumping system, including commercial, industrial, process and booster service pumps. They control one to four pumps and work with a variety of level controls, from state-of-the-art transducers to traditional float switches. They are easy to use thanks to a large, color touch screen and an intuitive user interface. Setting up wired or wireless remote monitoring and control of a system via network is simple. Additionally, the panels can integrate with an existing building automation system through BACnet and Modbus connections. Their advanced monitoring capabilities, multiple fail-safes and built-in troubleshooting provide early detection of faults to help keep mission-critical systems running smoothly and without interruption. **262-377-1399; www.weilpump.com**



PLC control panels from Weil Pump

Flow Monitoring

BADGER METER DYNASONICS ISONIC 4000

The Dynasonics iSonic 4000 flowmeter from Badger Meter is an economical solution for a wide range of open-channel flow measurement applications, accurately measuring level, flow rate, and total volume of water and other liquids flowing through weirs and flumes. It is suited for applications ranging from flow into water treatment plants, storm and sanitary sewer systems, and effluent from water resource recovery, to industrial discharge and irrigation channels. It uses a noncontact ultrasonic level sensor to measure the water level in a flume, weir or other channel. Based on Manning's equation, the flow rate is determined according to the dimensions, characteristics, and water level of the channel, allowing for a cost-effective solution for measuring flow in angular open channels and partially filled pipes, as well as measuring volumetric contents of liquids in tanks. **877-243-1010; www.badgermeter.com**



Dynasonics iSonic 4000 flowmeter from Badger Meter



Sonic-Pro S3 Hybrid Ultrasonic Flowmeter from Blue-White Industries

BLUE-WHITE INDUSTRIES SONIC-PRO S3 HYBRID ULTRASONIC FLOWMETER

The Sonic-Pro S3 Hybrid Ultrasonic Flowmeter from Blue-White Industries will measure flow in virtually any fluid in which sound can travel.

The sound transducers are clamped to the outside of the pipe wall to measure flow in clean and dirty fluids. It is well-suited for use in applications where harsh chemicals or other abrasive fluids are being used because the meter never encounters the fluid being measured. It has a backlit LCD display with a five-button, fully configurable, tactile switch keypad interface. The security system allows for master and configuration passwords. The meter may be ordered with a T-Track Mounting System, which is designed to quickly and accurately mount the transducers utilizing built-in ruler and mounting base to ensure transducers are perfectly aligned and spaced. It comes with user-selectable Doppler or Transit Time operation; can be factory configured; and has a portable, rugged carrying case. **714-893-8529; www.blue-white.com**

GREYLINE INSTRUMENTS TTFM 6.1

The TTFM 6.1 transit-time flowmeter from Greyline Instruments provides easy and accurate flow measurement of clean and relatively clean fluids (water, oil, chemicals). Its clamp-on technology does not require pipe penetration, cutting, or welding, greatly reducing costs. It is fast and simple to install in typically less than 30 minutes. It offers improved performance in a wide range of applications, operating conditions, and pipe materials, with high accuracy of plus or minus 1 percent of reading with a 25-1 turndown. A built-in five-key calibrator, intuitive menu and large backlit LCD display make it operator-friendly. At a glance, the user can view flow rate, flow direction, totalizer, relay status, and important diagnostic information on the display. An isolated 4-20mA output for flow rate, two relays for pulse output or alarms, and 26 million-point data logger offer greater flexibility of data monitoring and control. **888-473-9546; www.greyline.com**



TTFM 6.1 flowmeter from Greyline Instruments

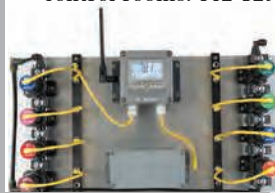
Monitors

AMETEK ARIZONA INSTRUMENT JEROME J605

The Jerome J605 from AMETEK Arizona Instrument is designed to detect hydrogen sulfide at concentrations as low as 3 ppb with a resolution of 20 ppt. It has a survey mode that allows the user to continuously draw in samples of air in order to sweep an area for hydrogen sulfide hot spots or leaks so corrective action can be taken. Its wide detection range makes it useful for multiple applications, including regulatory compliance and odor control at wastewater and landfill facilities, scrubber efficiency testing, and monitoring corrosion in control rooms. **602-529-3723; www.azic.com**



Jerome J605 from AMETEK Arizona Instrument



MetriNet from Analytical Technology

ANALYTICAL TECHNOLOGY METRINET

MetriNet from Analytical Technology is a low-power, modular system for monitoring water quality at remote locations. It is a unified system for monitoring water quality and then transmitting the data for web-based storage or directly

to a customer site. The system enables users to assemble monitoring units that fit their individual site requirement. Individual smart sensors called M-Nodes take the measurements. These devices are a complete sensor and monitor in one miniaturized package. Data transmission is accomplished via cellular modem; Wi-Fi; or wired Modbus, Ethernet, or Profibus. The M-Node sensors are available for a variety of water-quality parameters such as free chlorine, total chlorine, turbidity, pH, conductivity and ORP. **800-959-0299; www.analyticaltechnology.com**

CHEMETRICS K-7511

The K-7511 ultralow-range dissolved oxygen test kit from CHEMetrics can be used as the primary method for determining DO levels down to 2 ppb, a means to verify (and calibrate) readings obtained by online methods, or as a backup method if an online system is not operational. It eliminates the need for calibration or routine maintenance requirements associated with online methods. It is not subject to salinity or dissolved gas interferences. Low-range DO test kits include a special sampling tube for use with boiler feedwater. This device allows the user to break the tip of the vacuum-sealed ampoule in a flowing sample stream in order to preclude error from contamination by atmospheric oxygen. The kit contains everything needed to perform 30 tests. **800-356-3072; www.chemetrics.com**



K-7511 dissolved oxygen test kit from CHEMetrics

DE NORA WATER TECHNOLOGIES CAPITAL CONTROLS MICROCHEM3

The MicroChem3 multiparameter water analysis system from De Nora Water Technologies Capital Controls offers both measurement and control of chlorine-based compounds and other critical elements in one versatile instrument that can be specifically tailored to individual applications. Features include a color touch-screen display, menu-driven software for seamless setup and operation,

and a USB interface for software updates and data log downloads. The analyzer and controller can be used in conjunction with De Nora Water Technologies' preferred range of wet ends to measure and control any combination of chlorine, chlorine dioxide, pH, ORP, conductivity, and 4-20mA (e.g., flow). **215-997-4000; www.denora.com**



MicroChem3 water analysis system from De Nora Water Technologies Capital Controls

ELECTRO-CHEMICAL DEVICES TRITON TR86 TURBIDITY ANALYZER

The Triton TR86 Turbidity Analyzer from Electro-Chemical Devices features an advanced transmitter combined with a T80 Universal Analyzer to provide reliably accurate turbidity monitoring with the capability to add a second measurement parameter to the system, such as pH, ORP, conductivity, DO or various pIONs. It comes in a choice of three separate ranges from 0 to 4,000 NTU for continuous measurement. The advanced infrared optical sensing technology emits an 850 nm beam of near infrared light into the sample where it is scattered by the particles suspended in the water. Measurement is achieved when the amount of scattered backlight returns to the sensor, which is then correlated to the amount of suspended solid particulates in the water. The sensor's measurement response time depends on the size, shape and composition of the suspended particles. It is accurate to 2 percent of reading or 0.5 NTU, whichever is greater. **800-729-1333; www.ecdi.com**

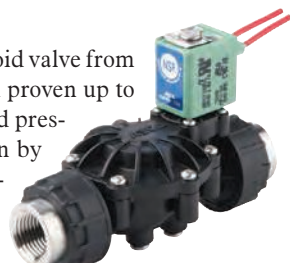


Triton TR86 Turbidity Analyzer from Electro-Chemical Devices

Measurement is achieved when the amount of scattered backlight returns to the sensor, which is then correlated to the amount of suspended solid particulates in the water. The sensor's measurement response time depends on the size, shape and composition of the suspended particles. It is accurate to 2 percent of reading or 0.5 NTU, whichever is greater. **800-729-1333; www.ecdi.com**

EMERSON ASCO 212 SERIES

The ASCO 212 Series composite solenoid valve from Emerson combines lead-free construction proven up to 1 million cycles with high temperature and pressure ratings, plus testing and certification by NSF International. It provides a fast, cost-effective assembly via its FasN universal valve connection system. A water treatment system's piping can be quickly connected to the NPT threads on the valve's connection system, saving installation cost and time. **888-637-7333; www.emerson.com**



ASCO 212 Series composite solenoid valve from Emerson

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**



Tote Bin Scale from Force Flow

KELLER AMERICA PRECISELINE

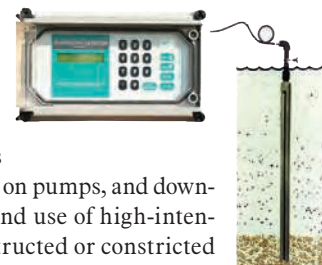
The Preciseline from Keller America uses microprocessor technology to provide accurate, thermally compensated outputs for use in pump control and pressure monitoring applications with pressures up to 15,000 psi. Users can choose between 4-20mA or volt DC analog outputs, while the digital output provides an RS485 connection that simplifies connection to a PC. **877-253-5537; www.kelleramerica.com**



Preciseline from Keller America

MARKLAND SPECIALTY ENGINEERING AUTOMATIC SLUDGE BLANKET LEVEL DETECTOR

The Automatic Sludge Blanket Level Detector from Markland Specialty Engineering monitors and controls the solid-liquid interface levels in water and wastewater clarifiers and settlement tanks and automates biosolids removal. Measuring primary, secondary, and backwash silt/sludge levels, it allows users to program pumps to operate only when necessary, preventing carry-over, optimizing feed density, and improving outflow for reuse. This helps reduce energy usage, wear and tear on pumps, and downtime for maintenance. Its slim profile and use of high-intensity infrared light make it ideal for obstructed or constricted areas. No calibration is required, and a wireless data link is available. **855-873-7791; www.sludgecontrols.com**



Automatic Sludge Blanket Level Detector from Markland Specialty Engineering

MASSA MASSASONIC PULSTAR PLUS 95

The MassaSonic PulStar Plus 95 from Massa provides continuous level measurement and performs reliably with liquids, solids, and slurry applications. Available in durable PVDF or PVC housings, these ultra-compact ultrasonic sensors are easy to use, fully programmable, and come with an IP68 submersion rating. It accurately measures from 8 inches to 20 feet, comes with no false echoes intelligence to simplify setups, and works in environments with vapors. Multiple models are available offering 0-10 volt DC, 4-20mA, TTL and RS-485 output, Modbus compatible. It is field-proven for wet well pump control, lift screen operations and tanks. Since it has a narrow 8-degree total beam, it is ideal in applications where complex target structures or interfering infrastructure can exist. **781-740-6119; www.massa.com**



MassaSonic PulStar Plus 95 from Massa

PHOENIX CONTACT EAGLEI

EAGLEi remote monitoring solutions from Phoenix Contact provide a way to cost-effectively collect data from distributed assets without the large capital investment of a traditional SCADA system. No software purchases or the maintaining of data servers is required. They provide location of an asset, historical data and trends, alarming and communication history, so users can see information about levels, temperatures, runtimes, and many other digital and analog inputs. Configuration is web-based, so no software programming tools are required. It can be set up in three easy steps. First, wire the desired inputs. Second, call to activate the cellular connection, start accessing data via webpage, and sync the unit. Third, configure permissions, users, and parameters for the unit



EAGLEi remote monitoring solutions from Phoenix Contact

Wastewater Treatment and Sludge Management Solutions from Komline-Sanderson



Pump. Thicken. Dewater. Dry.

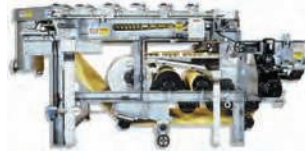
Paddle Dryer

- indirectly heated
- produce Class A product
- high efficiency



Belt Filter Press

- sludge dewatering
- high cake solids
- low polymer cost



Gravity Belt Thickener

- sludge thickening
- high rates
- low polymer cost



Dissolved Air Flotation

- sludge thickening
- wastewater clarification
- high float solids



weftec 2018
Booth 2429

Rotary Vacuum Filter

- sludge dewatering
- wastewater clarification
- continuous operation



Plunger Pump

- sludge transfer
- positive displacement
- high suction lift



K-S Komline-Sanderson

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on the webpage. It transmits data using a 4G cellular modem over a private cellular network to secure servers for a monthly fee. **800-888-7388; www.phoenixcontact.com**

PMC ENGINEERING THERM-ALERT

The Therm-Alert from PMC Engineering is a flexible and customizable alarm system intended to warn employees when temperature or dew point in either an industrial or domestic working area reaches dangerous levels. The system is comprised of a high-performance capacitive humidity sensor with temperature element, coupled to a display with one or more switch outputs to control functions such as single or stackable warning lights and/or audible alarms. The system displays and annunciates temperature, dew point, relative humidity or any combination. Setpoints are customer programmable. Operating range is from 40 degrees below zero to 140 degrees F. The display is mounted in a NEMA 1 enclosure for indoors or NEMA 4 for outdoors. The sensors can be installed within the main enclosure or in separate remote enclosures with or without a secondary display. **203-792-8686; www.pmc1.com**



Therm-Alert from PMC Engineering

SEALEVEL SYSTEMS SEACONNECT 370W

The SeaConnect 370W from Sealevel Systems is an Industrial Internet of Things edge device that remotely monitors and controls the status of real-world I/O processes. The module features a powerful, integrated event engine that is configured using an intuitive web-based interface

to send alerts and trigger actions when specific conditions are met. The 370W is designed to work with the Sealevel SeaCloud IIoT platform. It features a TI SimpleLink CC3200 ARM Cortex-M4 microcontroller unit with a certified Wi-Fi interface and WPA2 encryption for a secure connection to your wireless network. The module includes a variety of I/O interfaces and two 12-bit A/D converters. An optional QuickStart module is available for demonstration and testing purposes. **864-843-4343; www.sealevel.com**



SeaConnect 370W from Sealevel Systems

ZOELLER PUMP APAK

The APak indoor alarm from Zoeller Pump is CSA-approved and comes in a streamlined and easy-to-install design. The primary function is as a high-water alarm, and it can be packaged with the choice of reed sensor (10-4011) or mechanical float switch (10-4012). The presence of high water will trigger a loud tone and LED. A single button handles silence, reset and test. It offers a long battery life with low battery alarm; the ability to use as AC/DC alarm, or DC only, or AC only; the ability to use other switches when necessary (not included); and improved safety for consumers with a detachable power supply. Users can receive free alerts via email, text, and push notification for power outage, low battery, input one or two triggers, and loss of connectivity with Z Control. **800-928-7867; www.zoellerpumps.com**



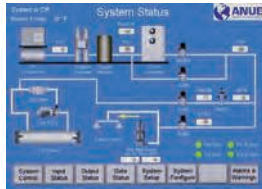
APak indoor alarm from Zoeller Pump

(continued)

Operations/Maintenance/ Process Control Software

ANUE WATER TECHNOLOGIES FLO SPEC CONTROL SOFTWARE

Flo Spec Control Software from Anue Water Technologies is a fully SCADA-compliant program that allows for bidirectional monitoring and control of each system with access to Wi-Fi or satellite/local Cat5 internet connectivity. It is manufactured in a NEMA 4 cabinet and includes Phantom I and II (point source odor control), FORSe 2 oxygen generation systems (force main corrosion control), and FORSe 5 combination ozone and oxygen systems (larger odor and corrosion control applications). It allows for stand-alone remote system monitoring, and programming options include specific alarm alerts that can be sent to any computer or smartphone to identify and correct problems quickly. **760-727-2683; www.anuewater.com**



**Flo Spec Control Software from
Anue Water Technologies**

PRIMEX ICONTROL

The icontrol system from PRIMEX is the ideal solution for operators seeking all the benefits of a full automation and control system without the expense and hassle of owning and maintaining these technologies. The cloud-based solution provides full SCADA functionality with secure remote access to an existing control infrastructure through our managed data center. There is no SCADA-related hardware, software, or licensing to buy, manage, or maintain. It interfaces to an existing local PLC control and telemetry network, offering accessibility, full SCADA/HMI, process control, monitoring and alarming, data and reporting, and asset management. Process information is transferred via secure data connection (cellular, broadband, satellite, etc.) to a data center. Each client then has secure access to its individual system from nearly any internet-enabled device. **844-477-4639; www.primexcontrols.com**



**icontrol system
from PRIMEX**

ROCKWELL AUTOMATION THINMANAGER

Rockwell Automation's ThinManager is a content delivery and thin client management platform designed for configuration, deployment, and management of industrial applications, users, and end-user devices. It centrally manages industrial computing assets and securely delivers content to terminals (thin clients, PCs), users (based on role), and/or locations (mobile devices). It provides features that allow for a customized end-user experience. Administrators can deliver multiple applications with customized layouts to any terminal. Content can be easily displayed across multiple monitors and touch screens or securely delivered to mobile devices, based on the location of the user. It also supports multiple forms of user authentication. It increases security by never storing content on end devices. All terminals connect to centralized servers (HMI, MES, CMMS, etc.) and only access content once authenticated. Managed terminals can also be replaced in under two minutes, reducing unplanned downtime. **877-239-4282; www.thinmanager.com**



**Rockwell Automation
ThinManager**

Process Control Systems

ACTIVATED CARBON SERVICES - PACS GAED

GAED, or Gravimetric Adsorption Energy Distribution, from Activated Carbon Services - PACS is a test to determine the best carbon and remaining service in carbon applications. Based on Polanyi-Dubinin-Manes-Greenbank, it provides low-cost, high-impact information for what carbon to purchase and when to change it out. It provides distribution of adsorption energy-binding sites and high to low energies with volumes. Every molecule removed from water or air requires a minimum energy-binding site in calories per cc. It provides isotherms — nine orders of concentrations and three orders of loading capacity. A two-day short course is provided in conjunction with the biannual International Activated Carbon Conference. A typical GAED report is 28 to 30 pages. **800-367-2587; www.pacslabs.com**

**GAED from Activated
Carbon Services - PACS**



**ChemScan 2150/DC analyzer
from ASA Analytics**

ASA ANALYTICS CHEMSCAN 2150/DC

The ChemScan 2150/DC chlorination-dechlorination analyzer from ASA Analytics measures total chlorine residual and dechlorination agent residual, automatically providing operators with timely chemistry measurements. This data can be used to assure process conformance, control energy and chemical costs, improve process performance, and avoid taste and order complaints. Two ChemScan mini analyzers

provide an add-on solution to existing plant control systems for analysis of key control parameters used in the wastewater effluent chlorination process. The ChemScan mini LowChlor and the mini Sulfite analyzers, used together, create a complete chlorination/dechlorination monitor and control system. **262-717-9500; www.asaanalytics.com**

EVOQUA WATER TECHNOLOGIES OSEC L

The OSEC L system from Evoqua Water Technologies provides a stable disinfection solution on site and on-demand. An inherently safe alternative to chlorine, sodium hypochlorite, and calcium hypochlorite, the system doesn't require handling of any hazardous chemicals. The generator produces a dilute hypochlorite solution less than 1.0 wt percent concentration using saturated brine, water and electricity in an electrochemical process. With an embedded process controller, the system is fully automated and can work in batching or direct-feed operation modes. No hazardous chemicals are required, making it a safe alternative to chlorine, bleach and chlorine tablets. It provides up to 20 ppd chlorine equivalent with interchangeable OSEC cartridges. It has a small footprint with plug-and-play installation, and push-button operation with long service intervals. It is certified to NSF/ANSI 61 Drinking Water. **www.evoqua.com**



**OSEC L system from
Evoqua Water Technologies**

FRANKLIN ELECTRIC SUBMONITOR CONNECT

The SubMonitor Connect electronic motor protector from Franklin Electric provides peace of mind through three-phase motor protection and enhanced troubleshooting proficiency. Using the FE Connect mobile technology app, it provides enhanced capabilities of real date and time-

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stamped system monitoring to improve troubleshooting while protecting three-phase motor and pump systems ranging from 1 to 700 hp, or those that require up to 1,000 amps. Contractors can easily monitor system status live, complete basic or advanced setup, save commonly used setups for later use, and view/send fault history through the convenience of Bluetooth connectivity. It protects against damage due to adverse conditions and provides protection against arc flash while also offering 1 percent power metering that eliminates the need for an additional meter while providing communication with building management systems to track energy costs and motor status. 260-824-2900; www.franklinwater.com



SubMonitor Connect
electronic motor protector
from Franklin Electric



Group 57 rotary valve actuator
from Harold Beck & Sons

HAROLD BECK & SONS GROUP 57

The Group 57 rotary valve actuator from Harold Beck & Sons can be used in remote applications where line power is not readily available and/or in hazardous environments where explosive gases are present. In addition to traditional Beck actuator features like the 100 percent continuous-duty, no-burnout motor and virtually no required maintenance, it offers the ability to run on 12-48 volts DC power, making it ideal for use with solar panel operation. It has Class I, Division 1, Groups B, C and D hazardous location ratings. It offers built-in electric fail-safe capability with optional, internal ultracapacitor

backup power, fast stroking speeds (9 seconds for 90 degrees) or applications with fast open or close requirements, simple and flexible valve mounting options including compliance with the ISO 5211 part-turn, Actuator Mounting Standard or custom hardware to fit virtually any valve. Space-efficient packaging makes it easier to fit on valves in any orientation. 215-968-4600; www.haroldbeck.com

PROMINENT FLUID CONTROLS CHLORINE ANALYZER AND CONTROLLER

Chlorine Analyzers and Controllers from ProMinent Fluid Controls provide precise monitoring or control of chlorine for potable and wastewater applications. They use amperometric sensor technology, resulting in a reagent-free online analysis with no colorimetric concerns or reagents. Packages are fully plumbed, wired and assembled on a back panel for easy wall mounting. Choose one of three packages by selecting one part number that includes a microprocessor analyzer, flow cell, flow sensor and a (2 or 10 ppm) free or total chlorine sensor. They have a reagent-free sensor design and are EPA Method 334.0 compliant. No service contract is required. 412-787-2484; www.prominent.us



Chlorine Analyzers and Controllers
from ProMinent Fluid Controls

PULSAFEEDER PULSABLEND

PULSAbend polymer makedown systems from Pulsafeeder are available in three control options — automatic, manual or dry contact. All systems feature a three-step static blending system that provides dilution without harming the polymer chains. With a wide range of dilu-

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tion utilizing three different water flow rates to choose from (0 to 5, 5 to 10, and 10-plus gpm), they are custom-sized to provide activation of all types of polymers, without the sometimes damaging effects of motorized mixing devices. Five neat polymer pump flow rates ensure the right makedown for any application. They include an auto-fill calibration column, an adjustable flowmeter and a neat polymer back pressure regulator to maintain a consistent, repeatable final product. **800-333-6677; www.pulsatron.com**



PULSAblend polymer makedown systems from Pulsafeeder

SCHNEIDER ELECTRIC ALTIVAR MACHINE ATV320

The Altivar Machine ATV320 drive from Schneider Electric is available in compact and book form factors, providing a powerful combination of safety, reliability, and simplicity for applications from 0.25 to 20 hp (single-phase ratings up to 10 hp). It offers advanced connectivity via many networks that are based on Ethernet (Modbus TCP, Ethernet/



Altivar Machine ATV320 drive from Schneider Electric

IP, Profinet, EtherCAT) or serial (Modbus RTU, CANopen, Profibus DP, DeviceNet), and reliable control for induction and permanent magnet motors, delivering performance with simple, plug-and-play commissioning. It has a robust design, including printed circuit boards class 3C3 coated in accordance with IEC 61721-3-3 to protect against corrosion in harsh environments and uninterrupted operation with ambient temperatures up to 140 degrees F. **888-267-2232; www.altivardrives.com**

VERDER VANTAGE 5000

The Vantage 5000 peristaltic metering pump from Verder incorporates stepper motor technology, in which a high-torque motor designed for position control moves in 1.6-degree increments, allowing for precise control at extremely low speeds of less than 0.1 rpm. Stepper motors do not require additional hardware, and the high-torque characteristic eliminates the need for a gear reducer. It combines the accuracy of a 4,000-1 turndown with high discharge pressures, a real-time event clock, a USB backup port, and can have seven digital inputs and four digital status outputs. **877-476-3569; www.verder-us.com tpo**



Vantage 5000 peristaltic metering pump from Verder

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- Siemens Industry Process Instrumentation SITRANS LUT400
- Smith & Loveless QUICKSMART System Controls
- Weil Pump PLC control panels

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- Badger Meter Dynasonics iSonic 4000 flowmeter
- Blue-White Industries Sonic-Pro S3 Hybrid Ultrasonic Flowmeter
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- Franklin Electric SubMonitor Connect electronic motor protector
- Harold Beck & Sons Group 57 rotary valve actuator

- ProMinent Fluid Controls Chlorine Analyzer and Controller
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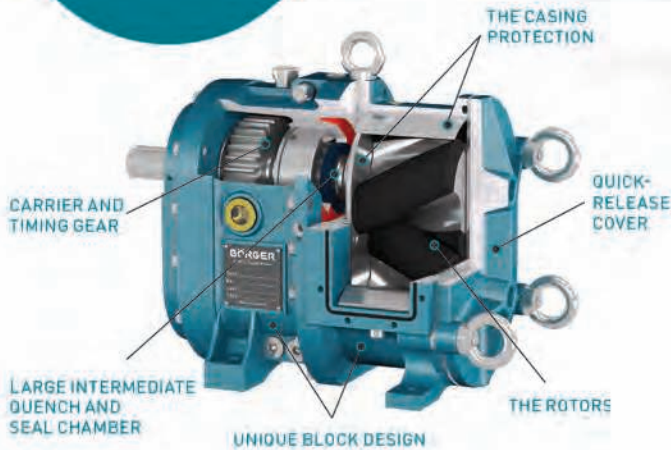
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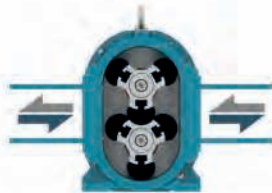
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Nidec names Yoshimoto as new president

For the first time in the 45-year history of Nidec, it named a new president, Hiroyuki Yoshimoto. He becomes the first person to hold the post after the company's founder Shigenobu Nagamori. Nagamori will remain at the helm of the company as chairman and CEO, together with Yoshimoto as the new president and chief operating officer. Currently the Nidec group employs over 100,000 people in more than 40 countries and manufactures motors and related products for a wide range of applications including information technology equipment, home appliances, electric vehicles and other automobiles, robots, drones, industrial facilities, and more.



Shigenobu Nagamori (left) and Hiroyuki Yoshimoto

Bioscience announces expansion

Bioscience announced newly expanded offices, laboratories and manufacturing facilities in Lehigh Valley Industrial Park III located adjacent to Lehigh Valley International Airport in Pennsylvania. The company's main phone number, email and website addresses will remain the same.

Dover Precision Components operating company formed

Cook Compression, Inpro/Seal, Waukesha Bearings and Bearings Plus have formed the newly named Dover Precision Components operating company. As the umbrella for these brands, Dover Precision Components is an integrated provider of performance-critical solutions for rotating and reciprocating machinery and features a diverse portfolio of products and services. Headquartered in Houston, Dover Precision Components maintains facilities in North America, Europe, Asia and the Middle East. It has more than 1,400 employees worldwide.

Aerzen USA opens office in Atlanta

After recently adding on to the Coatesville, Pennsylvania, headquarters and opening a regional sales office in Houston in 2017, Aerzen USA opened a new facility in Atlanta. The new office will provide better service to customers in southeastern U.S. The building will support both a regional sales office and a rental equipment and service depot. The 24,740-square-foot space consists of a production/warehouse area and additional office space.

Grundfos Pumps now Department of Energy-compliant

Grundfos Pumps announced that all Grundfos and PACO branded products sold in the U.S. currently meet or exceed the Energy Conservation Standards for clean water pumps set forth by the U.S. Department of Energy. Test facilities located in Brookshire, Texas, and Bjerringbro, Denmark, have been audited and approved by the Hydraulic Institute to ensure that test procedures and equipment comply with Department of Energy and HI 40.7 standards. Beginning Jan. 27, 2020, all pumps sold in the U.S. that are within scope will be required to be labeled with a Pump Energy Index rating that meets the new standard.

Val-Matic Valve's Andrew Brudniak receives certification

Andrew Brudniak has passed the exam for the Project Management Professional certification offered from the Project Management Institute. He has been with Val-Matic Valve for four years and was recently promoted to project manager. **tpo**

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1. BADGER METER E-SERIES ULTRASONIC METERS

Badger Meter E-Series ultrasonic meters are designed for high-measurement accuracy and long-term reliability. With extended flow ranges, they are ideal for measuring potable cold water in commercial and industrial applications that experience wide fluctuations in water demand. Smart alarms provide early detection for flow, temperature and pressure disturbances to help utilities proactively manage their water systems faster and more efficiently. The E-Series have an open-flow tube design, offer programmable registration and reporting, and are fully submersible to withstand harsh environments. **877-243-1010; www.badgermeter.com**

2. MUELLER WATER PRODUCTS SUPER CENTURION FIRE HYDRANT

The Super Centurion fire hydrant from Mueller Water Products features a two-piece ductile iron upper barrel with a nozzle section that can be separated from the traffic section by removing two high-strength bolts, making seat replacement or traffic repair simple and quick. The A-403 has a traffic flange; 5 1/4-inch, fully encapsulated, reversible main valve; a durable polyurethane topcoat; and automatic oil lubrication. All internal components, nozzles and repair parts are fully interchangeable with the Super Centurion 250 hydrant. The A-403 is currently available with a 5 1/4-inch main valve and a three-way opening configuration with two hose nozzles and one pumper nozzle. This lightweight, dry barrel fire hydrant is certified UL/FM/AWWA at 350 psi operating pressure and factory tested to 700 psi. **800-523-8618; www.muellerwaterproducts.com**

3. WEIL PUMP BASIN PACKAGE SYSTEM

Weil Pump's heavy-duty package systems are fully customizable and can be built to order in as little as two weeks. The systems come standard with a fiberglass basin with a reinforcement band that increases structural integrity by nearly 200 percent. It comes preassembled to the job site and is simple to install, with easy-access lifting handles and threaded inlet and outlet openings. The basin floor comes prestudded for mounting a Weil quick-removal subbase. The package system may also include a duplex valve assembly consisting of two check valves and an isolation valve spaced to be compatible with a duplex set of 2-, 3- or 4-inch quick removal mounted pumps. **888-945-6872; www.weilpump.com**

4. KRAUSZ USA HYMAX GRIP 16-INCH

The HYMAX GRIP 16-inch restraint coupling from Krausz USA features only four top-facing bolts for installers to tighten and a stab-fit, one-piece design. The top-facing bolts eliminate underdigging for space to crawl under the pipe to tighten bolts, while the stab-fit, one-piece design allows for easier and faster installation, eliminating problems such as losing bolts in the mud. Capable of gripping and connecting pipes with 70 tons of power, the GRIP chain offers circular restraint around the pipe using a radial closing mechanism that holds pipes tightly in place during installation, allowing full control over the gap between pipes. The coupling can absorb post-installation dynamic pipe deflection of up to 4 degrees on each end, reducing the risk of damage and cracking due to ground shifts and temperature changes, and saving resources on future pipe repairs. **855-457-2879; www.krauszusa.com**

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5. IWAKI AMERICA SANWA PUMP

IWAKI America's 316 stainless steel metallic sealless Sanwa pump line features two series of pumps. The MP series will feature flows to 340 gpm, while the smaller MMP series will be a fractional horsepower series of pumps with flows to 24 gpm. Both series incorporate 316 stainless steel construction, a one-piece nonwelded rear casing, and silicon carbide D bearings allowing for limited dry run operation. 508-429-1440; www.iwakiamerica.com

6. BIONETIX INTERNATIONAL AEROBOOSTER-O2 BIOSTIMULATOR

The AeroBooster-O2 from Bionetix International supplies ponds and wastewater with an oxygen source to promote aerobic conditions, reduce bad odors, and accelerate the digestion of contaminants. The slow-release supply of oxygen boosts the growth of biomass — helpful microorganisms that speed up the biodegradation of contaminants and excess nutrients in ponds and wastewater. AeroBooster-O2 also fights bad odors by accelerating the oxidation of odorous substances such as hydro-

gen sulfide, ammonia and other chemicals that form in anaerobic conditions. The product is stable in storage and easy to use. Varying dosages can be applied to address high anoxic conditions or to reduce sludge. 514-457-2914; www.bionetix-international.com

7. EVOQUA WATER TECHNOLOGIES CYCLIX ANAEROBIC DIGESTER CONTROL SYSTEM

The Cyclix anaerobic digester control system from Evoqua Water Technologies is a controls package that can be utilized with a JetMix hydraulic mixing system to optimize operational time and reduce costs. The system consists of a control panel with a PLC and temperature sensors that monitor temperature within the reactor to dictate when the mixing system should be operated. The Cyclix system delivers only the required amount of mixing energy, reducing operational costs. It is easy to install and has a flexible design that can be incorporated into a new system or integrated into an existing one. www.evoqua.com tpo

wastewater: product spotlight

Instrument makes turbidity measurement clear

By Craig Mandli

An accurate turbidity measurement often provides nearly immediate results on whether potable or wastewater treatment is effective. The more accurate the turbidimeter is, the easier it is to pinpoint problems. The makers of the new ratiometric versions of the **2020 series turbidimeters** from LaMotte believe they have their most accurate and precise instrument to date.

The model 2020t and 2020i are portable hand-held units for use in the field or lab. The 2020t unit is compliant with the Environmental Protection Agency 180.1 standard using a tungsten light source while the 2020i is compliant to the ISO standard and ideal for high-range turbidity measurements. According to Ernie Rector, market manager for industrial water/wastewater for LaMotte, the new units are not only more accurate, they are user-friendly.

"The 2020t/i series are ratiometric meters, which improve on accuracy and ease of calibration," he says. "The three modes — Nephelometric, Nephelometric ratio and Attenuation Units — allow the user to choose which best applies to their testing situation. Nephelometric for samples with turbidity below 40 NTU, Nephelometric Ratio for samples between 40-1,000 NTU and Attenuation Units for any sample above 1,000 NTU. The 'i' version is especially adept at reading turbidity in samples that have color in them."

The optical system is protected in a waterproof chamber with a removable cup. The instruments are rated waterproof to the IP67 standard with



2020 series turbidimeters from LaMotte

sealed, rechargeable lithium batteries. A bold backlit display improves visibility for all seven language options included.

"Our research and development team put several years of work into the development of this series," Rector says. "It makes the calibration process much easier, and is especially good at reading turbidity in samples with color, which has always been a huge challenge in the field."

The units are designed for low-turbidity drinking water applications, midrange industrial applications, and high-range environmental applications, such as wastewater effluent. Units come housed in a rugged, waterproof case complete with standards (0, 1, 10 NTU), four sample cells and a USB power charger. According to Rector, feedback so far has been positive.

"The results from the beta tests have been universally positive," he says. "Ease of calibration, accuracy and adaptability to changing situations were all referenced as huge benefits in the responses we've received."

800-344-3100; www.lamotte.com

water: product spotlight

Channel mixing on a large scale

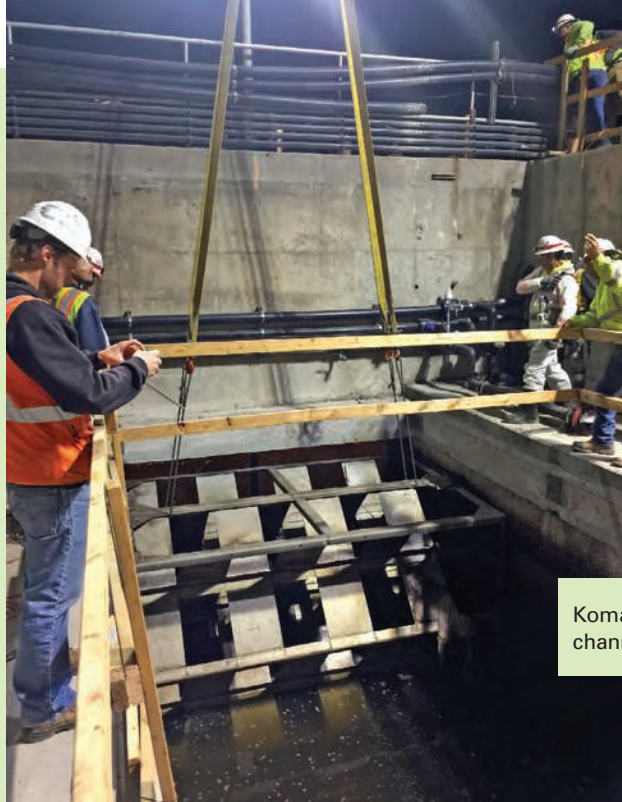
By Craig Mandli

The treatment of raw water entering a water treatment plant through a rectangular channel can seem like a daunting task. That is especially true when you take into account additional factors, such as low allowable pressure drop, injection of chemicals, and the desired homogenous blend of output downstream. However, Komax Systems, a manufacturer of in-line static mixers, has made the task easier.

The **Komax Systems channel mixer** consists of a series of interlocking left- and right-hand mixing elements, which under turbulent flow, produce elliptical vortices rotating in opposite directions of either side of each element. The axis of each vortex is at right angles to the axis of the main water flow, producing a back-mixing effect that disperses the chemicals evenly. Chemicals are added through several spargers connected at the upstream end of the mixer. Low-pressure drop designs for chlorinating can be supplied as complete assemblies or in component form for on-site assembly where access is difficult.

“Our customers are municipal water treatment plants that either want to treat the raw water coming into the water treatment plants for drinking or other purposes, or the effluent water being discharged to the rivers and creeks,” says Sameer Kshirsagar, senior application specialist. “The chemicals being injected are chlorine, ammonia, sodium bisulphite, coagulants and flocculants to achieve various treatment objectives. The types of channels are either closed underground channels or open (to atmosphere) channels. They can also be small channels inside the water treatment plants.”

The City of Denver installed a channel mixer from Komax Systems as their chlorine-contacting mixer. Assembled and installed in less than eight man-hours, later testing discovered a mixing efficiency of 0.02 COV.



Komax Systems
channel mixer

It was also quickly discovered that the installation meant a 50 percent reduction in chlorine consumption over the previous system. Completely customizable, the mixer is ideal for both new installations and those looking to retrofit older facilities.

“We have a dedicated engineer who will work with you from project inception to installation,” says Tory Turner, sales support and marketing manager. “We can also provide in-house CFD analysis for peace of mind when you know the in-line static mixer results before installation. We take the time, understand our client’s individual needs through industry-specific application engineers who will handle your project through the entire process.” **800-826-0760; www.komax.com**

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- 4. Krausz USA HYMAX GRIP 16-inch restraint coupling
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- 7. Evoqua Water Technologies Cyclix anaerobic digester control system
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people/awards

The Williston (North Dakota) Water Resource Recovery Facility was dedicated to **Monte Meiers**, a longtime city employee and former director of public works. It is the first municipal facility in North Dakota to achieve a Class A biosolids.

The **Exit 24 Wastewater Treatment Facility**, on Interstate 77 in Wythe County, Virginia, was officially opened.

The North Carolina Department of Labor presented a Gold Award for safety to the city of **Morganton Wastewater Treatment Plant**.

EPCOR USA was recognized by the Arizona Water Association with awards for operational excellence and safety. Among its honors: wastewater treatment in Anthem, Bullhead City, and Northwest Valley Reclamation Facility, and the wastewater collections system in Sun City.

Steve Wyzgoski was hired as the wastewater/water treatment plant superintendent for the city of Saline, Michigan. He replaces **Bob Scull**, who retired.

The **City of Bronson** received \$1.6 million as part of the state of Michigan Stormwater, Asset Management and Wastewater Grant.

The **Piqua (Ohio) Wastewater Treatment Plant** received a Cooperative Weather Observer Institutional Award from the National Weather Service for providing weather observations for more than 75 years.

Riverhead, New York, received a Diamond Award in recognition of its sewer district's wastewater reuse recovery system. The award was presented by the American Council of Engineering Companies of New York.

Jamie E. Potteiger III, a lab director for the city of Camden Wastewater Treatment Plant, received an individual Crystal Crucible Award and the facility overall won another Crystal Crucible Award at the South Carolina Environmental Conference.

Rick Lallish, program director of Water Pollution Control at the Environmental Resources Training Center at Southern Illinois University Edwardsville was named Outstanding Operator of the Year by the Illinois Association of Water Pollution Control Operators.

The Prince William County (Virginia) Service Authority's **H.L. Mooney Advanced Water Reclamation Facility** won a Platinum Peak Performance Award from the National Association of Clean Water Agencies for the fifth consecutive year.

A project that helped the **Helena Wastewater Treatment Plant** meet reduced permit limits earned the Grand Award from the American Council of Engineering Companies of Alabama. The project consisted of multiple improvements that helped the plant meet strict total phosphorus limits.

The **Star City and Cheat Lake wastewater treatment plants** owned by the Morgantown (West Virginia) Utility Board received Platinum Peak Performance awards by the National Association of Clean Water Agencies. It was the 17th consecutive Platinum Award for the Star City facility and the 19th for Cheat Lake plant.

events

Sept. 9-12

WaterReuse Symposium, held in cooperation with the Water Environment Federation, JW Marriott, Austin, Texas. Visit www.watereuse.org.

Sept. 9-12

Atlantic Canada Water & Wastewater Association Canadian Biosolids & Residuals Conference, World Trade and Convention Centre, Halifax, Nova Scotia. Visit www.acwwa.ca.

Sept. 10-13

WaterJAM 2018, presented by the Virginia Water Environment Association and the Virginia Section-American Water Works Association, Virginia Beach Convention Center. Visit vwea.site-ym.com.

Sept. 11-14

Michigan Section AWWA Annual Conference, Radisson Kalamazoo. Visit <https://mi-water.site-ym.com>.

Sept. 12-14

South Dakota Section AWWA Annual Conference, Deadwood. Visit www.awwa.org.

Sept. 12-14

Wisconsin Section AWWA Annual Conference, Madison. Visit www.wiawwa.org.

Sept. 15-18

Rocky Mountain Section AWWA Annual Conference, Colorado Convention Center, Denver. Visit rmsawwa.site-ym.com.

Sept. 16-19

New England Section AWWA Annual Conference, Stowe Mountain Lodge, Stowe, Vermont. Visit www.newwa.org.

Sept. 16-19

Atlantic Canada Water & Wastewater Association Annual Conference, Membertou Trade and Convention Centre, Sydney, Nova Scotia. Visit www.acwwa.ca.

Sept. 17-18

AWWA Customer Service Seminar, Louisville Water, Louisville, Kentucky. Visit www.awwa.org.

Sept. 18-21

Minnesota Section AWWA Annual Conference, Duluth. Visit www.mnawwa.org.

Sept. 18-21

Western Canada Section AWWA Annual Conference, Winnipeg, Manitoba. Visit www.wcsawwa.net.

Sept. 19-20

Effective Utility Management Seminar, Louisville Water, Louisville, Kentucky. Visit www.awwa.org.

Sept. 21-22

Water Distribution Systems Modewling Using EPANET, EPA, Cincinnati. Visit www.regonline.com.

Sept. 24-25

Kentucky Water & Wastewater Operators Association Fall Conference-Central, Rough River State Resort Park, Falls of Rough. Visit www.kwwoa.org.

Sept. 25-27

Tri-State Seminar, presented by the Nevada Water Environment Association, Arizona Water Association and California Water Environment Association, South Point Hotel Casino, Las Vegas. Visit www.tristateseminar.com.

Sept. 29-Oct. 3

Water Environment Federation Technical Exhibition and Conference, Morial Convention Center, New Orleans. Visit www.weftec.org.

Send your events notices to editor@tpomag.com

The **L.G. Everist wastewater treatment system** received the 2017 Operation and Maintenance Wastewater Treatment Award from the South Dakota Department of Environment and Natural Resources.

The **Noman M. Cole Jr. Pollution Control Plant** owned by Fairfax County, Virginia, earned its 20th consecutive Platinum Peak Performance Award from the National Association of Clean Water Agencies.

Donald J. Tata posthumously received the Kenneth J. Miller Founders Award from Water For People.

The **City of Hayward** received the 2018 Water System of the Year award from the Wisconsin Rural Water Association.

Iowa Lakes Regional Water received a 2018 National Environmental Achievement Award in the category of Operations and Environmental Performance from the National Association of Clean Water Agencies.

The **Cordova (Alaska) Public Works Water Division** received a WATERS Awards from Region 10 of the EPA for innovative and effective Drinking Water State Revolving Fund projects.

Bruce Partridge retired as wastewater treatment plant chief operator after 36 years with the Bergen (New York) Department of Public Works.

Kevin Williams was named director of public works in Rehoboth Beach, Delaware.

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Weir Water Treatment Plant and Pump Station Equipment for Sale. Used less than 1 year in Henderson, NV. Equipment includes: 24 pumps from 30 to 2,300 gpm • Electrical equipment – VFDs, breaker panels, soft starts and control panels • 2 cyclones sized for total of 6,900 gpm • WesTech Media Filters – 3, each sized for 5,000 gpm • Ion Exchange Vessels – 6, each sized for 2,000 gpm • Various Samplers, TSS Meters and Flow Meters • Various valves and instrumentation. Contact thhendersonnv@gmail.com (009)

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Liquid vacs, wet/dry industrial vacs, combination jetter/vacs, vacuum street sweeper & catch basin cleaner, truck & trailer mounted jetters. All available for daily, weekly, monthly, and yearly rentals. **VSI Rentals, LLC, (888) VAC-UNIT (822-8648) www.vsiRentalsllc.com.** (CBM)

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TV INSPECTION

Used and rebuilt camera kits in stock: RIDGID Mini Compact, Mini Color, Standard Self-Leveling, General Gen-Eye I, II and III, Aries Seeker, and SRECO kits. The Cable Center: 800-257-7209. (CBM)

If You Purchased Liquid Aluminum Sulfate From January 1, 1997 Through February 28, 2011, You Could Be Affected By A Proposed Class Action Settlement

Please read this entire Notice carefully.
Partial settlements of the lawsuit may affect your rights.

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

A Settlement has been reached with Defendant GEO Specialty Chemicals Inc. ("GEO"), Kenneth A. Ghazey ("Ghazey") and Brian C. Steppig (the "GEO Settling Parties"). The lawsuit will continue against the other Defendants (collectively, "Non-Settling Defendants").

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

WHAT DOES THE SETTLEMENT PROVIDE? GEO and the Settling Parties agreed to pay into an Escrow Account the sum of up to \$4,375,000 (the "Settlement Funds") as follows. GEO shall use its best efforts to cause its insurers to pay \$801,074 directly into the Indirect Purchaser Escrow Account within thirty (30) days of Final Judgment. GEO shall also pay \$898,926 into the Indirect Purchaser Escrow Account (collectively, the "First Installment"). GEO shall make one additional payment of \$1,675,000 that shall be paid into the Indirect Purchaser Escrow Account on or before the first anniversary of the First Installment. GEO will undertake a marketing process for a sale of all or substantially all of its equity interests, a merger of GEO and another entity, or a sale of all or substantially all of its assets (collectively, a "Sale") that will commence no later than thirty (30) days after entry of Final Judgment. If this marketing process is successful, upon the closing of the Sale, the Indirect Purchaser Settlement Class shall be entitled to receive from GEO additional compensation pursuant to an equity value formula up to \$1,000,000.

At this time, Interim IPP Lead Counsel are not seeking attorneys' fees in connection with this Settlement. Interim IPP Lead Counsel intends to ask for reimbursement of certain of their out of pocket expenses incurred so far in this litigation, including expert witness expenses incurred to date, as well as service awards for the class representatives of up to \$25,000.00 each from the Settlement Fund in recognition of their efforts to date on behalf of the Class. At a later date, Interim IPP Lead Counsel may seek up to one-third of the aggregate of funds achieved for the Class, and from any future recovery that may occur in this Class Action against the Non-Settling Defendants.

HOW DO I RECEIVE A PAYMENT FROM THE SETTLEMENT? No money will be distributed yet. The Interim IPP Lead Counsel will continue to pursue the lawsuit against the Non-Settling Defendants. All Settlement Funds that remain after payment of the Court-ordered attorneys' fees, incentive awards, costs, and expenses will be distributed at the conclusion of the lawsuit or as ordered by the Court.

You may visit the website www.LiquidAluminumSulfate.com for updates on the status of the lawsuit.

WHAT ARE YOUR OPTIONS? If you wish to remain an Indirect Purchaser Settlement Class Member, you need not take any action at this time. You will give up your right to sue the GEO Settling Parties for the claims that the Settlement with them will resolve. If you want to keep the right to sue or continue to sue the GEO Settling Parties about the legal issues in this case, then you must exclude yourself from the Class. **If you exclude yourself from the Indirect Purchaser Settlement Class, you will not get any payment from the Settlement.** To exclude yourself, you must send a letter to the Settlement Administrator, **postmarked no later than October 2, 2018.** You may also comment on or object to the proposed Settlement. Your objections must be **filed no later than October 2, 2018.** Details on how to request exclusion, comment, or object to the Settlement are available on the Settlement website, www.LiquidAluminumSulfate.com.

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

The Court will hold a final fairness hearing to decide whether to approve the terms of the Settlement at **10:00 a.m. on November 14, 2018**, at the Martin Luther King, Jr. Building & U.S. Courthouse, 50 Walnut Street, Newark, New Jersey 07101. If there are objections, the Court will consider them but may still approve the Settlement. You may appear at the hearing, but you are not required to do so. The hearing may be rescheduled without notice to the Class, so if you plan to attend, please periodically check the Settlement website for any updates.

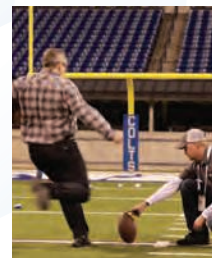
This notice is only a summary. For more information, please visit the Settlement website, www.LiquidAluminumSulfate.com or call 1-866-217-4455.



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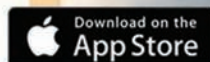
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