

TREATMENT PLANT OPERATOR

tpo™

DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS

tpomag.com
FEBRUARY 2019

EXAM STUDY GUIDE:
Chlorine contact time | 69

LET'S BE CLEAR:
A group for young
professionals | 8

SUSTAINABLE OPERATIONS:
Reclaimed natural gas in
Boulder, Colorado | 38

It Just Keeps Getting Better



EQUIPMENT, PROCESS AND EFFICIENCY
IMPROVEMENTS POWER THE TEAM
IN GLASGOW, KENTUCKY | 12

Jacob Billingsley
Superintendent
Glasgow, Ky.

ProSeries-M[®]

QUALITY • PERFORMANCE • INNOVATION



M-3 PERISTALTIC METERING PUMP

BUILT RUGGED ENOUGH TO HANDLE THE MOST DEMANDING MUNICIPAL WATER AND WASTEWATER TREATMENT ENVIRONMENTS.

PRECISION TURNDOWN	✓ 10,000:1 with High Resolution Motor Speed Adjustment
VARIABLE FLOW RATE	✓ .0002 to 33.3 GPH (.0007 to 126 LPH)
INPUT	✓ 4-20mA, 0-10Vdc, and Pulse inputs for remote external or batch control and 0-30 VDC contact closure remote start/stop
OUTPUT	✓ Scalable 4-20mA or Pulse, one 250V/3A relay and three 115V/1A contact closures assignable to monitor various pump functions
DEPENDABLE	✓ Equipped with Multi-Tube Heavy Duty Pump Head Tubing for up to 4X Longer Service Life
PATENTED	✓ Exclusive Built-in Tube Failure Detection System

IP66
NEMA 4X WASH DOWN
TFD system
Tube Failure Detection
NSF
Standard 61
ETL CE
EneC

Now Shipping!



THE ALL NEW MS-6 ULTIMATE CHEMICAL FEED SENSOR

MEASURING CHEMICAL FEED IS A CRITICAL FACTOR IN WATER AND WASTEWATER TREATMENT.

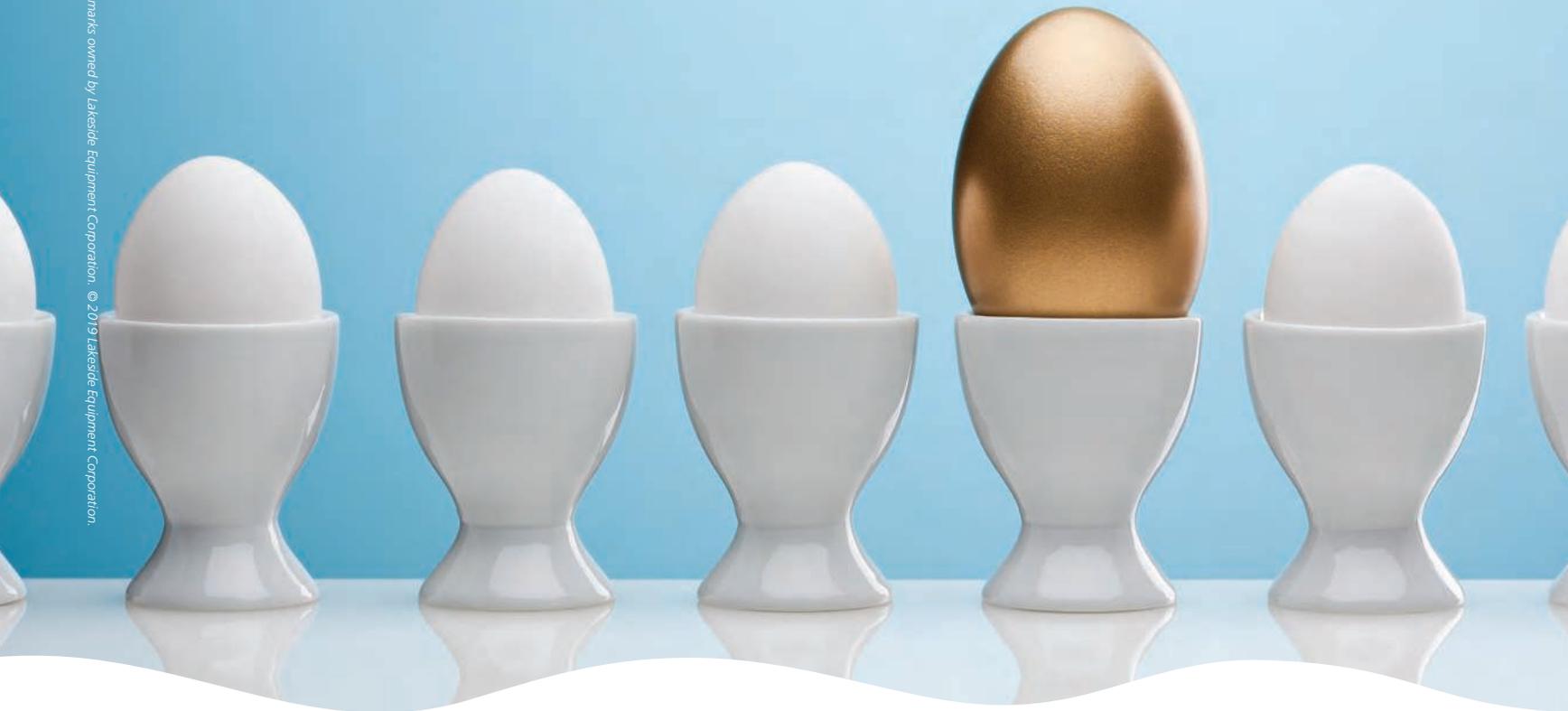
ACCURATELY MEASURES THE CHEMICAL FEED OF METERING AND DOSING PUMPS BY USING THE LATEST ULTRASONIC TECHNOLOGY.

PATENT PENDING DESIGN	✓ The Broadest Flow Range on the Market
VARIABLE FLOW RATE	✓ from 10 to 10,000 ml/min (0.158–158.5 GPH)
LOW PRESSURE DROP	✓ Less than 1 PSI
PVDF AND PEEK WETTED COMPONENTS	✓ Can Handle Harsh and Corrosive Chemicals Common in the Treatment of Water & Wastewater
INLINE PIPE FITTINGS	✓ Allow for Quick and Easy Sensor Installation
ACCURATE AND AFFORDABLE	✓ Unlike Anything the Industry Has Ever Seen.

NSF
Standard 61
IP66
NEMA 4X WASH DOWN

Blue-White is
ISO 9001:2015
Certified

PRECISION CHEMICAL METERING FOR OVER 60 YEARS
Blue-White www.proseries-m.com • www.blue-white.com
5300 Business Dr., Huntington Beach, CA 92649 USA • 714-893-8529 • sales@blue-white.com



WE STAND OUT FROM THE CROWD.

As you would expect from Lakeside, our **Raptor® Multi-Rake Bar Screen** is an efficient, proven screen technology for rapid removal of inorganic solids in municipal and industrial applications. But what sets it apart is the simple fact that ours is built to Lakeside's renowned standards and features superior quality. As with everything we do, our *Raptor* Multi-Rake Bar Screen is well-engineered, designed for optimum performance and durability, and is manufactured in the USA. That's important on a lot of levels. When critical decisions are made on design and specifications, stand out with the Lakeside *Raptor* Multi-Rake Bar Screen, the gold standard of the industry.

For more information on how you can achieve Lakeside quality and performance, contact one of our experts at **630.837.5640**, email us at sales@lakeside-equipment.com or visit our website www.lakeside-equipment.com



Cleaner Water for a Brighter Future®



Raptor® Screening Products

- Fine Screen
- Micro Strainer
- Rotating Drum Screen
- Septage Acceptance Plant
- Septage Complete Plant
- Complete Plant
- Multi-Rake Bar Screen
- TalonRake Bar Screen
- Rotary Strainer Screen
- Wash Press



present the webinar:

Houston Tackles the Challenge of Replacing Traveling Bridge Filters at 69th Street WWTP

March 6 at 11:00 a.m. C.S.T.

DESCRIPTION:

The existing traveling bridge filters at the 69th Street WWTP are near the end of their life and need replacement. Discover the challenges faced and solutions developed to meet the project's main objectives: retrofitting the existing filter basins, providing 440 MGD of treatment, and fitting the hydraulic profile. This webinar will discuss the background for the project and share the major factors of the review, selection, and design process for the new disc filter system.

SPEAKERS:



Nasser Oshkoohi, P.E. | Supervising Engineer
Houston Public Works
Houston Water | Wastewater Operations Branch



Li Chen, P.E. | Senior Project Manager
Binkley & Barfield, Inc.
TBPE-F-257



Mark Stewart | Product Manager
Hydrotech Filtration
Veolia Water Technologies



Jim Daugherty | Regional Manager
Hydrotech Filtration
Veolia Water Technologies

To register go to: <https://bit.ly/2EzeYjh>
For questions contact: usmunicipal@veolia.com



advertiser index

FEBRUARY 2019

AdEdge Water Technologies, LLC 59	KELLER Keller America Inc. 27
AERZEN Aerzen 25	Komline-Sanderson Komline-Sanderson 19
AQUA-AEROBIC SYSTEMS, INC. Aqua-Aerobic Systems, Inc. 17	KUHN Kuhn North America, Inc. 8
BDP INDUSTRIES BDP Industries, Inc. 31	LAKESIDE Lakeside Equipment Corporation 3
Blue-White Blue-White Industries 2	Markland Specialty Engineering Ltd. 21
Bright Technologies, Division of Sebright Products, Inc. 49	Meaty-Delivery 69
Brown Bear Corporation 63	Parkson Corporation 67
centrisys cnp Centrisys/CNP 47	Paxxo 9
Chemtrac, Inc. 39	ROTO-MIX Roto-Mix, LLC 67
delta Delta Treatment Systems, LLC ... 70	SEEPEX. ALL THINGS FLOW SEEPEX Inc. 45
Duperon Corporation 5	S&L Smith & Loveless Inc. 11
Force Flow 51	suez SUEZ - Water Technologies & Solutions 37
Fournier Industries, Inc. 53	Vaughan Vaughan Company, Inc. 72
GD Gardner Denver Inc. 29	Veolia Water Technologies 4
HUBER TECHNOLOGY HUBER Technology, Inc. 7	Walker Process Equipment, A Div. of McNish Corp. 29
Hurst Boiler 71	Weir Specialty Pumps (WEMCO) 61
JDV JDV Equipment Corporation 41	WWETT Show 66

**EAT.
SLEEP.
SAVE THE ENVIRONMENT.
REPEAT.**

tpo

IT'S YOUR MAGAZINE. **TELL YOUR STORY.**

Send your ideas for future articles to editor@tpomag.com

The Duperon FlexRake®

MADE TO WEATHER THE STORM

Client REFUGIO, TX

Location WASTEWATER TREATMENT PLANT

"We have normal operations with this equipment, and Hurricane Harvey was no exception, even with the increased flow due to flooding."

Wayne Berger | Plant Supervisor | Refugio Wastewater Treatment Plant



When Hurricane Harvey hit the Houston area, several wastewater treatment plants with 17 Duperon FlexRake bar screens stood in its path. The category 4 hurricane delivered sustained 140 mph winds and extensive flooding. Despite the devastation, the Everyday Water Heroes at the plants, along with all 17 FlexRakes, worked nonstop to keep the plant working.

It's what you can expect from Duperon. From our products. From our people. Designed with your mission in mind.

Duperon celebrates the Houston area's Everyday Water Heroes who were onsite nonstop during the storm to keep their plants working.



You'll like working with us™

www.duperon.com | 800.383.8479 | dcsales@duperon.com

Duperon® and FlexRake® are registered trademarks of Duperon Corporation.

contents February 2019

- 8 LET'S BE CLEAR: **ENTER THE YOUNG**
It's no secret that the operator workforce is aging. Now's the time to groom a new generation. Water Environment Federation's Students and Young Professionals Committee is a great resource.
By Ted J. Rulseh, Editor
- 9 LETTERS
- 10 @TPOMAG.COM
Visit daily for exclusive news, features and blogs.
- 18 TECHNOLOGY DEEP DIVE: **PERFORMANCE PACKAGES**
Compact factory-built membrane bioreactor units provide high-quality treatment for small flows in municipal and other applications.
By Ted J. Rulseh
- 20 BUILDING THE TEAM: **YH2O: FILLING THE PIPELINE**
A Baltimore initiative recruits unemployed and underemployed young people and trains them for water and wastewater careers.
By Sandra Buettner
- 28 **ANGELIC PERFORMANCE**
Four women from a South Carolina plant crash the male-dominated party at the 2018 Water Environment Federation Operations Challenge.
By Scottie Dayton
- 30 PLANTSCAPES: **BACK TO NATURE**
Rain gardens and bioswales at clean-water plants help an Arkansas utility promote sustainability, biodiversity and natural wildlife habitat.
By Jeff Smith
- 38 SUSTAINABLE OPERATIONS: **KEEPING THE CLIMATE COMMITMENT**
The Boulder Water Resource Recovery Facility practices sustainability by using brewery waste for nitrate removal and creating reclaimed natural gas from biogas.
By Steve Lund
- 40 HEARTS AND MINDS: **MEETING OF THE MINDS**
San Antonio Confluence Conference enables sharing of projects and ideas by young people who are passionate about water.
By Sandra Buettner
- 48 IN MY WORDS: **AN RO ALTERNATIVE**
Georgia's Gwinnett County pilot-tests its two-stage ozone-biological filtration process as a way to produce high-quality water for direct potable reuse.
By Ted J. Rulseh
- 50 HOW WE DO IT: **TOO VALUABLE TO WASTE**
A lime stabilization process helps an Arkansas city meet its goal of producing Class A biosolids to enable the resumption of beneficial use.
By Larry Trojak
- 52 **PUTTING THEIR BEST FACE FORWARD**
More operators share photos of their signs and the history behind them.
By Ted J. Rulseh
- 54 PRODUCT FOCUS: **BIOSOLIDS MANAGEMENT AND HEADWORKS**
By Craig Mandli

top performers



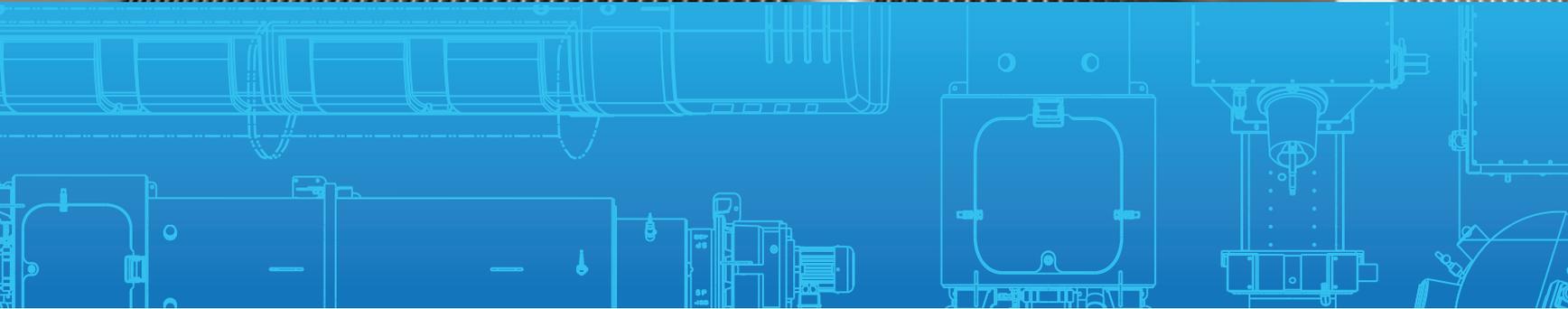
- 12 WASTEWATER PLANT: **IT JUST KEEPS GETTING BETTER**
Equipment, process and efficiency improvements are a way of life at the award-winning Glasgow Wastewater Treatment Plant.
By Jim Force
cover story
- ON THE COVER: The improvements just keep coming at the Glasgow (Kentucky) Wastewater Treatment Plant. Built in 1962 as a trickling filter plant with upflow sand filters and anaerobic digesters, the plant was upgraded four times, most recently in 2014. Today, it operates as a 4.0 mgd SCADA-controlled extended aeration facility. (Photography by Martin Cherry)
- 22 LABORATORY DIRECTOR: **GOVERNED BY NUMBERS**
Tiffini Adams helps environmental analytical laboratories serving water reclamation districts maintain consistent technical and scientific results.
By Scottie Dayton
- 32 WATER PLANT: **UPPING THE ANTE**
Operators at a North Carolina plant adopt new technology and climb a steep learning curve to tackle variable turbidity in source water.
By Trude Witham
- 42 WASTEWATER PLANT: **ALWAYS A BETTER WAY**
The operations team helped design a new treatment plant and continuously optimize its performance in Springfield, Illinois.
By Trude Witham
- 60 CASE STUDIES: **BIOSOLIDS MANAGEMENT AND HEADWORKS**
By Craig Mandli
- 64 PRODUCT NEWS
Product Spotlights:
Water: Securing energy-efficient flow
Wastewater: Producing drier grit
By Ted J. Rulseh
- 67 INDUSTRY NEWS
- 68 WORTH NOTING
People/Awards; Events
- 69 EXAM STUDY GUIDE
By Rick Lallish and Drew Hoelscher

coming next month: March 2019 FOCUS: **Pumps and Motors / WWETT Show Issue**

» Let's Be Clear: The People-Water Nexus » Top Performers: Kevin Zebrowski, Northeast Ohio Regional Sewer District | Bay County (Florida) Water Treatment Plant | Andrew J. Hickman, Round Hill General Improvement District, Nevada | Steve Williams, Magna (Utah) Water and Sewer District » Sustainable Operations: Multiple initiatives in Scottsdale, Arizona » How We Do It: Cost-effective dewatering in London, Ontario » In My Words: Hurricane readiness and recovery in Craven County, North Carolina » PlantScapes: Decorative fencing in Bellingham, Washington

Quality lives in the details.

HUBER Q-Press® screen basket



As the sole recipient of the Frost & Sullivan product line strategy leadership award in the wastewater industry, HUBER serves the municipal wastewater treatment market with distinction. Offering a complete line of screening, grit and sludge handling equipment, HUBER has the proven quality, experience and expertise with over 40,000 installations worldwide.

To learn more visit us at our website at www.huber-technology.com.

HUBER
TECHNOLOGY
WASTE WATER Solutions

**THOROUGH MIXING AND MATERIAL BREAKDOWN.
TOUGH, LONG-LASTING DESIGN.**



**VT & VTC SERIES
VERTICAL TWIN-AUGER MIXERS**



320 - 1,200 cu. ft. capacities

- Withstands continuous operation while mixing and breaking down tough materials
- Vertical sides, steep baffles and redesigned augers ensure a fast, complete mix
- Large, replaceable knives provide outstanding particle breakdown



Kuhn North America • Brodhead, WI • 608-897-2131 • KuhnNorthAmerica.com   

let's be clear

Enter the Young

IT'S NO SECRET THAT THE OPERATOR WORKFORCE IS AGING. NOW'S THE TIME TO GROOM A NEW GENERATION. WATER ENVIRONMENT FEDERATION'S STUDENTS AND YOUNG PROFESSIONALS COMMITTEE IS A GREAT RESOURCE.

By Ted J. Rulseh, Editor



“The power of youth is the common wealth for the entire world. The faces of young people are the faces of our past, our present and our future. No segment in the society can match with the power, idealism, enthusiasm and courage of the young people.”

Kailash Satyarthi

Those words from Kailash Satyarthi, a children's rights activist from India and a Nobel Peace Prize recipient, are worth remembering as the water industry faces a wave of retirements and a less-than-full pipeline of replacements.

The industry's future depends on an infusion of young talent. That means not just men and women coming up through high school and college but others who qualify as young: military veterans transitioning to civilian life, people unhappy with their jobs and seeking alternate careers, ex-inmates who received operations training and possibly licenses in one of many excellent prison-based programs.

Young people need to be introduced to the careers; brought on board through internships, apprenticeships, and operator-in-training programs; and then, perhaps most important of all, nurtured and mentored. One good place where that can occur is the Water Environment Federation's Students and Young Professionals Committee, or SYPC.

WIDER HORIZONS

Many treatment agencies do a great job of training and mentoring new people and encouraging them to continue their education and reach higher licensing levels. But in the context of a job, there can be an element of “nose to the grindstone” — a close focus on the day to day at the expense of seeing the career and its possibilities more broadly.

Events like state association conferences and short schools are great for learning and networking, but again they tend to focus on nitty-gritty issues. Through SYPC, on the other hand, young professionals can meet peers from around the entire country and the world. It spreads a full banquet table of opportunities to explore.

The SYPC includes not just the young participants, but also academics and established water-quality professionals. Regular programs are held at



DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS

Published monthly by COLE Publishing, Inc.

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

Call toll free 800-257-7222 / Outside of U.S. or Canada call 715-546-3346

Mon.-Fri., 7:30 a.m.-5 p.m. CST

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

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

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

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

Our subscriber list is occasionally made available to carefully selected companies whose products or services may be of interest to you. Your privacy is important to us. If you prefer not to be a part of these lists, please contact Nicole at nicole.labeau@colepublishing.com.

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

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

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

CIRCULATION: 68,515 copies per month.

© 2019 COLE PUBLISHING INC.

No part may be reproduced without permission of publisher.



WEFTEC and throughout the year, providing venues for professional development and leadership.

Members can take part in community service projects in the WEFTEC host cities of Chicago and New Orleans. Since 2008, the WEF Community Service Project has created five rain gardens, six bioswales and an outdoor classroom.

The WEF Student Design Competition gives students real-world experience to prepare them for careers in water and wastewater engineering and science. Teams of entrants prepare and present a design that helps resolve real-world water-quality issue. Other offerings include:

- Student Chapters that promote interest in the water and wastewater industry and provide an avenue for members to exchange information and ideas.
- The WEF/AWWA Young Professionals Summit, a joint leadership conference held with the Utility Management Conference and attended by young professionals from across North America.
- YP Connections, a forum for young people to share information and experiences around professional development and leadership.
- The \$25,000 Canham Graduate Studies Scholarship and the annual Outstanding Young Water Environment Professional Award.

A TESTIMONIAL

In a video on the SYPC webpage, Holly Falconer pinpoints the benefits of the group. “For networking, I think the people we have in WEF and in our member associations are incredible assets and there are incredible friendships to be developed through that,” says Falconer, Environmental Division manager in Boise, Idaho.

“But also, what we all work on individually tends to become pretty specific. Being exposed to the variety of things that are happening around the country and the world is amazing and opens up those opportunities for the future. The friendships I have gained from WEF and the experience in leadership that I’ve had, I wouldn’t change for anything.”

“The friendships I have gained from WEF and the experience in leadership that I’ve had, I wouldn’t change for anything.”

HOLLY FALCONER

So, what’s the main message? Mentor your new people. Send them to training sessions and conferences. But also encourage them to join SYPC, and support them with a budget and time away for events. It will pay dividends in more energized, higher-skilled professionals — in young people with “power, idealism, enthusiasm and courage” on your team. **tpo**



Every day
is Earth Day.™

Read about it. **FREE** subscription at tpomag.com

Longopac® Fill
— cap the risk

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

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

Visit www.paxxo.us for more information.



PAXXO

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

letters

About Reverse Euphemisms

I wanted to take a few minutes and say kudos for a job well-done in *TPO's* Let's Be Clear editorial. I know it can be a difficult challenge coming up with interesting subjects, along with an objective point of view every month.

So, on that note, in the November column, “Euphemisms in Reverse,” your last question ended with: “Your thoughts?” I would like to chime in with a few thoughts, for what they are worth. “Clean Water Plant,” “DC Water,” “New Water” and “Clean Water Services” always spark my neurons into thought of drinking water and/or water treatment plants producing potable water for human consumption.

“Water reclamation plant” or “water pollution control facility” (words that soften and sound better than “sewage plant” or “wastewater treatment plant”) conjure my thoughts toward the direction of wastewater treatment. Just a thought!

Richard D. Robbins
Wilson, North Carolina



Like something?
Hate something?
Agree? Disagree?

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

Send a note to editor@tpomag.com

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



NEW REPORT

Wildfire's Impact on Drinking Water

The frequency and intensity of wildfires, especially in the western United States, has increased in recent decades. Drinking water utilities may face issues with water quantity and availability, source water quality, and the ability to effectively treat and provide high-quality water. That's the impetus behind a new report titled *Wildfire Impacts on Drinking Water Treatment Process Performance: Development of Evaluation Protocols and Management Practices* published by the Water Research Foundation.

tpomag.com/featured



WATER TREATMENT RESEARCH

Inspired by Sea Creature

Inspired by *Actinia* — a sea organism that ensnares its prey with its tentacles — a team of researchers has developed a method for efficiently treating water. The research used a nanocoagulant to rid water of contaminants. By removing a broad range of contaminants in a single step, the discovery aims to improve on the centuries-old use of coagulants for water treatment.

tpomag.com/featured

OVERHEARD ONLINE

“The trend in modern education is anytime, anywhere online delivery with courses taken from a PC, a tablet or even a smartphone.”

Water Otter Presents Online Training Opportunities
tpomag.com/featured



CREATIVE SPIRIT

Model Water Tower Competition

The Prince William County (Virginia) Service Authority's Model Water Tower Competition took on a festive feel this year thanks to a holiday-themed winning entry. St. Francis student Jerry Boasmanboon and his neighbor Renu Nguyen-Rawoor of Graham Park Middle School created a working water tower that combined elements of Halloween, Thanksgiving and Christmas.

tpomag.com/featured



Emails & Alerts

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



Join the Discussion

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

95

PERCENT GRIT REMOVAL. AT ALL FLOWS.



There is only one grit removal system designed to remove 95% of grit down to 100 micron FOR ALL FLOWS experienced at WRRFs and treatment plants. While competing technologies derate efficiencies at peak flows, PISTA® hydraulic vortex grit removal systems consistently deliver in all conditions—backed by actual test results, not theory. Systems derating for storm events are not “advanced” — only the baffled PISTA® holds stake to that claim.

√ The Best Investment for 95% Grit Removal Across All Flows!

PISTA 360
WITH V-FORCE BAFFLE™


OPTIFLOW 270™
Baffle System


PISTA VIO™



CALL 800.898.9122

VISIT SmithandLoveless.com

Smith & Loveless Inc.

It Just Keeps Getting Better

EQUIPMENT, PROCESS AND EFFICIENCY IMPROVEMENTS ARE A WAY OF LIFE AT THE AWARD-WINNING GLASGOW WASTEWATER TREATMENT PLANT

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



Adam Headrick (left) and Tyler Bragg, Class IV operators, look with pride upon the final product.

The improvements just keep coming at the Glasgow (Kentucky) Wastewater Treatment Plant.

Built in 1962 as a trickling filter plant with upflow sand filters and anaerobic digesters, the plant was upgraded four times, most recently in 2014. Today, it operates as a 4.0 mgd SCADA-controlled extended aeration facility with new headworks, circular clarifiers, biosolids press and peracetic acid instead of chlorine for disinfection.

The improvements haven't gone unnoticed. For outstanding performance, Glasgow won the 2017 Kentucky Water & Wastewater Operators Association

Plant of the Year award. Last year, the Glasgow Water Co. received the Kentucky Excellence in Energy Leadership Award sponsored by the Kentucky Energy and Environment Cabinet.

"The plant is in a lot better shape than when I got here," observes Jacob Billingsley, superintendent, who joined the staff in 2010.

SERVICE PROVIDER

The Glasgow plant serves its community of 15,000 people in south-central Kentucky, not far from the Tennessee border. It also provides treatment for nearby Barren River State Park and two elementary schools roughly 8 and 15 miles outside the city limits. There are just over 1,000 commercial clients and 67 industrial users.

Wastewater enters the plant through an influent pumping station with new submersible pumps (Flygt - a Xylem Brand) that Billingsley calls "rock solids." They were added during the 2014 improvement project. The headworks, also upgraded in 2014, includes a pair of perforated plate screens (Parkson Corp.) and a PISTA Grit system (Smith & Loveless).

Following primary treatment, the flow enters a series of seven aeration tanks with Hoffman swing air diffusers (Hoffman & Lamson, by Gardner Denver) that use detachable socks at the pipe ends to disperse air, a system that dates to 1977. Centrifugal blowers (also Hoffman & Lamson, by Gardner Denver) driven by GE Industrial Motors and Baldor Electric motors provide the air.



Tyler Bragg tests final effluent in the lab, which is state-certified for all weekly and monthly NPDES compliance samples.

Secondary effluent settles in two 100-foot-diameter, 16-foot-deep clarifiers with turntables (WesTech Engineering) and brush systems (Weir-Wolf from Ford Hall Co.). New Gorman-Rupp and Vogelsang pumps handle return and waste activated sludge.

READY FOR THE RAINS

"The circular clarifiers were added in 2014 and replaced our old rectangular basins," Billingsley says. "They give us much better settling capability and have added solids capture capacity. We get solids at the bottom of the clarifier thick enough to press without polymer."

Disinfected effluent flows to Huggins Branch, a small creek that feeds into South Fork Creek and eventually the Barren River.

To handle wet-weather overflows, which can push the plant from 1 to 17 mgd, there's a new 7-million-gallon equalization basin, built in 2015 and designed to fill by gravity. An existing pump station was repurposed to deliver water from the EQ basin to aeration tanks.

"It really helps," Billingsley says. "If we get a 2- or 3-inch rain, we can handle up to 9 mgd, but anything over that gravity flows into the EQ tank to be fed back into the plant. We went to over 17 mgd during storms in September 2017. In the old days, we'd have to shut our blowers off and let solids settle in the aeration tanks."

HIGHLY AUTOMATED

Biosolids are digested and then, in cold weather, dosed with polymer and dewatered using a rotary fan press (Fournier Industries) installed in 2011. "It has worked great for us," Billingsley says. "We run it about 3 1/2 days a week. Up to this year, we've spent less than \$400 for parts, and we only use a gallon and a half of polymer an hour. That's our biggest savings."



All of the Glasgow plant's operators are certified Class IV and are cross-trained in all plant operations.



New Gorman-Rupp pumps handle return and waste activated sludge.



A Fournier rotary fan press installed in 2011 helps cut down polymer consumption in dewatering.

Glasgow Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	194 mg/L	5.4 mg/L	15 mg/L monthly average 22.5 mg/L maximum weekly average
TSS	312 mg/L	9.1 mg/L	30 mg/L monthly average 45 mg/L maximum weekly average
Ammonia	17.8 mg/L	1.7 mg/L	4.0 mg/L monthly average 6.0 mg/L maximum daily average May-Oct. 10 mg/L monthly average 15 mg/L maximum daily average Nov.-April
Phosphorus	6.8 mg/L	4.6 mg/L	Report only

In summer, solids are spread on drying beds to save on power costs. In all seasons, dewatered cake is trucked to the city landfill.

A SCADA system (HTI Instrumentation) provides monitoring and control of the entire system, including remote access. Billingsley appreciates the ability to dial up plant operations, receive alarms and make process adjustments using his cellphone. "We had some SCADA on our lift stations and at some points around the plant before, but the 2014 upgrade put SCADA on everything except our effluent outflow." That will be added during the next phase of upgrades.

“The landfill produces methane gas. We can tap into the methane gas generator if we have a power outage.” **JACOB BILLINGSLEY**

“Having the SCADA system decreases the chances of a failure and loss of solids,” Billingsley says. Staff can see rising flows and make adjustments to containing the flow among the aeration basins and clarifiers.

A QUALITY STAFF

The in-plant laboratory has also undergone a face-lift. It is state-certified for all weekly and monthly NPDES samples, plus surcharge samples for local industries. All full-time treatment plant staff members are trained in lab procedures. Billingsley is proud of that group, which includes a young tandem of operators: Tyler Bragg, also lab supervisor, and Adam Headrick, also lab technician. Two retirees come back to work part time. “We’re solid,” Billingsley says. “We’re all Kentucky Class IV operators and are cross-trained in all plant operations. Everybody understands all the SOPs (standard operating procedures). Plus, the retired guys really help out. They’re familiar with all our operations. Without them, we’d have to hire another full-time person.”

In addition to the lab work, the Glasgow team handles most plant maintenance: “We pull pumps, replace coolant and inspect impellers at least twice a year. Unless it’s something really large, we fix it in-house.”

STILL IMPROVING

While the city has invested more than \$12 million since 2011 to keep its processes up to date, Billingsley sees even more improvements and adjustments ahead. A bulk tank for peracetic acid will replace the tote system the plant uses now. “We made the move away from chlorine for safety reasons, generally. The acid is also more environmentally friendly. It’s totally biodegradable, and we’re getting really good results with it.

“Don’t get me wrong, chlorine worked great. But we were using 1-ton cylinders, and with the community close to us, there was always the risk of a leak and possible evacuation of the neighborhood. We’re spending a little more, but we’re looking out for the safety of our operators and our residents.” Peracetic acid also avoids the risk from disinfection byproducts.

Another improvement, long overdue, will be the replacement of the aging swing air diffusers: “We’ll be tackling them soon. They’re 40 years old. We’re seeing some deterioration and pitting. We’re also getting some fouling when trying on/off aeration.”

With new aerators, Billingsley expects to be able to shut off the blowers for short periods each day to operate with a lighter mixed liquor,

“We’re solid. We’re all Kentucky Class IV operators and are cross-trained in all plant operations.”

JACOB BILLINGSLEY



Glasgow (Kentucky) Wastewater Treatment Plant

BUILT:
1962; upgraded 1977, 1995, 2012 and 2014

AREA SERVED:
City of Glasgow, plus Barren River State Park and two elementary schools

POPULATION SERVED:
19,000

FLOWS:
4.0 mgd design, 2.2 mgd average

TREATMENT PROCESS:
Extended aeration activated sludge

TREATMENT LEVEL:
Secondary

RECEIVING WATER:
Huggins Branch

BIOSOLIDS:
Dewatered, landfilled

AWARDS:
2017 Kentucky Water & Wastewater Operators Association Plant of the Year

ANNUAL BUDGET:
\$783,000 (operations)

WEBSITE:
www.glasgowh2o.com

The Glasgow team includes, front row, from left, Billy Carver, operations manager; Ronnie Poynter, Class IV operator (former superintendent); Tyler Bragg, lab director/analyst, Class IV operator; and Patrick Young, collections system manager/pre-treatment coordinator. Back row, Adam Headrick, lab analyst, Class IV operator; Scott Young, general manager; Jacob Billingsley, superintendent, Class IV operator; and Clint Harbison, engineering manager.

saving on energy while storing solids. The team also expects to make more modifications to the aeration basins to enable biological nutrient removal.

The Glasgow crew already benefits from another modification; this one homegrown. “We figured out that we could take the filtrate off the rotary fan press and run it directly to our drying beds,” Billingsley says. “We had enough drop to do it without having to pump it.” The staff installed the necessary piping. In the first few months, the filtrate reconfiguration removed 8,000 pounds of solids that otherwise would have gone back to the head of the plant.

BENCH STRENGTH

The Glasgow (Kentucky) Wastewater Treatment Plant runs with three full-time Class IV operators, but it has a little extra in reserve. Superintendent Jacob Billingsley has contracted with two retired operators to help out on a part-time basis as needed.

They're both Class IV operators, and Billingsley says they'd rather come in and do a little part-time work than just sit at home. That's the way Ronnie Poynter looks at it. Poynter loves working at the plant where he was superintendent before his retirement two years ago: "I was there 37 years, and now I just go in and run the dewatering press. I know how to do it, and I enjoy doing it. There's no stress."

David Huffman retired on Jan. 1, 2016, after 29 years with at the plant. Now he spends just about every weeknight refereeing high school football and Little League baseball. Two days a week, he's back at the plant: "It's an all-new plant now, and there are different things to learn. I enjoyed it back then, and I still do."

ENERGY EFFICIENT

Of all the improvements, Billingsley and his staff may be most proud of reducing energy usage saving significant dollars. Glasgow took part in an energy optimization pilot study with the state Division of Compliance Assistance, University of Kentucky (Don Colliver), University of Memphis (Larry Moore) and U.S. EPA Region 4.

Through treatment process changes, variable-frequency drives on the blower motors, dissolved oxygen meters, SCADA, and the addition of LED lighting and occupancy sensors, Glasgow cut overall power consumption by 25 percent. The \$250,000 invested in energy improvements, added in February 2017, could see payback in just four years.

Glasgow also takes advantage of a unique opportunity available because the landfill is nearby. "The landfill produces methane gas," Billingsley says. "We can tap into the methane gas generator if we have a power outage. We have Siemens switchgear on our blowers, RAS and WAS pump stations and the main building. It's our backup to our normal power source, the Glasgow Electric Plant Board.

"During an ice storm, we would be able to keep power and save money. I don't know of any other plants that have a similar opportunity, but it's pretty clever. By taking our biosolids to the landfill, I know we're helping the cause."

And, there's still more. Billingsley and his staff have identified several air leaks in equipment and yard piping that could be wasting up to \$4,000 worth of air per month. They plan to fix those in the last phase of plant improvements.

These and energy saving plans for the future made Glasgow a winner in the Kentucky Excellence in Energy Leadership Award competition. Rick Bender, executive director of the Kentucky Office of Energy Policy, commended the Glasgow Water Co. for optimizing wastewater operations through energy efficiency.

"Not only have they realized significant savings," he says. "They have demonstrated leadership for the citizens of Glasgow. They can serve as a model for other wastewater operations in the commonwealth."

Brendan Held, environmental engineer with the U.S. EPA Energy Optimization Program in Atlanta, adds, "Under Jacob's leadership, the staff showed great enthusiasm and adaptability while taking steps to reduce excess aeration energy usage. They really pushed the envelope to maximize savings." **tpo**

The plant headworks was upgraded in 2014 (plate screen by Parkson with an EleMech control panel).



video profile



To learn more about the Glasgow (Kentucky) Wastewater Treatment Plant, take a look at a video profile of the company at www.tpomag.com

featured products from:

Baldor Electric Co.
800-828-4920
www.baldor.com

EleMech, Inc.
630-499-7080
www.elemechanic.com

Flygt - a Xylem Brand
855-995-4261
www.xylem.com/pumping

Ford Hall Company, Inc.
859-624-1077
www.weir-wolf.com

Fournier Industries, Inc.
418-423-4241
www.rotary-press.com
(See ad page 53)

GE Industrial Motors
773-414-3459
www.ge-energy.com

Gorman-Rupp Company
419-755-1011
www.grpumps.com

**Hoffman & Lamson,
by Gardner Denver**
724-239-1500
www.hoffmanandlamson.com

Parkson Corporation
888-727-5766
www.parkson.com
(See ad page 67)

**Siemens Industry Process
Instrumentation**
800-333-7421
www.usa.siemens.com/pi

Smith & Loveless, Inc.
800-898-9122
www.smithandloveless.com
(See ad page 11)

Vogelsang
800-984-9400
www.vogelsangusa.com

WesTech Engineering
801-265-1000
www.westech-inc.com

A large-scale photograph of the AquaPrime Cloth Media Filtration System. It shows multiple rows of green, fibrous filter cloths mounted on a rotating metal frame. The cloths are arranged in a circular pattern, and the entire system is set against a bright blue background.

AquaPrime®

CLOTH MEDIA FILTRATION SYSTEM

ADVANCED TREATMENT FOR PRIMARY WASTEWATER AND INDUSTRIAL APPLICATIONS

The AquaPrime® filtration system utilizes OptiFiber PF-14® pile cloth media in a disk configuration with three zones of solids removal to effectively filter high solids waste streams without the use of chemicals. This system is designed to handle a wide range of flows in a fraction of space compared to conventional clarifiers.

AquaPrime is ideal for primary filtration, primary effluent filtration and industrial wastewater due to its proven removal efficiencies and high quality effluent, even under varying influent conditions.

- Specifically designed floatable and settled solids removal zones
- Reduced energy costs in the secondary process due to reduction in organic loading
- More solids for increased biogas production in anaerobic digesters
- A footprint that is 15-20% of conventional primary treatment



Linda County Water District, Olivehurst, CA

- Primary filtration application
- TSS removal greater than 75%
- BOD removal up to 60%



A "Green" Advantage Product
Lower Energy • Small Carbon Footprint

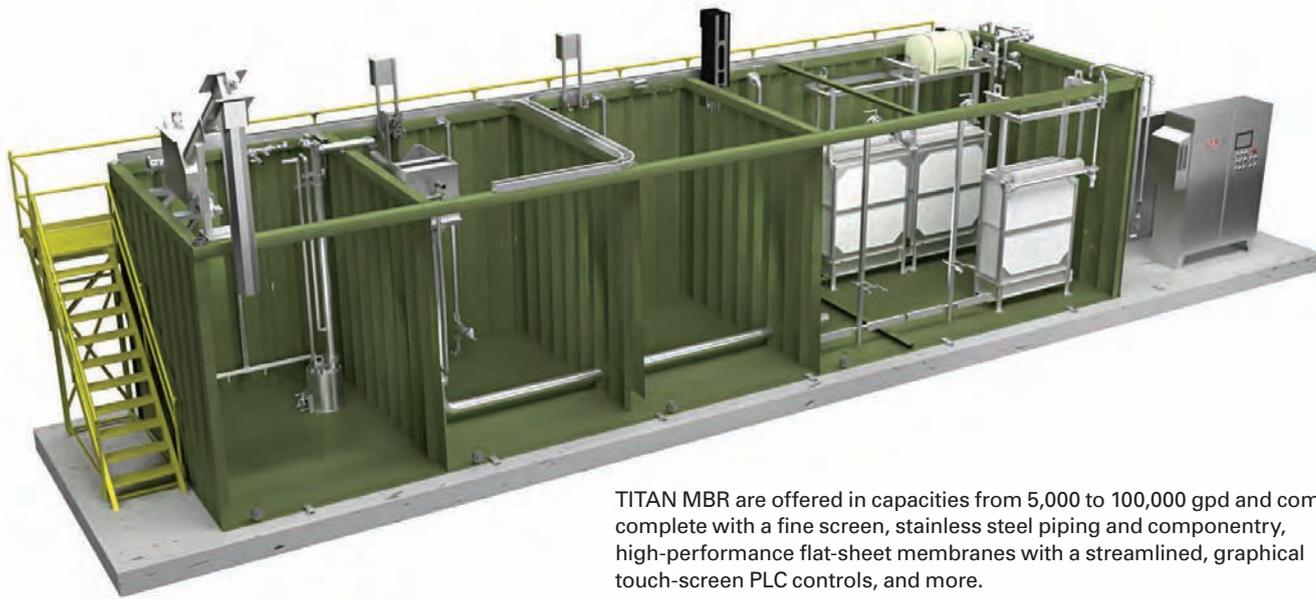


50th Anniversary
AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

1969 - 2019

www.aquaprimefiltration.com

815-654-2501



TITAN MBR are offered in capacities from 5,000 to 100,000 gpd and come complete with a fine screen, stainless steel piping and componentry, high-performance flat-sheet membranes with a streamlined, graphical touch-screen PLC controls, and more.

Performance Packages

COMPACT, FACTORY-BUILT MEMBRANE BIOREACTOR UNITS PROVIDE HIGH-QUALITY TREATMENT FOR SMALL FLOWS IN MUNICIPAL AND OTHER APPLICATIONS

By Ted J. Rulseh

Membrane bioreactors are designed with an all-in-one process to yield high-quality effluent that meets strict discharge requirements or can be reused for purposes such as irrigation.

Now Smith & Loveless has introduced a new series of compact, factory-built MBRs to accommodate small flows in a variety of applications, including some outside municipal systems. TITAN MBR systems are highly automated for ease of operation and maintenance.

Offered in capacities from 5,000 to 100,000 gpd, they include a stainless steel 3 mm fine screen, stainless steel piping and componentry, high-performance flat-sheet membranes with a streamlined chemical clean-in-place process, easily accessible components, intuitive graphical touch-screen PLC controls, and advanced data monitoring and communications.

A stable process helps users meet permit limits and achieve California Title 22 standards for water reuse. William Flores, vice president for municipal products and systems with Smith & Loveless, talks about the product line in an interview with *Treatment Plant Operator*.

tpo: What makes this product different from other MBRs on the market?

Flores: In factory-built MBRs the industry practice has been to send a tank that is factory-built, but when the user gets the system, there are numerous components that need assembly. We have simplified things into a truly factory-built plug-and-play system. The only thing that needs installation on site is the fine screen, which can't be shipped installed because then the unit would exceed shipping limitations. The unit has a wire man-

“ We have simplified things into a truly factory-built plug-and-play system. The only thing that needs installation on site is the fine screen.”

WILLIAM FLORES

agement system with cable trays and cable ladders, so it arrives with all the componentry factory-wired.

tpo: What market segments do you see this MBR family serving?

Flores: We provide complete systems tailored to smaller municipalities, residential and commercial developments, hotels, resorts, and campgrounds. It's also suitable for what people call scalping plants, where a city takes a sidestream from sewer line going to the wastewater treatment plant, treats it with a 50,000 or 100,000 gpd system and uses that water to irrigate a park or a public golf course.

tpo: Could this system be the main treatment facility for a small community?

Flores: Good candidates would be small towns or water districts with 200 to 500 people that can't by themselves afford a system. A number of these could get together and create their own utility that's able to afford a factory-built treatment system. They could deploy it not only for cleaning their wastewater and getting away from septic tanks, but also for water reuse.

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



Rotary Vacuum Filter

- sludge dewatering
- wastewater clarification
- continuous operation



Plunger Pump

- sludge transfer
- positive displacement
- high suction lift



tpo: How is this system designed for ease of operation?

Flores: Unlike the large municipal market where facilities have operators on site 24/7 or eight hours a day, we provide an influent transfer system with no moving parts, eliminating mechanical pumps and the maintenance that goes with them. Fine-bubble diffusers are common in larger MBRs. Our standard unit is coarse-bubble for lower operation cost and less need for operator attention — although fine-bubble is available as an option.

tpo: What about monitoring for a system that most of the time operates unattended?

Flores: We have remote monitoring because we know the owner or the operation firm will not go to the job site every day. So they can monitor the system, see the whole human-machine interface out of their office and receive alarms via text messages.

tpo: Do these units have any unique automation features?

Flores: Biological nutrient removal plants can be challenging to operate in low-flow conditions. To address that, we offer a LiquidLift mechanism that automatically adjusts the recycle from aeration back to the anoxic zones. So when the effluent is coming at a very low-flow rate, the operator can set the PLC to cut the recycle down from, say, 9 p.m. to 5 a.m. You bring the recycle down significantly to match the carbon source coming in.

tpo: In brief, how does the treatment process work?

Flores: There are two basic options: full BNR, or simply BOD and TSS removal. In the full BNR configuration, there's a dual anoxic zone followed by the aeration basin, which is also where the membranes are housed. Pressure created by gravity drives the flow through the membranes. Diffus-

ers beneath the modules scour the membranes while also providing air supply to the bacteria — that reduces the blower size. Clean water is discharged, while solids remain in the aeration zone. In the interest of keeping it simple, we use gravity discharge instead of a pump pulling a vacuum on the membranes.

tpo: Can any special components be added to the system?

Flores: Some customers want a sludge holding tank, which comes equipped with an automatic decanting airlift mechanism. That enables them to thicken the sludge so they don't need to have a vacuum truck come every 10, 15 or 30 days to remove the sludge. We can also add a flow equalization zone to the front end of the plant so operators can have a consistent flow through the system even as the influent flow varies significantly through the day.

“We have remote monitoring because we know the owner or the operation firm will not go to the job site every day. So they can monitor the system, see the whole human-machine interface out of their office and receive alarms via text messages.”

WILLIAM FLORES

tpo: What about the overall size of these units?

Flores: Typically, have offered 12-foot-wide tanks, but we have found that most of our customers want to minimize the size of their buildings. To help them, we have gone to 8 feet wide on most of our tanks, just to help them get the units into the limited spaces they have. tpo

YH2O: Filling the Pipeline

A BALTIMORE INITIATIVE RECRUITS UNEMPLOYED AND UNDEREMPLOYED YOUNG PEOPLE AND TRAINS THEM FOR WATER AND WASTEWATER CAREERS

By **Sandra Buettner**

YH2O mentoring participants sample water from a Baltimore-area stream.

Upon seeing seasoned workers leave for retirement and take many years of institutional knowledge with them, Rudolph Chow, P.E., met with department and industry colleagues and came up with a way to address the problem.

At the same time, Baltimore was experiencing widespread underemployment among young people, and city officials wanted to help address that, as well. The city, with 1.8 million residential and business water and wastewater customers, has two treatment plants: Back River (132 mgd average flow) and Patapsco (63 mgd).

Chow, director of public works, partnered with the Mayor's Office of Employment Development and the Chesapeake Water Environment Association. After eight months, they had developed a three-phase program known as YH2O, piloted in 2015.

Chow wanted to target younger workers and get them interested in the water industry as they started their careers. He felt that group would benefit the most from career guidance and support and would help replace the experienced workers leaving the industry.

TARGETING MILLENNIALS

"Baby boomers are very loyal to the companies they work for, but the millennials are slightly different; they like to move around," Chow says. "I feel it's our responsibility to keep them motivated and help them to continually learn. That includes grooming them for other roles within the utility.

"With more than 3,000 employees, our department is very large, so they can move up and advance and it's like going to a new job for them. In this way, we can keep them and their knowledge here, creating a new generation of workers to fill the roles of the retirees."

These roles in the Department of Public Works include jobs in wastewater, water, solid waste and energy. Applicants for the YH2O program, ages of 18-24, must have a high school degree or GED and be either unemployed or underemployed. Registration runs from mid-December through early January, and participants are chosen in February.

STRUCTURED TRAINING

Out of about 70 applicants, 20 are typically chosen for each class. In the first phase of the six-month program, held at the Mayor's Office of Employment Development, participants complete a skill and interest assessment and take part in basic job-readiness training, which covers topics including attendance, dress, and resume preparation.

In the second phase, participants explore a variety of career options in the water industry through the Mayor's Office of Employment Development.



The YH2O class of 2017 celebrated completion of the program with City of Baltimore representatives and water industry supporters. Front row, seated left to right: Jason Perkins-Cohen, Mayor's Office of Employment Development director; Rudolph Chow, P.E., Department of Public Works director; Mayor Catherine Pugh; Bernard "Jack" Young, City Council president; and Anthony Greene, internship coordinator in the Mayor's Office of Employment Development Youth Services Division.

They take part in job shadowing that includes work site tours at the wastewater treatment and water filtration plants. They are paired with a career coach from the Department of Public Works and Chesapeake Water Environment Association to learn about roles and opportunities.

In the third and final phase, participants are placed in paid summer jobs at the Department of Public Works through the Mayor's Office of Employment Development's YouthWorks program and start interviewing for full-

time positions at the plants. The YH2O workers are then placed in areas of the Department of Public Works Bureau of Water and Wastewater. Most stay in those positions for a long term before advancing to other roles.

IMPRESSIVE RESULTS

To date, 41 young people have completed the program and all are still employed with the Department of Public Works. Positions they have filled include water operation technician apprentice, maintenance technician, customer service, lab assistant and public works inspector trainee.



2018 YH2O participants visit the Patapsco Wastewater Treatment Plant.



2015 YH2O participant Darrius Pugh delivers remarks at the closing ceremony to celebrate the completion of the inaugural class of the water mentoring program.

According to Jennifer Combs, Department of Public Works public relations officer, “We have received great feedback from the participants. For some, the program gives them structure and inspiration to return to college for jobs in the environment or other areas. Some who complete the program and are parents like the stability of a full-time, well-paying job with a promising future.”

A set of twin brothers took part; one left a full-time retail position after taking the classes because he saw better career potential in the water industry. Both brothers work in the Department of Public Works and were recently promoted to utility installer II.

AWARDS AND RECOGNITION

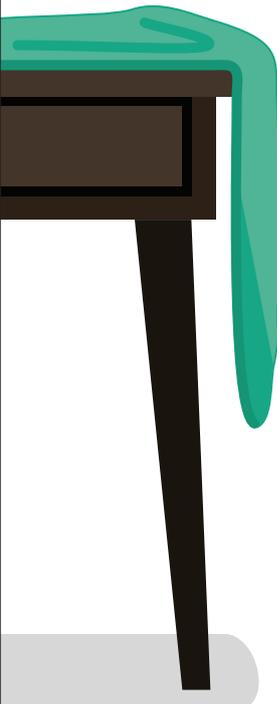
The Department of Public Works recently received a Public Communi-

“I feel it’s our responsibility to keep [the younger workers] motivated and help them to continually learn. That includes grooming them for other roles within the utility. ... In this way, we can keep them and their knowledge here.”

RUDOLPH S. CHOW, P.E.

Find your BLANKET!

**with Markland’s
Automatic Sludge Blanket
Level Detector**



Helps you:
Operate de-sludge pumps only when necessary
Prevent carryover
Optimize feed density
Reduce Energy Use



Contact Markland today.
Call **905-873-7791** • **1-855-873-7791** in NA
markland@sludgecontrols.com

MARKLAND
Specialty Engineering Ltd.

*A half century of service to the water and
wastewater industry*
www.sludgecontrols.com

cation & Outreach Program Award for YH2O from the Water Environment Federation. In addition, NASSCO awarded scholarships to seven graduates from the 2015 and 2016 programs. The scholarships, for pipeline inspection certification training, were valued at \$800.

Recognizing the success of YH2O, the leaders of Charlotte (North Carolina) Water and a group of Washington, D.C., government representatives recently visited Baltimore to seek advice on establishing similar mentoring programs. **tpo**

Governed by Numbers

TIFFINI ADAMS HELPS ENVIRONMENTAL ANALYTICAL LABORATORIES SERVING WATER RECLAMATION DISTRICTS MAINTAIN CONSISTENT TECHNICAL AND SCIENTIFIC RESULTS

STORY: **Scottie Dayton**

PHOTOGRAPHY: **Sallie Shatz**

Walking into the East Canyon Water Reclamation Facility laboratory in Utah for the first time, Tiffini Adams was struck by the silence and realized it was a one-woman show — hers.

As the new laboratory director and prime analyst, Adams was responsible for maintaining the Snyderville Basin Water Reclamation District's Utah-NELAC certified lab in Park City and performing NPDES permit sampling. "We were certified for only four analytical parameters," she says. "That had to change."

Six months later, with the support of Michael Boyle, Snyderville operations manager, Adams had doubled the laboratory's scope and parameters. "That enabled all analysis except metals to be performed in-house rather than sent to a contract lab, saving the district \$10,000 annually," she says.

Adams' career as an environmental analyst and a lab assessor provided the perfect segue to wastewater management. To learn about the field, she joined the Water Environment Association of Utah, serving on various committees and judging the Operations Challenge lab event for 12 years.

In 2017, she received the Laboratory Analyst Excellence Award, one of six WEAU awards the district received that year. The others were for the collections system, collections system supervisor (Scott McPhie), safety, excellence and Water Environment Federation Member Association service (Chad Burrell).



The Snyderville Basin Water Reclamation District.

FINDING A NICHE

The district operates the 4 mgd (design) East Canyon and 2 mgd (design) Silver Creek water reclamation facilities. Both have bioreactors, clarifiers and UV disinfection. East Canyon also has chemical phosphorus removal. In 2017, East Canyon earned its 14th and Silver Creek its 15th Platinum Peak Performance Award from the National Association of Clean Water Agencies. Silver Creek brings samples to the East Canyon lab for analysis.

“Quality assurance officers sit off on their own and provide a third-party perspective when reviewing data.”

TIFFINI ADAMS

BRUISES AND BADGES

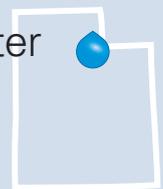
As the laboratory judge for the Water Environment Association of Utah Operations Challenge, Tiffini Adams offered participants ways to improve their use of lab equipment, and she demonstrated better techniques. Still, the role left her feeling too much like an observer. She wanted a stronger connection with the operators.

In 2011, Adams joined Wasted Gas, the Central Valley Water Reclamation District challenge team, to experience what it was like on the other side. “It’s not just a case of doing it fast, but it’s doing it correctly as well,” Adams says. “The process control section was the hardest, and we practiced scenarios, short math, and multiple choice every week. As an aside, I knew I would never be more prepared to take the operators certification exam Grade II than after learning from these seasoned operators.” She passed the exam.

Many events were physically demanding; the team members finished the days with bumps and bruises — badges of honor. Wasted Gas won the state competition and went on to finish third at WEFTEC in 2011. “I enjoyed the experience but treasure it more now because that was the only time I participated as a team member,” Adams says.

The next year, she was preparing the lab for its on-site assessment and couldn’t spare the time to practice. Since then, work and responsibilities kept her from rejoining the team. Still, since 2005, she has missed only a few years judging the WEAU lab event.

Tiffini Adams,
Snyderville Basin Water
Reclamation District
Park City, Utah



POSITION:
Laboratory director

EXPERIENCE:
13 years as environmental analyst; 15 years in wastewater treatment plant labs

EDUCATION:
Bachelor’s degree, environmental science, University of California, Riverside

CERTIFICATIONS:
Grade II Wastewater Treatment Operator

MEMBERSHIPS:
Water Environment Association of Utah; Utah Women of Water; TNI: The NELAC Institute

GOALS:
Earn ABC Laboratory Analyst certification, expand laboratory scope

Tiffini Adams, laboratory director



Tiffini Adams' contributions include expanding the lab's capabilities. Bringing the analysis for more parameters in-house has saved significant dollars.

“My boss trained me as a quality assurance officer. It turned out that QA is all about numbers, and I knew instinctively that whatever I did in life would be related to numbers.”

TIFFINI ADAMS

“This is my dream job,” Adams says. “I was happy doing quality assurance for the last 14 years, but the only opportunity for career advancement was lab director, and that position doesn’t come up too often. Leaving my colleagues from three different labs was hard, but it’s been a lovely move.”

Moves are something Adams always took seriously. Growing up with a strong interest in science and math, she had no career goals while studying for an environmental science degree from the University of California, Riverside. In her senior year, while Adams worked as an organic extraction technician at an environmental analytical lab, fate stepped in.

“My boss trained me as a quality assurance officer,” Adams says. “It turned out that QA is all about



Tiffini Adams with treatment plant operators Dave Simanich (center) and Jim Giles.

numbers, and I knew instinctively that whatever I did in life would be related to numbers.”

Quality assessment involved comparing lab results by looking for transcription errors, following the traceability of reagents and reviewing test quality-control requirements. Adams also did monthly chemical hygiene inspections and helped maintain the state’s standard operating procedures for certification.

After marrying Carl and moving with him to Utah, she spent six years as an organic chemist at Timpview Analytical before joining the state Department of Health, Bureau of Laboratory Improvement, as a laboratory assessor in 2001.

“Every other year, the bureau performs on-site assessments and evaluates environmental analytical laboratories to verify they are pro-

ducing legally defensible data to maintain their certification,” Adams says. “Ideally, the assessments help labs to continue to produce reliable data, batch after batch.”

REAL SCIENCE

The on-site assessment process enabled Adams to help improve lab performance by providing feedback to lab directors and staff. While her assessments focused mainly on the conduct of research, they also examined whether analysts achieved stated objectives. “Think of it as a peer review,” she says. “We work with labs to help them maintain consistent technical and scientific results.”

During three years with the bureau, Adams qualified as a laboratory certification officer and quality assurance officer, but she missed being an analyst. “An assessor’s life is mostly paperwork, and the stack never seems to diminish,” she says. “As an analyst, I could look at each day’s processed batches and see accomplishment.”

In 2003, she joined the Central Valley Water Reclamation District as a quality assurance officer contractor. Her responsibilities included double-checking data for wet chemistry, microbiology, metals and gas chromatography at the Central Valley and South Valley reclamation facilities.

Adams serves the industry as a member of the Water Environment Federation of Utah midyear and annual conference planning committees and as chair of the Young Professionals.



“Quality assurance officers sit off on their own and provide a third-party perspective when reviewing data,” she says. “It was great because I knew firsthand all the hoops the labs went through to maintain their NELAC certification. The knowledge enabled me to be empathetic and encouraging in my support and data oversight role.”

MAINTAINING PROXIES

Adams also acted as a sounding board for lab directors Anthony Daw at Central Valley, Sherry Sheffield at South Valley and Megan Moak at the Jordan Basin Water Reclamation Facility. Together, they worked toward goals and kept each other on task.

“We occasionally overlook certain quarterly and annually scheduled procedures because they aren’t part of the daily routine,” Adams says. “So it’s important for the directors and the QA officer to have a cooperative relationship that keeps them on top of miscellaneous requirements.” *(continued)*

HOW EFFICIENT IS YOUR AERATION REALLY?



LET'S TALK

Tom McCurdy, ENV Sales Team Leader
+1 856 685 7647 | tmccurdy@aerzenusa.com

Real efficiency means operating the load profiles in wastewater treatment plants with precision. Aeration consumes up to 80% of the total energy requirements. The greatest savings potential can therefore be found here.

With our Performance³ product portfolio, consisting of Blower, Hybrid, and Turbo, we always find the most efficient and tailor-made solution for you. Benefit from up to 30% energy savings! LET'S TALK! We'll be happy to advise you!

www.aerzenusa.com



AERZEN
EXPECT PERFORMANCE

Some months before an on-site assessment was scheduled, Adams and the lab director conducted an internal audit duplicating everything done by the state. They created a plan, followed through with corrective action for any infractions, and mapped who would do quarterly checks and when they would be done if some were off schedule. They reviewed the quality manual, updated SOPs, and then looked at detection limits and whether analysts demonstrated current capabilities. They also ran proficiency test samples twice a year.

“Keeping up with corrective actions, upgrading SOPs and sending out reports on time were the hardest parts of the job,” Adams says. “The high point of those years was having a great network of colleagues at three different labs. On a personal level, the position enabled me to participate more fully in my children’s lives.”

As a contractor, Adams worked a three-quarter week her first year at Central Valley. The 32-hour schedule continued even after she was hired full time in 2005 and contracted out to the South Valley and Jordan Basin labs. “My schedule allowed me to take field trips with Wiley and Pamela and later serve on the boards of their middle and senior high schools,” she says. “It’s been a tremendous benefit.”

LET THE GAMES BEGIN

An unexpected bonus arose from the Central Valley Wasted Gas team’s participation in the WEAU Operations Challenge. Adams joined WEAU to help the team prepare for the lab event and wound up judging it for 12 years.

“Joining the organization increased my knowledge and opened my world to networking further afield,” she says. “When meeting operators or other teams, conversations naturally go to troubleshooting and sharing solutions.”

Over the years, Adams served on the WEAU midyear and annual conference planning committees, the laboratory committee, and as chair of the Young Professionals. “I’m also a member of the Select Society of Sanitary Sludge Shovelers and wear my golden shovel with pride,” she says. “I’m equally proud of being a first-time judge for the lab event at WEFTEC 2018.”

Although happy at Central Valley, Adams saw an opportunity when the lab director at the East Canyon facility retired. She took the position in 2017: “I knew I could perform his duties with ease. However, the director has the ultimate responsibility, and carrying that weight is different. Thankfully, my lab director network facilitated the transition, and I have Iva Riveros, my own QA officer, to keep me on task.”

EXPANDING PARAMETERS

Adams’ first task was to expand the lab’s parameters from cBOD, TSS, total phosphorous, and ammonia to include TDS, BOD, nitrate, nitrite, TKN, oil and grease, and orthophosphorus. Bringing the analysis in-house saved the district processing fees and labor.

To fast-track the expansion, Adams worked closely with her colleagues at the bureau. “When I submitted paperwork, I told them it was coming and that I hoped it could be processed by a certain deadline,” she says. “The bureau’s goal is to help keep labs on task and growing, so they were eager to help.”

Their cooperation enabled the lab to have test results available in 24 hours instead of seven to 10 days. The lab has a Hach DR3900 spectrophotometer for nutrient analysis, a Hach Intellical LDO101 for cBOD and BOD analysis, and the StepSaver (Environmental Express) for oil and grease analysis. North Central Labs supplies most standards, reagents and supplies.

The next situation Adams addressed was finding a temporary replacement. East Canyon still sent out analysis when she was on vacation or attending conferences. Marlo Davis, the plant’s operations superintendent, and Cody Snyder, Silver Creek Wastewater Treatment Facility operations superintendent, rode to the rescue, sending Dave Smilanich and Jim Giles, Grade IV (highest) operators, to Adams for training.

“Their arrival was an empowering gift,” she says, “It ensures that the lab will run uninterrupted in my absence and thrive.”



Public education is a priority for the Snyderville district. The district headquarters is home to extensive informational displays.

EXPANDING EDUCATION

Adams’ third improvement is looking for ways to enrich laboratory tours and extend community outreach. “The lab just received a big-screen monitor on which I show slides with active microscopic organisms from the bio-reactors,” she says. “Visitors enjoy seeing rotifers eating marine microalgae, the tardigrades (water bears), and free swimmers, but it’s not enough. It would be great to collaborate with other labs and share our hands-on educational methods with each other.”

As for personal goals, Adams wants to stay where she is until it’s time to retire in 15 years. To add a homey touch and a splash of fun to the lab, she brought in her pig figurine collection. She concludes, “I am lucky to love the analytical side and quality control side of lab work and to be in such a beautiful place.” **tpo**

featured products from:

Environmental Express
800-343-5319
www.envexp.com

Hach
800-227-4224
www.hach.com

Change the way you look at level measurement

submersible level transmitters

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





PHOTO COURTESY OF DAVID WIMAN

Charlie's Angels team members (from left) Sarah Hickman, Melissa Engle, Morgan Greathouse and Candace Mathis competed in the state and national Water Environment Federation Operations Challenge for the Columbia (South Carolina) Metro Wastewater Treatment Plant. Their logo is the smiley face painted on the plant's methane storage tank.

Angelic Performance

FOUR WOMEN FROM A SOUTH CAROLINA PLANT CRASH THE MALE-DOMINATED PARTY AT THE 2018 WATER ENVIRONMENT FEDERATION OPERATIONS CHALLENGE

By **Scottie Dayton**

Women have competed on Operations Challenge teams for years. The Water Environment Federation's 2018 Technical Exhibition and Conference marked the first time an all-female team slugged it out on the national stage.

David Wiman, superintendent of the Columbia (South Carolina) Metro Wastewater Treatment Plant, worked with Sarah Hickman, lab manager, to form Charlie's Angels in 2017. Hickman was joined by Melissa Engle, lab analyst; Candace Mathis, a Class A (highest) operator; and Morgan Greathouse, a Class D operator.

"We didn't have to strong-arm anyone to join, but we didn't have to beat them away either," says Engle, 2017 Water Environment Association of South Carolina Laboratory Analyst of the Year and team captain. "Just the four of us were interested."

REGULAR PRACTICE

The four didn't realize how seriously operators took the competition until they attended their first meeting and heard teams arguing over the previous year's competition. "They were intense," Engle says. "At that point, we knew we were in over our heads a little, but we were determined to forge ahead."

They practiced twice a week before work; they had a mock version of the computer simulator used in the process control event to test their ability to control a plant. Charlie's Angels debuted at the 2017 Brawl at the Beach, the South Carolina Environmental Conference Operations Challenge in Myrtle Beach.

“Being on the first all-female team is fun and exciting, but we hope other women will follow suit. We don't want to be alone in the future.”

MELISSA ENGLE

"We finished second in the process control event but were seventh overall out of eight teams," Engle says. "In 2018, we placed third out of four state teams and qualified for the nationals."

The 2018 Brawl at the Beach introduced the maintenance event sponsored by KSB, which supplied a simulated pump station, control panel, and water-filled tank with an energized Amarex KRT submersible pump for use in the competition. Two company representatives saw Charlie's Angels compete and collaborated with Charli Matthews, CEO of Empowering Brands, to sponsor the team's travel expenses.

READY, STEADY, GO!

Only Engle had years of competitive experience and knew how to maintain her composure. She had skated as the jammer on a roller derby team for seven years before becoming its coach in 2015. "We had one member with a severe case of nerves, but once the whistle blew, she held up well," Engle says.

THE Best Blower WE HAVE Ever MADE

The CycloBlower H.E.

- Game changing patented design
- Best-in-class energy efficiency
- Built with the best-of-the-best components
- Flexible options & installation

www.gardnerdenverproducts.com

©2017 Gardner Denver. All rights reserved.



The team found the collections system event the most physically challenging. “Usually we can outthink what we can’t outmuscle, but even with practice, we couldn’t break the 45-second barrier when sawing through the pipe,” Engle says. “The guys cut it in 10 seconds.” To compensate for lower muscle mass, the women traded off as soon as the person sawing began to tire.

The process control event was the most mentally challenging for Engle and Hickman. “We have the math and lab tests down, but are not familiar enough with daily plant operations to know which valve to open in which situation,” Engle says. “Although we studied as if for a licensing exam, we really needed each other’s knowledge to get through that section.”

CHEERING SECTION

As Charlie’s Angels streaked through the maintenance event, they hit a heart-stopping moment: The team ahead of them had cross-threaded the pump impeller, and it wouldn’t budge. The judges replaced the pump and reset the clock. “Starting over was unsettling,” Engle says. “Our second run wasn’t as fast as the first, but we were grateful it wasn’t the disaster it could have been.”

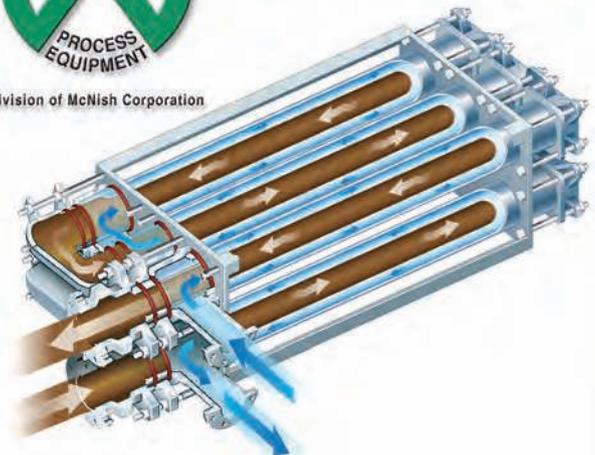
The team placed 18th out of 36 teams in Division 2 and won the Best Fan Support Award as determined by team ballots. “We made signs and inflated lab gloves for balloons and handed them to people who rooted for us,” Engle says. “A former professional cheerleader was in the crowd, so we recruited him to lead cheers. The crowd was loud and enthusiastic.”

Charlie’s Angels want to stay together and compete for as long as possible. “Being on the first all-female team is fun and exciting, but we hope other women will follow suit,” Engle says. “We don’t want to be alone in the future.” tpo



Division of McNish Corporation

Water-to-Sludge Heat Exchanger



- Efficiently Heat Digester Sludge.
- Tube-in-Tube Design.
- Low Headloss.
- Manufactured in Aurora, IL USA.

Walker Process Equipment
www.walker-process.com



Back to Nature

RAIN GARDENS AND BIOSWALES AT CLEAN-WATER PLANTS HELP AN ARKANSAS UTILITY PROMOTE SUSTAINABILITY, BIODIVERSITY AND NATURAL WILDLIFE HABITAT

Rain gardens like this one at the Paul R. Noland Wastewater Treatment Facility are part of a natural landscaping initiative in Fayetteville, Arkansas.

By Jeff Smith

There are huge benefits to the rain gardens at the two wastewater treatment plants in Fayetteville, Arkansas, says Tim Luther, operations manager for contract management firm Jacobs Engineering Group.

More than 135,000 square feet of turf has been converted to rain gardens, bioswales and managed naturalized buffer areas that support the city's commitment to sustainability. "We are using native vegetation and managing areas at our treatment plant sites to promote natural growth and reduce lawn maintenance," Luther says. "Done in the right way, you can get rather large areas of landscape that require zero irrigation."

DIVERSE VEGETATION

Fayetteville's West Side Wastewater Treatment Facility (16 mgd design, 10 mgd average) has the larger rain garden area; nearly 2 acres are dedicated to Ozark-only plants. They complement the adjoining Woolsey Wet Prairie Sanctuary, a 44-acre wetland and publicly accessible wildlife area that is integral to the plant's operation.

More than 50 species of native vegetation have been planted in the rain garden and bioswale areas to minimize maintenance, improve aesthetics, increase biodiversity as protection against disease or pest outbreaks, and improve stormwater uptake.

Native plants such as splitbeard bluestem, river oats, pink muhly grass, purpletop tridens, and switchgrass are mixed with wildflowers such as milkweed, dogbane, purple coneflower, black-eyed Susan, and sunflowers. Strategically placed native trees and bushes include black gum, eastern redbud wafer ash, Ozark witch hazel, possum haw and winterberry.

STILL EXPANDING

The rain gardens at the Paul R. Noland Wastewater Treatment Facility (17 mgd design, 12.6 mgd average) are a work in progress. "They are not

entirely maintenance-free," says Jeff Hickle, environmental projects specialist. "Each year we have project areas that need to be maintained, and nearly every year we create new ones, typically around 15,000 square feet."

Rain garden maintenance and expansion are part of the utility's community outreach and public education. Each year the staff engages community volunteers who spend a day weeding and cleaning the sites, gathering and planting native seeds and plants, improving existing gardens, and creating new ones.

"We made a commitment in 2013 to learn what's required to increase each species' density, improve plant diversity, and engage volunteers to collect native seeds from nearby areas and then broadcast them in the rain gardens," Hickle says. "It's a good fit for our maintenance schedule, supports our team's mission as environmental stewards and brings a lot of good attention to the city's commitment to be a resource-efficient community."

“Rain gardens are great place for the milkweed and other good pollinating wildflowers that create good habitat for monarchs.”

JEFF HICKLE

GRANT SUPPORT

The rain garden project began in 2009 with a design by The University of Arkansas Community Design Center, part of the university's school of architecture. The purpose of the original garden was to establish civic presence to an industrial area through habitat restoration and education.

Since then, grants from the Beaver Watershed Alliance and the Illinois River Watershed Partnership have largely funded the rain gardens. Goals to restore a natural habitat and attract butterflies, birds and other wildlife are being met, Hickle says.

Custom Dewatering & Composting Solutions.



DSP Screw Press



Rotary Drum Thickener



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



3DP Belt Press



Enclosed Gravity Belt Thickener



Skid-Mounted 3DP

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



Sales: 518-796-1440

Fax: 518-695-5417

Factory: 518-695-6851

Email: dan@bdpindustries.com



www.bdpindustries.com



The rain gardens are designed in part to restore natural habitat and attract butterflies, birds and other wildlife.

“Rain gardens are great place for the milkweed and other good pollinating wildflowers that create good habitat for monarchs,” Hickle says.

CLIMATE-FRIENDLY

The rain gardens also reflect the city’s commitment to sustainable landscapes. “We want to promote spaces that are good for mitigating heat island effects, offer climate resiliency, and aid in carbon sequestration by not using fossil fuel during mowing,” Hickle says.

Luther adds, “We’ve been at this for nearly 10 years, and we have had a learning curve. When it’s done right, you gain more benefits over time, like improved soil quality, better stormwater infiltration, improved habitat for butterflies and wildlife and, of course, the aesthetics and community involvement.” **tpo**

Share Your Ideas

TPO welcomes news about interesting features of your facility’s grounds, signage or buildings for future articles in the PlantScapes column. **Send your ideas to editor @tpomag.com or call 877-953-3301.**

Tim Nyander, utility director encouraged pursuit of the grants and supports other city initiatives. For example, Fayetteville is a signatory of the National Wildlife Federation Mayors’ Monarch Pledge. More than 25 mayors across the nation have pledged to create and sustain habitat for monarchs and other migratory pollinators.



City of King water plant team members use a benchtop Chemtrac Laboratory Charge Analyzer when performing jar tests.

Upping the Ante

OPERATORS AT A NORTH CAROLINA PLANT ADOPT NEW TECHNOLOGY AND CLIMB A STEEP LEARNING CURVE TO TACKLE VARIABLE TURBIDITY IN SOURCE WATER

STORY: **Trude Witham** | PHOTOGRAPHY: **Andrew Krech**



When the staff at the City of King Water Treatment Plant applied for the North Carolina Area-Wide Optimization Program Award, they never expected to win.

“When we heard about the award five years ago, we thought there was no way we would win, but we figured we would try,” says Ben Marion, plant supervisor.

The award, from the North Carolina Department of Environmental Quality, recognizes water systems for outstanding turbidity removal. The King plant won for 2017. “We went from six to eight turbidity violations a year to none in the last three years,” Marion says. “We turned things around by adding equipment that allowed us to simplify the treatment process.” Average 2017 finished water turbidity was 0.02 to 0.08 NTU.

Operator challenges included varying source water turbidity, especially during heavy rain. In 2017, the average source water turbidity was 54.2 NTU and the maximum was 963 NTU. Operators also had to deal with a steep learning curve on new equipment. The plant boasts excellent finished water TOC: In 2017 the raw water TOC averaged 2.5 mg/L, and the finished water averaged 0.7 mg/L.

CONVENTIONAL PLANT

The 3.0 mgd conventional treatment plant was built in 1967. It serves about 25,000 customers in King and the towns of Tobaccoville, Pinnacle, Rural Hall and Pfafftown. Plant staff includes

Marion, supervisor; Mark Danley, assistant supervisor; four full-time operators; and a belt filter press operator. The plant operates around the clock.

Raw water from the Yadkin River is treated with polyaluminum chloride in a flash mixer before flocculation and sedimentation. The water is sent to four dual-media filters (Leopold - a Xylem Brand) and then enters the clearwell and is dosed with caustic soda and orthophosphate.

The finished water is stored in four inground storage tanks. Before distribution, it is chlorinated

“We turned things around by adding equipment that allowed us to simplify the treatment process.”

BEN MARION

with sodium hypochlorite and then sent to three inground storage tanks before being pumped to one of three water towers.

Any wastewater generated is collected in a sludge decant tank. The clean water is dosed with sodium thiosulfate before discharge. Sludge is dewatered in a belt filter press, and the filtrate is returned to the head of the plant. Dried sludge is hauled off site for disposal and given away to farmers and to citizens to use for gardening.

SIMPLIFYING TREATMENT

The plant received capacity upgrades in the 1970s and 1980s. In 2014, it switched from alum to polyaluminum chloride (DelpAC 2000 from



City of King Water Treatment Plant

Tobaccoville, North Carolina

www.ci.king.nc.us/watertreatment



BUILT:
1967

POPULATION SERVED:
25,000

SERVICE AREA:
City of King, towns of
Tobaccoville, Pinnacle,
Rural Hall, Pfafftown

SOURCE WATER:
Yadkin River

CAPACITY:
3.0 mgd

TREATMENT PROCESS:
Conventional filtration

DISTRIBUTION:
40 miles of pipeline

SYSTEM STORAGE:
7 million gallons

KEY CHALLENGE:
Changing surface
water quality



The team at the City of King Water Treatment Plant received the 2017 North Carolina Area-Wide Optimization Program Award recognizing outstanding turbidity removal from the North Carolina Department of Environmental Quality.



Ben Marion, supervisor, volunteers teaching operator classes through the North Carolina Waterworks Operators Association, while plant staff works to promote the facility through community events.

USALCO). “Before then, whenever we had a major rainstorm that raised turbidity levels to 800 NTU or higher within 30 minutes, we had to run jar tests and then wait for the results,” Marion says.

The operators would feed 100 ppm alum, but the settled water turbidity was in the 6-10 NTU range. “The DelPAC 2000 simplified the process by using only one chemical for coagulation instead of the normal alum and pre-caustic combination,” Marion says. “The DelPAC 2000 has built-in alkalinity and pH adjustment, so no caustic feed is needed to raise the pH after the coagulant is dosed.”

Another improvement added in 2014 was a benchtop LCA-2 laboratory charge analyzer (Chemtrac). “It measures the negative surface charge of particles and predicts through a titration process the amount of PAC to feed to neutralize the charge,” Marion says. This allows operators to adjust chemical doses in minutes during heavy rain.

“All dosages and chemicals are entered into the system, and the software increases or decreases the chemical feed rates based on the flow-through calculations done by the software.”

BEN MARION

In 2015, another upgrade added a new raw water intake and pump station with two new vertical turbine pumps (Pentair - Fairbanks Nijhuis) and a static flash mixer (SPX). All these pumps have variable-speed drives (Eaton). Other additions included:

- Two sedimentation basins with hoseless vacuum sludge collection
- Two filters (Severn Trent) with an air scour system (United Blower)
- Two vertical turbine pumps (Pentair - Fairbanks Nijhuis)
- Chemical feed pumps (Milton Roy).

In 2016, the plant upgraded the SCADA to an InfoScan system with Dorsett Technologies software. “The system was designed around the specs that we wanted,” Marion says. “All dosages and chemicals are entered into the system, and the software increases or decreases the chemical feed rates based on the flow-through calculations done by the software.”

Operators still control the raw and filtered water flows, and filters are backwashed manually, but everything else is automated. The high-service pumps and all distribution pumps are controlled based on tank levels. Operators watch water demand in real time and adjust the plant flow to match demand.

TRIAL AND ERROR

While the upgrades improved plant performance, the operators were challenged. “The equipment vendors trained the operators during startup, but a lot of the learning was through trial and error,” Marion recalls. “I played with the equipment and collaborated with assistant supervisor Mark Danley. We tweaked it and got feedback from the equipment controls. Only then did we pass this knowledge on to the operators.”

Source water turbidity is always a concern. “It varies widely,” Marion says. The plant lies in an area of farmland and Yadkin River tributaries. “It is a long river that starts up in the mountains. We’re in the middle, so we catch everything.”

The operators rely on many online monitors and constantly look at the raw and finished water turbidity, and streaming current numbers. An alarm sounds when the raw water NTU reaches 50. When it reaches 100, the operators conduct a five-minute jar test. They enter the dosage results into SCADA and wait five minutes to see where the streaming current is. The SCADA automatically boosts the feed based on the flow. “There was a steep learning curve for the operators to master all this,” Marion says.

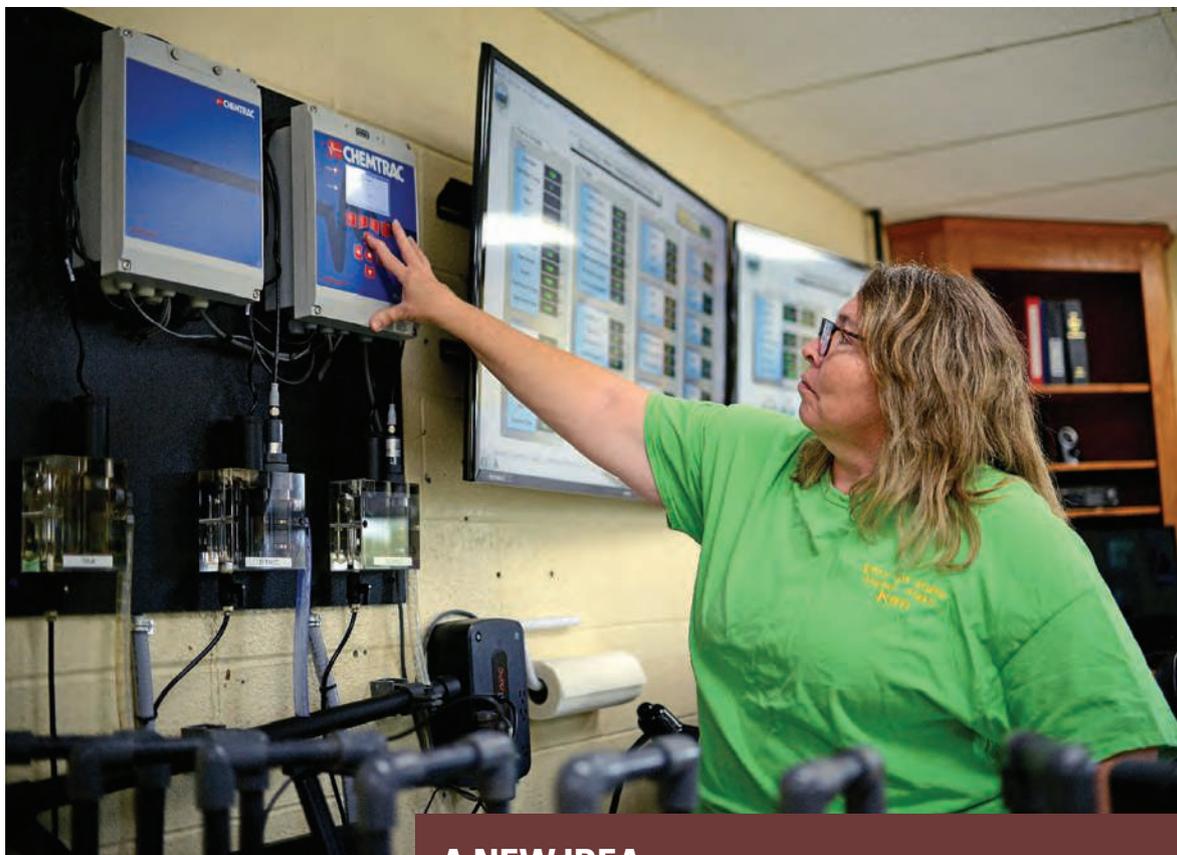
A WINNING TEAM

Marion has high praise for his team: “There has been a huge improvement from where we started to where we are now. Our operators have thoroughly learned the water treatment process and how it works. They take pride in

the plant and enjoy coming to work. And now, with the recent Area Wide Optimization Award recognition, they come to work with heads held high.”

Marion holds Class A surface water treatment, Grade 1 biological, Grade 1 physical/chemical, and total coliforms and *E. coli* certifications. He also holds a bachelor’s degree in engineering technology from the University of North Carolina at Charlotte. Team members are:

- Danley, Class A surface water treatment, total coliforms and *E. coli* certification. *(continued)*



Kim Sutton checks streaming current value on the Chemtrac analyzer to make sure the optimum coagulant dosage is being fed.

A NEW IDEA

Operators at the City of King Water Treatment Plant rely on two methods to check their coagulant dosages during turbidity events: jar testing using the benchtop Chemtrac LCA, and online monitoring using the Chemtrac DuraTrac 4 Streaming Current Analyzer.

Mark Danley, assistant supervisor, and Ronnie Gallimore, operator, came up with a new idea to check to make sure both units were correct. “They pulled a sample from the flash mixer in a 2-liter jar and placed the sample under the LCA,” says Ben Marion, supervisor. “This sample provided a charge straight from the source at which the coagulant and raw water meet. This charge should match close to what the streaming current charge should be, as well as what the LCA jar test should be.”

By knowing what dosage was fed at the time of the sample collection, operators now have a third method for checking that the dosages are correct. Marion says, “This method is now used by all our operators when turbidity events hit.”



Ben Marion,
City of King
Water Treatment
Plant supervisor

Danley supervises the operators, oversees daily operations and maintenance, and takes care of all distribution and quarterly sampling for the plant. He also performs relief work for each operator and some maintenance.

ONGOING CHALLENGES

Marion expects fluctuating turbidity to remain a challenge for the operators. “It just comes on so quickly, and while it’s not as hard to deal with as it used to be, we always have to be on our toes,” he says.

In 2018, “There was a lot of rain for much of North Carolina, and 5 inches fell within a week in early August. Raw water turbidity jumped from 8.0 NTU to 950 and averaged about 500 NTU throughout the week.” Using the

“There has been a huge improvement from where we started to where we are now. Our operators have thoroughly learned the water treatment process and how it works.”

BEN MARION

new plant equipment, lab and process equipment, and SCADA, the operators maintained settled turbidities at less than 2.0 NTU.

Total trihalomethanes and haloacetic acids are another concern. “We test for these quarterly within the distribution system — two tests near the elevated tanks and two tests at the farthest points in the system,” Marion says. “Bimonthly, we do control sampling to make sure the quarterly results are within range and also to catch and correct any TTHM and HAA5 problems before the required monthly reporting.”

Plant staff members take part in community events. Marion says, “We attend job fairs to get students interested in working at the plant. We usually do a small presentation, and we have literature for students to take home. It’s a perfect job for someone who wants to work right out of high school.”

Marion volunteers twice a year with the North Carolina Waterworks Operators Association, teaching math, maintenance, distribution and safety classes to operators. “This helps them to learn firsthand from someone with experience in the field, doing exactly what they do every day.”

Marion is excited about the future: “The area is growing rapidly and I see us expanding to 6.0 mgd capacity in the next five years. I see our young people coming through the ranks and also two people retiring. When I started here seven years ago, I was learning from those who were retiring, and now I will be the senior person.”

One thing that won’t change is the team’s dedication: “You see police cars and fire trucks drive by, and they are available 24/7. And, we’re here 24/7 too, making sure the water we provide is the best.” **tpo**

featured products from:

Chemtrac, Inc.
800-442-8722
www.chemtrac.com
(See ad page 39)

Eaton
877-386-2273
www.eaton.com

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

Milton Roy
877-786-7298
www.miltonroy.com

Pentair - Fairbanks Nijhuis
913-371-5000
www.fairbanksnijhuis.com

SPX
800-252-5200
www.spx.com

United Blower, Inc.
770-479-3000
www.unitedblowerinc.com

USALCO, LLC
800-882-3883
www.usalco.com

- Ronnie Gallimore, belt filter press operator, Class C surface water treatment total coliforms and *E. coli* certification.
- Water plant operators Denise Shelton, Class C surface water treatment, distribution, Grade 2 biological, Grade 1 collections, total coliforms and *E. coli* certification; Kim Sutton, Class A surface water treatment, total coliforms and *E. coli* certification; Larry Thompson, Class C surface water treatment, total coliforms and *E. coli* certification; and Clayton Inscore, Class C surface water treatment certification.

The operators do rounds every four hours and lab sampling every two hours, along with spot-checking the SCADA numbers. Gallimore handles all process water that goes back into the environment. He also performs all equipment and grounds maintenance. As a certified operator, he fills in when needed.

we are ready to solve the toughest water, wastewater and process challenges

RCS Nanterre 433 46 570 - les ateliers d'avenir

SUEZ's offering for Water Technologies & Solutions has the most comprehensive set of chemical, equipment and digitally enabled services and products to help our customers manage and optimize their water resources and overcome pressing challenges.
To learn more about our offerings: www.suezwatertechnologies.com



ready for the resource revolution

Sustainable practices at the Boulder Water Resource Recovery Facility include using a brewery byproduct called weak wort as a carbon source to aid in nitrate removal.



Keeping the Climate Commitment

THE BOULDER WATER RESOURCE RECOVERY FACILITY PRACTICES SUSTAINABILITY BY USING BREWERY WASTE FOR NITRATE REMOVAL AND CREATING RECLAIMED NATURAL GAS FROM BIOGAS

By Steve Lund

Sustainability was being practiced in Boulder, Colorado's water system long before sustainability was a trendy concept. There has been hydroelectric generation on Boulder's water supply since 1910, and hydroelectric generation in the water treatment plants since the 1980s. Cogeneration at the wastewater treatment plant has been going on since the 1980s.

Of course, Boulder's water source is high in the mountains, making hydro power feasible.

But Boulder also adopts sustainable practices not related to its geography. One recent project is the use of weak wort, a brewery waste product, to reduce nitrate in wastewater effluent. The weak wort is added during an anoxic phase of treatment.

"When oxygen is not present but nitrate is present, a group of organisms called heterotrophs essentially breathe the nitrate, and they consume readily biodegradable carbon," says Cole Sigmon, engineering project manager for wastewater. "An issue with many water resource recovery facilities is that there's plenty of nitrate for them to breathe but not enough carbon for them to eat to get the nitrate down to a level that's being targeted. One strategy is to add an external source of food to drive the reaction."

MAKING CHOICES

The Boulder Water Resource Recovery Facility (25 mgd design, 12 mgd average) has a daily nitrate permit limit of 17.9 mg/L. "To meet that limit, we need an external source of carbon," Sigmon says. The city contacted brew-

eries and pharmaceutical and food manufacturers and was considering using methanol or acetic acid.

Methanol was rejected for safety reasons and the need for a special group of organisms to convert it to readily biodegradable carbon. Acetic acid was selected as an option, along with weak wort from the Avery Brewing, 3 miles from the plant. "Weak wort was very promising," Sigmon says. "It has a really high fraction of readily biodegradable to slowly biodegradable carbon."

At the time, Avery Brewing was constructing a new brewery, so it was fairly simple to set up a system to separate the weak wort from the wastewater stream. The new brewery needed an industrial pretreatment permit. "We worked with them on the permit," Sigmon says. "Because the city was interested in the weak wort, we gave them an exemption so they could discharge it without the normal BOD surcharge."

The city built a tank for weak wort at the brewery. "They control infrastructure that sends weak wort into the tank, and we control the infrastructure that stores weak wort and transfers it out of the tank," Sigmon says. The city pays a third party to haul the weak wort to the treatment plant. The process began in February 2017. The city's cost for the overall project was about \$4.5 million; the initial pilot project received more than \$1 million in grants.

PRODUCT TESTING

The carbon content of the weak wort, essentially sugar water, varies significantly with the type of beer. Wort from wheat beers has less sugar, while

IPA wort has more. “We’ve seen an average of 60,000 mg/L of floc-filtered COD,” Sigmon says. “That’s a test that approximates readily biodegradable chemical oxygen demand, or what we call candy carbon, the carbon that we really want. We’ve seen loads as low as 17,000 and loads as high as almost 450,000.”

“With every load, our operators take a sample to our lab and get a number to put into our SCADA system. That concentration tells the pumps where to start when they are dosing carbon for nitrate removal. Nitrate sensors in each anoxic zone are used for feedback control on the chemical dosing, so the pumps kick on when the nitrate concentration reaches a setpoint. That way the product is efficiently used.”

“Brewery waste directly offsets the amount of acetic acid we have to add, so we are excited that Avery is ramping up its brewing.”

COLE SIGMON

If the weak wort supply runs out, operators switch to acetic acid. Using weak wort is more cost-effective as long as it tests to at least 17,000 mg/L. The average is 60,000 mg/L. Avery Brewing plans to increase production under a partnership with another brewery. “Brewery waste directly offsets the amount of acetic acid we have to add, so we are excited that Avery is ramping up its brewing,” Sigmon says. There are some light suspended solids in the weak wort, but most appear to be consumed in the treatment process.

“Some are beneficially used for denitrification and some for energy production,” Sigmon says. “Between the anoxic zone and the aerated zone that follows it, we believe the majority of the product is consumed. We didn’t see a significant change in our solids production when we began adding carbon.”

COMMUNITY PARTNERSHIP

Boulder has another partnership with a business for its Biogas Use Enhancement Project. Boulder’s cogeneration system is at the end of its life span, and replacing it would not be cost-effective. “Current practice is not financially viable,” Sigmon says. “The electricity and natural gas savings do not match the resources that we put into them.”

“The economically viable thing to do, and what you are seeing a lot of Colorado utilities move toward, is production of natural gas for use as vehicle fuel. We plan to partner with Western Disposal. Our reclaimed natural gas will fuel 12 to 15 or so of its trucks.”

The project is expected to begin production in 2020. The raw biogas will be scrubbed for removal of hydrogen sulfide, moisture removal, siloxanes, VOCs and carbon dioxide.

“After that, we’ll have natural gas of pipeline quality,” Sigmon says. The city is working with Public Service Co. of Colorado on an interconnect to deliver the finished gas to the grid.

CLIMATE ACTION

The project will have a very short payback and will fund some infrastructure upgrades already planned. “The sale of the reclaimed natural gas as vehicle fuel makes the city eligible for revenues available via EPA’s Renewable Fuel Standard,” Sigmon says. “Keeping this transaction and associated greenhouse gas emissions reductions within the community is important to us because of the city’s Climate Commitment.”

In 2016, the City Council unanimously approved the Climate Commitment, a strategy for transitioning to a clean-energy economy. Goals include powering the city with 100 percent renewable electricity by 2030 and reducing greenhouse gas emissions by at least 80 percent below 2005 levels by 2050.

Keys to the plan are developing renewable local energy sources, wise use of resources, enhancing urban and rural ecosystems, and fostering community climate action. The brewery waste and biogas projects help the city check a lot of boxes. **tpo**

COAGULATION TECHNOLOGY



DETERMINE DOSAGE IN 5 MINUTES

The bench-top **Laboratory Charge Analyzer** allows for the target coagulant dose to be quickly determined with an automatic titration.

MAINTAIN OPTIMUM COAGULANT FEED

The on-line **Streaming Current Sensor** will track and maintain the ideal coagulant feed rates...even with rapidly changing source water conditions.



PROVIDING SOLUTIONS FOR OVER 30 YEARS

Whether using the analyzers together, or individually, these are just two examples of the instrumentation that Chemtrac offers, along with their expertise, to help achieve maximum NTU and TOC reduction in the water plant.



chemtrac.com 800-442-8722 sales@chemtrac.com

Meeting of the Minds

SAN ANTONIO CONFLUENCE CONFERENCE ENABLES SHARING OF PROJECTS AND IDEAS BY YOUNG PEOPLE WHO ARE PASSIONATE ABOUT WATER

By Sandra Buettner

The 2019 San Antonio Water System (SAWS) Confluence Conference on Feb. 26 will assemble up to 700 high school students to showcase their schools' water projects under the theme of Water Conservation.

The Confluence Conference is the capstone event in the SAWS Impact Team program. Each year, high schools throughout the San Antonio region take part in this project-based program. And since San Antonio is home to the 15-mile River Walk, there couldn't be a more fitting place to host this event.

San Antonio, population 1.8 million, has more than 12,000 miles of water and sewer mains buried below the 560 square miles that SAWS serves.



At an exhibit set up by the SAWS Environment Lab, students perform experiments.

IMPACT TEAMS

To introduce the Impact Team program to San Antonio high schools, an open house is held at SAWS each September. All public, private and charter high schools are invited, as are home-schooled students. Teachers are asked to put groups of students together and work with them to design and facilitate water-related projects around the current year's theme.

For several months, the teachers work with the students to create projects and presentations. The teachers are encouraged to get the students involved in water-related community service projects that connect with what they are learning in the classroom.

"Teachers know going in that this is a big commitment," says Lynne Christopher, SAWS education coordinator. "Some teachers work their projects into the curriculum, and some may use it as part of their after-school ecology programs."

ON DISPLAY

The Confluence Conference is held at the Witte Museum. The students and teachers set up booths displaying their projects. The day starts at 9 a.m., and the students take turns visiting the other booths to see their counterparts' projects and listen to their project presentations.

After lunch break, there are more booth visits until the day ends at 3 p.m. There is no charge for the students; funding is provided by SAWS and corporate sponsors. "Even though it is a science fair of sorts, this is not a competition," Christopher says. "The main purpose of Confluence is for students to share their projects and network with like-minded individuals who share their passion for water."



Exhibits sponsored by community organizations provide students with hands-on displays and opportunities to explore new subjects.



The Confluence Conference includes booths where students display their projects and give presentations.

One example of a student project on display was the design of a raking system to collect plastic floatables from a river after a rainstorm. A working model of the unit was displayed at the conference, and after graduation the students planned to take the idea to market. Another team designed a system using an electric current whereby crops could grow using less water.

In addition to the students' booths, other exhibitors provide activities to engage the attendees. For example, the SAWS Conservation Department developed a game-show activity, the SAWS Environment Lab allows the students to dress in lab coats and safety glasses and perform hands-on experiments, and the San Antonio River Authority brings in insects from the river for the students to view.

CAREER OPPORTUNITIES

Engineering and construction firms set up booths to introduce their industries and to inform students about career opportunities. This year, SAWS is encouraging Confluence Conference exhibitors to choose a high school and work with students on their water projects from start to finish, mentoring them along the way.

"We find that a lot of the youth are very passionate about water and the environment, and one of the goals of the conference is to keep our San Antonio talent local," Christopher says. "We feel that by getting the students engaged in water projects through the Impact Teams and displaying them at Confluence, we are achieving that goal." Several current SAWS employees attended the conference when they were in high school.



JDV LEVEL LODOR™

*Design for Even Distribution
&
Odor Control*

www.jdvequipment.com



The Confluence Conference is a place for students to network with others their age who share a passion for water.

Recently, Christopher received a call from the San Antonio Zoo asking for a booth at the next conference. The caller had attended Confluence Conference in 2012 while in high school and was working as a zoo conservation specialist.

The conference has been so popular and grown so quickly in the last seven years that SAWS now plans to roll out a middle school version based on the high school model. It will engage an even younger group of minds about the importance of water and how it touches their lives. **tpo**



Operators like Danny Mills have a great deal to say about daily work and improvements at the Spring Creek plant.

Always a Better Way

THE OPERATIONS TEAM HELPED DESIGN A NEW TREATMENT PLANT AND CONTINUOUSLY OPTIMIZE ITS PERFORMANCE IN SPRINGFIELD, ILLINOIS

STORY: **Trude Witham** | PHOTOGRAPHY: **Bradley Leeb**

“ We give employees the tools and training they need, because the more training they have, the more valuable or high-performance they become.”

BRIAN TUCKER

Biosolids dewatered to cake at 21 to 25 percent solids on screw presses (HUBER Technology) are land-applied to field.



In building a new treatment plant, the Sangamon County (Illinois) Water Reclamation District wanted it to be a good neighbor.

The Spring Creek Wastewater Treatment Plant, built in 1929, had surpassed its useful life. “We’re next door to the Illinois State Fairgrounds, and we had the typical wastewater treatment plant reputation,” says Brian Tucker, operations supervisor. “We wanted to change that. We wanted to be environmentally conscious and find ways to work smarter instead of harder.”

The new plant was completed in 2012. Since then, its dedicated team has met the district’s goals with hard work and a supportive board of trustees. Tucker says, “We give employees the tools and training they need, because the more training they have, the more valuable or high-performance they become.”

Operators are encouraged to offer feedback to management. “Each operator understands that the better they do their job, the better they make us all look,” Tucker says. “Through their commitment and hard work, they give 110 percent.”

Challenges have included operating the old plant while the new one was built and switching from a manual to automated operation with all new technology. It was worthwhile: The plant received a 2017 Plant of the Year award from the Illinois Association of Water Pollution Control Operators (greater than 7.5 mgd).

FROM OLD TO NEW

The Spring Creek plant is one of two treatment plants owned by the Sangamon County district. With a design flow of 32 mgd, the biological nutrient removal plant is one of the largest in the state.

The district’s other facility, the Sugar Creek Wastewater Treatment Plant, was built in 1973 as a 10 mgd contact stabilization facility. In 2017, the district built a new 37.5 mgd Sugar Creek BNR facility to handle the community’s rapid growth.

Sangamon County (Illinois) Water Reclamation District, Spring Creek Wastewater Treatment Plant

www.spfldmetro.com/index.html



BUILT:
1929 (original plant),
2012 (new plant)

POPULATION SERVED:
170,000 (entire district)

EMPLOYEES:
68

FLOWS:
32 mgd design,
22-27 mgd average

TREATMENT LEVEL:
Secondary

TREATMENT PROCESS:
Activated sludge/biological
nutrient removal

RECEIVING WATER:
Sangamon River

BIOSOLIDS:
Land-applied

ANNUAL BUDGET:
\$4.9 million (operations)

Today, the plants together serve almost 170,000 people in the Springfield metro area. Both are activated sludge facilities, run by 11 operators and eight relief operators. An on-site laboratory is one of the few fully accredited publicly owned labs in the state. Lab technicians and chemists collect samples from streams above and below the plant and from monitoring wells biosolids application sites at both plants.

Although the Spring Creek plant was updated in the 1950s, 1970s and 1990s, it had exceeded its original limit of 20 mgd by 2004. Growth, aging equipment and strict regulations required a solution.



Ted Starrick opens a lateral to send dewatering press filtrate to a canary grass field.



Brian Tucker,
operations
supervisor

SECONDARY PROCESS

The new Spring Creek plant was built in four phases over five years. Wastewater enters the headworks, consisting of coarse screens (JWC Environmental), fine screens (Veolia Water Technologies/John Meunier), grit removal (Veolia Water Technologies/John Meunier), and channel odor/gas control with dual-bed granular activated carbon filtration (Met-Pro Environmental Air Solutions/HEE-Duall, a CECO Environmental Co.).

The wastewater is then sent to four primary clarifiers (WesTech Engineering). Clarified water is sent to the activated sludge tanks, consisting of 12 vertical-loop reactors (Evoqua Water Technologies) and then to COP suction header secondary clarifiers (WesTech Engineering).

Return activated sludge pumps (Pentair - Fairbanks Nijhuis) recirculate biomass from to the vertical-loop reactors. Effluent is sent to UV disinfection aquaray (Suez/Ozonias North America). Final effluent goes down cascade aerators to the Sangamon River. “We created our own cascade, or waterfall,” Tucker says. “Although this is uncommon in the industry, it is extremely effective, saving huge electrical dollars to accomplish post aeration.”

During wet weather when the river is above flood stage, the bottom three steps of the cascade are submerged. In this case, a post-aeration blower (Aerzen) adds air to achieve the desired dissolved oxygen level.

SUSTAINABLE PLANT

When building the Spring Creek plant, the district looked at its environmental impact. Some of the effluent is used to irrigate the plant’s landscap-

SEEPEX.
ALL THINGS FLOW

PROVEN RELIABILITY BN RANGE

Our BN range progressive cavity pumps are used in many industries and applications, moving thin to highly viscous liquids and materials, with or without solids.

Because of their plug-in shaft connection, they also simplify the replacement of rotating wearing parts and the shaft sealing. Reversible rotation and fluid flow is also available, which improves the NPSHr and sealing.



CONVEYING CAPACITY
UP TO 2,200 USGPM

PRESSURE
UP TO 720 PSI

ADDITIONAL BENEFITS

- Minimal pulsation, uniform flow
- High self-priming capabilities
- Mounted either horizontally or vertically
- Large entrance ports for solids handling
- Low shear rates

Contact us to purchase your pump with economical operation.

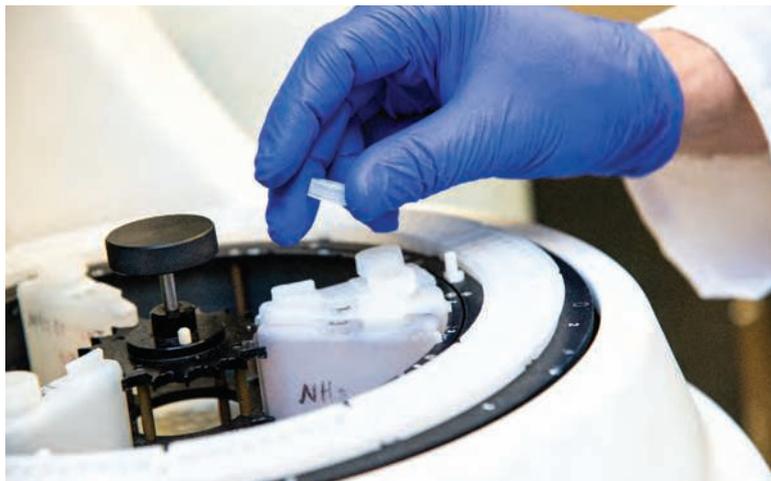
SEEPEX Inc.
sales.us@seepex.com
T +1 937 864-7150
www.seepex.com

“We don’t seek the norm, but constantly focus on trying to improve; ‘Good enough’ is never good enough.”

BRIAN TUCKER

ing and clean equipment. A green roof on the UV building helps keep down energy costs. The plant also has carbon filters that treat air from various processes, removing 99 percent of odors.

The staff has access to pipes and fittings via 1,900 feet of underground corridors. Motion-activated lights in the tunnels and natural lighting in the



Staff members test samples for ammonia using an AQ1 analyzer (SEAL Analytical).

buildings conserve energy. “Our team loves these underground corridors,” Tucker says. “If a valve needs replacing, there is no excavation, restoration, or downtime.” Operators also stay warmer in winter.

Two stormwater ponds collect water from the fairgrounds and nearby areas. Wetlands and prairie plantings help maintain the natural environment: “We planted buffalo grass, a prairie grass, which also lowers our grounds maintenance,” Tucker says.

The solids side of the process emphasizes beneficial use. Primary and waste activated sludges are anaerobically digested and sent to three 1.5-million-gallon biosolids storage tanks at about 3 percent solids. Each tank has a Rotomix system (Vaughan) to prevent freezing in winter. A fourth tank holds clear filtrate from later dewatering.

In late spring and summer, liquid biosolids are applied via fixed irrigation sprayers to the district 15-acre canary grass farm, from which a farmer harvests 400 to 450 1-ton bales of hay per year. During wetter and colder seasons, the biosolids are dosed with polymer and dewatered to 21 to 25 percent solids on two screw presses (HUBER Technology). The press filtrate is applied to the canary grass field.

The cake biosolids are either land-applied directly with a spreader truck or windrowed and aerated with a Brown Bear 500 Hydrostatic Tractor in an open-sided storage building, raising the solids content to 50 to 60 percent.

The digesters produce up to 100,000 cubic feet of biogas per day. About half is used to heat the digesters and for other heating on the plant complex.

CONSTANT IMPROVEMENT

Tucker credits the staff for the facility’s Plant of the Year award: “We won because of their consistent and maximum effort. They worked with the engineers to design and build the plant and exhibited team spirit.” The team is always looking to excel. “We don’t seek the norm, but constantly focus on trying to improve; ‘good enough’ is never good enough,” Tucker says. “That means we can do better.”

(continued)

Spring Creek Wastewater Treatment Plant PERMIT AND PERFORMANCE

	PERMIT (monthly average)	EFFLUENT (annual average)
CBOD₅	10 mg/L	< 2.0 mg/L
TSS	12 mg/L	< 4.0 mg/L
Total phosphorus	1.0 mg/L	0.62 mg/L
Ammonia nitrogen	1.5 mg/L (March-May, Sept.-Oct.)	< 0.2 mg/L
	1.5 mg/L (June-August)	< 0.3 mg/L
	4.0 mg/L (November-February)	< 0.2 mg/L
Total nitrogen*	No more than 10 mg/L	9.6 mg/L

* Monitor only

The district staff of 68 (31 wastewater certified and five laboratory accredited) is highly experienced; many have been with the district for more than 10 years. The staff consists of operations, maintenance, laboratory, labor, GIS and administration. They operate and maintain two major facilities, 30 lift stations and the collections system.

Tucker holds Class 1 wastewater operator certification, has been with the district for seven years and has 42 years in the field. Stephen Sanderfield, assistant operations supervisor, is also Class 1 certified. The operations team includes:

- Head operators Jeff Feurer and John Stephens.
- Operators Edward Starrick, Tim Beck, Nick Stoutamyer, Thomas Paoni, Bradley Schaive, Kenneth Shrake, Kenneth Fitzgerald, Clint Grolla and Danny Mills.
- Relief operators James Chestnut, Kyle Fawns, Ron Hickman, James Rychel, David Hanson, Aaron Alexander, Harlin Swofford and Chris Macklin.

All operators and most relief operators are certified. Also certified are a laboratory supervisor, a parts purchasing employee, a labor foreman, a laborer and nine maintenance employees. Second shift operators at the Spring Creek plant monitor both facilities from the plant's SCADA system, which operates both plants during the third shift.

FULLY AUTOMATED

In designing the new Spring Creek plant, the operators had input in areas from equipment selection to sidewalk and lighting placement. "We wanted to make it operator-friendly," Tucker says.

Tucker emphasizes that the plant stayed in compliance while the new one was built and started up. "During startup, we had to move tons of biomass within 24 hours," Tucker says. The contractor and operators worked overtime.

The learning curve was steep. "It was what I would call sticker shock," Tucker says. "We went from a manual to a totally automated plant. At the old plant, instrumentation was minimal. There were a few flowmeters that simply recorded flow, and controls were simply switches, hand-operated valves, and manually adjusted equipment. Suddenly, operators were thrust decades into the future."

The SCADA system was a completely new way of operating: "Each operator was given a smartphone for accessing the system. They quickly learned how to operate in that environment." The system made operators' lives much easier.

Online instrumentation and equipment automation gives them information in real time and makes operating multiple heavy valves and gates a one-person operation instead of a job for a crew. Isolating an 860,000-gallon

WADE THE WATER DROP

The Sangamon County (Illinois) Water Reclamation District wanted a video of the new Spring Creek Wastewater Treatment Plant to show the public during tours. Brian Tucker, operations supervisor, says, "We give over a dozen tours a year to school groups, civic groups and engineering firms. We wanted a video to show what happens to wastewater from the point it leaves the home, through reclamation and to the receiving waters."

The video needed to appeal to a wide age group and be entertaining for elementary school students, but not too simple for the college student or engineer. "We put together a video tour, starting at the sewer main and then through each phase of treatment," Tucker says. "But we needed a tour guide, so to speak."

Engineers at Crawford, Murphy & Tilly, who helped design the plant, came up with the perfect solution. "An animated water drop named Wade was our answer," Tucker says. "Wade is the tour guide throughout the video, starting out dirty and getting cleaner through each process. He finally gets a tan in the UV building."

Wade was such a hit that Gregg Humphrey, district executive director, decided it would be great to have a Wade the Water Drop squishy toy to give to school kids during plant tours. Tucker says, "What's funny is that everyone wanted a Wade toy. Adults ask for their own Wade as much as the kids do!"



A new SCADA system has made work life easier for John Stevens and other operators.

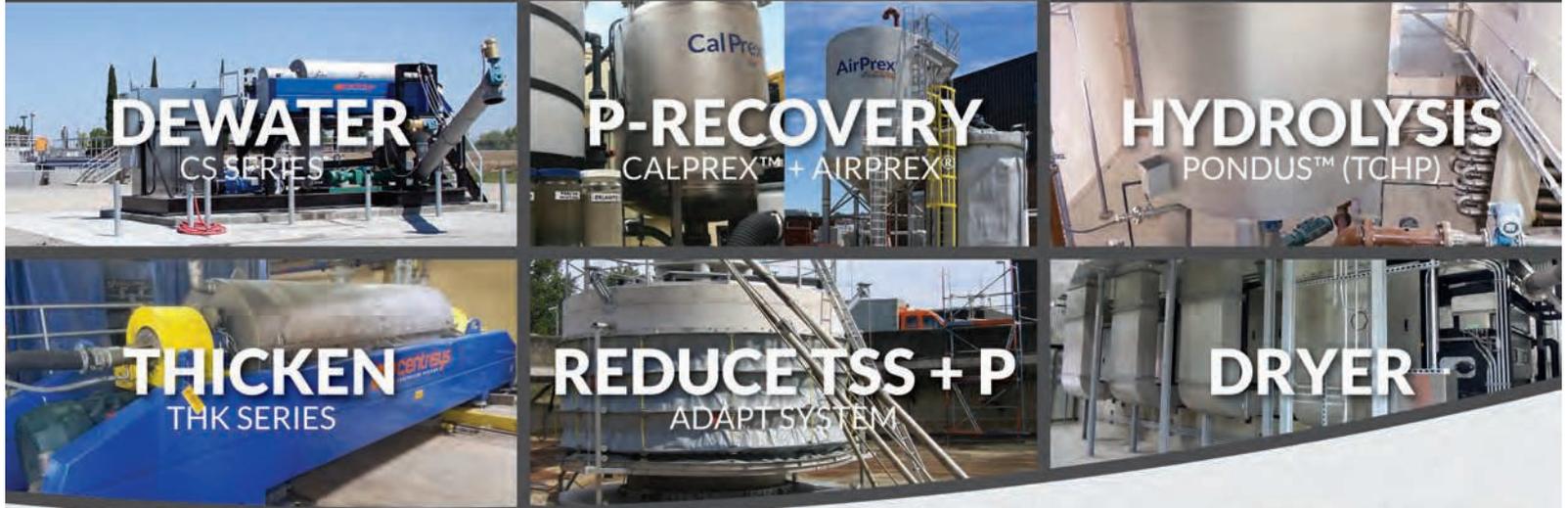
aeration tank used to involve six to eight people and take one to two days. Now, with a few mouse clicks, one operator can do the job in eight hours.

CATCHING CURVEBALLS

Weather plays a huge role at Spring Creek. Much of downtown Springfield's collections system dates to the 1920s and 1930s, and that means inflow and infiltration challenges. Rainfall has a dramatic effect. Average dry-weather flows range from 22-27 mgd; within hours of a rainfall of an inch or more, flows can double, triple or quadruple.

"On occasion, nature has thrown us a few curveballs," Tucker says. "Instrumentation and automation have one very big enemy — lightning."

Resource Intensification



Discover more at Centrisys.com  

Discover more at CNP-Tec.com
CNP - a division of Centrisys Corporation

Although the plant has a dual power source, surges or power spikes can be a big problem.

“During the Illinois State Fair in August 2016, a lightning storm struck our facility and caused over \$40,000 in damage to our SCADA network. We had to switch to manual operation.” Operators and maintenance workers were called in to operate the plant 24 hours a day while repairing numerous systems. “With total commitment by the team, we kept the facility operating and in compliance.”

FUTURE CHALLENGES

With a beautiful new plant, a stellar team, and a supportive board, it may seem that the Sangamon County Water Reclamation District has it made. Tucker feels the team’s greatest continuing challenge is to make the two plants even more efficient. A key aim is to stave off rate hikes by reducing chemical, energy and biosolids costs.

The team would like to use biogas to heat the entire complex. Tucker says, “During the colder months, we would have to make more gas to supply our total needs. In summer, we could not only supply all our needs but fuel generators, which would reduce our electrical dependency. That translates to savings for our rate payers.”

The district works continuously to improve the combined sewer network. The goal is to improve the structures and water quality by diverting flows more directly to the plant for treatment during storm events.

As for the Sugar Creek plant, it has been streamlined to run as efficiently as the Spring Creek plant: “It has been nominated for the 2018 Illinois Plant of the Year award, and we hope to win.”

For now, the operations team is content. Tucker says, “We have almost zero turnover. We retire operators; we don’t lose them to other facilities. The district realizes that if we’re going to spend time and money training our staff and making them high-performance, then we always need to take care of them.” **tpo**

featured products from:

Aerzen

610-380-0244
www.aerzen.com/en-us
(See ad page 25)

Brown Bear Corporation

641-322-4220
www.brownbearcorp.com
(See ad page 63)

Crawford, Murphy & Tilly, Inc.

844-426-8364
www.cmtengr.com

Evoqua Water Technologies LLC

www.evoqua.com

HEE-Duall, a CECO Environmental Company

989-725-8184
www.dualldiv.com

HUBER Technology, Inc.

704-949-1010
www.huberforum.net
(See ad page 7)

JWC Environmental Inc.

800-331-2277
www.jwce.com

Ozonias North America, LLC

201-676-2525
www.ozonia.com

Pentair - Fairbanks Nijhuis

913-371-5000
www.fairbanksnijhuis.com

SEAL Analytical Inc.

888-211-9829
www.seal-analytical.com

SUEZ - Water Technologies & Solutions

www.suezwatertechnologies.com
(See ad page 37)

Vaughan Company, Inc.

888-249-2467
www.chopperpumps.com
(See ad page 72)

Veolia Water Technologies

312-552-2887
www.veoliawaterna.com
(See ad page 4)

Westech Engineering

801-265-1000
www.westech-inc.com

An RO Alternative

GEORGIA'S GWINNETT COUNTY PILOT-TESTS ITS TWO-STAGE OZONE-BIOLOGICAL FILTRATION PROCESS AS A WAY TO PRODUCE HIGH-QUALITY WATER FOR DIRECT POTABLE REUSE

By Ted J. Rulseh

As various regions of the country struggle with stressed drinking water supplies, direct potable reuse of wastewater is gaining acceptance. Various hurdles stand in the way, and one of them is cost. There's no question that technology can treat wastewater to meet drinking water standards; the question is how. One obvious solution is reverse osmosis, but that can be expensive.

The Gwinnett County (Georgia) Department of Water Resources in 2017 completed a pilot study to test the feasibility of a different method: two-stage ozone-biological filtration, without RO. The project found that the method appears feasible, in terms of both treatment quality and cost. The results have implications not just for Gwinnett County (in the Atlanta metro area), but for utilities in any water-scarce area.

The project was conducted in collaboration with the Water Research Foundation, and co-principal investigators from CDM Smith (Jennifer Hooper, P.E., senior environmental engineer with CDM Smith) and Stantec (Katherine Bell, Ph.D., P.E., BCEE, now water strategy leader with Brown and Caldwell).

It has received two major honors: a 2018 Excellence in Environmental Engineering and Science Award from the American Academy of Environmental Engineers and Scientists and a 2018 WateReuse Excellence Award in the Transformational Innovation category from the WateReuse Association.

The principal investigator was Denise Funk, P.E., BCEE, division director of research and development with the Gwinnett County Department of Water Resources. She talked about the project (Water Research Foundation Project Reuse 15-11) in an interview with *Treatment Plant Operator*.

tpo: What does the Gwinnett County water treatment picture look like today?

Funk: We currently practice indirect potable reuse. We treat our wastewater to a very high level through advanced processes and return it to Lake Lanier, which is the source of water supply for our two drinking water treatment plants.

tpo: Why did the county undertake the investigation of direct potable reuse?

Funk: We have very robust treatment trains at our water reclamation facility and our water treatment facilities. So we decided to do research to look at skipping the lake for a portion of our advanced treated water.

tpo: In brief, what did the project consist of?

Funk: We purchased a pilot plant that is a small-scale version of our drinking water treatment train and ran blends of our advanced treated wastewater with lake water through our drinking water process. That's direct potable reuse. We tested different blends, different filter media and different filtration rates.

tpo: Why does Gwinnett County face the potential for water supply shortages?

Funk: Metropolitan Atlanta lies at the headwaters of six major river basins. Because we are at the headwaters, the drainage basin for our reservoir is very small. In addition, our geology consists of clay over bedrock, which means access to groundwater is limited. So we rely on surface water. Our average rainfall is 50 inches a year, but because of our storage issues, if we get less than that, we're in severe drought pretty quickly, within a year or so.

tpo: If indirect potable reuse is serving the county well, why is it beneficial to explore direct potable reuse?

Funk: Right now, we only have one source of water supply. So if we're able to use our advanced treated reclaim water through direct potable reuse,

“We wanted the information for ourselves, but we also wanted to advance the science for the U.S. and the world on using ozone-biofiltration as an alternative to RO.”

DENISE FUNK

that's another source. It's a potential way to diversify our water supply portfolio. We don't have a plan to do this full-scale, but there was a great opportunity with the treatment processes we already have to do this investigation. We wanted the information for ourselves, but we also wanted to advance the science for the U.S. and the world on using ozone-biofiltration as an alternative to RO.

tpo: What processes are used at the county water treatment facilities?

Funk: Both facilities have the same treatment process. They are direct filtration plants because the water quality from Lake Lanier is very good. The first step is pre-ozonation, followed by coagulation and flocculation, and

then direct filtration on deep-bed anthracite over sand. We also operate our filters biologically, so we remove dissolved organics as well as particulates.

tpo: What is the treatment process at the water reclamation facility?

Funk: The F. Wayne Hill Water Resources Center starts with a traditional activated sludge process, with biological nutrient removal for nitrogen and phosphorus. After the secondary clarifiers, the flow splits into two trains. The first has chemical clarification for additional phosphorus removal and then anthracite over sand media filters. The other train is treated the same except that it has ultrafiltration membranes instead of granular media filters. The two flows then come back together for pre-ozone followed by biological filtration with spent granular activated carbon, or GAC. The final step before discharge is disinfection with ozone.

tpo: How would you characterize the quality of the water after the advanced treatment?

Funk: The water is very high quality with turbidity that's a lot lower than our 0.5 NTU limit, and it's a lot lower than the lake water (about 1 NTU). We did a lot of testing for microbials in the treated water — *Cryptosporidium*, *Giardia*, *Legionella* and some others — and everything was nondetect.

tpo: How was the pilot study performed?

Funk: We purchased two pilot plants, which we still have and are using today on other projects. They're located at the Shoal Creek Filter Plant. Our waterline from the F. Wayne Hill facility runs nearby, so we were able to tap in and run a 2-inch line over to the water plant to feed our pilot plant for the study. The operational phase of the study started in August 2016 and continued through June 2017.

tpo: How was the water treated in the pilot process?

Funk: The pilot plant had a blending tank where we added the F. Wayne Hill water to the lake water. We then injected ozone for a 30-minute contact time, about the same as in our full-scale plant. Then we had chemical addition, coagulation and flocculation, followed by four filter columns where we could test different filtration rates. Three of the filters had anthracite from our full-scale plant, and the other one had spent GAC. So we compared the performance of the anthracite against the GAC, and we used three columns to look at different filtration rates.

tpo: What was the scale of the pilot plant?

Funk: It was a very small flow rate. The Shoal Creek plant can process 98 mgd at peak flow, and the pilot plant can process 6 gpm, so it's about 10,000 to one. The full-scale plant can serve about 800,000 people, whereas the pilot plant could serve 80 people, although we didn't put any of the water from that plant into our system. It was just for testing.

tpo: What did you learn from the study as it relates to the county's needs?

Funk: We looked at different blend ratios, the lowest being 15 percent advanced treated water to 85 percent lake water. At that blend, we found that the finished water from the pilot plant met all of the drinking water standards and health advisory limits that we evaluated in the study. At higher blends, we had some issues with nitrates and bromates, but we feel we could optimize our treatment processes in order to reduce those.

tpo: What did this study reveal about treatment costs?

Funk: We did a cost analysis comparing two-stage ozone-biofiltration versus an RO-based treatment train. For utilities that are inland, the RO-based approach is expensive because it creates a brine concentrate that has to be managed. Mechanical evaporation of brine is challenging and expen-

“We analyzed capital and operating costs using our 15 percent blend over a 30-year time frame. The ozone-biofiltration-based train had a cost 2.5 times less than the RO-based approach.”

DENISE FUNK

Dewatering Made Easy



1.0 Meter Skid Mounted Press

INTEGRATED COMPONENTS:

- ◆ Stainless Steel Frame & Rollers
- ◆ Biosolids Pump
- ◆ Polymer System
- ◆ Wash Water Booster Pump
- ◆ Cake Solids of 35% Solids
- ◆ 1,000 GPM Dewatering
- ◆ Fits 18.5' X 6.2' Floor Area

ADDITIONAL OPTIONS:

- ◆ Flowmeter
- ◆ Air Compressor
- ◆ Discharge Conveyors

wwet BOOTH 5312, 5314, 5413

BRIGHT TECHNOLOGIES
A Division of Sebright Products, Inc.

800-253-0532 | 269-793-7183 | F: 269-793-4022
127 N. Water St., Hopkins, MI 49328
www.brightbeltpress.com

sive. We analyzed capital and operating costs using our 15 percent blend over a 30-year time frame. The ozone-biofiltration-based train had a cost 2.5 times less than the RO-based approach.

tpo: Do you have any plans to deploy direct potable reuse based on this study?

Funk: We don't have any plans to go full-scale right now. We do want to look at some of the issues and explore them further. We'd like to do some more testing.

tpo: In a larger sense, what are the implications of this study for other utilities with water-scarcity issues?

Funk: It means that a non-RO approach to potable reuse is definitely feasible, but that also depends on source water quality. If a utility has problems with nitrate or total dissolved solids, an RO approach may be necessary. There has to be some thought for each individual system to determine whether a non-RO approach is appropriate.

tpo: Would you expect any of the usual public acceptance issues if Gwinnett County were to adopt direct potable reuse in the future?

Funk: Yes. It's really important to educate the public so that they understand the treatment processes and the science behind them. Public outreach and education is always a key component for acceptance of these projects. **tpo**

Too Valuable to Waste

A LIME STABILIZATION PROCESS HELPS AN ARKANSAS CITY MEET ITS GOAL OF PRODUCING CLASS A BIOSOLIDS TO ENABLE THE RESUMPTION OF BENEFICIAL USE

By Larry Trojak

Innovative solutions in wastewater are not limited to treatment plants in big cities. Small or mid-sized operations can be progressive as well.

The Russellville (Arkansas) Pollution Control Works Facility was faced with a challenge when its Class B biosolids no longer could be land-applied. Rather than commit long-term to landfilling the material, plant officials explored alternatives and decided to upgrade to a Class A product.

They chose lime stabilization using the Schwing Bioset process. Since 2016, the facility now processes an average 81,000 pounds of Class A material per month for distribution to farmers at no charge.

HISTORY OF UPGRADES

Russellville, between Little Rock and Fort Smith, is home to several major manufacturers and the state's only nuclear power plant. Operated under contract by City Corp., Pollution Control Works Facility serves a population of 30,000 including all of Russellville and the nearby town of Dover. The wastewater collections system consists of 170 miles of gravity sewer, 14.1 miles of force main and 18 lift stations.

The plant has undergone periodic updates in its 55-year history, but it made a major shift in its approach a couple years back. "Up to that point, and still to a large part today, we were a fairly typical operation," says Randy Bradley, wastewater operations manager.

The plant is designed for 7.3 mgd. The wastewater goes through Duperon bar screens, grit removal and primary clarifiers, and then to three aeration basins before final clarification. A final stop is chlorine contact followed by dechlorination with sulfur dioxide.

CHANGE IN PLANS

In the past, the facility's primary and waste activated sludges were pumped into a digester and through a belt press for dewatering. The material was then trucked to permitted properties for land application.

"However, in 2014, land ownership changed on one of those parcels, and the new owners no longer wanted biosolids on their land," Bradley says. "That was a substantial loss in available area, and we're restricted solely to a parcel we owned. At that time, we were generating about 2,400 pounds per day of Class B biosolids. We might have been able to make that work, but we had just added another aeration basin and clarifier to the front end of the process,



Biosolids are dewatered to 18 percent solids in a gravity thickener and this 1.5-meter three-belt press (MSD Environmental Services) before being mixed in with quicklime and sulfamic acid.

“We absolutely hate to send anything to landfill — and not just because of the costs involved in doing so, though those costs are substantial. Landfills have space issues of their own, and biosolids can ultimately serve a benefit.”

RANDY BRADLEY

so we were going to be generating more solids. Something had to be done.”

The facility team conducted an intensive study of options, which included increasing the digester volumes or improving the existing ones, composting, and biosolids drying. “Drying the material was a significant initial investment,” Bradley says. “And as I talked to people at other facilities, I discovered there was a fairly high maintenance cost on that equipment.”

“When we went to a northwest Arkansas composting facility, we found that solution to be very labor-intensive, and it would demand much more acreage than we had available. In addition, we weren't sure of a reliable availability of the organic material needed for the process. We needed another viable option.”

A GOOD TIP

Meanwhile, the Russellville facility had issues that prevented keeping the biosolids in the digester for the retention time required to meet Class B specifications. That meant taking the biosolids to a landfill.

“We absolutely hate to send anything to landfill — and not just because of the costs involved in doing so, though those costs are substantial,” Bradley says. “Landfills have space issues of their own, and biosolids can ultimately serve a benefit. And yet, we had no choice, so we contracted with Denali Water Solutions to haul off our material.

“It just so happened that they’d been working on some potential projects with Tom Welch, a regional manager from Schwing Bioset. They told us about the Schwing Bioset process for creating Class A biosolids.”

Bradley contacted Schwing Bioset and was intrigued by what he learned. He took Lance Bartlett, utility engineer, and Chesley Jackson, senior operator, on a trip to Florida to see the process in operation. The rest is history.



ABOVE: Dewatered biosolids go to a hopper with a twin-screw mixer, where quicklime and sulfamic acid are added and blended. BELOW: A Schwing Bioset KSP-25 piston pump sends the blended material to a 35-foot-long reactor, where the Bioset process yields a Class A product.



At Russellville, the Schwing Bioset process takes biosolids dewatered to about 18 percent solids in a gravity thickener and a DBP 1.5-meter Model 3DP three-belt press (MSD Environmental Services). The material drops into a hopper with a twin-screw mixer in which quicklime and sulfamic acid are added and blended.

The mixing alleviates issues such as unreacted lime in the final product and the associated costs. A Schwing Bioset KSP-25 piston pump then sends the blended material into a 35-foot-long reactor where the acid/quicklime mixture generates temperatures in the range of 140 degrees F, raises the pH, stabilizes the biosolids, and yields the Class A product.

BUILT FOR EXPANSION

Getting the process fully online was anything but business-as-usual. In

Monitor Usage, Level & Feed Rate:
CHLORINE SCALES



Wizard 4000*
Advanced
Digital System



Century*
Hydraulic System



Chlor-Scale* for Ton Containers



Chlor-Scale* for 150 lb Cylinders

- ◆ Accurately measure chlorine usage and tank levels
- ◆ Easily comply with government reporting requirements
- ◆ Remote monitoring via 4-20mA outputs and RS485

For more information,
Call (925) 686-6700 or
visit www.forceflowscales.com



CHECK. CONTROL. COMPLY.

a deal that involved the city, Schwing Bioset and Denali Water Solutions, a mobile system was brought to Russellville for a pilot program to prove out the process.

“The final agreement involved Bioset leasing a mobile system to Denali, who operated it for us, charging us a monthly fee to cover the labor, operation, and lease of the equipment and placing of the material at an on-site dirt yard,” Bradley says. “However, after we purchased our permanent system and the installation was nearing completion, we decided we had the comfort level to operate it and manage the disposition of the product ourselves. And bringing that process in-house would save us a substantial operating cost.

“Largely due to the help Schwing Bioset provided — technicians spent the first two weeks with us — the install was very smooth,” Bradley says. “During the design phase, we gave Hawkins-Weir Engineering a projection for where we might be in 10 to 20 years. They designed the facility for future area development. As a result, the reactor is sized to handle two belt presses. If growth warrants it, we can just move another belt press in without skipping a beat.”

GREAT FOR THE SOIL

Once the material exits the Schwing Bioset process, it is trucked to an area next to the plant, spread out using a front-end loader, and allowed to dry. Once dry, it is moved into piles and, after periodic testing for *Salmonella*, given away to area farmers.

“We have several farmers competing for it at times, which is great for us,” Bradley says. “While the material has nutrient value, its ability to boost the soil pH is its real selling point. Almost all the soil in Arkansas is pretty acidic, so farmers welcome that pH boost.

“Next spring we are looking at possibly doing some type of bid for it. Simply recouping some of our costs, even enough to pay for fuel for the loader, would be a nice bonus. Right now, just having someone haul it off for us and make good use of it is a huge improvement. This entire project could not have gone better nor had better results.” **tpo**

Putting Their Best Face Forward

MORE OPERATORS SHARE PHOTOS OF THEIR SIGNS AND THE HISTORY BEHIND THEM

By Ted J. Rulseh

First impressions matter. Two clean-water plant operators responded to TPO's request to share pictures of the welcome signs that help send positive messages about their facilities to visitors.

INSCRIBED IN STONE

The Mishawaka (Indiana) Wastewater Treatment Plant makes an impression on visitors with its extensive landscaping, set off by a sign carved into stone.

The landscaping includes a rock garden at the entryway of the administration building. Parks department and treatment plant staff built it using rocks unearthed during the construction of a plant expansion, according to Karl Kopec, division manager in the Utili-

ties Wastewater Treatment Division. The rock on which the sign appears did not come from the site; plant personnel found it on the property of a rock engraver in a nearby community.

Another feature of the plant's landscape is a boulder unearthed on a sewer construction job. "The contractor asked us if we wanted the boulder to complement the rock garden theme at the plant," Kopec says. "After inspecting the boulder, I said we definitely wanted it."

At Kopec's request, Peter Burns, a geology professor at the University of Notre Dame, examined the boulder. He identified it as a metamorphosed conglomerate — a sedimentary rock that consists of pebbles and sand that has been changed and hardened by heat and pressure. It was brought to the area by a glaciation event about 20,000 years ago, probably from Michigan or Canada.

The geologist described the boulder as "at least several hundred million years old." It weighs about 31,000 pounds. Information about the boulder is presented on a sign next to it.





SCOUTS' HONOR

The Clear Lake City (Texas) Water Authority has a sign that clearly states the organization's mission and its emphasis on safety while also inviting requests for plant tours.

The team at the authority's Robert T. Savely Wastewater & Water Reclamation Facility recently dedicated a new flagpole with help from local Boy Scout Troop 848. **tpo**

Boy Scouts joined the Clear Lake authority management team for the flagpole dedication. Front row, from left, Scouts Robert Byrnes, Alexander King, Brandon Jackson, Drake Rodriggs, Lucas Rodriggs, Hunter Noyes and Tyler Rathjen. Back row, Kristopher Allsbrooks, operator; Hector Guzman, maintenance operator; Jennifer Morrow, general manager; Frank Elliott, superintendent; and Curtis Rodgers, utilities and emergency director.

WHAT DOES YOUR SIGN SAY ABOUT YOU?

You can still submit a photo of your water or wastewater treatment plant sign. Send to editor@tpomag.com.



ROTARY PRESS

SLUDGE DEWATERING EQUIPMENT

FACTS

High cake dryness

Clean and Easy Operation

Fully Automated

Expandable

Operator Friendly

For Municipal and Industrial Application



Patented technology

MORE THAN **500** INSTALLATIONS WORLDWIDE



PLEASE ASK US ABOUT OUR FULL SCALE PILOT OPTION



418-423-4241

rotary-press.com | fournierdewatering.com



Biosolids Management and Headworks

By Craig Mandli

Belt Filter/Rotary Presses

BRIGHT TECHNOLOGIES, DIVISION OF SEBRIGHT PRODUCTS INC., 0.6-METER SKID-MOUNTED BELT FILTER PRESS

The compact, 0.6-meter skid-mounted belt filter press from Bright Technologies, Division of Sebright Products Inc., has stainless steel frame and roller construction, as well as radius wedge zone and wing roller for sludge dewatering. Components include a sludge pump, polymer system and wash-water booster pump. Options include a sludge flowmeter, air compressor and discharge conveyors. The compact walkaround skid design can be utilized in as little as a 20-by-10-foot floor area. The Boerger rotary lobe sludge pump has a maintain-in-place design. A Gould's belt wash booster pump can handle small solids and operate with recycled water from the process. Allen-Bradley controls and touch screen integrate the components to make an operator-friendly design that is intuitive to operate. Cake solids of up to 35 percent can be achieved. Rates of 25 to 50 gpm (depending on biosolids type) help in small applications or when a processor has outgrown dewatering containers. **800-253-0532; www.brightbeltpress.com**



Belt filter press from Bright Technologies, Division of Sebright Products Inc.

Biosolids Handling/Hauling/Disposal/Application



Neutralizer advanced oxidation process from BCR

BCR NEUTRALIZER

The Neutralizer from BCR is a two-stage advanced oxidation process that converts waste activated sludge to Class A biosolids, which can be registered as a commercial fertilizer. The process is an 8-hour batch process that can process up to 3,650 dry tons per year in a 12 mgd facility. The highly scalable process thickens WAS to 4 percent total solids and adds chlorine dioxide for the first stage of the disinfection process. After pH adjustment, sodium nitrite is added to produce nitrous acid in situ, which completes the disinfection process. After processing, the biosolids are dewatered using any common dewatering method. The process is a closed system and eliminates odors normally associated with biosolids processing. The entire process uses approximately 10 percent of the energy expended by a single digester, making it cost-effective and reducing the carbon footprint of the plant. **904-819-9170; www.bcrenv.com**



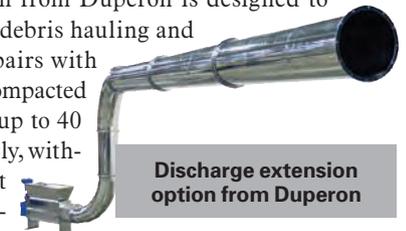
BLUEline Rotary Lobe Pump from Boerger

BOERGER BLUELINE ROTARY LOBE PUMP

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

DUPERON WASHER COMPACTOR DISCHARGE EXTENSION

A discharge extension option from Duperon is designed to reduce energy usage, along with debris hauling and maintenance costs. The option pairs with a washer compactor to transport compacted debris collected by a bar screen up to 40 feet in any direction, even vertically, without the energy usage and layout challenges of a traditional motorized conveyance system. The discharge extension option relies on gravity for resistance. The result is consistent, effective compression through a customized chute, acting as a conveyor to guide the debris plug to a different location inside or out of the building. Debris forms into a column that is routed by the vertical chute. The weight of the plug column provides the resistance for additional compaction. Since the debris is nearly fully compacted prior to its arrival in the chute, vertical elevations are achieved with little or no further resistance. **800-383-8479; www.duperon.com**



Discharge extension option from Duperon

HYDRA-TECH PUMPS S4T



S4T trash pump from Hydra-Tech Pumps

The S4T 4-inch hydraulic drive submersible trash pump from Hydra-Tech Pumps is versatile with its rugged, compact design and the ability to pass large solids. It is designed to tackle many jobs ranging from construction site dewatering to sewage and slurry pumping. This pump operates with HT20 to HT25 power units or other hydraulic power sources capable of flows of 10 to 16 gpm. It delivers output flows to 800 gpm, heads to 110 feet and pressure up to 3,000 psi. The safe and variable-speed hydraulic drive can be used where electric power is hazardous or impractical. **570-645-3779; www.hydra-tech.com**

JDV EQUIPMENT LEVEL LODOR

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



Level Lodor cover system from JDV Equipment



Silos from Jim Myers & Sons (JMS)

JIM MYERS & SONS (JMS) SILOS

Jim Myers & Sons (JMS) silos are necessary in dried biosolids applications as a safe, effective means to store and outload the dry product. National Fire Protection Association-mandated safety measures for combustible dust are utilized on the silo, including carbon monoxide, internal temperature, and oxygen monitoring; nitrogen storage or generation systems, nitrogen delivery system for purge or blanketing; dust control; and explosion rupture panels. Outloading to trucks is attained via one or more retractable dust-controlled spouts. **704-554-8397;**

www.jmsequipment.com

PAXXO LONGOPAC FILL

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

770-502-0055; www.paxxo.com



Longopac Fill continuous bag system from Paxxo



Tri-Flow 825 vacuum blower from Robuschi USA

ROBUSCHI USA TRI-FLOW 825

The Robuschi USA Tri-Flow 825 vacuum blower is capable of continuous operation at 18 inches Hg. The open-airflow bearing housing allows more air circulation and additional cooling, which allows it to run continuously at deep vacuum. The tri-lobe design combined with helical gears allow it to run quieter, enabling use of smaller silencers and freeing up available payload and space, while keeping noise complaints to a minimum.

It offers 4,805 cfm free air capacity and the ability to hit 18 inches Hg. **866-428-4890; www.gardnerdenver.com/robuschi**

Biosolids Heaters/Dryers/Thickeners

PARKSON THICKTECH ROTARY DRUM THICKENER

The ThickTech rotary drum thickener from Parkson is suitable for biosolids thickening in both municipal and industrial applications, and it can be used to increase capacity of other solids-handling equipment, such as digesters. Fabricated of stainless steel, it is engineered to provide years of reliable service. The flocculation tank design allows for maximum detention time with low fluid shear. The internal drum components such as roll bars and split augers ensure complete sludge turnover in three dimensions and detains sludge for maximum water release. It uses woven wire mesh screens, which have the smallest individual opening sizes, yet possess the highest overall open area. As a result, sludge volume reduction and capture rates up to 98 percent are possible, all with low polymer usage. The EZ-Care design, available on most models, saves time on maintenance with a no-lube drive system, long-lasting stabilizer wheels, and extreme-duty trunnion wheel bearings. **888-727-5766; www.parkson.com**



ThickTech rotary drum thickener from Parkson



STC System thermal dryer from SUEZ

SUEZ STC SYSTEM

The STC System low-temperature thermal dryer from SUEZ enables an operator to reduce biosolids and recover a resource as fertilizer or fuel, using an energy-efficient belt dryer. It is fully automatic and offers efficient

odor control, easy operation, and maintenance. It is intrinsically safe, thanks to low temperature and dust-free operation.

The efficient and flexible unit uses hot water from 158 to 194 degrees F and can be fully supplied by waste heat, with a wide range of primary heat sources possible. It produces Class A biosolids at 90 percent dry solids, to be recycled as fertilizer or as solid fuel. **www.suezwatertechnologies.com**

Centrifuge/Separator

ACTIVE WATER SOLUTIONS SUBMERGED FIXED-BED BIOFILM REACTOR

Submerged fixed-bed biofilm reactor systems from Active Water Solutions are pre-engineered for plug-and-play-type installation. They are an alternative to activated sludge systems and eliminate the need for the return activated sludge components of treatment systems, reduce sludge production, and make basic operation a breeze. They provide a stable environment for bacteria that resists washouts, shock loading, electrical blackouts, and that increases overall treatment effectiveness, which makes the system survivable. Their HVCF Membranes are self-cleaning, utilize higher flux rates and reduce energy consumption. **832-571-1111; www.activewatersolutions.com**



Biofilm reactor systems from Active Water Solutions

Chemical/Polymer Feeding Equipment

ADEGE 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. As a gas, carbon dioxide is inert, noncorrosive and easy to store. 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. An injector and mixer are provided with all systems for optimal injection. A manifold and regulators are provided for carbon dioxide cylinders. **866-323-3343; www.adedgetechnologies.com**



ADIN CO2 injection system from AdEdge Water Technologies

BLUE-WHITE INDUSTRIES PROSERIES-M M-3

The ProSeries-M M-3 peristaltic metering pump from Blue-White Industries has feed rates from 0.0002 to 33.3 gph, with pres-

sure ratings to 125 psi. It comes with a heavy-duty multichannel pump tube, and a Tube Failure Detection System that senses tube failure caused by conductive chemicals. The pump will automatically shut down until the problem is resolved. It also includes a brushless DC motor and a revolution count display and alarm. It is NEMA 4X (IP66), NSF Standard 61, CE and ETL listed. **714-893-8529; www.blue-white.com**



ProSeries-M M-3 peristaltic metering pump from Blue-White Industries



Tote Bin Scale from Force Flow

FORCE FLOW TOTE BIN SCALE

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

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

PROMINENT FLUID CONTROLS PROMIX-L

The ProMix-L from ProMinent Fluid Controls is a complete pre-engineered polymer mixing system with intuitive controls. Designed as an in-line or make-down unit, the system is engineered to meet liquid polymer applications using gear or progressing cavity pump technologies. The mixing regime delivers a highly activated polymer solution to every application with optimum performance. **412-787-2484; www.prominent.us**



ProMix-L from ProMinent Fluid Controls



PULSAblend polymer makedown systems from Pulsafeeder

PULSAFEEDER PULSABLEND

PULSAblend 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 dilution 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**

SEEPLEX BRAVO

BRAVO chemical metering systems from SEEPLEX are plug-and-play, pre-engineered feed systems that improve process control with

accurate and repeatable flows and lower chemical consumption. The system is an integrated, modular and scalable solution used for disinfection, pH control, flocculation, corrosion inhibition, oxygen scavenging, and contaminant elimination. It is designed as single source for pumps and controls. Systems are built from standardized panels in floor- or wall-mounted simplex, duplex or triplex options. The system incorporates NSF/ANSI 61 certified SEEPLEX progressive cavity Intelligent Metering Pumps. Slip is minimized even when fluid temperature, viscosity or discharge pressure fluctuates. **937-864-7150; www.seepex.com**



BRAVO chemical metering systems from SEEPLEX

Composting Equipment



920-18 horizontal rotary compost mixer from Roto-Mix

ROTO-MIX 920-18

The Roto-Mix 920-18 horizontal rotary compost mixer has a mixing capacity of 920 cubic feet and can hold a maximum load of 26,100 pounds. It is designed to thoroughly mix materials to ensure rapid decomposition to produce quality com-

post. It is equipped with the GeneRation II Staggered Rotor Mixer to uniformly blend materials in a tumbling action that does not pack material and helps introduce air into the mix. The rotor lifts the material past the wedging point of the lower side auger, resulting in an aerated mixture while lowering power requirements. Total movement of material in the mixing chamber eliminates dead spots that are common in conventional auger mixers. Optional conveyors allow for the discharge and distribution of mixed nutrients with microorganisms into static compost piles or windrows. This size of mixer works well with medium to larger composting operations. It is available in truck, trailer or stationary options. **620-225-1142; www.rotomix.com**

Dewatering Equipment

AQUA-ZYME DISPOSAL SYSTEMS ADS

The ADS 30-yard open-top roll-off dewatering unit from AQUA-Zyme Disposal Systems can be filled with 22,000 to 25,000 gallons of biosolids at 1 to 2 percent solids in about two hours. After draining for 24 hours, the unit can be picked up using a standard-capacity roll-off truck and transported for solids disposal. Sludge volume can be reduced by 80 percent with reductions to 98 percent in BOD, COD, FOG and TSS. Effluent is clear, the unit has few moving parts, and the size of filter media can be selected according to job requirements. Standard equipment includes a roll-over tarp system; side, floor and center screens; 1/4-inch floor plate; 7-gauge side plates; four door binder ratchets; eight drain ports; two inlet ports; and a long-handle scraper. Units are also available in a 15-yard size. **979-245-5656; www.aqua-zyme.com**



ADS dewatering unit from AQUA-Zyme Disposal Systems

PARK PROCESS SLUDGE KING

The Sludge King dewatering container from Park Process includes radiused, edged filter screens providing extra filter area and eliminating

90-degree angles that can trap cake when dumping. Between the bottom ends of the wall filters and middle wall filters are installed Cake Away thick plastic panels that fill the void in the container bottom where water could collect. They facilitate the dumping of cake from the container by providing a nonstick surface. Two center-wall filter panels offer additional filter area, translating into drier cakes and faster dewatering times. The inlet manifold has individually controlled inlet ports for distributing the incoming flow equally to each side of the center wall filters. Units are offered in five capacities. **855-511-7275; www.parkprocess.com**



Sludge King dewatering container from Park Process

Digester

EVOQUA WATER TECHNOLOGIES CYCLIX



Cyclix anaerobic digester control system from Evoqua Water Technologies

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 programmable logic controller 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**

Grinders/Shredders

JWC ENVIRONMENTAL CHANNEL MONSTER FLEX GRINDER

The Channel Monster FLEX high-flow wastewater grinder from JWC Environmental has a modular design that allows for more flexibility of servicing the cutting element and perforated solids diverter element separately. The cutter module can be replaced with a pre-assembled one in the field, eliminating the need to ship the entire unit back to the factory for repair. The FLEX maintains high flow capacity utilizing a perforated solids diverter instead of horizontal screening bars, minimizing material bypass while ensuring all debris is shredded. With flow capabilities from 3.0 to 42 mgd and numerous combinations of grinder heights, diameters of the solids diverter, plus customized installation frames, the grinder is versatile for both in-channel installations or wall mounting within wet wells. **800-331-2277; www.jwce.com**



Channel Monster FLEX grinder from JWC Environmental

NOV CHOPPER HOPPER

The Chopper Hopper from NOV is an all-in-one solution for biogas generation. This powerful and aggressive grinder pump contains both pumping and solids reduction technology and can homogenize objects like whole fruits and vegetables into a pumpable puree or mash. It is available for coarse, medium



Chopper Hopper from NOV

and fine particle sizes, and it uses angled cutters for grabbing or tearing large objects. The design of the progressing cavity pump allows for low friction with a universal pin-joint, leading to less wear and improved overall performance. This unit is a suitable solution in applications such as food processing, waste handling, rendering or slaughtering of plants, orange peels, waste potatoes, and meat products. It is available in carbon, stainless steel or specialized materials of construction. **346-223-3300; www.nov.com/industrial**



VOGELSANG ROTACUT

The RotaCut inline macerator from Vogelsang is designed to remove heavy solids from the waste stream while using a spinning blade assembly to reduce debris such as rags, wipes, hair, string, plastics, wood and bone into an acceptable size for the downstream equipment to pass. Instead of shredding hard objects such as metal or stone, the units catch

RotaCut inline macerator from Vogelsang

heavy debris in a collection pot for removal from the line. Not only will these units protect pumps and dewatering equipment,

they are ideal for biosolids conditioning based on the blades' ability to create a homogenized slurry. It comes in numerous models designed for a range of flow rates and pressures. They offer an ACC (Auto Cut Control) design, auto-reverse, self-sharpening blades and easy inline maintenance. **330-296-3820; www.vogelsangusa.com**

WEIL PUMP STAINLESS STEEL GRINDER PUMPS

Weil Pump has added five stainless steel models to its grinder pump offering. Ranging from 1 1/4- to 3-inch discharges, the 2- and 3-inch models can also be paired with an all-cast stainless quick-removal system. With heads to 100 gpm, solids are reduced to 3/8-inch diameter by the 440C stainless steel grinder cutter and shredding ring components, which are hardened to Rockwell 58C. The semiopen impeller is available in cast iron or bronze and is sized to efficiently pump slurry at



Grinder pumps from Weil Pump

flows and pressures determined by the system design. The grinder component consists of a hardened rotating cutter mounted on a stainless steel motor shaft. A stationary shredding ring is positioned in the pump inlet. Pump models available in stainless steel construction include the 2105S, 2516S, 2516S (Style C impeller), 2526S and 2526S (Style C impeller). **262-377-1399; www.weilpump.com**

Grit Handling/Removal/Hauling

SMITH & LOVELESS OPTIFLOW 270

The OPTIFLOW 270 baffle system from Smith & Loveless addresses the numerous 270-degree vortex grit chambers that are installed throughout North America and elsewhere. It is a simple retrofit baffle system that allows 270-degree grit systems to achieve improved removal efficiencies. Vortex grit removal systems designed to meet previous standards can be upgraded to remove 95 percent of grit down to 150 microns with the retrofit. The baffle system achieves improved efficiencies by directing the flow toward the hopper for an additional pass along the chamber floor, reducing the weir effect at the outlet and ensuring ideal velocities at all times. The retrofit system is available

not only for flat-floor vortex grit chambers, but also as a conversion system for sloped and cone-shaped grit chambers. It can be installed for new systems requiring 270-degree layouts. **800-898-9122; www.smithandloveless.com**



OPTIFLOW 270 baffle system from Smith & Loveless

WEIR SPECIALTY PUMPS (WEMCO) HYDROGRITTER



Hydrogritter system from Weir Specialty Pumps (WEMCO)

Municipal wastewater contains significant amounts of grit from inflow and infiltration that originates in cracked and leaky pipes, manholes, and stormwater. The Weir Specialty Pumps (WEMCO) Hydrogritter is a grit classifier system, which removes 95 percent of all particles with a specific gravity of 2.65 and greater. The grit classifier's main purpose is to protect downstream equipment from damage

due to abrasive wear. The first step to removing grit is to concentrate it, and the first step is a cyclone that concentrates the grit slurry to approximately a 10-1 ratio. After the grit is concentrated, it drops into a settling pool, specifically sized for removing fine grit. When in the pool, the grit particles settle, while the lighter particles, such as organics, float and are carried over the weir at the end of the pool, to be returned to the wastewater stream. The settled grit is then carried up the inclined bottom to the discharge chute, where it is dropped into a dumpster for final disposal. **800-716-5050; www.weirsp.com**

Headworks

PHILADELPHIA GEAR - A TIMKEN BRAND CONTINUOUS OIL RESCUE EQUIPMENT (CORE)

The CORE filter from Philadelphia Gear - A Timken Brand can remove particles as small as 1 micron. At the center is a series of annular magnets shrouded by steel plates. When the oil is filtered through these plates, it is subjected to a high magnetic flux gradient caused by the focusing of the magnetic field at the tips of the plates. The result is that contaminants are drawn into collection areas between the plates and out of the oil flow. This filtering process results in a negligible pressure drop, while at the same time helping to prevent "wash off" since the contaminant is isolated and cannot wash back into the oil. **800-766-5120; www.philagear.com**



CORE filter from Philadelphia Gear - A Timken Brand

WALKER PROCESS VERTICAL SHAFT MECHANICAL MIXER

The Walker Process vertical shaft mechanical mixer provides a low-energy solution for thorough and effective mixing in an anaerobic digester. Each agitator is custom-designed for the application and the specific geometry of the digester tank. The dual impeller arrangement is designed to optimize the most effective glide ratio at the lowest power usage and the highest pumping capacity. Features include a lev-



Vertical shaft mechanical mixer from Walker Process

eling base, low-power consumption compared to pumped systems, high turnover and controlled downward pumping to achieve whole volume mixing. The dual impellers are fabricated from stainless steel and attached to a carbon-steel shaft that is clad and sealed in stainless steel to provide the strength of carbon steel and the corrosion resistance of stainless steel. This system comes complete with full electrical controls. **630-892-7921; www.walker-process.com**



Screenshot vertical bar screen from Aqualitec

Screening Systems

AQUALITEC SCREENTEC

Screenshot from Aqualitec is an automatic vertical bar screen designed for headworks, pump stations, lift stations, wet wells and manholes. It protects pumps from rags, wipes, plastics and other solids. It also prevents pumps from clogging up, extends their life

cycle and improves the quality of wastewater treatment. Thanks to its vertical design, it fits into narrow and deep structures, avoiding costly structural changes. It does not have any moving parts under grade level, providing easy and safe maintenance for the operational staff. Thanks to its 90-degree installation angle, it can fit any wastewater structure up to 90 feet deep. **855-650-2214; www.aqualitec.com**

ENVIRO-CARE SAVI - GVS PERFORATED PLATE MULTIRAKE SCREEN

In the SAVI - GVS Perforated Plate MultiRake Screen from Enviro-Care, bars are replaced by a stainless steel perforated plate to achieve higher debris capture. Multiple wipers remove the debris from the perforated plate and transport the screening material to discharge. This screen can be mounted at 90 degrees for deep narrow channels and pump stations. It is also available in tank for pumped flow. The low-maintenance design makes it suitable for remote locations. The perforated plate is particularly suitable for removing wipes from the flow. Larger debris builds a mat on the surface of the perforated plate. The mat further enhances capture by attracting smaller material. **815-636-8306; www.enviro-care.com**



SAVI - GVS Perforated Plate MultiRake Screen from Enviro-Care

HUBER TECHNOLOGY DRUM SCREEN LIQUID

The Drum Screen LIQUID from HUBER Technology is a horizontal drum screen system that uses a stainless steel mesh with 300 micrometer openings to separate solids and capture carbon. The stainless steel mesh is resistant to aggressive fluids, water and acids. The mesh has a



Drum Screen LIQUID from HUBER Technology

long life and can therefore be very economical. To ensure safe and long-lasting operation, a 6 to 8 mm bar screen and grit trap should proceed this unit. During a two-year research project at three test sites, it demonstrated throughput capabilities of 475 to 1,110 gpm. Additionally, the unit uses a high-pressure spray bar to clean the mesh, so no chemical cleaning is required to sustain throughput. Throughput is also not affected by fats, oils

and grease in the influent. It averages 71 percent total suspended solids removal with no chemical addition. With chemical addition, TSS reduction can reach 88 percent. **704-949-1010; www.huberforum.net tpo**



ARSENIC IS **NOT** A GAME

Ready to make the right move?

AdEdge is your one-stop resource for arsenic treatment systems for any size community. We now supply Bayoxide E33 adsorptive media and E33 media replacements for the largest and the smallest systems. As always, AdEdge offers competitive pricing, experienced engineers, and unparalleled support.

With AdEdge's arsenic treatment systems' global success history, why would you go anywhere else?

When you're ready to make the right move, call us at **866.823.3343**.



www.AdEdgetech.com

By Craig Mandli

Cleaning system eliminates biomass, increases productivity

Problem

Shane Donoghue, a wastewater facilities manager in a large Australian city, saw accumulation of FOG and biomass up to 4 feet deep in a month in a lift station. This required tens of thousands of dollars in maintenance, including weekly to biweekly vacuum truck service and confined-space entry to clean the well by hand. “Sometimes the FOG would build so thick, it was too great of a load for a single truck,” Donoghue says.

Solution

Donoghue purchased the **EP-1300 conditioning and cleaning system** from **Anue Water Technologies**. The unit operates by recycling a small amount of discharged flow to create ongoing surface agitation that prevents FOG buildup and promotes aerobic activity.



RESULT:

The installation immediately reduced maintenance checkups from weekly to monthly. The lift station no longer required frequent vacuuming, and confined-space entry was nearly eliminated. The unit saved \$15,000 in the first year and nearly \$22,000 in the second year on labor, vacuum truck services and landfill tipping fees. Maintenance costs declined by nearly 50 percent. **760-727-2683; www.anuewater.com**

Mixing panels keep grit removal system running

Problem

The Southport Advanced Wastewater Treatment Plant in Indianapolis sought to prevent buildup in its grit removal system for a dry-weather flow of 70 mgd. “The pulsed air mixing system is provided in Junction Structure 101B to suspend solids, which settle out following grit removal so they can pass on downstream for further removal or treatment,” says Gary Ruston, senior project engineer. “Keeping solids from accumulating will minimize or eliminate the need to periodically take the structure out of service for cleaning.”

Solution

Wessler Engineering worked with **Pulsed Hydraulics** to provide 24 bubble-forming plates in the channels and basin. The company supplied three four-valve mixing panels with an Allen-Bradley PLC (Rockwell Automation) and two 20 hp rotary screw compressors. “The pulsed air system was selected due to its higher mixing energy and better ability to keep or resuspend solids throughout the tank,” Ruston says.



RESULT:

The requirements were met and verified by the customer’s engineer. “The system can be operated on a continuous basis or intermittently, based on operator preference,” Ruston says. **800-641-1726; www.phewater.com**

Septage receiving stations secure water and wastewater utility

Problem

The Anchorage (Alaska) Water and Wastewater Utility had two septage receiving facilities guarded only by a gate access system. There was no way to record what haulers were dumping at either site, and a 25-mile trip to the facilities from the administration office made sampling visits time-consuming.

Solution

The utility installed a **Portalogic DS-200 Septage Receiving Station** from **EleMech** at each facility. The systems are monitored remotely by Portalogic Management Software. The customized stations are insulated and have heavy-duty heaters. Proximity card readers and keypads are used to access the gate-secured area. Native gate control capabilities are integrated with the gate access system, providing backup. EleMech trained utility personnel on the stations and software.



RESULT:

Administrative personnel can see when a hauler opens the gate and when either station is in use. The stations automatically sample each load, track volume and hauler information, and sync that data with software on the office PCs. The utility now can charge haulers by volume, eliminating cheating. **630-499-7080; www.portalogic.info**

Headworks screen successfully removes wet wipes

Problem

Up until 2007, the Glenbard Wastewater Treatment Plant in Glen Ellyn, Illinois, had outdated catenary screens that were too coarse and unable to collect any wipes; they were passing through the system and causing issues downstream.

Solution

The **MS Bar Screen** from **Headworks International** was installed in 2007, and Glenbard never experienced problems with wipes clogging its system. The bar screen is known for effectively screening out wipes. It has 3/16-inch bar spacing and the unit is suitable for fine screening and for removing solids from incoming wastewater, thus protecting downstream equipment.



RESULT:

To prove the screen’s effectiveness, Headworks International performed a test in the spring of 2016. Wipes were purchased at a nearby store, dyed fluorescent yellow, then fed into the sewer system at two points. Over 97 percent of wipes were recovered within 20 minutes. Moreover, the operators reported nothing of color showed up downstream. **713-647-6667; www.headworksintl.com**

WEMCO® - First Choice for Grit Removal and Pumping

WEMCO Hydrogritter components are designed as a system to optimize each piece of equipment - both mechanically and hydraulically - to consistently produce long-term, high performance grit removal, automatically, with unmatched reliability and low operating and maintenance costs.

The grit pump's job is to pump the abrasive, destructive grit slurry to the cyclone without clogging or wearing out. The WEMCO Torque-Flow Model C severe duty pump for continuous duty or the WEMCO Torque-Flow Model CE heavy-duty pump are superbly designed to do so.

WEMCO comprehensive product offering for grit removal and grit pumping is unmatched, along with our 50+ years of knowledge and experience in handling grit makes WEMCO the first choice for grit removal and pumping.

Contact us to learn more about the [WEMCO Hydrogritter](#) and other related equipment.

801-359-8731

info@weirsp.com

www.weirsp.com



Submersible chopper pump stands strong through tropical storm

Problem

The main lift station serving the wastewater treatment plant in Morgan's Point, Texas, experienced problems with its three standard nonclog pumps. The pumps frequently clogged with shop rags, pieces of lumber, plastic bottles, gloves and wet wipes when rainfall reached or exceeded 2 inches. Over seven years, these issues required the city to spend \$100,000 for pump maintenance and service.

Solution

The city installed a **Vaughan SE-Series submersible chopper pump**, along with a complete guide rail system to solve the problem.



RESULT:

After the pumps were installed in July 2016, the city experienced more than 100 inches of rain with no plugging or other issues. During Hurricane Harvey in 2017, the pumps ran continuously for 72 hours without incident. "I just wish we had purchased these pumps years ago to eliminate the maintenance headaches we endured and the costs we incurred keeping our previous pumps in operation," says Brian Schneider, city administrator. "If the former pumps were still installed, residents would have had sewage in their homes." 888-249-2467; www.chopperpumps.com

City converts biosolids processing equipment after fire

Problem

The City of Northfield (Minnesota) Wastewater Treatment Plant (3 mgd design) produced Class A biosolids via an open alkaline and thermal stabilization process. In May 2018, a fire destroyed all of the Class A biosolids processing and the dewatering and odor control equipment.

Solution

Rather than replace the old equipment, the city converted from belt presses to **screw presses** for its dewatering and purchased two machines from **Schwing Bioset**. The closed Schwing Bioset process contains odors and dust and does not require supplemental heat. It is approved by the U.S. EPA through the Process to Further Reduce Pathogens to operate at temperatures below those specified in the 503 regulations.



RESULT:

The plant is scheduled to be operational later in 2019. To help bridge the gap in biosolids processing while the new facility is built, the city rented a mobile screw press and Schwing Bioset trailer. 715-247-3433; www.schwingbioset.com

(continued)

Centrifuge system decreases manpower, increases biosolids quality

Problem

Solvay, an advanced materials and specialty chemicals company in Willow Island, West Virginia, has five chemical plants that produce around 3 mgd of wastewater. Because the wastewater produced by chemical plants contains very few fibers, dewatering the biosolids was difficult. “We have a lot of batches that change day to day and month to month,” says Brian Smith, maintenance and wastewater treatment superintendent. “This makes it difficult to keep a healthy biomass.” Two old chamber presses could not always handle the demand.



Solution

Smith connected with **Flottweg Separation Technology** for a pilot program on a rental agreement for centrifuge equipment. The pilot unit originally came with a solid scroll, which was then exchanged for an open-bodied Xelletor scroll.

RESULT:

Solvay saw an immediate improvement as the pilot unit produced biosolids at 19 to 20 percent solids. The centrifuge system allowed the company to reduce dewatering labor, reduce the volume sent to landfill, increase biosolids consistency and save energy. The plant saw a return on investment within a few months. After the first year, the system saved about \$214,000. **859-448-2300; www.flottweg.com**

Mixer provides efficiency and energy

Problem

The Bellozanne Sewage Treatment Works on the island of Jersey in the Channel Islands, a crown dependency of Great Britain, sought an energy-efficient mixer system.

Solution

An externally mounted **GasMix system** from **Landia** was installed, using a chopper pump to break down particles. “We agreed straightaway that for the three new anaerobic digesters, all pipework and moving parts should be on the outside of the tank,” says Michelle Macleod, principal mechanical engineer for Doosan Enpure, which delivers water, wastewater, and renewable energy solutions. “Externally mounted equipment would also improve health and safety by eliminating working at height and confined-space entry.” The plant team also chose Landia pumps for three tanks containing digested, thickened and unthickened biosolids.



RESULT:

Dave Garnett, technical specialist for wastewater at Doosan Enpure, notes that Bellozanne is achieving about 60 percent volatile solids: “Good mixing is critical with the high temperature feed to the digesters to make sure that everything is distributed properly. GasMix is working very well because we’re seeing plenty of energy produced by the combined heat and power system, making a big reduction in operating expense.” **919-466-0603; www.landiainc.com tpo**

Screening system saves company time and money

Problem

Aqua Engineers has served the water and wastewater needs of the Hawaiian Islands for 37 years. With limited space at sites served by the Oahu Wastewater System team, it was not feasible to build a drying bed for debris. This meant driving an hour to the available drying bed and then returning to clear out the bed after the material dried.



Solution

The **Mega Screen** from **ScreenCo Systems** allows the company to dewater and clean debris on site at one of its pump stations.

RESULT:

The screen has saved time and increased productivity, as it provides a quick and easy way to unload the Vactor vacuum truck. **208-790-8770; www.screencosystems.com**



Every day is Earth Day.™

“Most don’t even think their tap water is safe to drink. If I can help the public understand how high quality their tap water is and how important source-water protection is, I believe they will take ownership of keeping their water resources safe.”

Jane Moore
An Original Environmentalist
PRODUCTION SUPERVISOR
Philipsburg (Pa.) Water Treatment Plant



Read about original environmentalists like Jane each month in *Treatment Plant Operator*.

FREE subscription at tpomag.com



SC3610C

COMPOSTING

BROWN BEAR attachments and self-propelled transportable units: **CHOOSE THE PERFECT FIT** for your composting, dewatering or bioremediation projects.



*inspiring
stimulating
motivating*

Savored by wastewater and water treatment professionals everywhere.

Get your fill for free. Subscribe at tpomag.com



Danfoss VACON HazLo AC Drive

Danfoss' VACON X5 HazLo AC Drive is designed with safety-yellow-colored metal covers to protect against bumps and misuse or full stainless steel enclosures. Because there is no additional box in which to place the drive, cooling is not an issue. The drives are available in frame size T3 and T4 for applications from 40 to 100 hp. They are designed to keep operating in harsh environments and are built from the ground up to survive tough conditions while remaining simple to use. They are certified for Division 2 hazardous locations. **800-432-6367;** www.danfossdrives.com



Hayward Flow Control PVDF Y-Check Valves

Hayward Flow Control's YC Series Y-Check Valves in natural PVDF is ideal for extreme corrosive media or sensitive media systems and higher-temperature services. The valve is available in either threaded or IPS socket fusion molded-in end connections. The piston is made from PVDF material and FPM O-ring seals are standard. Sizes include 1/2, 3/4 and 1 inch. All sizes carry a rating of 150 psi nonshock at 70 degrees F. Maximum service temperature is 240 degrees F. **888-429-4635;** www.haywardflowcontrol.com

product spotlight wastewater

Producing drier grit

By Ted J. Rulseh

Hauling and disposal of effluent and grit is often one of the largest budget items wastewater treatment plant operators need to consider. Those costs are only going to increase, too, as landfill space fills up across North America. Taking a proactive approach to reduce the total amount going to the landfill may be a partial answer. **Hydro International** recently introduced the **Hydro GritCleanse fluidized-bed grit washing system** — a unit that significantly reduces volatile solids content to produce cleaner and drier grit. Cutting volatile solids grit reduces weight, volume and water content, which can significantly reduce odors and save money on landfill costs.

The system retains 95 percent of grit 106 microns and larger and discharges washed grit with less than 5 percent volatile solids, according to the company. Flow is introduced tangentially into a conical clarifier, forcing the grit to contact the vessel walls, creating drag forces and establishing a rotary flow pattern. Incoming grit settles into the low-velocity boundary layer at the inside wall of the vessel. The structured, laminar flow pattern allows retention of fine and slowly settling grit particles, while the interior baffle prevents short-circuiting.

Once in this boundary layer, grit is further decelerated and settles to the bottom of the unit into the gently agitated fluidized bed, where physical forces separate fixed and volatile solids by density. This



Hydro GritCleanse from Hydro International

causes grit to fall to the bottom of the bed while the lighter organic materials remain in suspension at the top of the bed.

Washing occurs in the fluidized bed as organic material attached to the grit particles is scrubbed away due to friction between particles. The higher-density cleaned sand descends to the bottom. Once the grit is captured, organic particles flow out of the unit for additional treatment downstream. Cleaned grit is intermittently discharged to a dewatering screw.

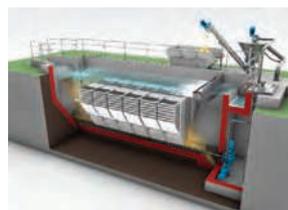
According to the manufacturer, the GritCleanse unit works best when paired with its grit separation systems such the HeadCell and Grit King to provide a complete advanced grit washing and dewatering system. The system can be deployed for grit washing where very low volatile solids levels are required. It is suited for new wastewater treatment plants, plant retrofits and as a replacement for worn out or ineffective grit washing and dewatering systems. **866-615-8130; www.hydro-int.com**



CUES remote evaluation diagnostic inspection kit

The CUES REDI pipeline inspection troubleshooting kit is designed to help diagnose electrical issues, allowing for quicker and more accurate definition and repair of problems while in the field. The kit features a high-resolution web camera for two-way video conferencing with CUES to expedite troubleshoot-

ing and parts identification. It also features a diagnostic test box for easy access to the TV cable conductors via test points, and a built-in mini-camera to send video back through the TV cable and truck. **800-327-7791; www.cuesinc.com**



HUBER Technology Grit Trap GritWolf

HUBER Technology's Grit Trap GritWolf compact grit and grease removal system uses aeration to

remove the grit from the wastewater flow while also capturing grease to keep floatable particles from settling or overflowing in downstream treatment systems. It consists of an aerated chamber and a separate unaerated chamber. With a deep flow approach and a lamella separator, it removes 90 percent of grit grains 75 microns and larger. The system is available in different sizes for flow rates from 1 to 20 mgd and requires much less space than conventional systems. The system can be integrated into existing grit trap chambers. The horizontal grit conveyor, the lamella packages and the paddle system for grease removal are made from corrosion-resistant material. **704-949-1010; www.huberforum.net**

product spotlight water

Securing energy-efficient flow

By Ted J. Rulseh

In today's high-tech water treatment world, automation is synonymous with efficiency. With that in mind, **ABB** has introduced the **ACQ580 variable-frequency drive**. Specialized for the most commonly required pump functions, this drive offers built-in pump application functionalities, along with single and multi-pump system configurations. This capability ensures accurate water flow control in all applications including raw water, utilization and wastewater treatment. It is designed to enhance system performance, simplify commissioning and operation, and optimize efficiency in water and wastewater facilities. The drive also improves flow and reliability in pumping and aeration.

Created specifically for the municipal market, the ACQ580 includes features such as a pump clean function that dislodges debris from impellers and a sensorless flow calculation that provides accurate flow measurement without a flowmeter. The drive is compatible with ABB Ability condition monitoring services, which enable users to get real-time data about the status and performance of monitored equipment from any location.

The VFD includes dry-run protection to keep pumps from running without water. Embedded PID controllers automate flow, pressure, level and dissolved oxygen. Multipump control manages the operation of up to eight pumps simultaneously.

Safety features in the drive include safe torque-off and a maximum speed limit to protect against overspeed. Safety is also enhanced with an optional device that enables the drive to be programmed without primary power.

Menu-based programming simplifies setup and operation. An easy-to-use keypad uses industry terminology that enables intuitive system monitoring and operational tuning. An optional Bluetooth keypad provides connectivity between the drive and mobile devices and provides an extra level of safety for commissioning and troubleshooting.

The all-compatible drives offer built-in energy-efficiency calculators to help analyze and optimize pump processes to reduce stress on the environment. Other environmentally friendly features include the built-in soft pipe fill function to ensure less water hammering on the water pipes, thus preventing the risk of unwanted leaks, unplanned outage, and repair costs.

The drive works with motors ranging from standard induction to permanent magnet and synchronous reluctance. With a wide range of power ratings and control technologies, it can be used for any application in the facility and can upload or download configurations via the keypad. It provides fast and reliable communication with PLCs and SCADA on a broad range of protocols. Embedded inputs and outputs simplify connectivity.

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



LMI Pumps LIQUITRON 7000 Series metering pump controller

The LIQUITRON 7000 Series controller from LMI Pumps provides multiparameter monitoring and control for metering pumps used in boiler feed, cooling tower, and industrial and municipal water treatment applications. The pumps are designed to be backward compatible, facilitating drop-in upgrades for most existing uses. They feature a 7-inch, full-color touch screen and an intuitive user interface offering seamless setup and operation in five different languages — English, Spanish, German, Chinese, Portuguese and French. The 7500 Model has an embedded 4G/LTE cellular modem for connection to the LMI Connect, Smart Monitoring Services.

800-564-1097; www.lmipumps.com



Kaeser Compressors CBS screw blower

The CBS screw blower packages from Kaeser Compressors deliver 93 to 448 cfm and pressures up to 15 psig. The blowers feature the Sigma Profile air-end and high-efficiency gear-drive technology and are available in both STC (wye-delta start) and SFC (variable-frequency drive) for energy performance and reliability. The CBS blowers are shipped completely assembled with high-efficiency motors, inlet filters, silencers, integral starters/drive and a full complement of sensors. The fully soundproofed enclosure is designed so that maintenance access is in the front and process connections on are the back for space-saving side-by-side installation.

540-898-5500; www.kaeser.com



Endress+Hauser RSG45 Advanced Data Manager

The Memograph M RSG45 Advanced Data Manager DIN rail version from Endress+Hauser is an intelligent remote device with extensive communication abilities, ideal for Internet-of-Things applications and use as an edge device to get data to cloud-based servers. It can acquire data from up to 20 HART or universal analog input channels and 14 digital inputs, has two analog outputs and up to 12 relay outputs. Interfaces and protocols include 4-20mA HART, Modbus RTU, Modbus TCP/IP, Profibus DP, Profinet, Ethernet/IP, Ethernet TCP/IP, USB, RS-232C/RS485 and OPC. It also has an embedded web server that can be accessed by any web browser via the internet once proper security procedures are followed. The Memograph M mounts on a standard DIN rail and is powered by standard 24-volt DC or 230-volt AC power supplies.

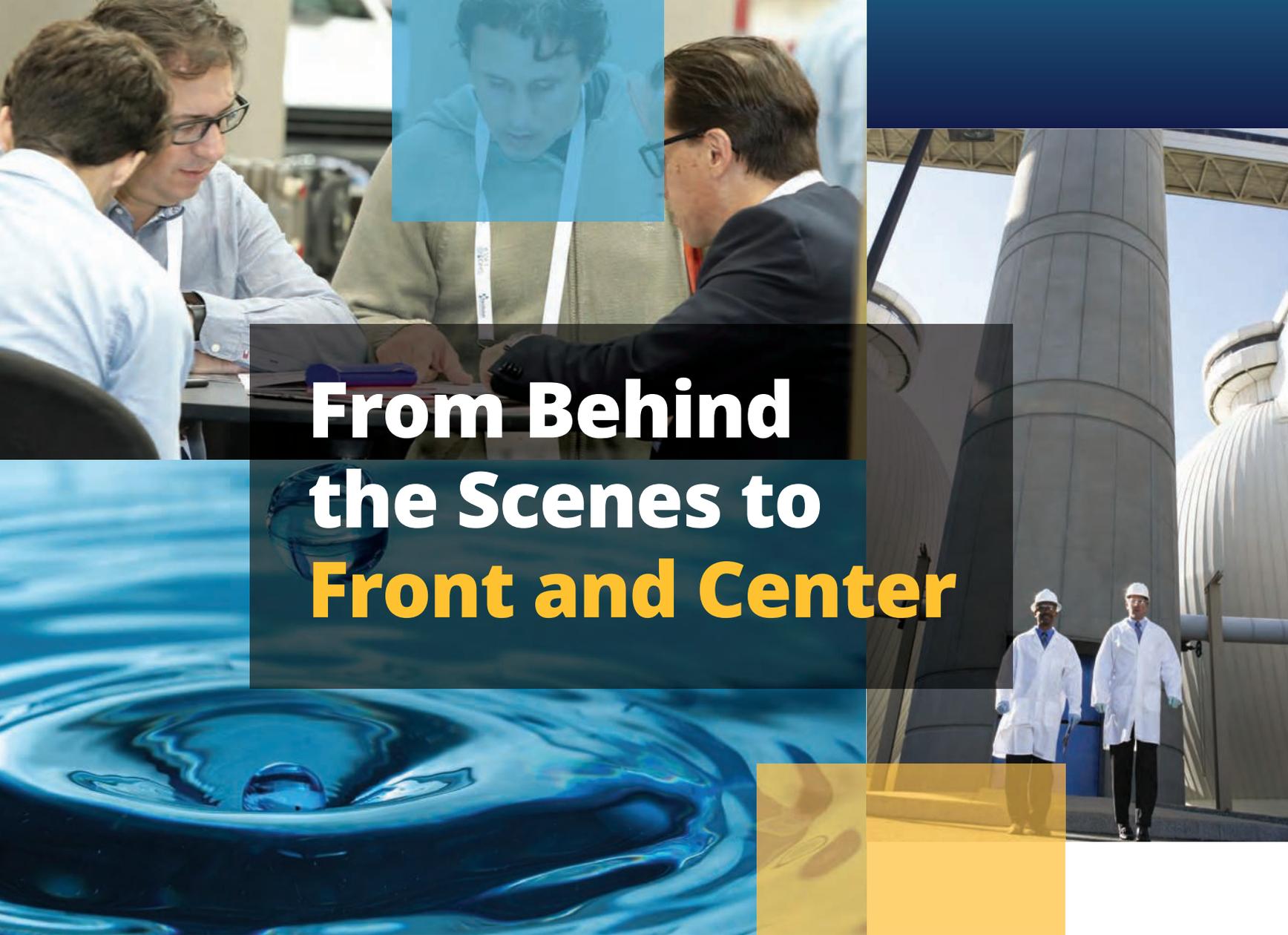
888-363-7377; www.us.endress.com



Nidec Motor vertical frame motors

The TITAN II WPI and WPII 449 frame vertical motors from Nidec Motor are available in HOLLOSHAFT and solid shaft constructions. The 449 lower bracket has been redesigned to allow stiffer attachment of the motor to the pump head, raising its reed critical frequency by 12 percent on average. Multiple P-base options of 20, 24.5 and 30.5 inches enable alteration of the RCF for the best variable-speed pumping system design to stay out of the resonance region. The output has also been increased to 500 hp. In addition to the redesigned WPI 449 frame, a new WPII 449 frame is well-suited for indoor or outdoor use.

888-637-7333; www.usmotors.com



From Behind the Scenes to Front and Center

KEEPING US ALL GOING STRONG

To many, your work is magic. But you know that providing for the future of your community's water needs is a complex and demanding challenge. And while you provide an essential service, you don't always get the recognition you deserve. At the WWETT Show, you will.

Surrounded by other wastewater professionals who understand your daily challenges, you'll discover the newest technologies, tactics and tools designed to streamline your services and generate new sources of revenue. Try out the newest equipment and get hands-on training and demos. Earn CEUs through industry classes. Attend courses tailored to your business needs in marketing, hiring and budgeting. **Step into the forefront of your industry and career.**

REGISTER TODAY | www.wwettshow.com



FEBRUARY 20 - 23, 2019

Indiana Convention Center
Indianapolis, IN



Grundfos Pumps celebrates opening of new Florida facility

Grundfos Pumps expanded its U.S. footprint in Florida with a new facility in Deerfield Beach. A ribbon-cutting ceremony was held Nov. 8 to celebrate the occasion. The facility will serve as a distribution hub for water and wastewater pumps, controls, and related accessories, and it will also offer service and testing.

Mueller Water Products acquires Krausz Industries

Mueller Water Products announced it has signed a definitive agreement to acquire Krausz Industries for \$140 million in cash. Once the transaction has closed, Krausz will become part of Mueller Water Products' Infrastructure segment. Krausz's product line of pipe couplings, grips and clamps are designed to address pipe connection or repair needs across a broad range of applications, pipe sizes and pipe materials.

Axine Water Technologies announces staff changes

Axine Water Technologies announced that Paris Neofotistos joined the company as vice president of sales and Chris Morrison joined the company's board of directors. Neofotistos has over 20 years' industry experience focused on municipal and industrial wastewater treatment. In his current role as vice president of sales, he will be responsible for building and leading the commercial organization to deliver Axine's solutions to market. Morrison has over 30 years' success with water treatment leadership roles in North America, Asia and Europe. Formerly vice president at Ecolab, he has a proven track record of discovering high-impact technologies, extracting maximum value, building high-powered teams and driving process improvements.



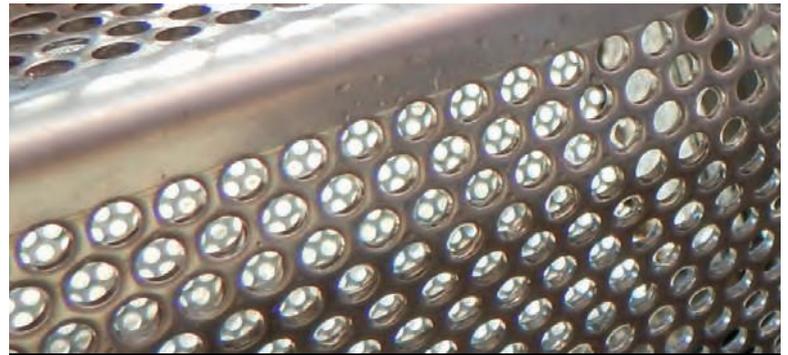
Paris Neofotistos



Chris Morrison

Water Otter presents online training

Water Otter, an educational and regulatory compliance program, offers anytime, anywhere online delivery. Its mobile-friendly platform allows courses to be taken from a PC, tablet or smartphone. The program recently added a management and human resources curriculum that addresses newer requirements for management courses in some states. Plans are to continue to expand the program to cover safety and other job-related subjects. For more information, visit www.waterotter.com or call 877-378-8111. **tpo**



Did you know?

Did you know Parkson's classic headworks screen, the **Aqua Guard®**, is also available with perforated sheet as the screening material?

The **Aqua Guard® PF** provides some of the highest capture rates among in-channel screens.

Learn more at parkson.com/AquaGuardPF



Proud to be a part of the Glasgow, KY WWTP

www.parkson.com

ROTO-MIX

Staggered Rotor Industrial Series Mixers feature superior blend with reduced maintenance and operating cost.

Patented Staggered Rotor

Available in Truck, Trailer or Stationary

Designed for Composting Performance

Vertical Compost Series
process and incorporate coarse carbon sources quickly and efficiently.

ROTO-MIX

620.225.1142
620.338.0090 Cell

Made in U.S.A.

www.rotomix.com



Every day is Earth Day.™

Read about it. **FREE** subscription at tpomag.com

people/awards

The City of Norwalk, Ohio, hired **Wade Leimeister** as the wastewater treatment superintendent. For the previous five years, Leimeister supervised both the water and wastewater plants in Plain City.

The **Cleveland (Tennessee) Utilities Wastewater Treatment Division** was recognized by the Kentucky-Tennessee Water Environment Association for operational excellence in 2017.

The **City of Preston** received a \$65,000 wastewater planning grant from the Idaho Department of Environmental Quality to prepare a feasibility study and environmental review.

For the ninth straight year, the **City of Lynden Wastewater Treatment Plant** received an Outstanding Performance Award from the Washington State Department of Ecology.

The **Sarpy County and Sarpy Cities Wastewater Agency** (Nebraska) received a Regional Service Award from the Metropolitan Area Planning Agency.

The **City of Ada Wastewater Plant** received the Medium Wastewater Plant of the Year award at the Oklahoma Water & Pollution Control Conference.

Michael Baker International, APTIM and **Gannett Fleming** received the national Construction Management Association of America Project of the Year award in addition to the National Project Achievement Award in the category of Water/Wastewater: Construction Value Greater Than \$50 Million for upgrading New York City's Newtown Creek Wastewater Treatment Plant in Brooklyn.

Emory University in Atlanta received a 2018 Campus Sustainability Achievement Award from the Association for the Advancement of Sustainability in Higher Education. The university was recognized for its innovative teaching and student docent programs related to the WaterHub, which uses engineered processes that emulate natural ecological systems to reclaim wastewater for heating and cooling buildings and flushing toilets.

Glasgow Water Co. received an Excellence in Energy Leadership Award from the Kentucky Energy and Environment Cabinet for reduction of electricity costs at the wastewater treatment plant by more than 25 percent, reducing energy usage per unit volume of wastewater treated by more than 40 percent.

United Rentals announced that its EC-250 Mobile Treatment Trailer and CL-250 Mobile Clarifier won Frost & Sullivan's 2018 New Product Innovation Award for mobile water and wastewater treatment.

Missouri American Water was named the Best Employer in the Water and Wastewater Industry in the category of Operations by Hunter Crown.

Clark County, Washington, hired **Ahmad Qayoumi** as director of the public works department. He had served as deputy director and as interim director after former public works director Heath Henderson accepted a job with the Clark Regional Wastewater District.

Scottsdale (Arizona) Water received the Association of Metropolitan Water Agencies' 2018 Sustainable Water Utility Management Award for responsible management of resources, protection of public health, meeting

events

Feb. 3-6

New York Water Environment Association Annual Meeting & Exhibition, New York Marriott Marquis. Visit www.nywea.org.

Feb. 6-9

Water Environment Federation Midyear Meeting, Grant Hyatt Atlanta, Buckhead, Georgia. Visit www.wef.org.

Feb. 11-13

California Water Environment Association P3S Conference, Embassy Suites by Hilton Monterey Bay Seaside. Visit www.cwea.org.

Feb. 11-13

Illinois Wastewater Professionals Conference, presented by the Illinois Water Environment Association and the Illinois Association of Water Pollution Control Operators, Crowne Plaza Hotel, Springfield, Illinois. Visit www.illinoiswpc.org.

Feb. 20-23

Water & Wastewater Equipment, Treatment & Transport (WWETT) Show, Indiana Convention Center, Indianapolis. Visit www.wwetshow.com.

Feb. 25-28

AWWA Membrane Technology Conference & Exposition, Ernest M. Morial Convention Center, New Orleans. Visit www.awwa.org.

responsibilities to the community and providing cost-effective services to ratepayers.

The **Orange County (California) Water District** renamed its lab as the Philip L. Anthony Water Quality Laboratory in honor of its former director, who passed away in July 2018.

Jacobs Engineering Group received a 2018 Water Heroes Award from the Water Environment Federation. Recognized for their efforts during the most expensive and destructive U.S. hurricane season on record were the Florida-based Jacobs Operations Management project teams in The Villages, Key West, West Melbourne and Pembroke Pines.

Wichita Falls, Texas, received a U.S. EPA Clean Water State Revolving Fund Performance and Innovation in Creating Environmental Success Award, given to municipalities that install and use or plan to use indirect potable reuse.

California Water Service received a 2018 Management Innovation Award from the National Association of Water Companies.

The **Elkins Water Department** was named the 2018 Water System of the Year by the West Virginia Rural Water Association. The city's Mike Currence received the Wastewater Collection System Operator of the Year honor.

The **City of Okanogan, Washington**, won the Outstanding Achievement in Infrastructure-Wastewater Award from the Infrastructure Assistance Coordinating Council.

**MUNICIPAL
SEWER
&
WATER**

**Dig into
our pages.**

Each issue shows you:

- New technologies that boost efficiency and drive out costs.
- Tips for building a stronger, more productive staff.
- Bargains on a wide range of tools and equipment.
- And much more.

Plus, you'll learn from other successful people in your industry – how they do it, and how you can, too.

**FREE Subscription –
sign up today!**

800.257.7222
www.mswmag.com



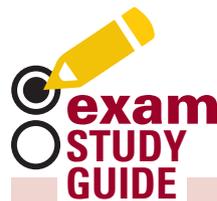

= Thank You!

Hand-selected Wisconsin sausage and jerky delivered in a 20-qt. **RUGID** cooler.

\$199.99 Delivered

Meaty-Delivery™

meaty-delivery.com
833-777-8443



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

WASTEWATER

By Rick Lallish

Chlorine contact time varies from state to state. Most states require either 15 or 30 minutes at the design average flow rate. Why is a minimum contact time so important for disinfection?

- A. Chlorine gas is hazardous and has to be regulated
- B. To allow excess chlorine gas to dissipate
- C. To allow the chlorine time to inactivate the microorganisms
- D. To allow the BOD time to bleed off before disinfection

ANSWER: C. Disinfection using chlorine is based on contact time. It takes time for the chlorine to react with the components of the microorganism. Several factors affect the time needed to achieve disinfection: concentration, temperature, pH, mixing and level of disinfection required. The contact time is based on the amount of flow moving through the facility and the contact basin size. The operator cannot control either of these, but can control the dosage to achieve proper disinfection. This knowledge is important for many reasons, such as meeting chlorine residual limits and fecal coliform reporting. Understanding how to control the chlorine dosage is an important process control tool for successful disinfection.

DRINKING WATER

By Drew Hoelscher

What is the U.S. EPA primary maximum contaminant level for iron?

- A. 1.0 mg/L
- B. 0.3 mg/L
- C. 0.0 mg/L
- D. Iron is not regulated by a maximum contaminant level

ANSWER: D. There is not a U.S. EPA maximum contaminant level for iron, which is regarded as an aesthetic issue rather than a health issue. However, the EPA does have iron on the secondary maximum contaminant level list as 0.3 mg/L. This is a recommended level and is not enforceable. Studies have shown that a water system typically experiences red water complaints at or above 0.3 mg/L for iron.

ABOUT THE AUTHORS

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

Mark Smith was named chairman of the Contentnea (North Carolina) Metropolitan Sewerage District. He succeeds Mary Alice Davenport, who remains as a board member.

San Jose (California) Water was named the 2018 Water Industry Innovator by the National Association of Regulatory and Utility Commissioners for the design-build construction of its Montevina Ultrafiltration Water Treatment Plant.

An advanced oxidation system using UV reactors designed by **Smith Seckman Reid** at the Franklin (Tennessee) Water Treatment Plant won a Grand Award in the American Council of Engineering Companies of Tennessee Engineering Excellence Awards competition.

For the second year in a row, the **Ames Water Treatment Facility** received the Best Tasting Water Award by the Iowa branch of the American Water Works Association.

The Cobb County-Marietta Water Authority in Georgia recognized three employees for 40 years of service. **John “Bill” Davis, Steven “Brady” Gayton** and **Dale Shoemaker** each received a Brumby Rocker for their service. Davis is the maintenance superintendent at the Wyckoff Water Treatment Plant, Gayton is operations superintendents at the Wyckoff plant and Shoemaker is operations superintendent at the Quarles Plant.

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

**The Clear Choice for
Commercial Projects**



ECOPOD-D[®]

FBBR WASTEWATER SOLUTIONS

Why ECOPOD-D[®] Advanced Wastewater Treatment?

- Effluent quality <10 mg/L BOD/TSS
- Total nitrogen removal capabilities to low level requirements with additional equipment
- No mixed liquor suspended solids to manage
- Simple to operate and maintain
- Low sludge production
- Suitable for seasonal or intermittent use
- Designed with the same technology utilized in our NSF/ANSI certified unit



**Design and
Engineering
Assistance
Available**

ECOPOD-D[®] Applications

- Schools
- Campgrounds and trailer parks
- High strength commercial facilities
- Apartment complexes and subdivisions
- Retail developments
- Office buildings
- Small cities and rural communities



(800) 219-9183 • www.deltatreatment.com • info@deltatreatment.com

■ STEAM BOILERS

BOILERS

Digester
Methane Gas
Ready

CALL toll free
1.877.774.8778
click  hurstboiler.com

Sludge / Digester
HEATING



BIOGAS

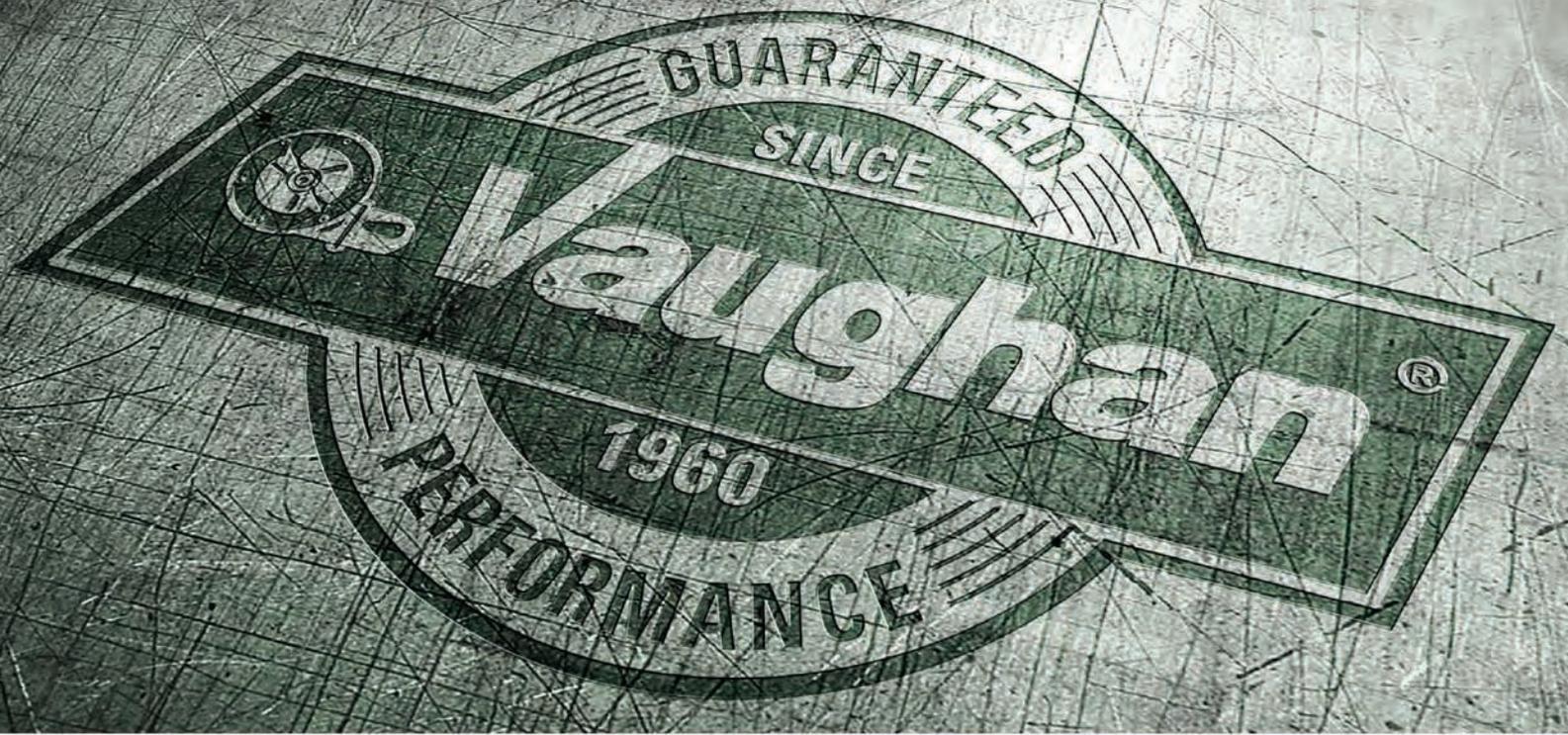
join the conversation

 **HURSTBOILER**

100 Boilermaker Lane • Coolidge, GA 31738-0530

Tel: (229) 346-3545 • Fax: (229) 346-3874

email: info@hurstboiler.com



WIPE OUT CLOGS

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

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



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

