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TECHNOLOGY DEEP DIVE:
**Mobile rental
treatment systems | 46**

HOW WE DO IT:
**PFAS treatment in
New Windsor,
New York | 28**

SUSTAINABLE OPERATIONS:
**Biogas to renewable
natural gas | 34**

Lance Phillips
Operations Manager III
Dallas, Texas

Baseball and Clean Water

**LANCE PHILLIPS BRINGS ATHLETICS-STYLE
ENERGY TO HIS CLEAN-WATER CAREER | 12**


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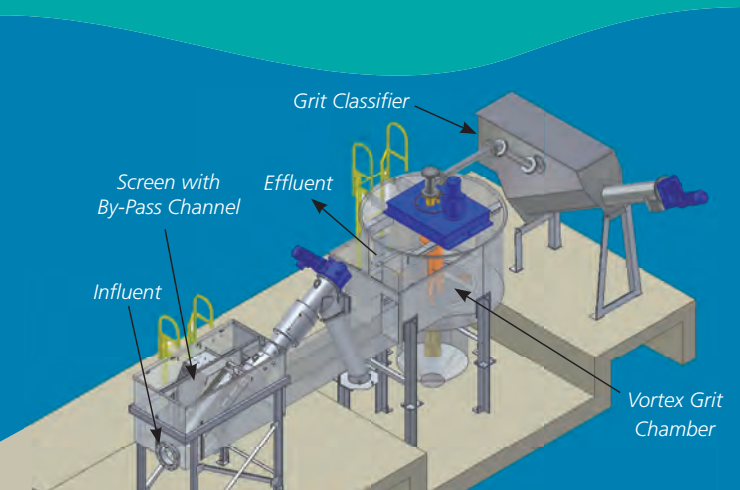
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advertiser index

August 2020

Alfa Laval	25	KELLER Keller America Inc.	5
 AllMax Software, Inc.	19	Kohler Power Systems	7
Anue Water Technologies	25	 Komline-Sanderson Komline-Sanderson	43
 Aqua-Aerobic Systems, Inc.	59	 Kuhn North America, Inc.	44
 BDP Industries, Inc.	15	 Lakeside Equipment Corporation	3
 Blue-White Industries	2	Paxxo	8
Bright Technologies, Division of Sebright Products, Inc.	47	 Penn Valley Pump Co., Inc.	33
 Centrisys/CNP	26	Pieralisi North America, Inc.	45
DO2E Wastewater Treatment LLC	23	 Roto-Mix, LLC	55
Duperon Corporation	17	 SAF-T-FLO Chemical Injection	35
 Eagle Microsystems, Inc.	45	 Screenco Systems LLC	57
 Enviro-Care Company	4	 Smith & Loveless, Inc.	11
Hurst Boiler	27	Tetra Tech, Inc.	19
 JDV Equipment Corporation	9	 Vaughan Company, Inc. ...	back cover
Jim Myers & Sons, Inc. (JMS)	29	Vulcan Industries, Inc.	43
Kayden Industries	9		



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contents **August 2020**

- 8 **LET'S BE CLEAR: TOO MANY ACRONYMS IN TPO? IDK.**
For editors, part of the job is knowing when to use the short form and when to spell things out. TBH, sometimes we can use readers' advice.
By Ted J. Rulseh, Editor
- 10 **@TPOMAG.COM**
Visit daily for exclusive news, features and blogs.
- 18 **IN MY WORDS: RECYCLING ON THE RADAR**
A survey finds Americans consider water scarcity a major concern and show strong support for water recycling for irrigation and drinking.
By Ted J. Rulseh
- 28 **HOW WE DO IT: FAST-TRACK FIX**
A New York town removes PFAS from its drinking water supply in four months using a granular activated carbon treatment system.
By Fil L. Fina III
- 34 **SUSTAINABLE OPERATIONS: PIPELINE QUALITY**
A Nebraska city replaces a combined heat and power facility with a gas scrubbing system that yields renewable fuel for vehicles.
By Steve Lund
- 36 HEADWORKS AND BIOSOLIDS MANAGEMENT DIRECTORY**
- 42 **TECH TALK: GETTING MORE FROM DIGESTERS**
Upgrades to accommodate a variety of organic wastes and optimize the process can help communities curb greenhouse gases while creating reliable revenue streams.
By Michael Theodoulou
- 45 **EXAM STUDY GUIDE**
By Rick Lallish and Drew Hoelscher
- 46 **TECHNOLOGY DEEP DIVE: READY TO RUN**
Mobile rental solutions from WesTech Engineering give water and wastewater operators temporary capacity for a variety of short-term needs.
By Ted J. Rulseh
- 48 **PRODUCT FOCUS: HEADWORKS AND BIOSOLIDS MANAGEMENT**
By Craig Mandli
- 52 **CASE STUDIES: HEADWORKS AND BIOSOLIDS MANAGEMENT**
By Craig Mandli
- 55 **INDUSTRY NEWS**

top performers



12 **WASTEWATER OPERATOR: BASEBALL AND CLEAN WATER**

Injury derailed Lance Phillips' career as a pitcher and catcher, but he brings athletic-style energy and dedication to his wastewater career.

By Steve Frank

ON THE COVER: Lance Phillips dreamed of playing in baseball in the major leagues. Injuries derailed his career, but not his ambition to succeed. He's now operations manager III at the Central Wastewater Treatment Plant in Dallas and a 2019 winner of the William D. Hatfield Award. (Photography by Olivia Ogren-Hrejsa)

20 **WATER OPERATOR: A BETTER WAY**

In seeking its own drinking water supply, Tarpon Springs chose reverse osmosis treatment. The operations team stepped right up to the challenges.

By David Steinkraus

30 **WASTEWATER OPERATOR: LOVE AT FIRST SIGHT**

Jeremy Carnahan immediately took to the clean-water profession. His enthusiasm has only increased as he worked his way up the ladder.

By Suzan Chin-Taylor

56 **PRODUCT NEWS**

Product Spotlights:

Wastewater: Geomembrane covers provide odor control solution
Water: System removes heavy metals from water streams

By Craig Mandli

58 **WORTH NOTING**

People/Awards; Events

cover story

coming next month: September 2020 **FOCUS: Digital Technology, WEFTEC Preshow Issue**

» Let's Be Clear: The water quality-quantity nexus » Top Performers: Water Operator: Ted Meckes, Springfield, Illinois | Wastewater Plant: Main Wastewater Treatment Facility, St. Charles, Illinois | Wastewater Plant: Coeur d'Alene (Idaho) Wastewater Treatment Plant » How We Do It: Tackling grease and debris in Madisonville, Texas » Sustainable Operations: Resource recovery in Paso Robles, California » In My Words: Water reuse: Progress and outlook » Hearts and Minds: Science fair winners in Maryland's Prince William County » Technology Deep Dive: Varcor (Sedron Technologies) process for biosolids management



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let's be clear

Too Many Acronyms in TPO? IDK.

FOR EDITORS, PART OF THE JOB IS KNOWING WHEN TO USE THE SHORT FORM AND WHEN TO SPELL THINGS OUT. TBH, SOMETIMES WE CAN USE READERS' ADVICE.

By Ted J. Rulseh, Editor



Acronyms are funny things. On one side, they're a useful shorthand: Writing BOD beats writing "biochemical oxygen demand" every time that parameter is mentioned. On the other hand, too many acronyms create clutter and confusion.

The big issue for a magazine editor is where to draw the line between using an acronym or not. Spelling out terms that every reader knows (or should) insults their intelligence. But to use an acronym that is less universally understood is to leave some readers in the dark.

For example, anyone in a water profession knows what EPA stands for. But what about NACWA? Or Central States WEA? In those last two cases, we've tended to spell out "National Association of Clean Water Agencies" and "Water Environment Association" the first time they appear. Do we need to? What about WEF (which we spell out) and AWWA (which we don't)?

As for state regulatory agencies, is it enough to say DEP and DEC? Or should we spell out "Department of Environmental Protection" and "Department of Environmental Conservation"?

DEALING WITH NAMES

Sometimes we choose not to use acronyms, even though we believe readers know them, just because they're, well, sort of ugly. For example, we spell out "wastewater treatment plant" instead of using WWTP; for shorthand, we refer to "the plant" or "the facility." It's the same on the drinking water side: We don't use WTP.

FWIW, we also tend (with limited exceptions) to not use acronyms for long names of water authorities or districts. For example, we'll spell out "Any City Public Utilities Authority" the first time it's mentioned in a story, but after that we'll use "the authority" or "the utility" instead of the unsightly and possibly confusing ACPUA.

Then there's industry terminology. We assume (I hope correctly) that any clean-water operator knows BOD, COD and TSS and that any drinking water operator knows TOC and NTU. But we also have to make allowances for our readers who are newer to the profession.

BEING SELECTIVE

So, should we use the acronyms MLSS, WAS and RAS? Or spell out "mixed liquor suspended solids," "waste activated sludge" and "return



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activated sludge”? When the topic is disinfection, we always say UV instead of “ultraviolet.” But we spell out “dissolved oxygen,” at least on the first mention, instead of just using DO. Does that seem appropriate to you?

Do the vast majority of readers understand TMDL (total maximum daily loading) and MCL (maximum contaminant level)? What about the various treatment technologies and processes? Is BNR good enough, or do we need “biological nutrient removal” on the first mention? MBR or “membrane bioreactor”? DAF or “dissolved air flotation”?

Spelling out terms that every reader knows (or should) insults their intelligence. But to use an acronym that is less universally understood is to leave some readers in the dark.

I guess by now you get the point. If you look across the water industry, you can find literally several pages of acronyms. IMHO, it’s best to use acronyms selectively — enough so that we show familiarity with the industry and respect for readers’ knowledge, but not enough to create blizzards of capital letters and leave some readers wondering what they just read.

It’s a balancing act, and in that spirit, I would certainly welcome your comments on acronyms and how we use them. Send your thoughts to editor@tpomag.com. I hope to get enough of them to justify an interesting follow-up to this column.

BTW, I leave to you to decipher IDK, TBH, FWIW and IMHO — and BTW, for that matter. After all, I wouldn’t want to insult your intelligence.

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WOMEN BREAKING BARRIERS

Utility Reaches Milestone

While engineering remains a male-dominated field, the Birmingham (Alabama) Water Works Board is changing those expectations. The utility has three female engineers on staff who have doctorate degrees in civil engineering and work in water filtration. Meet the engineers in this online exclusive article, which includes video footage provided by BWWB.

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BOTTLED WATER

Counting the Cost

Of course it's preaching to the choir to say this in *TPO*, but bottled water is at best unnecessary and at worst a waste of money and a scourge on the environment. Now there's an online calculator that gives you a quick way to show your customers how much bottled water really costs — to their pocketbooks and to the planet Earth.

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OVERHEARD ONLINE

"Even in the world's richest country, the United States, at least 2 million people still do not have access to piped water."

COVID-19 Heightens Water Problems Worldwide
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NEW RESEARCH

Conservation and Wastewater

When it comes to water conservation in cities that depend on wastewater reuse, even the best intentions can have unintended consequences. That's the message from a team of water economists and engineers who took a close look at how water conservation measures in Southern California after a drought affected the availability of regional wastewater.

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The Central Wastewater Treatment Plant came online in 1917 with just primary clarifiers and a discharge pipe to the Trinity River. It has been upgraded extensively since then to meet increasingly strict effluent limits.



Baseball and Clean Water

INJURY DERAILED LANCE PHILLIPS' CAREER AS A PITCHER AND CATCHER, BUT HE BRINGS ATHLETIC-STYLE ENERGY AND DEDICATION TO HIS WASTEWATER CAREER

STORY: **Steve Frank**

PHOTOGRAPHY: **Olivia Ogren-Hrejsa**

“I believe in the open door. Sometimes I stand out front at the end of the shift or sit on the tailgate of a truck and just talk.”

LANCE PHILLIPS

As a youngster, Lance Phillips played baseball at W.W. Samuell High School in Dallas. Like many boys, he dreamed of playing in the major leagues.

His performance as a catcher and pitcher won him a scholarship to Navarro Junior College, a North Texas school known for sending players to the big leagues. He majored in business and played ball in 1987-88. Injuries derailed his baseball career, but not his ambition to succeed.

Summers found Phillips working as a pipe fitter with his two older brothers. He worked one job in 1987 and 1988 installing pipe at the 110 mgd Southside Wastewater Treatment Plant in Dallas. That experience showed him what the pipes were for and gave him the idea of working in wastewater treatment.

After pipe fitting, he worked at several other jobs, including at a steel mill and for an electrical contractor. Eventually he applied for work in wastewater with the City of Dallas, but a hiring freeze was in effect. Finally, a year and a half later, he got an interview. He started work at the city's Central Wastewater Treatment Plant on Feb. 19, 1992.

It turned out to be a great move; he's still with the plant, now operations manager III, and in 2019 he received a William D. Hatfield Award from the Water Environment Association of Texas.

APPRENTICE AT WORK

Phillips' first job at the Central plant was as an apprentice operator. "Like everyone else, I had six months to get my Class D license and then a year to get

my Class C license," he says. He worked hard, learned plant and treatment operations, and was promoted in 1995 to plant operator.

He kept climbing the career ladder, and along the way, he earned his Class B and Class A wastewater licenses. In 2010 he moved up to shift supervisor, and in 2013 he was promoted to interim assistant plant manager and section supervisor. His promotion to his current position came in February 2016. And, as he says, "I'm not done yet."



Lance Phillips, Dallas Central Wastewater Treatment Plant

POSITION: **Manager III, Operations, Dallas Water Utilities**
EXPERIENCE: **28 years at Central plant**
CERTIFICATIONS: **Class A wastewater operator**
AWARDS: **2019 William D. Hatfield Award**
EDUCATION: **Business studies at Navarro Junior College**
GOAL: **Continue to advance in the wastewater field**





Lance Phillips, right, shown with Richard Britton, special projects supervisor, emphasizes communication with his team and data-driven decision-making.

“On-site training is a big addition to our plant, especially the ability to schedule training classes. Other plants can send people here for training, too.”

LANCE PHILLIPS



Phillips (left) is a big believer in training, both in the classroom and hands-on in the plant. He's shown with Larry Middleton, shift supervisor and training coordinator, and Richard Britton, special projects supervisor, at the Central plant outfall.

Training has always been important in Phillips' work life. “When I first started, we had a training program at the plant,” he says. “Within a couple of years that went away, but the city certified five trainers through the Texas Commission on Environmental Quality, and they can set up continuing education hours as needed.

“On-site training is a big addition to our plant, especially the ability to schedule training classes. Other plants can send people here for training, too. It costs me a little in overtime, but overall it saves the city money.”

The trainers at the Central plant do substantial hands-on instruction that doesn't count toward classroom hours, but it helps team members

(continued)

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just the same: “You can teach in the classroom all you want, but if you’re not doing hands-on training, are your people really learning it?”

OPEN CONCEPT

While emphasizing training, Phillips stresses communication and data-based decision-making. “I believe in an open concept, in being able to get information from everyone,” he says. “I’ve worked in the past with people who didn’t work well with others. When I was an operator, nobody ever asked me what I thought. Now it’s more of an open door, and we collaborate.”

Phillips gets operators and maintenance people together weekly to discuss what’s going on. Information as mundane as birthdays and as important as a major piece of equipment being taken out of service comes up regularly. “There’s so much equipment here that it’s easy to miss something,” he says. “This way, we at least catch up on the major items.”

Decision-making data come from all over. Sometimes it’s informal, but sometimes a more formal setting is used to gather information and troubleshoot problems. Sophisticated techniques such as fishbone diagrams can be used. To help solve problems using data, Phillips and other team members have earned the Lean Six Sigma Green Belt certification.

Not every issue needs such intense exploration: “One of the biggest things is making myself available. I believe in the open door. Sometimes I stand out front at the end of the shift or sit on the tailgate of a truck and just talk.”

PEER RECOGNITION

Phillips’ professional colleagues have recognized his dedication to data-driven decisions and continuous improvement. In 2019, the Water Environment Association of Texas nominated him for Operator of the Year. As the awards committee read through his nomination package, they decided he had earned the William D. Hatfield Award, the Water Environment Federation’s highest honor for operators.

“I’ve spent my whole career in wastewater, and sometimes it’s nice getting a little bonus like that,” Phillips says. “They don’t give that award every year, so it’s special to me.”

The Central plant is huge and is more than 100 years old. It came online in about 1917 with just primary clarifiers and a discharge pipe to the Trinity River. Additional treatment processes were added over the years. The activated sludge process was added when the Clean Water Act took effect in the early 1970s.

The plant has three sections: the Dallas plant, White Rock plant and activated sludge plant. Flows from throughout the service area wind up at the Dallas or White Rock plant. Each has a lift station, bar screens, grit removal, trickling filters and secondary basins.

REUSING WATER

The flows come together at activated sludge influent pump stations installed in 1986. The station effluent is pumped to two activated sludge plants (Complex A and Complex B), secondary clarifiers and then to gaseous chlorination contact chambers for disinfection.

Since 2012, the Central plant has delivered chlorinated reuse water to two nearby golf courses and a city park. To meet Texas Commission on Environmental Quality requirements, “Chlorine residual is 1.0 ppm leaving the plant,” Phillips says. “The chlorine dissipates pretty quickly.” Effluent not diverted to reuse is gravity filtered, treated with sulfur dioxide to dechlorinate and discharged to the Trinity River.

The nearest golf course irrigating with reuse water is about half a mile away; the other is about 6 miles. A tank at one course and a pond at the other provide temporary storage for the water before it is used. Signs tell golfers their course is irrigated with reuse water. “In eight years, I haven’t had one phone call,” or other complaint, Phillips says.

Over the past several years, North Texas saw a big push toward water reuse because of drought. The drought broke in 2015, and when it did, the rain brought flooding. “We treated over 500 million gallons one day,” Phillips says. “Things moved fast. Sometimes we stored it, and sometimes we let it go. Operators made decisions on the spot.”

Operators made store-or-release decisions because there was no time to run ideas up the supervisory chain and wait for a determination: “They couldn’t wait for me to decide whether to store it or process and release it. You can’t micromanage in this position. If you do, you’ll run yourself into the ground.”

READY FOR CHANGE

There has been plenty of rain since 2015. Lakes are full, and the reuse push has subsided as a priority. “We have major changes coming in the next few years,” Phillips says, but it’s hard to see with a murky crystal ball what changes will come. “We went to 60% design for biological nutrient removal, but that project was put on hold because we didn’t get the phosphorus limit we were expecting in our permit.”

Their phosphorus performance is now at about 2.6 mg/L, against no specific limit. Phillips estimates it would cost about \$30 million to change to biological nutrient removal. “There was a huge push to get to BNR, but that push has slowed down now that PFAS removal is getting so much attention. It’s become the constituent of major concern.”

And the next chapter is yet to be written. **tpo**

“You can’t micromanage in this position. If you do, you’ll run yourself into the ground.”

LANCE PHILLIPS

THE OTHER CAREER

Baseball and wastewater treatment seem to have little in common. One is an athletic endeavor; the other is scientific and technical. Yet both benefit from good coaches and managers.

Lance Phillips played baseball as a young man, attending Navarro Junior College on a baseball scholarship. Persistent shoulder pain and failure to rest properly cut his playing career short, but it didn’t dampen his desire to be involved in the game.

“I’ve played, coached and instructed baseball for 42 years,” he says. “For 13 years I worked the night shift and was able to coach my kids and others. In 1998, I started coaching and instructing baseball at the Dallas Baseball Academy of Texas and did that until 2017. I had a great, successful career but stopped to spend more time with my new daughter and family.”

Coaching skills are an everyday part of life for Phillips: “What you put into it is what you get out of it.” He finds it important to teach the proper way of doing things and to check that it’s being done properly. Repetition makes habits. For example, Phillips says, “Repeating the correct swing builds muscle memory and confidence.”

During his “other career” in baseball, Phillips mainly coached 15- to 16-year-olds through the baseball academy. His team won the American Amateur Baseball Congress championship for 15-year-olds in 2009: “I had some great, satisfying moments teaching kids. Like a 4-year-old who can’t hit the ball off a tee and 30 minutes later he’s hitting the ball to the back of the cage.”

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A SURVEY FINDS AMERICANS CONSIDER WATER SCARCITY A MAJOR CONCERN AND SHOW STRONG SUPPORT FOR WATER RECYCLING FOR IRRIGATION AND DRINKING

By Ted J. Rulseh

Even in the largely water-rich U.S., a majority of people see water scarcity as a major environmental concern and support water recycling. That's a key result of a 2020 Earth Day survey of Americans commissioned by SUEZ Water Technologies & Solutions.

Nearly 75% of those surveyed agree that there is a global climate crisis. Sixty-nine percent of survey respondents say water scarcity is a significant concern of theirs, and 74% agree that more needs to be done in their communities to conserve water. The survey found widespread acceptance of recycled water: 34% of respondents say they would drink recycled water, and 48% are open to its use for irrigation. Only 5% say they would not be comfortable using recycled water for any purpose.

At the same time, 70% of respondents strongly or somewhat agree that recycled water carries a stigma. Seventy-five percent say they would be willing to see their taxes increase if it meant their community would invest more in protecting the local water supply.

Yuvbir Singh, SUEZ CEO, observes, "While most Americans accept the use of recycled water, they aren't sure their communities are ready to take the plunge. This really highlights the need for broader educational campaigns about the safety of this technology and for further investment in sustainable infrastructure and industrial projects."

Kevin Cassidy, executive vice president of SUEZ, talked about the survey and its implications in an interview with *Treatment Plant Operator*.

tpo: Why did your company commission this survey?

Cassidy: It was to connect with our communities and customers and get a sense of where we stand on some important topics. One of our core values is passion for the environment. We wanted to understand what's on people's minds, what they understand, and what are they curious about and worried about as it relates to water. We released the results on Earth Day to give everybody a chance to step back and reflect on how they can make a difference.

tpo: What was your biggest takeaway from the survey results?

Cassidy: One thing I found interesting was the level of awareness and acceptance of topics like water reuse. I led part of our business in Asia for six years, and I lived in Singapore where you don't even need to talk about water reuse, because it's second nature. Water plants there are open to the public; they have museum-type setups with interactive exhibits to help people understand how things work. When I saw our survey results, I was really encouraged: This is something Americans are more accepting of than a lot

of us realized. It feels like there is a desire to understand more and to be more aware.

tpo: Was it surprising that so many people called climate change a major issue and saw water scarcity as a personal concern?

Cassidy: Climate change gets a lot of press, but less media attention is focused on water and, more important, the value of water. So it was surprising in a positive way to see that people do have concerns and that they are interested in what can be done and how they can help.

tpo: What opinions did respondents have about the greatest threats to water supplies?

Cassidy: People were worried about different pollutants and contaminants, from microplastics and fertilizers to PFAS, which is the one that's getting the most attention lately. These are things we deal with daily when we help our customers in purifying water.

tpo: What was your reaction to the 76% of respondents who say more people should be educated on the problem of water scarcity?

Cassidy: I was glad to see that. Education is an important part of driving more water conservation and water reuse. I think more people need to understand the true value of water, what it costs in real terms and what's behind it.

“I think more people need to understand the true value of water, what it costs in real terms and what's behind it.”

KEVIN CASSIDY


tpo: How would you say the survey results are relevant to water and wastewater operators and others in the water industry?

Cassidy: We talk a lot about the circular economy. That's what we'd like water professionals to start asking and talking more about: driving more reuse, driving understanding of options. There are places in the world where this is already accepted and adopted, and we can all learn from that and move things forward together.

tpo: Did it surprise you that most respondents say water conservation is not enough and that more technology-based action is needed?



Kevin Cassidy



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3/4 are willing to see their **taxes increase** to see their city **protect** their local **water supply** more

SUEZ

Cassidy: I agree that conservation is not the only thing we can do. Reuse is at the heart of it. It's been easy for companies or consumers to just draw from surface waters or groundwater nearby. But the technology is there to enable greater efficiency, higher recovery rates, reuse on site, closed loops and everything else that can be done to streamline the process. We need to do more to use what we have more wisely.

NOTE: This online survey of 2,000 U.S. adults was commissioned by SUEZ Water Technologies & Solutions and conducted by the OnePoll market research company on Feb. 13-18, 2020. Participants were paid, and the survey was overseen and edited by the OnePoll research team. Participants opted in through the OnePoll website where core demographic information (such as gender, age and region) was collected, with a verification process to ensure that postal code and email addresses were correct. Participants were then sent an email containing a link to confirm their registration. The survey margin of error was plus or minus 2.2%. The complete survey results are available at my.suezwatertechnologies.com/WTSCustomerPortal/s/content-download?DN=Climate_Change_Anxiety_Survey.pdf. tpo

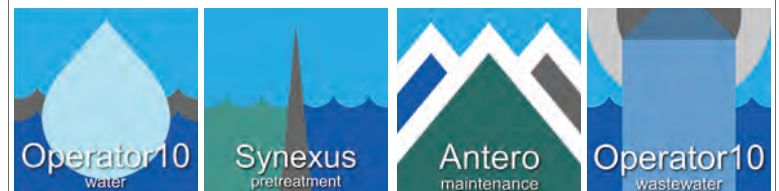
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Operator trainee James Schaff replaces filter cartridges in the treatment plant's reverse osmosis system.

A Better Way

IN SEEKING ITS OWN DRINKING WATER SUPPLY, TARPON SPRINGS CHOSE REVERSE OSMOSIS TREATMENT. THE OPERATIONS TEAM STEPPED RIGHT UP TO THE CHALLENGES.

STORY: **David Steinkraus** | PHOTOGRAPHY: **Heidi Kurpiela**

When the City of Tarpon Springs, Florida, decided to build its own water treatment plant, it selected reverse osmosis.

The city had purchased water from Pinellas County but wanted an independent supply, says Ronald Claunch, the RO plant's lead operator. With its own plant, the city can set prices and capital budgets that allow for future development, says Earl Nash, water division manager.

Construction began in 2013, and the plant opened in 2015. CDM Smith created a 30% design, Tetra Tech handled the remainder of the design, and Wharton-Smith was the general contractor. The design-build approach enabled process adjustments based on communication among the city team, designer and contractor.

Their work earned two Outstanding Water Treatment Plant awards from the Florida Section AWWA, in 2016 and 2018. Claunch earned a 2019 Outstanding Operator Award from the Southeast Desalting Association, and Kelly Frazier, chief operator, won that award in 2017. "We're constantly looking for a better way to get our work done," Frazier says.

The team is proud of the city's well management program, the caustic system installation and the plant in general.

BRACKISH CHALLENGE

Tarpon Springs, on the west coast of Florida, has a population of about 25,500. It's at the north end of Pinellas County (population 975,000), which includes St. Petersburg. Because Tarpon Springs is a coastal city, the water in its aquifer is naturally brackish. RO was the best technology to make that water useable, and the regulatory environment probably would have pushed the city to RO in any case.

“The team members have done a really good job from startup to where we are, with day-to-day learning and improving as we go.”

EARL NASH

In the near term, the city wants to drill more wells. "We started with the wells necessary to start the plant," Nash says. "The RO system can produce more water than we are able to feed it at the moment, and that's for our future development."

Because the aquifer is of poor quality and high conductivity, Claunch observes, more wells would



Tarpon Springs opened its \$36 million reverse osmosis plant in 2015, allowing the municipality to pump and filter its own water instead of buying it from Pinellas County.

Tarpon Springs (Florida) Water Treatment Plant

www.ctsfl.us

BUILT:
2013-15

POPULATION SERVED:
28,000

SERVICE AREA:
16.1 square miles

EMPLOYEES:
12

FLOWS:
6.4 mgd design/2.5 mgd average

SOURCE WATER:
19 wells

SYSTEM STORAGE:
5 million gallons

DISTRIBUTION:
180.2 miles of water mains

ANNUAL BUDGET:
\$8.6 million (operations)

KEY CHALLENGE:
Conductivity in the feed water

spread raw water demand over a larger wellfield and provide the flexibility to take wells out of service for maintenance.

The operators' work includes well rehabilitation as part of a well management program that began in 2018 when capacity in some wells began to decrease. Maintenance and instrumentation staff members handle basic rehabilitation with a 12% hydrochloric acid that is pushed into the well and allowed to sit for 24 hours.

"Florida is basically lime rock, and acid helps open some of the rock formation to get more water to the well," Frazier says. Operators perform bleaching to reduce iron and bacteria.

AGGRESSIVE WATER

A sodium hydroxide system was installed in 2017 to give better alkalinity control. "One of the challenges with RO is that after water goes through, it's aggressive; it has very little hardness in it or none at all," Nash says. "We have to put some back in."

When the plant opened, operators did that with calcium hydroxide and carbon dioxide. Too much calcium hydroxide creates turbidity, yet calcium hydroxide is also cheap and is now used for large adjustments. Operators use sodium hydroxide to make fine adjustments and to control turbidity.

Now in the design phase is the addition of solar panels to offset some of the plant's power needs. In case the power grid fails, the plant has a 2.5 MW diesel generator (Caterpillar Inc., Electric Power Division) that can power the RO system and some of the wells on the plant site. Ten portable generators (Blue Star) can be moved to remote well sites to keep pumps operating, and more portables are available from the city if the need arises. "We're vulnerable to hurricane season, and we want to be prepared," Claunch says.

The people who make the facility work besides those already mentioned are:

- Ray Page, utilities superintendent
- Michele Koziol, water division coordinator

- James Garner, lead operator; John Giordono, Jacqueline Douglas, Lowell Quarterman and Mark Van Der Horst, operators; and James Schaff, operator trainee
- Cassandra Arter, compliance officer
- Justin Economos, maintenance technician, and Jeff Geary, instrumentation technician

DESIGNED FOR THE FUTURE

Raw water comes into the plant through a 20-inch pipe fed by 19 wells: some on site and the most distant one about 3 miles away. Water first flows through 5-micron spiral-wound cartridge filters (Tri-Dim) in housings from Fluytec. There are four housings with 150 filters in each. This step traps large debris that would clog the membranes. At this stage, pH is adjusted with sulfuric acid and an anti-scalant (American Water Chemicals) to keep iron in solution.

Next, Flowserve pumps send water through the RO filters (Harn R/O Systems with DuPont Water Solutions membranes). Groups of filters are assembled into skids, of which there are three. Each skid has a two-stage filter arrangement. The first stage is 42 pressure vessels with seven membrane cartridges in each; the second stage is 21 pressure vessels, each also with seven membrane cartridges.

One skid is always offline for rotation, while one or two operate depending on tank levels and wellfield management. Treated water goes to a forced-air degasification tower (Jacobs Air Water Systems) to remove hydrogen sulfide, which is common in Florida groundwater.

Next in line are biological scrubbers (Jacobs Air Water Systems) that use bacteria on a growth media to break down the hydrogen sulfide. These are

“We’re constantly looking for a better way to get our work done.”
KELLY FRAZIER



The team at the Tarpon Springs Water Treatment Plant includes, from left, Jeff Geary, instrumentation technician; Earl Nash, water division manager; Mark Van Der Horst, operator; Ronald Claunch and James Garner, lead operators; Kelly Frazier, chief operator; Lowell Quarterman, operator; Michele Koziol, water division coordinator; James Schaff, operator trainee; Cassandra Arter, compliance officer; and Justin Economos, maintenance technician.

(continued)

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AFTER AERATION



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- 2) Raise pH levels
- 3) Raise dissolve oxygen levels (<2.0 ppm)
- 4) Reduce BOD by 70%
- 5) Reduce F.O.G. by 70%
- 6) Reduce TSS by 75%

RESULTS

- 1) Fines were eliminated
- 2) Ph. levels steady at 7.65 ppm
- 3) DO levels averaging 4.6 ppm
- 4) BOD reduced by 93.75%
- 5) F.O.G. reduced by 82.30%
- 6) TSS reduced by 87.5%



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Jeff Geary takes a voltage reading in the facility's main PLC cabinet.

not in use at the moment because while there is enough hydrogen sulfide to require degasification, there isn't so much that it must be scrubbed before release, Nash says.

Biological scrubbers are more economical to operate long-term than a chemical-based system, Claunch says. If future wells contain enough hydrogen to require scrubbing, the system would be seeded with bacteria just as a wastewater system is.

From the degassing towers, water flows to the clearwell. The first section is a contact chamber for chlorination, and the second section is for introduction of conditioning chemicals. An on-site, 5 million-gallon storage tank is designed as a tank within a tank: It has two concentric circular tanks of 2.5 million gallons each that can be operated independently if needed, so one can be taken offline for maintenance.

Brine waste (concentrate) from the RO process is sent to a 1,200-foot-deep injection well offsite. Water in that deep aquifer is of similar conductivity and is so deep that private wells in the area cannot tap it.

(continued)

James Garner at the helm of a service pump (Flowserve).



STAFFING FOR RO

When Tarpon Springs, Florida, built its reverse osmosis water treatment plant, there was no plant to replace. The city wanted to stop buying water and control its own supply.

In the beginning, the city created a position for a water division manager and an environmental scientist to help with compliance, says Earl Nash, water division manager. New operator jobs were created, and while the city hired some experienced operators, others needed training on RO technology. In general, people with RO experience are harder to find than operators with other backgrounds, says Ronald Claunch, lead operator.

People inexperienced in RO learned from the experienced operators hired to start the plant. Good training is offered through the Southeast Desalting Association. That organization trains specifically for membrane technology, which is in wide use in coastal Florida, the Bahamas and on other islands in the Caribbean, observes Kelly Frazier, chief operator.

To help the Florida water industry, the city has made a point of having two trainee positions at the plant. "One of the challenges of having operations staff is they have to be certified," Nash says. "There are people out there who take the test and have their courses passed, but they can't accept a job because they don't have the required number of hours operating a plant."

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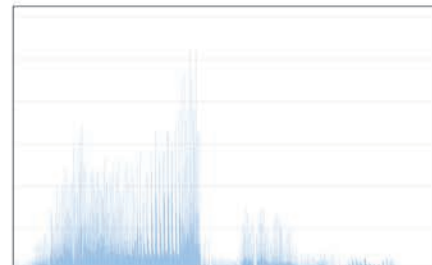
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A BETTER SYSTEM

The Tarpons Springs plant is the first RO facility that Claunch has operated, and he prefers it to other types. It's also more challenging; many ground-water treatment facilities don't have to do as much to their raw water, Nash says.

Frazier observes, "We spend a lot of time on sampling events. In the beginning, one of the challenges was dosing lime appropriately." There was also the challenge of learning a new system and the day-to-day challenge when more well pumps are switched on to fill storage tanks. Each well has water with its own characteristics, so changing the raw water feed changes the conductivity. That affects pressure in the system, which affects everything in the plant.

Nash notes, "This plant was totally new for the city, and all the team members have done a really good job from startup to where we are, with day-to-day learning and improving as we go." **tpo**

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Ronald Claunch,
lead operator



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-Jeff Pippenger, Utilities Administrator.
Eau Claire, Wisconsin Wastewater Treatment Plant



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Fast-Track Fix

A NEW YORK TOWN REMOVES PFAS FROM ITS DRINKING WATER SUPPLY IN FOUR MONTHS USING A GRANULAR ACTIVATED CARBON TREATMENT SYSTEM

By Fil L. Fina III

PFAFAS, used in nonstick and waterproof coatings, personal products and fire suppression foams, have become a significant concern for drinking water utilities.

These long-molecular-chain fluoride and carbon chemicals are resilient and are suspected of being linked to many health risks. Federal oversight with clearly defined safe and unsafe thresholds has been absent, leading many states to set their own standards.

For local government decision-makers, media coverage of the issue has created a need for some knowledge of high school chemistry: parts per trillion, compounds, molecular chains, adsorption and absorption are commonly used terms.

Unfortunately PFAS, known as “forever chemicals,” are still considered emerging contaminants, and so regulatory consensus remains elusive. While many treatment methods are being discussed, it is hard to know what is proven to work.

Therefore, recent experience of the Town of New Windsor, New York, is of interest. Aztech Environmental Technologies, a LaBella Company, designed, procured and installed a PFAS treatment system for the town in only four months.

NO PFAS — AT FIRST

Historically, the town purchased water from the City of New York (Catskill Aqueduct) at significant expense. Town officials worked for more than 12 years to develop an independent water source, ultimately drilling and constructing three wells, which are the largest-yielding municipal wells in the state.

Knowing about issues at the nearby Washington Lake site, in 2016 the town sampled the new wells for PFAS and found them nondetect, based on detection limits in the range of 10 parts per trillion.

After development of the wells, the Butterhill Water Treatment Plant was constructed with a design capacity of 6.4 mgd. It was designed to treat elevated levels of iron and manganese, which were identified in the well water. The plant went online in August 2018.

TROUBLE DETECTED

Later, on two occasions, the state Department of Health tested water from the Butterhill plant; the samples tested positive for PFAS (notably PFOA and PFOS). However, town officials and representatives were not told of the results until February 2019, and only verbal confirmation of a positive result was provided.



Granular activated carbon adsorber pipes are connected to a valve manifold that directs the water to and from the granular activated carbon vessels.

The written report town officials received was the first indication of the specific levels of PFOA and PFOS in the water that sourced the wells. The levels were below the U.S. EPA public health advisory and even the proposed maximum contaminant limit.

Still, out of an abundance of caution for its residents, the town shut down the wellfield and returned to the Catskill Aqueduct for its source of supply. Officials quickly realized they were on the clock for solutions for the Butterhill plant: A planned maintenance closure of the Catskill Aqueduct was scheduled for November 2019.

REVIEWING OPTIONS

The New York State Department of Environmental Conservation retained Aztech to develop a solution. Given the short timeline, the company turned to carbon: readily available, easy to procure and one of the most reliable treatment technologies.

The New Windsor story illustrates that it is possible to treat a PFAS-contaminated water supply in a relatively short time.

Granular activated carbon has long been used in water treatment for its ability to adsorb most chemical compounds while allowing clean water to pass through. Another treatment considered was ion-exchange resin, which offers some advantages and trade-offs.

Whereas carbon adsorbs most organics, ion exchange can be tailored to adsorb only certain compounds. This tailoring of treatment can extend bed life and reduce media changeouts. Resin vessels can also have a smaller footprint due to the lower residence time than carbon. However, resin costs more than carbon, and some resins cannot be regenerated, requiring thermal destruction. Aztech recommended the GAC treatment, and the DEC agreed to proceed.

DEPLOYING THE SOLUTION

The New Windsor system consisted of six 10-foot-diameter, 20,000-pound carbon units, able to produce 1,500 gpm (2.16 mgd). The balance of the sup-

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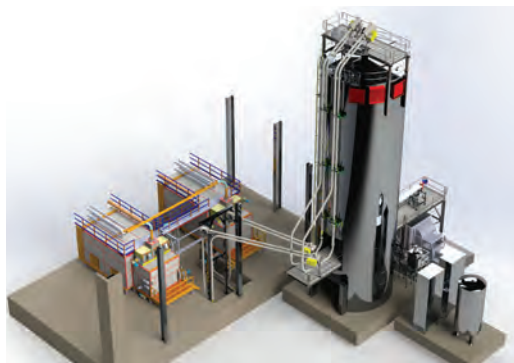
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This granular activated carbon vessel pair is one of three at the Butterhill Water Filtration Plant in New York. Raw water flows top to bottom through the lead vessel and then through the lag vessel.

ply was provided by neighboring municipal systems and a smaller supply well, owned by the town.

After the carbon vessels were delivered and installed, disinfection and testing were performed on the vessels and related plumbing. Backwashable GAC vessels were installed and also tested.

Backwashing of carbon vessels is occasionally required to reduce water flow channelization and to remove any materials that may have been deposited on the top of the carbon bed. However, it presents some issues. Breakthrough of PFAS constituents can occur due to the redistribution of the bed, moving

more contaminated carbon particles from the upper bed to the lower bed. With that in mind, the backwash procedure and schedule has to be well planned.

The Butterhill plant water was deemed compliant after testing for bacteria, microbes and turbidity according to state Department of Health regulations. The GAC treatment system was brought online, and the Butterhill treatment plant was once again fully operational, producing water with undetectable PFAS contamination.

LESSONS LEARNED

Since commissioning, some site water drainage modifications have been made. In addition, a tensioned fabric building was constructed and propane tanks and heaters were added to keep the system operational through the winter.

The New Windsor story illustrates that it is possible to treat a PFAS-contaminated water supply in a relatively short time. Aztech designed, built and tested that system using in-house services, but in other instances, the company has collaborated with customers' consultants and engineers.

Available funding may depend on the source of contamination; in New Windsor, questions remain about culpability for the contamination; for the time being, the state of New York is funding the project. Cost recovery will begin after the responsible party is determined.

Plants located near potential PFAS sources should test for contamination regularly and proactively. Depending on the plant and contamination levels, some cities and towns may choose to seek uncontaminated water sources elsewhere. However, cost-effective treatment is possible and will likely become more refined with each community that tackles the challenge.

ABOUT THE AUTHOR

Fil L. Fina III, P.E., (ffina3@aztechenv.com) is environmental remediation program manager at Aztech Environmental Technologies, a LaBella Company and a full-service environmental, geology/hydrogeology and remediation consulting and contracting firm. tpo

Love at First Sight

JEREMY CARNAHAN IMMEDIATELY TOOK TO THE CLEAN-WATER PROFESSION. HIS ENTHUSIASM HAS ONLY INCREASED AS HE WORKED HIS WAY UP THE LADDER.

STORY: **Suzan Chin-Taylor**

PHOTOGRAPHY: **Stephen Brashear**

A simple description for Jeremy Carnahan is that he's a natural. His exposure to wastewater and sanitation began during Army tours of duty in Iraq. He was "voluntold" (as he puts it) to handle the construction of sanitation structures for field operations and support personnel.

For Carnahan, it was love at first latrine dig. These days, as operations supervisor with the Pierce County (Washington) Planning and Public Works Sewer Division, he takes every opportunity to further his education in wastewater and process management. He also facilitates education and conversation about the challenges facing the industry.

REALLY DIGGING IT

Carnahan took to wastewater work with a natural fascination for the mechanics and the importance of it. Throughout his tours in Iraq, he was consistently promoted to greater responsibility for managing sanitation construction projects.

Upon discharge in 2006, wanting a career in wastewater infrastructure, he entered the industry in the private sector with R/S Construction and Excavation, installing underground utilities, building lift stations, installing waterlines and sewer lines, and operating a sewer cleaning and vacuum truck. The work included pumping septic tanks, clean-outs and manholes. It all solidified his desire to become more deeply involved in the field.

Jeremy Carnahan, operations supervisor, Pierce County (Washington) Planning and Public Works Sewer Division





Jeremy Carnahan enjoys challenges and finding solutions to tough problems, especially when they involve brainstorming and feedback from his team.

“I don’t know what it was that clicked for me to pick up the information so quickly, but I immediately saw the math and the biology and became hungry to learn more.”

JEREMY CARNAHAN

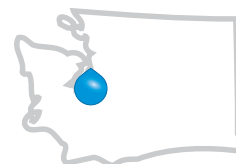
After finding himself a single parent, in May 2015 he shifted to a position with the City of Puyallup Wastewater Treatment Plant with an extended aeration activated sludge design (14 mgd design, 6 mgd average). This career move offered more stable hours to give him the family time he now needed. The job included a mixed bag of tasks: grounds maintenance, pressure washing, basin cleaning and others. “As soon as I started that job, I loved it,” Carnahan says, “I don’t know what it was that clicked for me to pick up the information so quickly, but I immediately saw the math and the biology and became hungry to learn more.”

BACK TO SCHOOL

That was the start of his rapid rise. His fresh perspective and eagerness to learn led him to constantly question experienced operators. “I was just a sponge for information, asking questions almost to the point of annoying my supervisor. He encouraged me to investigate a degree program in wastewater offered at the local community Green River College.

“I was excited I could get a formal education using my GI Bill in a field I loved, but it was scary, too.” It meant working and going to school full-time, a challenge for the father of young children. “I had to weigh whether it was

Jeremy Carnahan, Pierce County, Washington



POSITION:
Operations supervisor, Planning and Public Works Sewer Division

EXPERIENCE:
5 years in the industry

EDUCATION:
Associate degrees in wastewater management and water distribution; working on bachelor’s degree in applied management

LICENSING:
Wastewater operator 4, water treatment operator 1, water

distribution manager 1, cross-connection control specialist

AWARDS:
2019 Western Washington Wastewater Treatment Plant Operator of the Year, Pacific Northwest Clean Water Association

GOAL:
Continue learning and educating; implement the best of new technology

worth the sacrifice. It only took me two quarters of school to see that it was definitely worth it. That made me love this industry much more.”

He has earned associate degrees in wastewater management and water distribution and is working toward a bachelor’s degree in applied management. His superiors, seeing his commitment and leadership ability, quickly promoted him as he progressed in education and operator certification. While at the Puyallup plant, he operated a biological nutrient removal process; that made him an excellent candidate for a position with Pierce County in August 2018 at the Chambers Creek and Cascadia facilities.

EMBRACING TECHNOLOGY

Carnahan admits to being a technology geek and an early adopter, always seeking the latest solutions and processes that can make a system better. His acceptance of the Pierce County position was due largely to the agency’s cut-

Jeremy Carnahan believes in training people well enough so they can leave, but treating them well enough so they want to stay.

ting-edge technology, which included an anaerobic ammonium oxidation, or anammox, system and a membrane bioreactor.

“The opportunity to gain first-hand experience working with these processes was intriguing,” Carnahan says. “Pierce County’s Chambers Creek Regional Wastewater Treatment Plant is the only plant in the Northwest and one of only two in the nation with the anammox system, so I had to jump on it.”

After six months as an operator level II at Chambers Creek (44 mgd design, 16 mgd average), Carnahan was promoted to operator level III. Almost exactly a year from the day he was hired, he earned a promotion to supervisor. He was excited about



RECRUITING THE NEXT WAVE

Like most utilities, the Pierce County (Washington) Planning and Public Works Sewer Division faces the Silver Tsunami. Jeremy Carnahan, operations supervisor, is taking a proactive approach by recruiting soon-to-be or fresh high school graduates.

He hits them point-blank with tough questions about what their opportunities are versus what they think they are and whether they ever thought about the wastewater industry. “When I bring up our industry to young people, most don’t even know it exists as an option,” he says. “They are shocked to hear how quickly they can train and enter such a dynamic field with good earning potential that is very recession resistant.”

It sometimes shocks and pleases him that so many show interest in knowing more about how to get involved in the field he loves. He stresses the importance of math and science. They perk up, when he speaks about their algebra class. They may wonder: When am I ever going to use this? His answer: “In your career as a top-level wastewater operator.”

Carnahan encourages his peers to reach out to that segment of the population: “All you have to do is open the door so they can peek inside. Those with an affinity for math and science will typically dive in headfirst and go for it.”

All this has been rewarding for Carnahan: He often meets someone he introduced to the career only a few years back and learns they are now a lead operator, able to discuss processes on a high level. “It is important for us to be mentors and to seek out mentors all throughout our careers,” Carnahan advises, “Never stop looking for things to learn, and don’t be surprised if your apprentice become the teacher.”



The Chambers Creek Wastewater Plant in Tacoma, Washington.

the increase in responsibility and the potential as a leader to create a positive impact on his work group.

Carnahan prefers to work hands-on whenever possible. He enjoys being in the thick of it when something has gone amiss and requires a mess to clean up or a solution to a tough problem that involves brainstorming and feedback. He also appreciates overseeing processes and leading a highly skilled group of professionals working to protect the environment and public health at both the Chambers Creek and Cascadia facilities.

MIX IT UP, MAKE IT BETTER

Shedding the military imperative to follow orders without question, Carnahan came to civilian life with determination to question the status quo. He admits that one of his pet peeves is hearing, “That’s the way we’ve always done it.”

And that is why he enjoys his work at Pierce County: The organization is extremely forward-thinking in its approach and culture. That organizational

mindset makes Carnahan comfortable encouraging his team to examine “why” and “how” and to consider whether they are doing things the best way.

The key members on his team of 15 are lead operators Derek Sobczak, Todd Carlson, Roland Randolph and Dennis Cossett; Aaron Jones, operator in training; and Amanda Tobin, lab analyst.

Being responsible for process control and being a key member of complex projects like implementing a pilot BNR study, Carnahan makes sure his team is fully engaged instead of performing tasks by habit. “My role as a supervisor to this group of very knowledgeable operators is to help them understand why we’re doing what we do or why I’ve made the decisions I’ve made,” he says.

His draws his management philosophy from his favorite quotes of business magnate Richard Branson: Train people well enough to leave, but treat them well enough that they want to stay. Carnahan observes, “I want to give my team all the tools they need to be an awesome operator anywhere, but when that door opens, they’ll have to think about whether or not leaving here would be better for them.”

DOING THE MATH

Carnahan believes education and having a relationship with “the numbers” are keys to an operator’s success and career advancement. For many, math and science can be challenging, but Carnahan believes that can be overcome by connecting the numbers on paper with what happens in the process. He attributes his career rise partly to his nurturing relationship with the numbers.

To foster consistent team engagement, weigh-in and buy-in, Carnahan emphatically supports communication and the sharing of ideas. He saw that when large groups were brought together, there were volumes of opinions. He is less concerned with reaching people than with getting people talking, playing devil’s advocate if necessary and encouraging productive conversation.

As part of the team in charge of setting BNR pilot study objectives, Carnahan recalls, “I would spur on dialogue with the team to get them talking and sharing their perspectives. By doing this, we got everyone active in the problem-solving process.”

Carnahan also encourages active participation and communication to solve common problems beyond

“It is critical to understand other people’s perspectives. That takes education and outreach.”

JEREMY CARNAHAN

his own plant: “When it comes to process control and treatment plants, there are a million ways to go about things because there are a million variables inside the plant and an equal number of ways to make it work based on your own perspective. It is critical to understand other people’s perspectives. That takes education and outreach.”

BRIDGING THE GAP

Carnahan’s military background helped make him a natural leader. He has a talent for reading and understanding different personalities and knowing

how to work with the differences. He shifts communication and training approaches to fit the individual instead of using a single management style or method.

He stresses asking questions to understand others’ perspectives and gain clarity. That is especially helpful when working with a multigenerational team. “When we listen to respond instead of listening to understand, nothing happens,” he says. Bridging communication between older team members and younger recruits is a priority for preparing his agency for the future.

“Our industry as a whole is looking to change our culture for the better,” Carnahan says, “We may not know precisely what that will look like, and it may take generations to get there. But if we continue to educate our community, develop our workforce, build trust, listen, and encourage transparent, honest and open communication, we’ll get where we need to be.” **tpo**

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Digesters at the Theresa Street Water Resource Recovery Facility display the Lincoln Renew logo.

Pipeline Quality

A NEBRASKA CITY REPLACES A COMBINED HEAT AND POWER FACILITY
WITH A GAS SCRUBBING SYSTEM THAT YIELDS RENEWABLE FUEL FOR VEHICLES

By Steve Lund

When it came time to replace the biogas-fueled combined heat and power system at the Theresa Street Water Resource Recovery Facility in Nebraska, one number stood out: the price of utility electricity.

“Right now, power in the Midwest, certainly here, is fairly reasonable,” says Steve Crisler, superintendent of water resource recovery facilities for Lincoln Wastewater System. “It’s 5 cents per kilowatt-hour. To spend the capital, operating and maintenance costs to offset 5-cent power was a challenge.”

But the CHP system that had produced about a third of the facility’s power and heated the digesters since 1991 was showing its age. The generators had been rebuilt several times by 2014, when the utility staff began discussing alternative uses for the methane produced by three egg-shaped digesters at the Theresa Street facility (28 mgd design, 26 mgd average).

“The system in general, at 25 years old, was reaching the end of its useful life, certainly the end of its efficient life,” Crisler says.

MULTIPLE OPTIONS

HDR Engineering helped evaluate 11 alternatives; the team then pared the list to four. One was selling the biogas, with some sulfur and moisture removed, to the University of Nebraska. That would have relatively low capital costs but a long payback. Reinvesting in CHP required more capital but a shorter payback.

Producing pipeline-quality natural gas and marketing it as a vehicle fuel had the highest initial costs but a short payback of four to five years. That was the option selected. The key to the decision was the federal renewable fuel standard program, which offers credits known as Renewable Identification Numbers.

By scrubbing the biogas to pipeline quality and marketing it for vehicle fuel, the utility can qualify the gas as an advanced biofuel eligible for RINs.

The project will cost about \$9 million overall, but it can generate about \$2 million to \$3 million a year from fuel sales and the credits.

The buyers of the credits are fossil fuel suppliers and refiners that are required under federal law to blend renewable fuels into transportation fuels and to buy RINs to meet their obligations under the U.S. EPA Renewable Fuel Standard program volume obligations. The credits create the value of the renewable natural gas purchased by a fuel company.

“If you break it down to Btus, we are very close to energy neutral on an annual basis and even positive in the summer season. We’re very proud of that.”

STEVE CRISLER

WHEELS IN MOTION

In February, the Lincoln City Council approved a contract with Blue-source, an energy management company, to oversee the sale of the gas, including storage, marketing and the sale of the environmental credits. “The Renewable Fuel program is the game changer,” Crisler says. “That is the source of revenue that pays for the investment rather quickly.”

Although RIN legislation has set up the program only through 2022, Crisler is confident it will stay in place. Even if not, the clean biofuel will have value. “In the future, we can supply gas to our transit system, StarTran, or to our own city fleet,” Crisler says.

“There are a lot of options with pipeline-quality fuel coming out of this facility over and above the federal Renewable Fuel program. It may not have the same return on investment, but it’s certainly a viable option for us. It’s a sustainable project.”



Unison Solutions gas carbon dioxide cleaning equipment was installed for the conversion from combined heat and power to producing pipeline-quality renewable natural gas for transportation fuel.

SIMPLE TRANSITION

The project will not substantially affect facility operations. Instead of going to the CHP system, the gas will go through a series of steps to reduce moisture, hydrogen sulfide and siloxane and then through a membrane to remove carbon dioxide. Finally, the gas will be chilled to remove more moisture before it is compressed and fed to the pipeline.

After years of maintaining a CHP facility, Crisler thinks the facility staff will be well equipped to maintain the gas scrubbing equipment. "We feel the fuel-cleaning equipment, compressors and membranes are right up our alley," Crisler says. "We think this will be a little easier to maintain than the CHP facility."

Gas scrubbing was scheduled to begin in April, and the portal to the pipeline was expected to be operational by June 1. Lincoln expects to produce about 8,000 MMBtu of renewable natural gas per month thereafter. The project is already a point of pride in Lincoln. The egg-shaped digesters now have the Lincoln Renew logo painted on them.

EXPORTING ENERGY

Advanced biofuel production is hardly the first big sustainability project for Lincoln Wastewater System. In 2014, the utility began sending treated effluent to the 164-acre University of Nebraska Innovation Campus for heating and cooling.

The campus, next to the Theresa Street facility, uses the thermal capacity of the 55- to 75-degree F effluent for heating and cooling, then sends it back to the facility for discharge into Salt Creek. Lincoln's other water resource recovery facility, Northeast (10 mgd design, 5 mgd average), sends its effluent to the Lincoln Electric System Terry Bundy Generating Station for its cooling tower.

The facilities also use effluent for washing and process water. If purchased from the municipal system, that water would cost about half a million dollars a year.

Lincoln long ago replaced the typical packing on pumps to mechanical seals that stop leaks and allow the pumps to operate at lower amperage, saving 10% to 30% on energy. Later, variable-speed drives and soft-start switches were added to equipment at the facilities.

Ceramic fine-bubble diffusers (Sanitaire - a Xylem Brand) and Turblex blowers with variable guide vanes were installed to save energy on aeration. Recently, Sulzer high-speed turbo blowers were added at the Northeast facility.

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POINT OF PRIDE

The wastewater system has worked with a consultant to quantify net energy usage at both facilities and to establish a baseline from which to measure future energy improvements.

With the CHP facility shut down, the Theresa Street facility will have to buy utility power and fuel, but the facility will be a net energy exporter, considering the fuel that it will produce and the thermal energy it sends to the Innovation Campus and the Lincoln Electric System generating station.

"Now we are using more electricity and natural gas, but look at all the Btus we're sending outside the fence," Crisler says. "If you break it down to Btus, we are very close to energy neutral on an annual basis and even positive in the summer season. We're very proud of that." **tpo**

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Getting More From Digesters

UPGRADES TO ACCOMMODATE A VARIETY OF ORGANIC WASTES AND OPTIMIZE THE PROCESS CAN HELP COMMUNITIES CURB GREENHOUSE GASES WHILE CREATING RELIABLE REVENUE STREAMS

By Michael Theodoulou

The U.S. EPA reports that organic food waste and yard trimmings accounted for 28% of the total mixed solid waste in the country in 2019.

When landfilled, these organics break down and release carbon dioxide and methane gas, a greenhouse gas 25 times more potent than carbon dioxide. Capturing and diverting these materials at the source can substantially reduce GHG emissions from landfills.

Instead of being landfilled, these materials can be anaerobically digested along with biosolids at wastewater treatment plants. Of the roughly 1,200 anaerobic digesters in operation in the U.S., many are significantly underloaded. By making use of that capacity, communities can curb GHG emissions and generate revenue.

IMPACT ON CLIMATE

The Intergovernmental Panel on Climate Change says up to 2.245 metric tons of equivalent CO₂ GHG emissions can be reduced for every metric ton of organic waste diverted from landfills, mainly by eliminating methane releases.

Wastewater treatment plants can further reduce emissions by converting that waste into biogas, offsetting the use of fossil fuel natural gas. GHG emissions can be further reduced by applying the digested biosolids to cropland, offsetting the use of synthetic fertilizer.

With electricity prices relatively low, municipalities and plant owners are seeing strong financial returns by upgrading biogas to renewable natural gas, or RNG, for injection into a commercial natural gas pipeline. Plants that go this route can sell this gas directly and generate credits in the form of renewable identification numbers.

These RINs are sold to parties such as refiners and refined fuel importers who need them for compliance reasons. RINs serve as currency in the Renewable Fuel Standard program. Because RINs are traded on an open market, their value is determined by demand. Based on current market pricing, plants that generate RNG from organic food waste and yard scraps can recoup six to eight times the equivalent price value of natural gas on the RIN market.

OPTIMIZING CAPACITY

An effective way for plants to get the most from their digesters is to invest in infrastructure to optimize the digestion process. One pretreatment option is biological hydrolysis, which conditions sludge to accelerate the efficiency with which it can be digested.

Installed in front of the digester, this retrofit solution can be integrated without taking the process offline. By shortening the time that sludge resides in the digester, biological hydrolysis in effect increases digester volume, allowing plants to codigest with materials like FOG, liquid waste and organic slurries.

A more extensive upgrade includes biowaste separation — an integrated, multistep process that removes contaminants and grit and maximizes organics capture. This mechanical solution produces a high-quality slurry that is easily digestible, reducing downstream operational issues and improving

With electricity prices relatively low, municipalities and plant owners are seeing strong financial returns by upgrading biogas to renewable natural gas, or RNG, for injection into a commercial natural gas pipeline.

digester performance. Plants that adopt this technology can realize revenue in the form of tipping fees for receiving waste.

The ultimate step is the technology to convert biogas to RNG for pipeline injection.

PROCESSES AT WORK

Experience from three projects completed and under development shows how handling organic waste in these ways can reduce GHG emissions while creating reliable revenue streams.

1. Retrofit

This project includes a series of technology and digester upgrades at a municipal wastewater treatment plant in the southern part of England and generates more than 36,000 dry metric tons of solids per year. Previously, the plant imported sludge and combined it with sludge generated on site. At the time, the plant's anaerobic digestion system could only handle roughly half the total volume and required lime stabilization to treat the remainder.

In phase 1, a biological hydrolysis system was added, enabling the existing digesters to treat more than 80% of the combined volume. Two years later in phase 2, four sludge holding tanks were repurposed as digesters, enabling

(continued)

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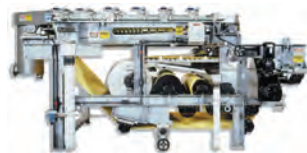
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Dissolved Air Flotation

- 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



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the entire load to be digested. This led to the production of enough renewable energy to cover the plant's entire energy demand.

Finally, in phase 3, the facility added food waste reception, pretreatment and pasteurization; and two digesters were dedicated to food waste. Today, both sludge and source-separated organics, or SSO, are treated in dedicated digesters, and the plant generates more than 13 MW of renewable energy as RNG, renewable electricity and heat.

2. New construction

In this project in eastern Canada, a stand-alone, dedicated anaerobic digestion facility will be constructed to manage and process 60,000 metric tons of residentially collected food waste. The facility will be equipped with technologies to convert the organic waste into biomethane for injection into a local gas network.

3. Pretreatment plus RNG

This project at a wastewater treatment plant in eastern Canada will add

pretreatment technology to intensify the digestion process in an existing anaerobic digestion system. The project will allow 24,000 metric tons of SSO such as household food scraps, expired groceries, restaurant waste, chicken viscera, fish products and bread/dough to be imported for codigestion with biosolids. The biogas will be upgraded to RNG for pipeline injection.

The actual and potential GHG emission reductions for each project are shown below.

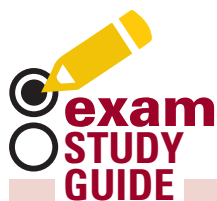
As shown in these examples, anaerobic digestion can help communities reduce GHG emissions, meet waste diversion goals and reduce the carbon footprint of waste management.

ABOUT THE AUTHOR

Michael Theodoulou (michael.theodoulou@suez.com) is a senior product manager with SUEZ Water Technologies & Solutions. tpo

GHG Emission Reductions Resulting From Anaerobic Digestion Projects

Project Example	Digested Materials	Landfill Diversion GHG Reductions (TCO ₂ eq/yr)	Natural Gas Offset GHG Reductions (TCO ₂ eq/yr)	Synthetic Fertilizer Offset GHG Reductions (TCO ₂ eq/yr)
1 (actual)	Wastewater Sludge + SSO	89,800	23,312	210
2 (estimated)	Residential SSO	134,700	10,732	313
3 (estimated)	Wastewater Sludge + SSO	45,012	3,939	167



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

Which of the following pumps would be the least effective for pumping heavy sludges?

- A. Progressing cavity
- B. Rotary lobe
- C. Centrifugal
- D. Diaphragm

ANSWER: C. Progressive cavity pumps are well suited for pumping sludges, especially for dewatering or thickening processes. Of the choices, a centrifugal pump is least suited for this operation. Understanding the different types of pumps and what types of flows they can pump is important for the operator's knowledge of plant operations. Pumps and pumping questions are included in most states certification examinations. More information can be found in the Water Environment Federation, Operation of Water Resource Recovery Facilities, Manual of Practice No. 11, Chapter 29.

DRINKING WATER

By Drew Hoelscher

How are slow sand gravity filters backwashed?

- A. Slow sand gravity filters are not backwashed.
- B. Spraying high-pressure water over the entire surface area until all the sand appears clean.
- C. Reversing the flow through the filter at a slow and steady rate until the sand appears clean.
- D. Reversing the flow through the filter at a fast and steady rate until the sand appears clean.

ANSWER: A. Slow sand gravity filters were the first type used in the production of potable water. Through engineering and technology advancements, these filters were replaced with conventional rapid sand filters and high-rate multimedia gravity filters. However, slow sand gravity filters are still sometimes used at water purification plants to filter backwash water before it is discharge to a receiving stream. As with any filter, it eventually becomes exhausted, and an operator needs to clean it by physically removing the top 1-2 inches of sand. After several cleaning cycles, the operator replenishes the sand to the original depth.

ABOUT THE AUTHORS

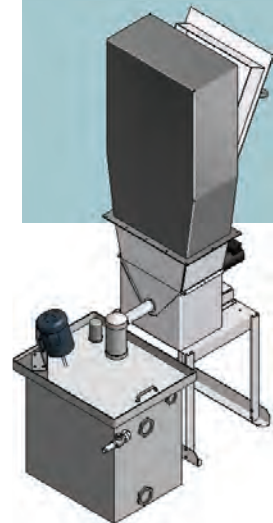
Rick Lallish is water pollution control program director and Drew Hoelscher is program director of drinking water operations at the Environmental Resources Training Center of Southern Illinois University Edwardsville. tpo

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1. One of the most requested mobile equipment pieces is this RapiSand ballasted flocculation unit, which can handle up to 1 mgd.
2. Frac tank aeration units are run in series at an installation in Kentucky to treat a 0.33 mgd wastewater treatment plant.
3. This RapiSand pilot was built in a shipping container for easy transport to this challenging mountain site.



1



2



3

Ready to Run

MOBILE RENTAL SOLUTIONS FROM WESTECH ENGINEERING GIVE WATER AND WASTEWATER OPERATORS TEMPORARY CAPACITY FOR A VARIETY OF SORT-TERM NEEDS

By Ted J. Rulseh

Various occasions call for temporary water and wastewater treatment capacity. Maybe part of the plant is down for maintenance. Maybe a storm event affects operations. Maybe a plant upgrade is underway and a fill-in is needed during the transition to the new system.

For whatever reason, it helps to have capacity that can be moved in and connected quickly. That's the idea behind rental treatment solutions supplied by WesTech Engineering. The company offers mobile, containerized, skid-mounted systems that can be on site and operating within days with little upfront cost.

Temporary solutions encompass a wide variety of treatment processes and include tanks, accessory equipment and a range of support services. Tyler Gladwin, application engineer for the rental services group of WesTech, talked about the offering in an interview with *Treatment Plant Operator*.

tpo: What is the market rationale behind this offering?

Gladwin: Rental is a great way to provide a service that all of our clients need at some time. That includes clients who use WesTech capital equipment and need temporary solutions, such as while they're waiting for new equipment to arrive.

tpo: What are some of the most common situations that call for rentals?

Gladwin: A large need is when they have shutdowns for different pro-

“Connection is very simple. ... The systems are designed to use simple clamp fittings for connections, and they have just one power input.”

TYLER GLADWIN

cesses within the plant that need to be inspected after being in service for 10 or 20 years. While they are looking at the internals, they still need that water or wastewater to be treated. Other cases include repairs or retrofits to existing infrastructure, as well as emergencies, which can come up at any time.

tpo: Are these units designed and built specifically for the rental market?

Gladwin: Yes. They are designed so users can install them and take them down quickly. Many of the units are built in frac tanks or shipping containers that can be mounted on trailers or delivered on a carbon steel or stainless steel skid.

tpo: Which processes are rented the most often?

Gladwin: Some of the most common ones we see are multimedia pressure filters, our RapiSand ballasted flocculation units, dissolved air flotation

systems, disc filters, aeration units and containerized membrane ultrafiltration systems.

tpo: In what capacities are these units available?

Gladwin: Pressure filters and RapiSand units can handle up to 1 mgd. The ultrafiltration systems can process about 1.5 mgd. Aeration unit capacities vary based on the strength of the wastewater; six of them in series can treat 0.3 mgd on average. The disc filters can treat 1 to 2 mgd, and the DAFs can treat about 0.75 mgd.

tpo: Can multiple units be installed for larger flows?

Gladwin: Yes. We usually place them in parallel, except for aeration units, which are typically run in series. For example, a customer who wanted 2 mgd capacity in a RapiSand system would rent two units. The different systems are very modular; they can be placed in parallel to deliver the flow the customer needs.

tpo: How easy is it to connect these units on site?

Gladwin: Connection is very simple. For example, the pressure filter units are designed so the user can put the influent or the effluent on either side. The systems are designed to use simple clamp fittings for connections, and they have just one power input.

tpo: How long does it take from the time a unit arrives on site until it is operating?

Gladwin: Typically about one week, although that depends on how fast the user can get the piping set up. If they have the fittings and an electrician on site as soon as the equipment arrives, they could have it running the same day.

tpo: Are there any challenges in making space for the units on plant sites?

Gladwin: The packages in general are very compact. If customers can fit a shipping container somewhere on the site, they can fit one of these units there. A gravel pad is usually a sufficient foundation for the equipment.

tpo: What services typically go along with the rental packages?

Gladwin: Generally, we will send someone to the site to show team members how to run the equipment, what the operating parameters are and what adjustments they need to make. We can do installation as well.

tpo: What if a user has trouble with the system after the training representative leaves?

Gladwin: They usually have telephone support available at any time of day. We can also send our own operators or process engineers to the site to help them with upsets and give them more training. On top of that, we can have our own technicians do the entire project on a turnkey basis. We often do that for industrial customers.

tpo: What is done to ensure the end product is compliant with regulations?

Gladwin: We can take charge of the permitting. If the state requires the user to meet certain limits, we can take that into our scope so that we're responsible if the water doesn't meet the required quality. We can also offer performance guarantees. For example, if a drinking water plant needs to meet a limit of less than 5 micrograms per liter of arsenic, we can guarantee that our process will hit that.

tpo: Can you describe a case where rental equipment helped a user solve a problem?

Gladwin: At a resort community in Arizona, a contractor needed one to two months to replace the media in one of our Trident package water treat-



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“We can take charge of the permitting. If the state requires the user to meet certain limits, we can take that into our scope so that we're responsible if the water doesn't meet the required quality.”

TYLER GLADWIN

ment plants. Within a week, we were able to send a RapiSand unit and a pressure filter to the site, and we were able to start treating water almost immediately.

tpo: Is there an example you can cite on the wastewater side?

Gladwin: We provided temporary aeration for a lagoon system in Kentucky. The lagoon liner was collapsing; they needed to drain and dredge the lagoon, remove the liner, compact the soil, add the new liner, add the sludge back and get the lagoon running — a process that took about six months. We provided six frac tank aeration units in series to treat about 0.33 mgd. All we had to do was seed them with return activated sludge from a local municipality. They were online and meeting specifications within one week.

tpo: What should customers look for when evaluating rental equipment suppliers?

Gladwin: They need someone who can show up and be ready to run water through the unit as soon as possible. Our media filters come with media installed. The ultrafiltration systems have an integral booster pump and backwash tank, as well as a clean-in-place pump so chemical cleanings can be done on site. It's important to have equipment that's all in one piece. They also want a solution that's specific to their need, and they want to work with a company experienced with multiple industries and types of water or wastewater. **tpo**

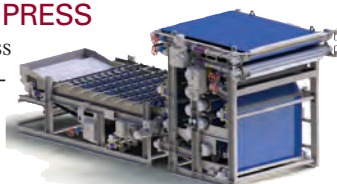
Headworks and Biosolids Management

By Craig Mandli

Belt Filter/Rotary Presses

ALFA LAVAL AS-H KPZ BELT PRESS

The Alfa Laval AS-H KPZ belt press is designed to allow high solids loading while maintaining a high hydraulic throughput. Performance results in ideal sludge cake dryness in a layout that allows for an operator floor-level view of the gravity deck. It is suitable for all municipal biosolids and residual sludge types and a wide variety of industrial solid/liquid separation applications, such as paper, petrochemical, mineral, food processing, pharmaceutical and chemical. It incorporates variable energy mixing, flocculation, gravity drainage and pressure filtration. The design allows for decreased civil construction costs, elevated cake discharge height and low maintenance requirements. **866-253-2528; www.alfalaval.us**



AS-H KPZ belt press from Alfa Laval



Belt filter press from Bright Technologies, Division of Sebright Products

BRIGHT TECHNOLOGIES, DIVISION OF SEBRIGHT PRODUCTS, 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, 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 walk-around skid design can be utilized in as little as a 10-by-20-foot floor area. The Boerger rotary lobe sludge pump has a maintain-in-place design offering ease of maintenance. Cake solids of up to 35% can be achieved. Rates of 25 to 50 gpm make it ideal for small applications or when a processor has outgrown dewatering containers. **800-253-0532; www.brightbeltpress.com**

Biosolids Handling/Hauling/Disposal/Application

HYDRA-TECH PUMPS S4SHR-LP

The S4SHR-LP 4-inch hydraulic submersible shredder pump from Hydra-Tech Pumps continuously rips and shears solids with a 360-degree shredding action. The carbide-tipped impeller and hardened macerator suction plate work together to produce a violent shred-



S4SHR-LP shredder pump from Hydra-Tech Pumps

ding action that keeps the discharge open. It is 21.5 inches, which allows it to fit through most manholes. Depending on the application, there is a version for portable or fixed installations. A guide rail assembly is available for stationary applications. Combined with HT15 to HT35 power units, it is capable of flows up to 810 gpm. The safe and variable-speed hydraulic drive can be used where electric power is hazardous or impractical. **570-645-3779; www.hydra-tech.com**



Level Lodor cover system from JDV Equipment

JDV EQUIPMENT LEVEL LODOR

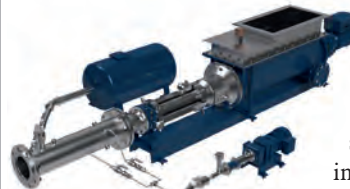
The Level Lodor cover system from JDV Equipment helps contain odors by covering standard dump containers used for hauling processed material. The design allows for even distribution, increasing the fill percentage without having to manually even out material. Enclosing containers allow outdoor installation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

PAXXO LONGOPAC FILL

The Longopac Fill continuous bag system from Paxxo can connect to the discharge point of machines used to move, dewater or compact screenings, grit and biosolids. Material is then deposited in a 90-meter-long continuous bag for odor containment and spillage control. The cassette bag can be sealed with ease, and the material and odors are trapped inside, cutting down development of bacteria and fungus spores. **770-502-0055; www.paxxo.com**



Longopac Fill continuous bag system from Paxxo



Smart Air Injection pumping system solution from SEEPEX

SEEPEX SMART AIR INJECTION

Smart Air Injection, or SAI, is a SEEPEX customized system solution for pumping over long distances. The system uses compressed air and polymer injections to convey biosolids, or other media with a dry matter content of 20% to 40%, over distances of up to 1,000 meters. This combination ensures a low pressure level in the delivery line, as well as low friction, which translates into a long life cycle and low operating costs. The system is easy to integrate into existing automation and control systems; reduces the pressure rating of the pipework and valves; and is an enclosed pipework system, eliminating unpleasant odors or rainfall dilution. Open-hopper SAI systems with Smart Conveying Technology reduce maintenance time by up to 85% with the maintain-in-place design, requiring no disassembly of discharge pipework. **937-864-7150; www.seepex.com**

SRS CRISAFULLI SYSTEM VERTICAL PUMPS

SRS Crisafulli System vertical pumps are designed for stationary applications, such as sewage digesters and lift stations, manure tanks, chemical sumps and dry docks. They are submersible, centrifugal pumps that range in size from 2 to 24 inches. The pumps require no priming, check valves, suction pipes or screens, and they are self-drained. Steel construction ensures long life



Vertical pumps from SRS Crisafulli System

and trouble-free operation. The pumps pass large solids and pump high-weight/high-viscosity fluids with ease. Standard Duty pumps move relatively clean water and are equipped with grease-lubricated, sealed bearings. Severe Duty vertical pumps move sand, silt, mud, sludge or abrasives; are constructed with abrasion-resistant, heat-treated steel (450 Brinell hardness); include dual mechanical shaft seals (to prevent contamination); and have an enclosed, oil-filled bearing frame, allowing the pump to perform in demanding environments. **800-442-7867; www.crisafullpumps.com**

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BDP INDUSTRIES ROTARY DRUM THICKENER

The rotary drum thickener from BDP Industries is a suitable solution to thicken at water and wastewater treatment facilities. Internally baffled thickening zones lead to higher solids capture and higher throughput capability, all with reduced polymer usage. A full stainless steel construction with all bearings located outside of the enclosure makes operations and maintenance activities simple and easy. **518-796-1440; www.bdpindustries.com**



Rotary drum thickener from BDP Industries

HURST BOILER FIREMASTER INTEGRATED CONTROLS

Firemaster Integrated Controls from Hurst Boiler optimize the boiler lead/lag operation by continually monitoring the rate of change in steam pressure, which allows a single packaged boiler or multiple packaged boilers to work together efficiently to achieve system setpoints. They enable fuel flexibility, with automated fuel changeover to maintain constant header pressure. The onboard automated monitoring control system is designed for the optimal control and operation of a single boiler/burner package. It brings all boilers and equipment to a single collection control point. Monitor and control steam and hot-water operations from an on-site touch screen, remotely from a smartphone via secure internet, or through a SCADA building automation system. Real-time data of efficiency and operating conditions are reported on a continual basis, and this information is archived daily into the system's history log and retrievable at any time. **229-346-3545; www.hurstboiler.com**



Firemaster Integrated Controls from Hurst Boiler

PIERALISI NORTH AMERICA SLUDGE THERMAL DRYER

The sludge thermal dryer from Pieralisi North America is totally automated and easy to operate. It reduces sludge volume by 75%, producing Class A biosolids. It is self-sustainable with biogas as fuel from biodigesters or energy from waste gas turbines. It uses AISI 316L stainless steel for all contact parts, needs only a small area for installation and has low maintenance cost. Its operation uses negative pressure throughout the system, avoiding gas emissions, dust and odor. The dried sludge has a spherical shape of 0.5-inch average diameter. **513-760-9077; www.pieralisinorthamerica.com**



Sludge thermal dryer from Pieralisi North America

Centrifuge/Separator

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Centrifuges from Centrisys/CNP apply 3,000 g (G-force) to dewater solids while accelerating the liquid end sedimentation of fine particles, resulting in drier solids and cleaner discharge water, which may reduce disposal costs. With a hydraulic back drive system, a centrifuge delivers high torque and low horsepower to reduce moisture in an energy-efficient manner. The three-phase centrifuge divides feed into solids, water and FOG from the grease trap or other biodiesel production sources. Inside the centrifuge, lighter oil separates from the water and discharges through an adjustable nozzle, while the heavier solids dewater and discharge from the opposite end. Centrifuges are available with flow rates of 5 to 700 gpm and can be a stationary skid-mounted unit or a mobile trailer. **262-654-6006; www.centrisys.com**



Centrifuges from Centrisys/CNP

Chemical/Polymer Feeding Equipment



ProSeries-M CHEM-FEED skid systems from Blue-White Industries

BLUE-WHITE INDUSTRIES PROSERIES-M CHEM-FEED

ProSeries-M CHEM-FEED polyethylene engineered skid systems from Blue-White Industries are complete solutions designed to dose liquid chemicals from a tank to an injection point in the process. The systems can be equipped with the ProSeries-M pump of the user's choice, and both diaphragm-type and peristaltic-type pumps are offered. If requested, the metering pumps can be installed on the skids before shipment. Single- and two-pump units are available on skids constructed of chemical-resistant polyethylene with a drop-in-place design. Components include a visual flow indicator and an optional chemical feed flowmeter. Plast-O-Matic components include vented ball valves, gauge guard and pressure relief valve. They also feature Flex-A-Prene tubing designed to stay flexible and leak-free in chemical environments. **714-893-8529; www.blue-white.com**

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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 management system. **800-893-6723; www.forceflow.com**



Tote Bin Scale from Force Flow

(continued)

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The LJ-PolyBlend Polymer System from Lutz-JESCO America is a dependable, motorized mixing machine with a corrosion-resistant housing, large turbine and multizone mixing chamber that provides uniform dispersion energy at the moment of initial polymer wetting. The prime mixing zone fully activates the polymer, while the second mixing zone promotes gentle polymer activation via a small turbine, lessening molecule fracturing. Its stainless steel injection valve prevents agglomerations and reduces the need for extended mixing time. The system includes a clear mixing chamber that provides visual monitoring of mixing polymer feed. Its compact design — only 1 to 1.5 square feet — means it's light and allows for easy installation and transportation. It has automatic pump speed adjustment via 4-20mA input, water flow sensor and priming port. **800-554-2762; www.lutzjescoamerica.com**



**LJ-PolyBlend Polymer System
from Lutz-JESCO America**



**PULSAtrON chemical feed
pumps from Pulsafeeder**

PULSAFEEDER PULSATRON

PULSAtrON diaphragm chemical feed pumps from Pulsafeeder have a guided check valve system with a seat-and-ball design that ensures reliable and accurate metering year after year. Their fin-cooled solenoid enclosure dissipates heat, ensuring that the pressure-handling capability of the pump can be maintained. The thermally protected solenoid protects the pump from seizing up in extreme heat conditions with an

automatic reset feature, allowing the pump to resume operation upon cool-down. Units are tested and rated under hot conditions so flow and pressure ratings meet specifications. They offer flows up to 600 gpd and pressures up to 300 psi, with a wide range of flows and pressures. Agency approvals include CE, ETL, ETL san. and NSF 61 approval on PVDF material and degassing head models. **800-333-6677; www.pulsatron.com**

Composting Equipment

ROTO-MIX MODEL 1220-20

The Roto-Mix 1220-20 horizontal rotary compost mixer has a large mixing capacity of 1,220 cubic feet and can hold a maximum load of up to 40,000 pounds. It is designed to thoroughly mix materials to ensure rapid decomposition and to produce quality compost. This rotary compost mixer, equipped with the GeneRation II Staggered Rotor mixer, will 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. It is available in truck, trailer or stationary units. This size mixer works well with large-volume composting operations. **620-225-1142; www.rotomix.com**



**1220-20 rotary compost
mixer from Roto-Mix**

Dewatering Equipment

IN THE ROUND DEWATERING HORIZONTAL DRUM

The horizontal biosolids dewatering system from In The Round Dewatering has a stainless steel drum with perforated plastic tile lining. The drum is mounted on a roll-off frame for easy transport and unloading. Water trays allow containment of discharge water. An 18,000- to 25,000-gallon batch is mixed with polymer before being filtered in the rotating drum, driven by a 1/2 hp variable-speed electric motor with a heavy-duty chain and sprocket. The turning eliminates crusting and wet pockets to produce uniform, consistent results. The dewatered material dumps easily, and the drum is self-cleaning. **317-563-2072; www.itrdewatering.com**



**Dewatering system from
In The Round Dewatering**

PARK PROCESS SLUDGE KING II



**Sludge King II roll-off dewatering
container from Park Process**

The Sludge King II roll-off dewatering container from Park Process uses filters that turn 90 degrees at the bottom of the container, leaving standing water in the cake. This also increases the usable area of the filters by 33% over older containers with only one center filter wall. The increased filter surface area and the narrowed sludge compartments formed by the additional filter panel translate into drier cake formed in less time. **855-511-7275; www.parkprocess.com**

Digester

WESTECH ENGINEERING EXTREMEDUTY SLUDGE MIXER

ExtremeDuty sludge mixers from WesTech Engineering are designed to combat rapid rise events that can cause millions of dollars in damage at plants, from sludge plugging the pressure relief valves and flame arrestors to tank and cover damage. Trapped gas within the sludge content builds up but has no way to get out. It can form a scum layer on top, stratified sludge layers, or varying pressures and temperatures throughout the digester. If the mixing is inadequate, the result can be stratified sludge, a scum layer, a large grit layer or higher liquid levels due to gas entrapment. The mixers provide high flow rates while pumping both upward and downward, providing needed floc shear in the tank. The change in flow also aids in preventing stratification, suspends grit and disturbs the top of the sludge to break up the scum layer. **801-265-1000; www.westech-inc.com**

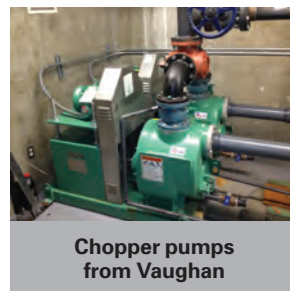


**ExtremeDuty sludge mixers
from WesTech Engineering**

Grinder/Shredder

VAUGHAN SELF-PRIMING CHOPPER PUMP

Self-priming chopper pumps from Vaughan are designed to be easily accessed outside of the wet well while pumping waste solids at heavy consistencies, without plugging or dewatering of the solids.



**Chopper pumps
from Vaughan**

They eliminate the loss in production and mess, along with making it easy to service the pump to get it back in operation. **888-249-2467; www.chopperpumps.com**

Grit Handling/Removal/Hauling



OctoCell grit removal system from Envirodyne Systems

ENVIRODYNE SYSTEMS OCTOCELL

The OctoCell grit removal system from Envirodyne Systems uses stacked trays to achieve a small footprint. Unique to their design is the inlet trough and tentacle arrangement above the trays, which means the flow path to each tray is the same size/length to better equalize pressure drops, meaning reduced

headloss and greater grit removal efficiency. It allows for visual detection of any plugging and serves as a means of controlling flow to each individual tray. It has the ability to engage/disengage trays automatically based on flow variations. A “lollipop” configuration is also available for enhanced control of velocities and reduced organics accumulation. **717-763-0500; www.envirodynesystems.com**

SMITH & LOVELESS PISTA VIO GRIT REMOVAL SYSTEM

The PISTA VIO grit removal system from Smith & Loveless provides grit removal efficiencies and application flexibility with a design that allows for full variability of the inlet and outlet channels. It provides the ability to design the inlet and outlet channels at any variable angle up to the full 360 degrees of the chamber. Designers can flexibly arrange the system to fit existing sites or maximize space during construction on new sites. This baffle system, in addition to providing application flexibility, also offers grit removal efficiency. It has a hydraulic vortex grit chamber design that uses a baffle system to create the vortex action that removes 95% of grit down to 100 microns. Its effluent flume design minimizes the harmful weir effect that can contribute to grit bypass. **800-898-9122; www.smithandloveless.com**

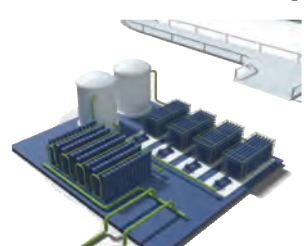


PISTA VIO grit removal system from Smith & Loveless

Headworks

CECO ENVIRONMENTAL HEADWORKS TREATMENT SYSTEMS

Custom-designed headworks treatment systems and services from CECO Environmental are primarily geared toward oil field or other



Headworks treatment systems and services from CECO Environmental

project location setups and can be retrofitted to existing plants or installed as part of new ones. Designs combine different types of screening, oil removal, clarification, and other chemical and physical processes that render influent wastewater suitable for further treatment and protect the downstream treatment from abrasion and clogging. Typical headworks treatment applications include screening industrial

wastewater that contains high levels of oil, suspended solids or ammonia. Fine screening primary treatment strategies safeguard sensitive equipment like membrane bioreactors by blocking large solids and catching sand, oil and grit. Together, the screening, washing and compacting phases separate fecal matter from inorganics and produce a clean, dry, compacted material. Headworks are supplied in a customized design as part of an integrated system, using different types of screening as needed to meet performance values. **800-333-5475; www.cecoperless.com**

Septage Receiving Station

SCREENCO SYSTEMS TRASH MASTER 400 AUTO SCREEN

The Trash Master 400 Auto Screen from Screenco Systems uses gravity to separate the trash from the flow stream through a 4-inch inlet with a fan spreader to power-offload vacuum trucks.

It has an aluminum hopper with a 6-inch outlet cam and 3/8-inch gapped 1/4-inch bar screen that meets U.S. Environmental Protection Agency 503 regulations. A stainless steel U-channel with plastic-lined titanium UHMW provides for years of wear, with a high-strength alloy steel 8 1/2-inch shaftless screw that moves trash to a waste container. The stainless steel U-channel has slotted drain holes and a center channel bar screen for cleaner and dryer trash. A custom-built stainless steel bar rake is included for easy maintenance. A front spray bar with a 1 gpm nozzle keeps the unit clean and free of buildup. A 2 hp NORD gear reduction drive with Lenze variable-frequency drive control accomplishes a variable-speed screw from 6 to 30 rpms. **208-790-8770; www.screencosystems.com**



Trash Master 400 Auto Screen from Screenco Systems

Screening System

HEADWORKS INTERNATIONAL MS BAR SCREEN

The 2 mm MS bar screen from Headworks International is a retrofitted Headworks MS Series bar screen that reduces the bar spacing from 6 mm to 2 mm. Traditionally a

client would buy a perforated plate, or band screen, that requires spray water and often rotating brushes and that are maintenance intensive. The 2 mm MS bar screen provides a high capture rate with the simplicity of a bar screen. No sprays or brushes are required. **713-647-6667; www.headworksinternational.com** tpo



MS bar screen from Headworks International



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By Craig Mandli

Washing system helps eliminate FOG problem

Problem

A large north Florida regional wastewater system was battling FOG up to 4 feet thick that was blanketing lift station walls and equipment. Dry-weather spills exacerbated the problem and drove a search for solutions.

Solution

The agency selected the **EP-1300 well-washing and pretreatment system** from **Anue Water Technologies**.



RESULT:

The system eliminated the FOG in two hours. Spills were nonexistent, and confined-space entry for cleaning was no longer necessary. Expenses for a boom truck and two operators for two hours on each occasion were eliminated, reducing maintenance costs by up to 20% annually. The agency now operates 15 EP-1300s and plans to add more. **800-559-7159; www.anuewater.com**

Screening system eliminates clogged pumps at pump station

Problem

The Drake Pump Station, located in Saginaw, Michigan, experienced chronic pump maintenance due to flushable wipes. Although the dry pit pump station represented only 0.1 mgd of flow in the city's collection network, it required a substantial amount of servicing — up to three times a week. This consisted of two operators spending four hours manually removing rags in a confined space to clean out the clogged pump. It was a dirty, unplanned and time-consuming task.

Solution

In partnership with the city, **Duperon** adapted a proven **screening system** for a novel application. Deployed inside a 19-inch manhole, the system uses three existing technologies to screen, compact and transport collected debris 26 feet vertically without auger-assisted conveyance. Traditional solutions to handle flushable wipes require manual clean-outs or maintenance-intensive grinders that shred fibers to reconstitute, compromising downstream equipment. By removing nondissolvable solids at (or near) the point they enter the collections system, the Duperon system restores integrity and resiliency.

RESULT:

For the duration of the testing period, the city had zero instances of clogged pumps, resulting in a potential labor and maintenance savings of more than \$41,000 annually. **800-383-8479; www.duperon.com**

Microturbine system helps plant save money

Problem

The aging internal combustion engines at York (Pennsylvania) Wastewater Treatment Plant caused energy bills to top \$63,000 per month.

Solution

The city selected a **Capstone microturbine combined heat and power system** that promised lower life cycle costs, less maintenance and fewer emissions. A Capstone C1000 and C600 operate on natural gas and biogas.



RESULT:

The units produce 40% more power using the same amount of natural gas as the former internal combustion engines. The plant also reduced operating costs by recovering the exhaust heat for digester heating. **818-734-5300; www.capstoneturbine.com**

Wastewater treatment facility finds efficient screening solution

Problem

In 2018, the Spencer (Wisconsin) Wastewater Treatment Plant launched a series of improvement projects and planned to invest \$2.55 million. The first priority was replacing the headworks fine screen; options for a hauled-in waste receiving facility were also evaluated.

Solution

The plant conducted a successful one-week pilot test of a **Septage BEAST in-tank screening system** from **Enviro-Care**. However, the staff preferred to receive waste directly into the headworks channel. Instead of one screen for hauled waste and one for the headworks, the Enviro-Care representative suggested putting the dual drive screen from the BEAST directly into the channel. Spencer purchased a VFA800/6DM (BEAST) dual drive screen.



RESULT:

The screen reduced maintenance at the headworks and downstream. The high capture rate keeps debris out of the plant even with the increase in hauled waste. Revenue from the hauled waste is paying for the screen. **815-636-8306; www.enviro-care.com**

Screw press provides Class A biosolids for coastal city

Problem

The City of Long Beach, Washington, faced challenges in managing biosolids due to increased regulations and loss of farmland for application.

Solution:

The city added an **FKC screw press** to dewater biosolids before composting. The biosolids are then blended with wood chips and yard waste for in-vessel composting. The resulting Class A compost provides a stable source of nitrogen, phosphorus and potassium where applied.



RESULT:

The screw press provided a consistently dry cake, enabling a smooth composting process with easy-to-determine blending rates, composting times and temperatures. **360-452-9472; www.fkcscrowpress.com**

Grinding at the headworks improves screens' performance

Problem

Operated by Northern Ireland Water, the 25 mgd Moygashel Wastewater Treatment Plant in Dungannon faced operation and maintenance issues with its fine band screens and screenings compactors. Due to heavy rainfall, the flush surcharge from the gravity main flowed immediately onto the 6 mm headworks band screens, causing the screens to overload and blind three to four times a week. This resulted in screenings being forced into the treatment process; addressing the issues took about 16 labor hours per week.

Solution

JWC Environmental's Channel Monster heavy-duty grinders were chosen to precondition the solids and debris and protect the screens from overload and damage. The units reduce solids to a smaller, uniform particle size, leveling the rate at which they hit the screen. The grinders also liquefy more of the solid fecal matter so that it remains in the flow and enters the treatment process, thereby reducing odors.



RESULT:

The grinders resolved the peaking factor at the headworks and solved problems with the compactors. Previously, the compactors could not process heavier plugs of screened rags and solids. Now the compactors can process all the material coming off the screens. **800-331-2277; www.jwce.com**

Rotary press used to replace outdated press system

Problem

The Town of Lewiston (New York) Water Pollution Control Center needed to replace a 35-year-old belt press.

Solution

After full-scale pilot testing, the town chose a **Fournier Industries rotary press**. GHD Group engineers were assigned to get the press to the second floor where the existing belt press was. Fournier shipped the unit with the channels separate from the gearbox, allowing the drive to fit through the floor opening.



RESULT:

"In the short time that the press has been in operation, staff has been very pleased with the quality of the biosolids produced, the ease of operation and how quiet the equipment is," says Jeff Ritter, wastewater administrator/chief operator. "The low water usage is an added benefit. This has reduced the humidity in the pressroom, which was contributing to problems with electrical and HVAC equipment." **418-423-4241; www.rotary-press.com**

Receiving station helps ready plant for increased influent load

Problem

Legislation for septic tanks in Florida may lead to increased septage volume at Indian River County's Residuals Dewatering (Biosolids) Facility. Moves are afoot to require inspection and pumping of septic tanks every three to five years.

Solution

The county chose a fully automated **Raptor septage complete plant** from **Lakeside**. The compact, self-contained unit compacts and dewater screenings to 40% solids. An overnight self-cleaning cycle stops the buildup of grit in the bottom of the unit. The system is preengineered, and all-stainless steel construction resists corrosion.



RESULT:

Far more grit and rags are captured than anticipated. A 4-cubic-yard container is filled daily. There have been no equipment issues, and only basic daily maintenance is required. **630-837-5640; www.lakeside-equipment.com**

Mixer reduces grease buildup and high solid slug loading

Problem

The Random Farms wastewater treatment facility, located in Chapqua, New York, has faced various issues related to pump station grease buildup, solids settling and pump clogging.

Solution

C3ND Environmental Consulting installed the **Phi-Constant Air (Phi-CA)** from **Pulsed Hydraulics** within 2 inches from the bottom of the pump station to provide a full mix of the pump station wet well to eliminate sedimentation buildup and removal of residual grease at the surface and accumulated on floats.



RESULT:

Within 10 minutes, the residual grease at the surface was removed, while also generating a complete mix to transfer sedimentation through the station to be treated appropriately within the wastewater treatment plant. Within one week, residual grease accumulated on the station's pump floats were removed, helping consistent operation of the pump station pumps. It has also been reported that the pump station now experiences reduced odors and reduced maintenance associated with "ragging" of the pump impellers. **800-641-1726; www.phiwater.com**

Aeration tank organic overload resolved by mixers

Problem

The 29 mgd Little Patuxent Water Reclamation Plant in Howard County, Maryland, is an enhanced nutrient removal facility. A planned upgrade to the biosolids management facilities included high-rate anaerobic digestion, rebuilt centrifuges, phosphorus recovery and sidestream deammonification to reduce nitrogen loading in the return to the main treatment process, helping to meet a 3 mg/L total nitrogen limit.

Solution

The county chose **Veolia Water Technologies' ANITA Mox** moving bed biofilm reactor sidestream **deammonification process**, which uses K5 biofilm carriers and media-retaining screens, eliminating anammox washout. Biomass remains attached to the carriers as high TSS passes through. The system was retrofitted to existing tanks and includes media, media-retaining screens and medium-bubble aeration diffusers designed to be maintenance-free. The media fill volume of the two reactors leaves room for expansion by adding more media if ammonia loading increases. The process control strategy has flexibility to be controlled by DO, pH or ammonia for optimal energy savings.



RESULT:

The reactors reached the design loading and removal rates despite high influent TSS. Since startup, the system continues to meet the design nitrogen removal rates. **800-337-0777; www.veoliawatertech.com**

Screw press used to effectively dewater while saving time, money

Problem

The 2 mgd Upper Sandusky (Ohio) Wastewater Treatment Plant aerobically digested its biosolids and dewatered them to 10% solids on drying beds. Due to the age of the beds, hauling costs were increasing and personnel spent more time keeping the beds functioning.

Solution

The city successfully tested a **Schwing Bioset screw press**. It delivered cake at more than 20% solids, and plant staff found it well constructed and easy to use.



RESULT:

The Schwing Bioset equipment became the basis of the design for a new dewatering building. The FSP 603 screw press reduced hauling costs substantially because of the higher solids content and a reduction in labor. **715-247-3433; www.schwingbioset.com**

City saves on polymer expense by implementing two-zone polymer activation system

Problem

The original wastewater treatment plant in Fort Atkinson, Wisconsin, was built in 1972, and a large portion of the operating budget is spent on polymer, primarily to dewater aerobically digested sludge. The system was effective, but the operators sensed it required too much polymer and started to investigate efficiency opportunities.

Solution

UGSI Chemical Feed, working with its local Wisconsin representative, Energenecs, offered a free demonstration of the **Polyblend-Magnum** skid-mounted **polymer system**. Polyblend systems are designed to use an optimized energy sequence in the mixing chamber. By immediately subjecting the polymer to a high level of energy and then tapering the amount of energy in a second stage in the mix chamber, the system is able to activate polymer without subsequently "chopping it up" once the polymer starts to increase in viscosity.



RESULT:

The system was able to decrease polymer usage by 25-30% and enabled the dewatering equipment to operate more efficiently. The city projects an annual savings of \$20,000. Staff also found the system to be much more space efficient versus the older mix-tank system. **855-669-3845; www.ugsichemicalfeed.com tpo**

Enviro-Care announces change in leadership

Philip Thompson retired as president of Enviro-Care. He joined the company at its Rockford, Illinois, location in 2011 and within three years had made the company a desirable acquisition target. In 2015, Enviro-Care was purchased by the WAMGROUP of Modena, Italy, and the company moved to Gurnee, Illinois. With the retirement of Thompson, Stephen Rioux assumed the responsibilities of president at Enviro-Care. With more than 30 years in the water and wastewater industry, Rioux brings a wealth of knowledge and an array of experience. He spent more than 20 years with Waste-Tech, ultimately becoming the general manager of the Waste-Tech division of Kusters. In addition, he started the company CleanTek Water Solutions and spent several years with WesTech Engineering.

Grundfos' Swetye added to board of Hydraulic Institute

Grundfos announced the appointment of Jim Swetye, technical training manager, to serve on the board of the Hydraulic Institute for 2020-21 as vice president of education. In this role, Swetye is responsible for leading educational initiatives within HI. The position ensures educational content is in alignment with HI's technical standards and guidelines while also remaining accessible and addressing user needs. In addition to serving on the board of HI, he serves on the board of HI's educational subsidiary Pump Systems Matter as vice chairman. PSM, the primary focal point for HI's pump systems education and outreach, helps the pump industry and users gain a more competitive business advantage through strategic, broad-based energy management and pump system performance optimization.



Jim Swetye

KROHNE receives the in-kind support award

KROHNE announced it received the Pipeline Research Council International in-kind support award for its outstanding commitment and support of several significant research programs. KROHNE was presented with the award at PRCI's annual Research Exchange Meeting on March 3 at the Westin San Diego. KROHNE supports PRCI research programs through donated time, hosted events and technical sessions, equipment and other resources.

MFG Chemical partners with EcoVadis to improve sustainability

MFG Chemical partnered with EcoVadis to measure and continuously improve its sustainability profile. EcoVadis is a provider of business sustainability ratings, intelligence and collaborative performance improvement tools. The program provides reliable corporate social responsibility scores across 21 CSR indicators within four categories, including environment, labor and human rights, ethics and sustainable procurement.

Victaulic names Bucher as president

Victaulic announced Rick Bucher has been appointed to the position of president and chief operating officer. He will continue reporting to John Malloy, who has served as chairman, president and CEO for the past 16 years. Malloy will remain chairman and CEO.



Rick Bucher

Badger Meter awarded recertification for ISMS

Badger Meter announced it was again awarded ISO 27001 recertification and successfully conducted a Service Organization Control 2 Type 2 examination of its information security management system. Since 2015, Badger Meter has completed an annual ISO 27001 certification and SOC 2 Type 2 examination, demonstrating a commitment to minimizing potential information security threats and ensuring trust with its customers.

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Wilco USA announces plans for new headquarters and production site

Wilco USA, a subsidiary of Wilco SE, announced the investment of a new 250,000-square-foot headquarters and production facility in Cedarburg, Wisconsin. A developer's agreement with the City of Cedarburg was approved on May 11, with construction scheduled to begin in fall 2020. The new headquarters will bring the combined operations of Wilco USA, Weil Pump, Scot Pump and Wilco Machine to a single production site.

Asahi/America welcomes new business development manager

Asahi/America announced the addition of Peter Quinn to its business development team. He joined the company as national business development manager for custom fabricated products. Quinn brings more than 30 years of sales and distribution experience of pipe, valves and fittings with him to Asahi/America. He will work closely with the company's sales and engineering teams to promote the company's growing custom fabrication division. **tpo**



Peter Quinn

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Flomatic Valves Flo-E-Centric plug valves

Flomatic Valves' Series 5400 Flo-E-Centric plug valves are energy-efficient, round-port, eccentric, quarter-turn plug valves designed in compliance with AWWA C517 in a fusion-bonded, epoxy-coated ductile iron body. Designed with a 98% nickel-welded seat for long service life, Flomatic's plug valves are used in a variety of applications where slurries, solids or grit are present. Flomatic's plug valves are available in a variety of configurations: bare stem, 2-inch AWWA operating nut, buried service gear, gearbox and actuator. The valves are certified lead-free NSF/ANSI 372 and have V-type packing.

800-833-2040; www.flomatic.com



FEBCO MasterSeries valves

The FEBCO, a Watts brand, MasterSeries valves are available from 4 to 10 inches in N- and Z-pattern configurations and are designed with the same lay length as other manufacturers' valves for easy retrofits. In addition to being ready for drop-in replacement, the FEBCO MasterSeries models have all the advanced features of the existing MasterSeries products — making them a value-added replacement for an existing competitor valve. The valves have advanced ArmorTek coating tech-

product spotlight wastewater

Geomembrane covers provide odor control solution

By Craig Mandli

Controlling odors has long been one of the most important — and yet challenging — aspects of wastewater treatment. Foul odors are a common source of complaints, igniting objections from plant workers and neighbors alike. To combat the issue, **Anue Water Technologies** offers a **geomembrane-based odor-control system** for wastewater treatment plants.

The solution consists of custom-designed geomembrane with integrated odor-control filters. It is designed to reduce odorous emissions for tanks and containers of nearly any shape or size. The membranes are very low-permeability synthetic liners that control fluid migration, are made from a material with high tensile strength and chemical resistance, and are fitted with pockets containing replaceable filter media. They are supported by a cable grid and batter bars so that it is unaffected by aeration, changing water levels, foaming, bacteria and other conditions.

"Anue is pleased to introduce this innovative, thoroughly tested and proven technology in the U.S., Canada and Caribbean region," says Paul Turgeon, Anue CEO. "These geomembranes provide many more municipal and industrial customers an even lower-cost approach to sustainable odor control. This broadens Anue's product line to a wider range of odor control solutions."

The membranes have a life expectancy of more than 10 years, even in harsh environments, according to the manufacturer. The filter inserts last 9 to



Odor-control system from Anue Water Technologies

18 months, depending on the emission level. The filters consist of a spongelike media impregnated with an odor-control substance. Air flows through freely, allowing the system to breathe while odors are captured. Rainwater does not hinder odor-capturing ability.

With an ability to remove all odors, including those from sulfide and ammonia buildup, which can be difficult to control, the geomembranes can be used in practically any application. According to Turgeon, there has been a lot of early uptake in the food and beverage industry, and the geomembranes are also being used as vent covers in the petrochemical industry to prevent noxious gases from escaping. Gas-specific filters for hydrogen sulfide and ammonia can be combined in the system for optimal control, even under grates and manhole covers.

"We're getting a lot of interest with every application, and the word-of-mouth factor has been pretty impressive," Turgeon says. "We've only had this technology in-house for a short period of time, but we have a significant pipeline of opportunities and an impressive market response."

760-727-2683; www.anuewater.com

nology to mitigate corrosion of internals, modular investment cast stainless steel checks and captured springs for easy service.

978-688-1811; www.watts.com



Endress+Hauser Micropilot FWR30 radar level sensor

The Micropilot FWR30 radar level sensor from Endress+Hauser is a cloud-connected radar and 80

GHz wireless Industrial Internet of Things sensor, providing full transparency in the storage and transport of liquids. The sensor combines high-end technology and user-friendly digital services in one cost-effective device. The instrument's continuously recorded measurement data can be accessed at any time, from anywhere due to the device's cloud connection, with communication made possible by an integrated SIM card. Installation is easy and can be done in less than three minutes. An integrated battery allows operation without an external power supply for measuring points that are difficult to access. The compact device

is a perfect fit for stackable tanks and enables a plug-and-play solution for flexible and easy installation.

888-363-7377; www.endress.com



CAS DataLoggers Delphin data loggers

The Delphin Message data loggers from CAS DataLoggers have adjustable sampling rates of up to

product spotlight water

System removes heavy metals from water streams

By Craig Mandli

Heavy metal contamination in drinking water poses a threat to humans and can be linked to various severe health issues such as cancer and organ damage. Unfortunately the industrial manufacturing process of lead-acid batteries, as well as aerospace and automotive components, produces a high amount of wastewater laced with heavy metal. **PowerTech Water** recently introduced **ElectraMet** as an advanced solution for removing metals from water streams.

The ElectraMet technology is an electrochemical filter that uses activated carbon electrodes and small amounts of electricity to attract, immobilize and filter metals with 99% selectivity and no sludge production for 100% water recovery. It is energy efficient, high-temperature tolerant (up to 176 degrees F), and acid and alkali tolerant. The energy requirement of the system is less than 0.1 kWh/m³. No chemicals are required, and the system uses no membranes.

"Events like the Flint, Michigan, water crisis have drawn attention to the problem of heavy metals contamination in water, but that contamination can come from myriad sources including industrial wastewater streams," says Cameron Lippert, CEO of PowerTech Water. "ElectraMet is reframing how the industrial sector manages wastewater and, in particular, the removal of harmful heavy metals from its wastewater streams. We are thrilled by the marketplace's response to this breakthrough solution."

The technology delivers up to a 90% reduction in capital and operating expense with its low energy usage, easy setup and maintenance,

and small footprint that facilitates retrofits. Automated operation and trackable filter life enable ease of operation.

The proven technology removes heavy metals from industrial wastewater streams, including lead, copper, iron, manganese, nickel, zinc, chromium, cobalt and others. The electrochemical process also uses carbon electrode technology to actively attract, immobilize and filter metals with 99% selectivity, no sludge production and up to a 90% reduction in operating expenses.

"The marketplace has embraced our solution, which provides both environmental benefits such as the elimination of toxic sludge, as well as numerous economic benefits that include shrinking the footprint of the water treatment system, reducing labor requirements and removing the need for chemicals in the treatment process," Lippert says. "We are delighted with the response from our customers and the support from our investors, and we look forward to continued strong growth."

859-600-1857; www.powertechwater.com



ElectraMet from PowerTech Water

100 kHz that enable performance of high-speed acquisition inspections and testing. The hardware's dependability and the continuous, long-term archiving of data via the ProfiSignal software make the Delphin ideal for service-life testing, environmental simulation and endurance testing. The Delphin has universal inputs for any type of sensor and control functions via analog, digital and PWM outputs.

800-956-4437;

www.dataloggerinc.com



Hayward Flow Control PVDF solenoid valve ranges

Hayward Flow Control continues its expansion of PVDF flow control products with the addition of Natural PVDF to its SV Series solenoid valves range. Available in sizes

1/2-inch DN15 through 1-inch DN25 with true union end connections, the SV Series in PVDF is the ideal choice for extremely corrosive, high-temperature or sensitive medias. The valves are a continuous-duty-rated normally closed/fail-closed valve that allows ease of service and long-term performance. FPM seals are standard, with EPDM optional. Maximum service temperature is 240 degrees F, and end connections available include socket fusion or threaded per ANSI or DIN/EN standards.

888-429-4635;

www.haywardflowcontrol.com tpo

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GRIT ELIMINATOR



- Removes Grit From Flow Stream
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people/awards

Naperville's **Springbrook Water Reclamation Center** received the 2019 Group One Best Operated Wastewater Treatment Works Award from the Illinois Association of Water Pollution Control Operators.

The **Northwest Wastewater Treatment Plant** in Carbondale was named 2019 Plant of the Year by the Illinois Association of Water Pollution Control Operators.

The **Decatur Wastewater Treatment Plant** and **McClelland Consulting Engineers** won the Engineering Excellence Honor Award from the American Council of Engineering Companies of Arkansas.

The **Henry County Water Authority** received multiple Georgia Association of Water Professionals spring awards:

- Best Operated Water Treatment Plant, Certificate of Achievement, and Platinum Award, **Tussahaw Water Treatment Facility**
- Best Operated Water Treatment Plant, Certificate of Achievement, and Platinum Award, **Towaliga Water Treatment Facility**
- Wastewater Facility Gold Award, **Indian Creek Water Reclamation Facility**
- Land Application System Gold Award, **Bear Creek Water Reclamation Facility**
- Golden Hydrant Society Induction for **Andy Young**, operations supervisor at the Towaliga Water Treatment Plant
- District 3 Top Water Plant Operator for **Sheila Kern**, Class 1 operator at the Tussahaw Water Treatment Plant
- Education Program of Excellence Award

Shaun Youravich was been appointed Hardin County (Kentucky) Water District No. 2 general manager. He is a 28-year veteran of the district.

Richard Adams, Palm Coast (Florida) utility director, retired after almost 43 years working for the community.

The Glasgow (Kentucky) Water Co.'s **Barren River Lake Water Treatment Plant** was recognized as the state's top plant for microbial removal and three-year compliance performance. The Kentucky Energy and Environment Cabinet also recognized the company for Area-Wide Optimization Program longevity.

Lea Wang, a sophomore at Council Rock High School South in Northampton Township, Pennsylvania, won the 2019 President's Environmental Youth Award in the U.S. EPA Mid-Atlantic Region for her work on the Teen Research and Education in Environmental Science program. She took part in a study using charcoal filters to remove antibiotics during wastewater treatment.

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events

Aug. 5

AWWA webinar, Disinfection Byproducts: Perspectives on Formation, Control and Mitigation. Visit www.awwa.org.

Aug. 12

AWWA webinar, Tools to Build Utility Source Water Protection Programs. Visit www.awwa.org.

Aug. 18-20

Puerto Rico AWWA Section Annual Conference, San Juan, Puerto Rico. Visit www.prwea.org.

Aug. 19

AWWA webinar, Sustaining an Asset Management Program: What Works? Visit www.awwa.org.

Aug. 22-26

Missouri AWWA Section Annual Conference, Tan-Tar-A, Osage Beach, Missouri. Visit www.awwa-mo.org.

Aug. 24-27

World of Wipes (WOW) International Conference, Hyatt Regency, Minneapolis. A virtual attendance option is also available. Visit www.worldofwipes.org.

Aug. 26

AWWA webinar, Stormwater Management: The Case for a One Water View. Visit www.awwa.org.



AquaSBR®

Sequencing Batch Reactor

Easily Achieve Nutrient Removal with the Flexibility of a Time-Based, True Batch System

Biological nitrogen and phosphorus removal can be a challenge for wastewater plants as effluent objectives change due to new or future permits. Since the mid-1980s, the AquaSBR® sequencing batch reactor has achieved efficient, cost-effective nutrient removal with more than 1,100 installations, worldwide.

True batch operation and time adjustment flexibility allow plants to easily achieve low Total Nitrogen less than 3.0 mg/l and Total Phosphorus less than 0.5 mg/l with reduced chemicals and power compared to other activated sludge systems.

- Independent aeration and mixing with the Aqua MixAir® system
- Modular system is ideal for small or large flows
- Lowest cost of ownership
- Remote 24/7 process support



All components are accessible from the side of the basin for ease of maintenance.

New Plant Construction | Existing Plant Upgrades and Retrofits | Plant Expansions



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

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ADD A VAUGHAN CONDITIONING PUMP TO THE MIX



The Vaughan Conditioning Pump is our Submersible Chopper Pump mounted on a portable stand and fitted with a high-velocity mixing nozzle. The Conditioning Pump recirculates wet wells, chopping and mixing to produce a homogeneous slurry that is more easily pumped out. Floating mats are removed and solids that have accumulated on the floor are re-suspended. Being portable, it can be used in multiple applications at a single job-site, facility or municipality. In one recent project, the Vaughan Chopper Pump paid for itself in 2.5 months!

APPLICATIONS

- Lift Station Conditioning
- Basin Conditioning
- Influent Station/Channel Conditioning
- Holding Tank Conditioning
- Digester Cleanout/Homogenization



CONTACT US TO SEE HOW WE CAN HELP YOUR NEXT PROJECT



CHOPPERPUMPS.COM | 360.249.4042 | INFO@CHOPPERPUMPS.COM

