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DECEMBER 2015

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Cheyenne, Wyoming**

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Water Quality Superintendent
Essex Junction, Vermont

Partners in Production

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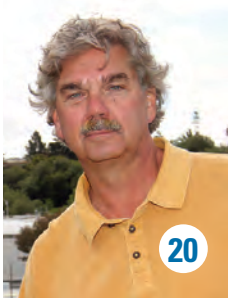
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on the cover

James Jutras, Essex Junction (Vermont) Water Resource Recovery Facility superintendent, has formed a business relationship with dairy farmer Lorenzo Whitcomb. Essex Junction biosolids fertilize

Whitcomb's fields, and the community benefits by having a single customer, almost next door. (Photography by Oliver Parini)

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What's the Wipes Solution?

Truly flushable materials? Better product labeling? Screens and grinders at treatment plants? All fine, but the real answer for wipes in sewers lies in education.

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By Jeremy S. Bril, Ph.D., EIT, and George L. TeKippe, PE, PLS

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By Pete Litterski

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By Craig Mandli

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» Let's Be Clear: Speaking of overflows

» Top Performers:

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Wastewater Biosolids: Production and sharp marketing in Denton, Texas

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Water Plant: Directors Award in North Brunswick, New Jersey

» How We Do It: Efficiency upgrades in Greeley, Colorado

» Hearts and Minds: Treatment plant tourism in Milwaukee, Wisconsin

» Sustainable Operations: CNG fleet fuel in Grand Junction, Colorado

» In My Words: Making investments in public outreach

» PlantScapes: Teaming with Ducks Unlimited in Niverville, Manitoba

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let's be clear

What's the Wipes Solution?

TRULY FLUSHABLE MATERIALS? BETTER PRODUCT LABELING? SCREENS AND GRINDERS AT TREATMENT PLANTS? ALL FINE, BUT THE REAL ANSWER FOR WIPES IN SEWERS LIES IN EDUCATION.

By Ted J. Rulseh, Editor



A friend a few years ago told me he'd been prescribed medication for high blood pressure. I asked why he didn't try non-pharmaceutical remedies. His response: "My doctor said it's easier to medicate than to get people to change their habits."

Does something similar apply to curing the problems that wipes are causing in wastewater collections systems? Is it possible to teach millions upon millions of people not to flush things down the toilet that don't disintegrate like toilet paper? Or is it better for a clean-water agency to install equipment to grind up the offending items? Or for wipes producers to make their products more truly flushable?

Interesting questions. Last month TPO carried an interview-style article featuring the president of INDIA, the trade group for the nonwoven fabrics industry, whose products include an assortment of wipes. I was encouraged by his report on how the industry is responding to the wipes problem — with new flushability tests, innovations in flushable products and a "do not flush" label symbol for products not made to be flushed.

WHAT'S THE SOLUTION?

Still, the question remains: Is it possible to innovate and educate around this issue? Or will it take mechanical solutions? There is probably no answer that applies to every clean-water plant. However, always the optimist, and perhaps naive in believing in people's basic intelligence and good intentions, I keep coming down on the side of education. Here's why.

First off, mechanical solutions, while potentially effective, cost money to install, operate and service. And wipes can cause problems well upstream of plant headworks and lift stations, in sewers, in laterals and even in household piping. Installing special screens and grinder pumps seems to me a bit like running up a white flag of surrender, saying that people's flushing behavior is what it is, like the doctor assuming my friend would not work on his blood pressure by exercising or changing his diet.

So then, what about making flushable wipes that really

live up to the term? That's great as far as it goes. But as noted by David Rousse, INDA president, some 93 percent of wipes are neither made nor marketed to be flushed. So making the remaining 7 percent of wipes more truly flushable only attacks a fraction of the problem (all kinds of wipes get flushed). And let's not forget that people also flush things like paper towels, feminine hygiene products and other non-dispersibles, none of them exactly beneficial to collections and treatment system operations.

Is labeling products with a "do not flush" symbol as easy to understand as the "no smoking" icon? Fine, but no matter where you put it on a package, will consumers heed it, even if they see and understand it? How much attention, really, do we pay to the packages for the products we buy? We recognize the packaging of a familiar brand, but we don't read the package.

SIMPLE, SIMPLE, SIMPLE

Now, even if you grant all the above (and maybe you won't), you can easily argue that many public education campaigns promoting all kinds of behaviors have been tried and have failed. They can be expensive, and they run up against the proven difficulty of getting people to change comfortable habits. Look at how long it took to get people to use seat belts in their cars. And even then it took laws and actual penalties to drive the message home.

So, why do I think education can work in this case? Because the message is so incredibly simple and the change in behavior so small. Any number of simple messages and slogans can work. One popular message is: "The toilet is not a trash can." San Francisco uses a campaign based on the three Ps: Flush nothing except Pee, Poop and Paper.

These programs have the virtue of looking beyond wipes to include the many other things that don't belong in toilets, sewer pipes or treatment plants. Hammer on the point hard enough and many or most people eventually will respond,

Why do I think education can work in this case? Because the message is so incredibly simple and the change in behavior so small. Any number of simple messages and slogans can work.

especially if they're told that indiscriminate flushing comes back to bite them through higher operating costs that jack up their water and sewer fees.

One can argue that the trouble with education isn't that it has been tried and found wanting, but that it has not been tried with enough persistence and conviction. Of course, education will never get everyone on board. But can it make enough of a dent so that more radical measures, like adding mechanical equipment, become unnecessary? I would like to think so.

ALL TOGETHER NOW

So, start with a heavy dose of education. Add improved products and better on-label disposal instructions. And hold mechanical solutions in reserve to be deployed if needed. Seems like a sound approach to me. What do you think? Share your thoughts by sending me an email to editor@tpomag.com. I will respond, and we'll print selected comments in a future issue. **tpo**



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OPEN-HOUSE PARTY!

Milwaukee Sets Attendance Record

How'd you like 2,100 guests knocking at your door? Well, they were more than welcome at Milwaukee's Jones Island Water Reclamation Facility, which recently set an open-house attendance record. See what all the commotion was about, and find out how the facility's tours became so popular.

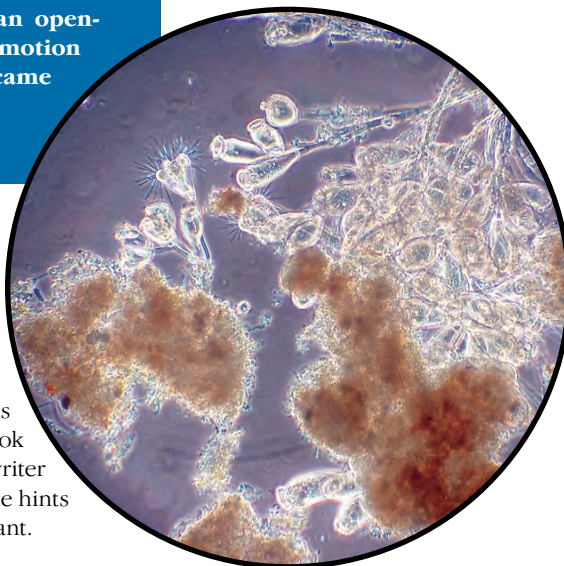
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THOSE CREEPY-CRAWLIES

6 Photos From Under the Microscope

Water bears, *suctorina* and *pediastrium*, oh my! What can you learn from the creepy-crawly microorganisms in your lab samples? In this online slideshow, take a look at some of the interesting organisms contributing writer Jeff Kalmes noticed in his lab samples. He shares some hints about what these critters mean for your treatment plant.

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OVERHEARD ONLINE

"What is occurring in Milwaukee is much more than one building or one organization. ... so many ... wanted to be part of our ecosystem in the Global Water Center."

Meghan Jensen, The Water Council
Why Milwaukee's Water Business is Booming
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GOING VIRAL

The Great Canadian Wastewater Tour

"Why not have fun with social media?" thought Natasha Niznik, a wastewater engineering technologist for Toronto Water. And so began a silly hashtag, a bicycling pilgrimage and the opportunity to spread the word about wastewater. Learn how this Canadian is taking wastewater viral during her tour of Ontario's wastewater treatment facilities.

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RAISED IN THE BUSINESS

LYNN CAMPBELL CARRIES ON A FAMILY TRADITION IN THE WATER INDUSTRY WITH AN UNWAVERING COMMITMENT TO EXCELLENCE IN PERFORMANCE AND CUSTOMER SERVICE

STORY: **Jim Force** | PHOTOGRAPHY: **Kaylinn Gilstrap**

“WATER RUNS THROUGH MY BLOOD,” SAYS LYNN CAMPBELL. “And it probably ran through the blood of my ancestors.”

That’s not an overstatement. Campbell’s grandfather, father, brothers, uncles and cousins were well drillers and water system managers across the South. When public water and wastewater systems started growing, his father became manager of the wastewater system in Arab, Alabama.

Campbell has continued the tradition. He began as a teenager, working odd jobs and sometimes in the summer helping his father at the wastewater treatment plants. He began his water career in 1974. Today, as vice president of Water Resources Operations and Managed Maintenance in Columbus, Georgia, he oversees all above-ground assets.

Those include two water treatment plants, the wastewater treatment operation, two combined sewer overflow (CSO) treatment facilities, all water booster stations, 84 wastewater lift stations, and all above-ground storage tanks. He’s also responsible for 66 of the utility’s 280 employees and an annual budget of \$14.5 million.

In managing this large operation, he has won recognition from peers, receiving the 1994 Georgia AWWA Operators Meritorious Service Award, the 2014 Georgia AWWA William J. Greene Award for service to the organization, and the Georgia AWWA 2015 George Warren Fuller Award for service to the water supply industry. He has also earned the 2011 Elizabeth



Lynn Campbell, vice president of Water Resources Operations and Managed Maintenance for Columbus Water Works.

McEntire Award from the Georgia Association of Water Professionals (GAWP) for industry service.


GETTING STARTED

The start of Campbell’s career more than four decades ago was less prestigious. “When I worked at my dad’s plant in the summer, he was always doing things to apply for and win the best operated plant award in Alabama — cleaning, cutting the grass, painting equipment,” Campbell says. “I helped with that. He drilled into me early that in order to win the award, you had to do things right.”

Campbell then took a job at the Northeast Morgan County water plant, a decision that proved fortuitous. “I was working at a Piggly Wiggly grocery store at the time, trying to make ends meet,” he says. “It was either that, a local manufacturing plant or water treatment.” He joined the county staff and earned his certification. He then moved on to chief operator at Muscle Shoals (Alabama) Utilities, to Phenix City, Alabama, and finally to his present loca-

tion in Columbus.

“That was 1984,” Campbell recalls. “They had an opening for assistant superintendent at the water plant, so I came across the river.” Five years later he was superintendent, a few years after that manager of Water Resources Operations, then assistant vice president in the Water Resources Division. He assumed his current position in 2009.



The team at the 8 mgd Fort Benning Water Treatment Plant includes, from left, James Pace and Derrick Harper, process control specialists; Narvie Nowling, mechanical technician II; John Otto, North Columbus Water Resource Facility assistant superintendent; and Lynn Campbell.

Lynn Campbell, Columbus (Georgia) Water Works



POSITION: | Vice president, Water Resources Operations and Managed Maintenance Division

EXPERIENCE: | 41 years in water professions

DUTIES: | Oversees all above-ground assets, staff of 66, \$14.5 million budget

CERTIFICATIONS: | Georgia Class I Water System and Class III Wastewater

AWARDS: | Georgia AWWA 2015 George Warren Fuller Award, 2014 Georgia AWWA William J. Greene Award for Outstanding Service and 1994 Georgia AWWA Operators Meritorious Service Award; 1998 U.S. EPA Safe Drinking Water Act Excellence Award, many Georgia Association of Water Professionals Best Operated Plant Awards

GOALS: | Continue strategic planning, customer service and infrastructure improvement

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PRAISE FROM COLLEAGUES

Nobody knows Lynn Campbell's strengths and contributions better than his colleagues. Sandy Smith, superintendent of Department of Watershed Management in DeKalb County, Georgia, has known Campbell for at least 25 years and voices respect and admiration.

"He's probably one of the most generous, giving spirits of all the folks I've known in the industry," Smith says. "Lynn has never said no to chairing or serving on a committee, mentoring or teaching others. He's great at communicating, collaborating, teamwork and leadership."

Smith says Campbell's contributions to the field, and the Columbus operation in particular, include attention to employees and workforce training and advancement, as well as preparedness and emergency response. Campbell's legacy will include overall operational efficiency in the water treatment plant and system, as well as sound management of the utility's assets.

Campbell reports to John Peebles, senior vice president of Water Resources Operations: "He's my right-hand man. He's my expert; I've learned a lot from him. He sets a high standard for his subordinates. He has been in all those roles, and he expects a sense of pride and a strong work ethic."

As Campbell approaches retirement, Peebles will remember him for his attention to detail: "He's deliberative. He acknowledges what obstacles may be in the way and how to avoid them. He's been the perfect type for our water system and treatment process, because you can't have mistakes."

Lynn Campbell oversees a repair at the pump station that delivers raw water to the North Columbus Water Resource Facility.

He holds a long list of certifications and educational achievements. Besides Georgia Class I Water System and Class III Wastewater licenses, he holds water treatment certification for Alabama vocational education instructors, certification for Instructional Technology Water Treatment with the Georgia Water and Wastewater Institute, and a Water and Wastewater Leadership Certificate of Completion from the Kenan-Flagler Business School at the University of North Carolina. He is also a graduate of the GAWP Leadership Academy.

“When I worked at my dad's plant in the summer, he was always doing things to apply for and win the best operated plant award in Alabama.”

LYNN CAMPBELL

ALL ABOUT PEOPLE

With a resume steeped in water, Campbell has a unique and far-ranging perspective on the challenges facing water and wastewater utilities and how to achieve success. To begin with, he hasn't forgotten the importance of the operator and operator-management relationships.

"Operators like to be recognized for the job that they do and to be appreciated," he says. "It is extremely important for the executive staff to provide the tools they need to do their job." He believes the key to success in water treatment plant operation is a motivated and competent staff, anchored and supported by a management team that "strives to excel and do better than

most other utilities.” Every plant Campbell has worked at has won at least one award for operational excellence.

Strategic planning has a lot to do with top-shelf performance, Campbell says. Columbus has made strategic planning part of its normal operation for more than 20 years: “We’ve been doing it for a long time. You just have to make it part of your culture. If you’re not changing, not doing anything, that doesn’t cut it in today’s world.”

At Columbus, strategic planning requires out-of-the-box thinking, along with discipline. The utility’s planning process focuses on six strategic initiatives: customer service, regional partnerships, information technology, optimizing infrastructure, a sustainable workforce, and financial stability.

“We develop goals and objectives for reaching the goals, and those goals lead us into the future,” Campbell says. “To the largest extent possible, we use benchmarking as an important part of our strategic planning. We currently track 27 performance indicators with other utilities or within our utility. That serves to assist on continuous improvement.”

PERFORMANCE PLANNING

Columbus also has a strategic planning department, which meets regularly and updates the strategic plan to the senior staff each quarter. “We have strategic teams for each initiative,” says Campbell. “Each team has a leader and five to six staff members.” The teams develop performance work plans for each of the objectives designed to achieve the stated goals.

“We look toward the future,” says Campbell. “We run the business strategically. Our planned capital improvement program is prepared with input from asset management, our facilities and IT master plans, and an energy gap analysis, anchored by our strategic plan. All this rolls up into a financial plan for the capital improvement program. The whole thing is one big process.

“Now when we have to raise rates to pay for infrastructure needs and construction, we have a basis for doing that.”

Columbus Water Works also employs the industry’s effective utility management (EUM) principles. These best practices dovetail with the Columbus utility’s strategic plan. The bottom line: “Strategic planning has enabled us to go forward in a strategic way,” Campbell says. “The result is sustainability and better customer service.”

CARING FOR CUSTOMERS

That brings up Campbell’s favorite topic — customers. “Customer service is our big thing,” he says. “Our goal is to provide the best customer service. Everything you do drives you to make that happen.”

Customer service is one of four major planks in the Columbus vision statement, along with protecting the environment, aspiring to new opportunities and being an outstanding provider of utility services. “It’s so important to have your customers’ buy-in,” Campbell says.

Stakeholder surveys help cement relationships: “In our process, each person on our management team interviews a stakeholder — our partners, business people, citizens. We ask what we’re doing right and what we’re doing wrong. We get them involved in our business.”

The utility also sends written surveys and conducts surveys over the phone.

“To the largest extent possible, we use benchmarking as an important part of our strategic planning. We currently track 27 performance indicators with other utilities or within our utility.”

LYNN CAMPBELL

In Campbell’s view, the more a water utility communicates, the better: “We always try to communicate what we’re doing and why we’re doing it.” That brings up the ticklish issue of rates and rate increases. “Our rates are generally low in the first place, so increases have not been so much of an issue,” Campbell says. “We benchmark our utility against others of our size in the Southeast, and our rates are usually third or fourth from the bottom.

(continued)

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But when we do increase them, we want the community to buy in and understand that we have a need.”

TIME TO INVEST

At the same time, Campbell sees changes ahead in the cost of clean water: “Historically, water in most parts of the United States is very, very cheap as compared to other utilities such as power and natural gas. However, water utilities are faced with aging infrastructure. Water systems built in the 1960s and 1970s, for example, are just now starting to experience signs of aging, and huge capital expenditures are necessary to sustain these

“We always try to communicate what we’re doing and why we’re doing it. Our rates are generally low in the first place, so increases have not been so much of an issue.”

LYNN CAMPBELL

assets. Older and larger systems are facing even more of a challenge.”

For the most part, Campbell says, the only way to pay for improvements is through water rates, “unless by some miracle the federal government steps up and provides the funding.”

Throw in changing regulations that require different treatment technologies, and even more funds will be needed, he says.

“As Bob Dylan sang, ‘The Times They Are a-Changing.’ Cheap water may at some point become a thing of the past.”

Although he greatly enjoys what he’s doing, Campbell plans to retire in a couple of years.

He’s getting closer to the time to enjoy his grandchildren and do other things. Not surprisingly, those involve water: bass fishing and taking his family on his center-console boat down to St. Joe Bay in Florida for scalloping and snorkeling.

During those quiet moments, he’ll be able to reflect on a satisfying career that includes a legacy of industry service. Campbell has served on the GAWP Best Operated Plant Award Committee and Water Treatment Committee. He has also been part of the Georgia Water and Wastewater Agency Emergency Response Network and served on the Executive Committee for GAWWA. He is a member of GAWP 5-S Club.

“There’s a right way to do things, and not so right,” he says. “We are all about doing things the right way.” **tpo**



Lynn Campbell (center) and James Pace (left) look on as Derrick Harper monitors the Fort Benning Water Treatment Plant SCADA system.

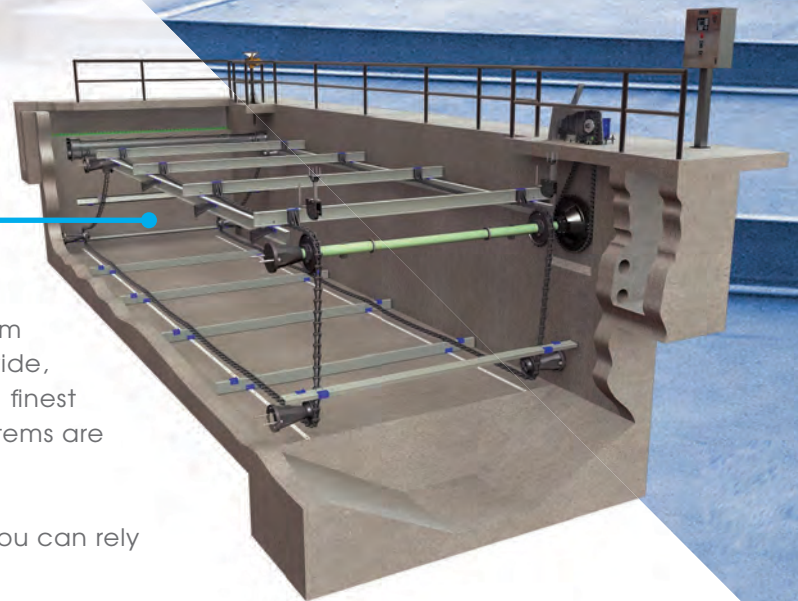


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Greg Wukasch, left, a San Antonio Water System education coordinator, leads a tour of the city's Dos Rios Water Recycling Center. The screw pumps pictured reseed microbe-infused water into aeration basins.

PHOTOS COURTESY OF THE SAN ANTONIO WATER SYSTEM

A Novel Approach

SAN ANTONIO'S WATER EDUCATION PROGRAM TAKES PARTICIPANTS ON IN-DEPTH EXPLORATION OF EVERY CHAPTER IN THE STORY OF WATER

By Craig Mandli

Most of us don't think about water much when we use it. We turn on the faucet and clean water is right there. We flush the toilet, and the used water is gone.

But an outreach program by San Antonio Water System (SAWS) brings the story of water to the forefront. The free Rain to Drain tour is offered nine times a year. Greg Wukasch, a SAWS education coordinator and the brains behind the program, says the aim is to offer more than a typical treatment plant tour.

"The wastewater and potable water treatment plants are certainly a big part of the water cycle in San Antonio, but they are only a couple of the chapters in the book," he says. "You have to read each chapter to tell the whole story."

GEARED TO GROWN-UPS

Each daylong tour (breakfast and lunch provided) buses a pre-registered group to three locations: Stone Oak Parkway where water

time it falls as rain through final effluent treatment and release back to area waterways.

"When they begin the day, water is out of sight and out of mind for most participants," says Wukasch. "When the day is done, they get off the bus and tell us how they had no idea what actually went into their water system."

Most of the system's educational programming targets youth — education specialists offer sessions to elementary, middle and high school students. Rain to Drain is geared toward adults in the SAWS service area.

"It really evolved from a program aimed at high school students to one that encourages adults to learn about and question where their water comes," says Lynne Christopher, another education coordinator. "The high school students were interested, but we found it was their teachers who became especially engrossed in the process. That made us think, 'Hey, maybe this would work for adults, too.'"

“The wastewater and potable water treatment plants are certainly a big part of the water cycle in San Antonio, but they are only a couple of the chapters in the book. You have to read each chapter to tell the whole story.”

GREG WUKASCH

floods into caves that go directly into the Edwards Aquifer, Maltsberger Pump Station where drinking water is stored and treated, and Dos Rios Water Recycling Center.

The tour program, in its fourth year as part of the utility's education process, offers an inside look at resource management, walking observers step by step through the process water takes from the

wastewater, water recycling, and heating and cooling. The system has 144 million gallons of water in storage and 10,000 miles of water, sewer and recycled water pipes. Wukasch and Christopher explain in detail the drainage, recharge and artesian zones.

The next stops are two caves in the parkway where water goes straight into the aquifer when it rains. The bus then shuttles the

ALL ASPECTS

Tours begin in the customer service center at the SAWS central office, where Wukasch and Christopher give a short introduction. SAWS serves customers in four ways: water,

group to the Maltsberger Pump Station, where enormous storage tanks suspended overhead provide a setting for a discussion about potable water. Large tan pipes come up from the ground, extracting water from artesian wells and treating it with chlorine and fluoride.

The final stop is at the Dos Rios plant, which uses a pure oxygen aeration process. Biosolids are made into landscaping compost, and biogas is treated and delivered to a natural gas company pipeline.

Greg Wukasz, right, explains how water samples are taken at San Antonio's Maltsberger Pump Station.



Lynne Christopher, back, gives an overview of the Rain to Drain program at the San Antonio Water System customer service center.

LESSONS FROM DISNEY

"We've done a lot of work to adapt the program," says Wukasz. "Lynne and I took separate family trips to Disney World a few years ago and found ourselves taking notes on how we could 'Disney-fy' our tours. We added logos, video components, interactive exercises and excitement to it. It really plays out like a storybook now and keeps everyone entertained."

Last year San Antonio began a campaign to explain an increase in utility rates slated for early 2016. The increase will fund infrastructure improvements and capital projects that include installing new technology for the water and wastewater treatment systems.



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Wukasz led public meetings on the increases at several city libraries and found attendees enthusiastic about the city's water system and mostly agreeable to higher rates. Many had taken Rain to Drain tours.

"Those meetings were really the best advertising we ever could have done for our utility, mainly because so many people came just to thank us for Rain to Drain," says Wukasz. "After that, it got to the point where every time we opened up tour sign-up, they would book up in less than a day."

LOOKING TO GROW

Christopher hopes to expand the program in the coming year. Plans are underway to offer abbreviated and niche tours for the city's elected officials and employees. She has reached out to civic organizations and young leadership groups to get more people on board. While the program is more labor intensive than coordinating plant tours, Christopher encourages other municipalities to consider outreach programs that tell the entire story behind their water.

"Taking a tour of the wastewater plant is certainly worthwhile and educational, but it's important to remember that it's only part of the story," she says. "We've found a lot of people who are very excited to read the whole thing, cover to cover." **tpo**

What's Your Story?

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

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Pumping Up the

Team members at the Santa Cruz Wastewater Treatment Facility include Al Locatelli, Armando Deloera, Greg McNair, Dan Seidel, Mike Sanders, Akin Babatola, Greg Galvin, Larry Wisler, Anne Birch, Jennie Munster, Grant Lineham, Robert Blume, Fred Stevens, Forrest Locatelli, John Locatelli, Mike Ortega, Ron Frazier, Tim Morton, Ron Carlson, Michelle Courtrol, Tom Pretzer, Dave Meyers and Bud Miller.

Power

A CALIFORNIA PLANT MAKES THE MOST OF GREEN ENERGY WITH BIOGAS-FUELED COGENERATION, SOLAR POWER AND A NUMBER OF ENERGY-SAVING PROCESS INNOVATIONS

STORY: **Jim Force**

PHOTOGRAPHY: **Shmuel Thaler**

WASTEWATER OFFICIALS TALK MORE AND MORE about turning publicly owned treatment works into publicly owned power plants.

They should take a lesson from the Santa Cruz (California) Wastewater Treatment Facility.

The plant has 1,300 kW of electric power generating capacity in a cogeneration system that burns digester methane. It also operates a 53 kW solar photovoltaic system and has energy-saving water fixtures and lighting. Team members continuously monitor the plant's energy and greenhouse gas performance. All told, the plant operates on 70 percent green power.

As a result, the plant has achieved Green Business Certification from the Monterey Bay Area Green Business program, as well as partnership status in U.S. EPA Green Power and Energy Star programs. It was named 2013 Plant of the Year in California in its size category.

Superintendent Dan Seidel points out that the plant is the city's biggest energy consumer and presents a great opportunity to use on-site renewable energy. Greg Galvin, electrical supervisor and certified energy manager, observes, "Over the past four years we have increased our uptime and our methane gas production, while reducing our kilowatt-hours per gallon treated. That allows us to reduce our carbon footprint and operate in a more sustainable fashion."

THOROUGH TREATMENT

The treatment plant (design flow 17 mgd) serves 130,000 people in Santa Cruz and surroundings, an environmentally minded area tucked into the Pacific Ocean shoreline on the northern edge of Monterey Bay. The city is famous for surfing, skateboarding and the Santa Cruz Beach Boardwalk amusement park.

In the plant's headworks, mechanical bar screens and grit removal systems (Vulcan Industries and Serpentix) remove debris before six primary sedimentation basins (Brentwood's Polychem Systems). Mike Sanders, operations manager, says not all six are in use at once; some are kept in reserve or for use during maintenance and high flows during winter months.

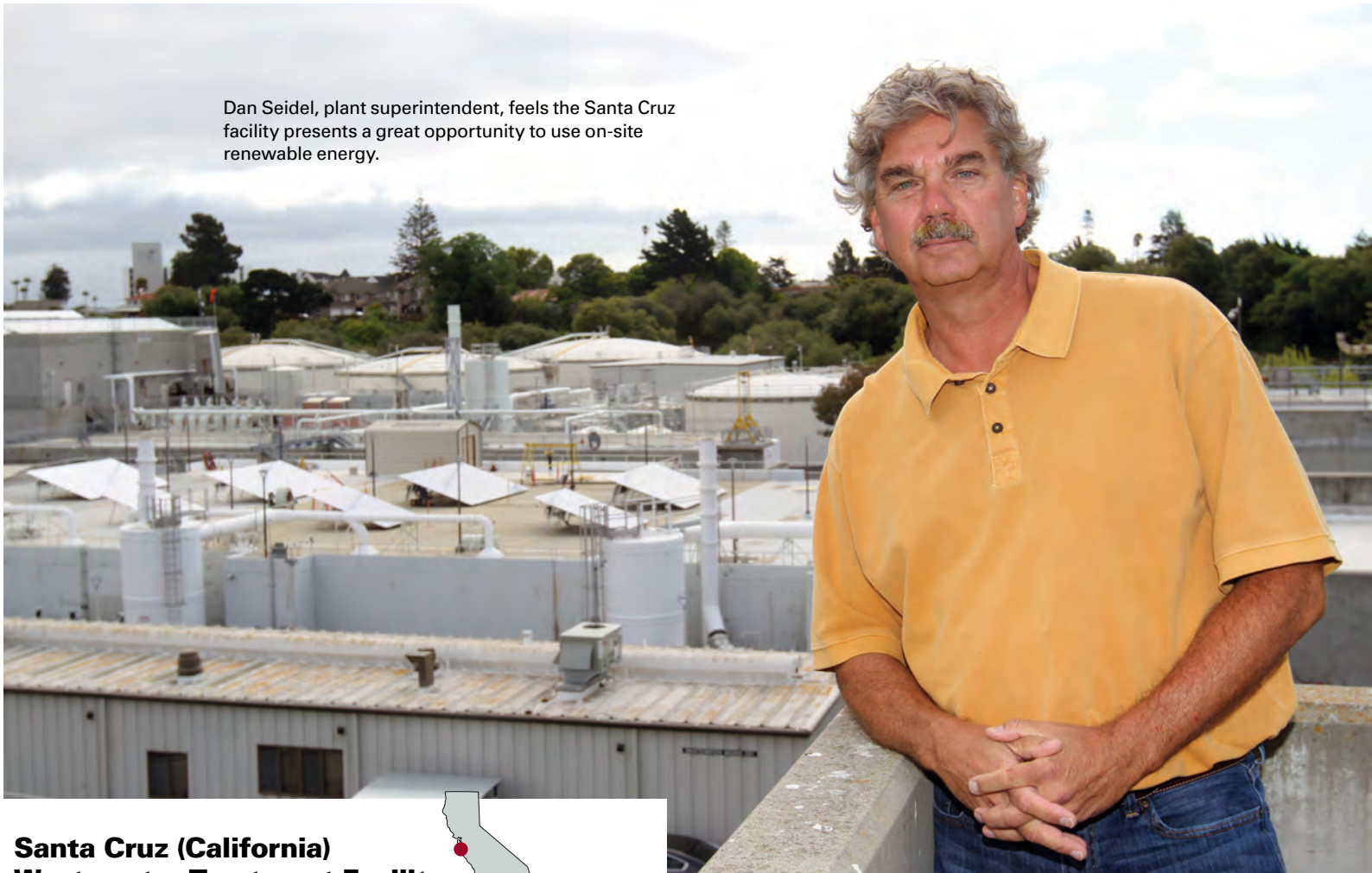
“We’ve broken down the silos between the laboratory, maintenance, electrical and operations. Everybody works together. We’re an integrated professional team.”

DAN SEIDEL



Operator John Bontrager checks the sludge blanket in one of the facility's secondary clarifiers.

Dan Seidel, plant superintendent, feels the Santa Cruz facility presents a great opportunity to use on-site renewable energy.



Santa Cruz (California) Wastewater Treatment Facility



BUILT: 1928 (upgrades 1999 and 2012)
POPULATION SERVED: 130,000
SERVICE AREA: City of Santa Cruz and outlying areas
FLows: 17 mgd design, 9 mgd average
TREATMENT LEVEL: Secondary
TREATMENT PROCESS: Trickling filters with contact stabilization
RECEIVING WATER: Monterey Bay
BIOSOLIDS: Land-applied
ANNUAL BUDGET: \$9 million (operations)
WEBSITE: www.cityofsantacruz.com
GPS COORDINATES: Latitude: 36°57'36.77"N; longitude: 122°2'15.47"W

Secondary treatment is provided by six trickling filters (WesTech Engineering), followed by contact stabilization tanks. The trickling filters are filled with plastic media and are 60 feet in diameter, 16 feet deep, with center-driven trickling arms. Two trickling filters operate in summer and three in winter.

The solids contact units are serpentine-shaped and provide reaeration and flocculation of solids before the secondary clarifiers. Detention time is 30 minutes at the normal flow rate of 9 mgd. Secondary sludge and trickling filter solids are returned to the contact stabilization units to form a mixed liquor.

The secondary clarifiers (WesTech) are 120 feet in diameter with a side water depth of 16 feet. After settling, the water is disinfected in a twin-channel UV system (TrojanUV). Effluent is discharged to Monterey Bay. About 150,000 gpd is diverted to a multimedia filter (WesTech Trident) and disinfected with sodium hypochlorite. This water is recycled for pump packing, polymer mixing, plant washup, and sewer line flushing.

SOLIDS SIDE

Waste solids are thickened using gravity and dissolved air flotation thickeners, then anaerobically digested and dewatered in centrifuges. Cake qualifies as a Class B material and averages 22 percent solids. The original centrifuges have been recently upgraded using the latest Andritz technology for energy efficiency. The \$2 million upgrade involved addition of a variable-speed drive.

Fifty tons per day of the dewatered material is hauled by a local trucking company to Merced County, where it is applied to farm fields. During the wet season, it is landfilled. The Santa Cruz plant also processes biosolids from the neighboring Scotts Valley Treatment Plant.

The plant is staffed around the clock with one operator on site at all times and senior operators on call for backup. The plant's SCADA system with Wonderware software (Schneider Electric, Telemetry & Remote SCADA Solutions) allows remote access through individual desktop computers and tablets.

GIVING IT THE GAS

While plant performance is excellent, the plant team's efforts to generate power and reduce energy consumption make the headlines these days. "We average 7 million cubic feet of methane gas per month," says Seidel. "That translates into 560,000 kWh per month on one cogeneration engine and 150,000 kWh on the other. Both machines (Waukesha Engine by GE Energy) produce electricity for use in the plant; heat is captured for the digesters and buildings."

"We use the smaller engine depending on time of year," Sanders says. "We use it as a peaker power plant during May through October when our utility power is the most expensive. We can reduce our load and receive a smaller unit time-of-use charge when we add the second unit to the mix." The larger unit operates continuously. With the expertise of the facilities

Santa Cruz Wastewater Treatment Facility PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	245-936 mg/L	18.4-30 mg/L	N/A
TSS	166-440 mg/L	3-17 mg/L	30 mg/L monthly avg. 45 mg/L weekly avg. 75 mg/L daily max.
TOC	106-392 mg/L	12-17 mg/L	17 mg/L monthly avg. 23 mg/L weekly avg.

maintenance division, the power plant can achieve 97 percent uptime.

The solar units, installed atop the dewatering building and primary tanks by Renewable Energy Resources in 2002, provide additional energy for in-plant use. The local power utility does not permit export of power to the grid. "Over the years, we've increased the ratio of in-house power versus that purchased from the utility," Sanders says.

The Santa Cruz staff regularly comes up with innovative solutions. In a case involving the gas recovery and power generation system, the team devised ways to clean the digester gas and blend it so that the gas feed has a consistent heating value.

The gas comes off the digesters and passes through iron sponge scrubbers, then to Spencer blowers, then to an activated carbon filtering system (Applied Filter Technology) and finally to the engines. "The feed heating value was not consistent as we blended biogas with natural gas," says Fred Stevens, lead mechanic. Natural gas can come in at 1,000 to 1,050 Btu/ft³, while the biogas heating value can be as low as 600 Btu/ft³.

“Over the past four years we have increased our uptime and our methane gas production, while reducing our kilowatt-hours per gallon treated. That allows us to reduce our carbon footprint and operate in a more sustainable fashion.”

GREG GALVIN

"That's huge," says Seidel. "The changes between high and low Btu gas were raising havoc. We went to another treatment plant where they had thrown out some old dilution blenders. We brought them back and our staff rebuilt them." Now the blenders smooth out the heating value differences and the engines run more consistently. "It was a very creative solution to the problem," Seidel says.

HOMEGROWN SOLUTIONS

That's not the only idea the team has come up with. "We've pretty much scrapped the old way of controlling flows," says Galvin, electrical instrumentation supervisor. New approaches include modulating motors

so they don't run at full speed, using variable-speed drives controlled by the SCADA system, and submetering throughout the plant.

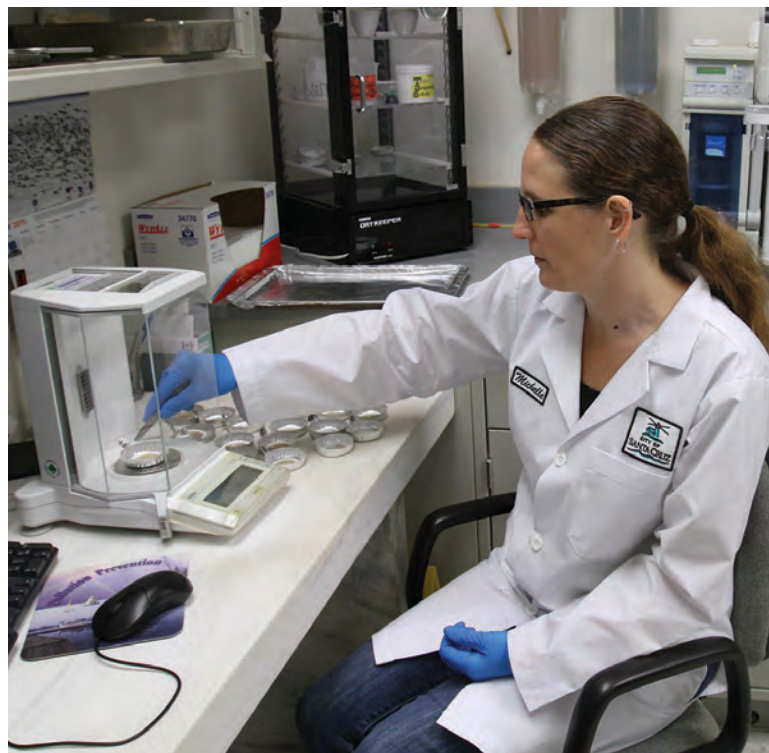
"Rather than one meter and one reading, submetering lets you look back and make changes," Galvin says. "When you make adjustments on a single process step or piece of equipment, submetering tells you the impact. It lets you see what the energy change is in real time."

Energy audits are another tool, revealing energy use by motors, fans and other equipment. "We get a full-scale evaluation of energy consumption out of those reports," says Galvin. The plant's odor-control system is a case in point. It has four carbon scrubbers designed to run fully on or fully off. The old practice was to run two at full blast.

When an energy audit revealed the true power draw, the staff put variable-speed drives on all four scrubbers. Now all four run at once and modulate according to the power needs. "We've seen a significant power reduction," says Sanders.



ABOVE: Al Locatelli, mechanic technician, services a Waukesha engine (GE Energy) in the plant's cogeneration facility. BELOW: Michelle Courtroul, lab technician, weighs filters to measure TSS.





Forrest Locatelli, master fixer.

IS THERE ANYTHING HE CAN'T FIX?

It's a good thing no one could keep Forrest Locatelli down on the farm. He is the go-to guy at the Santa Cruz Wastewater Treatment Facility when anything needs to be fixed, improved or made from scratch.

"There isn't anything he can't do," is how fellow staff members describe him. One of his latest inventions — the Flocatelli 5000 — helps record influent and effluent values every 30 days on a constant stream basis, a big improvement over the previous practice of grabbing a sample twice a year.

The device, a chambered canister patterned after those used by the U.S. Forest Service in stream sampling, allows debris to settle out before the water passes through a semipermeable membrane filter, where contaminants like pharmaceuticals and other chemicals can be filtered out and analyzed.

"The problem with wastewater was plugging," Locatelli says. The chambered design gets the water cleaner before it crosses the membrane. Water-quality regulators are especially happy with it, says Michelle Courtroul, laboratory technician, because it yields a much more accurate picture of what comes into the plant and what goes out.

"The membrane mimics the aquatic organisms and simulates their exposure levels to pesticides, PAHs and pharmaceuticals, in and out," says Locatelli. "With the 30-day sample, we get a lower detection limit and we get better numbers and a more accurate picture of what's happening."

Locatelli learned to make and fix things as a farm kid: "My dad was mechanically inclined, and we built our own equipment." Later, he was a mechanic for a Wrigley gum factory and a farming machinery manufacturer. In 15 years at the treatment plant, he has built a reputation for welding stainless steel, an art that requires precision, know-how and a steady hand. He rebuilt the paddle skimmers on the clarifier out of stainless steel so they don't rust. He also fabricated the racks and frames on the bar screens.

On the compressors in the digester area, Locatelli replaced just about everything with stainless steel: piping, loaders, traps, discharge and regulators. He also installed the new parts, turning balky machines into more consistent operators.

"It was incredible," says Mike Sanders, operations manager. "We won't let him go anywhere else. He's under lock and key."

Not all improvements are energy related. A testing method developed by Akin Babatola, laboratory and environmental compliance manager, substitutes TOC as the water-quality parameter in place of BOD. "The TOC number is equivalent to what BOD would be, but the turnaround time for the analysis is much quicker," says Michelle Courtroul, lab technician.

That means the staff can analyze the number while the water is still in the plant rather than waiting for the five-day period required for BOD analysis. "We are the first facility in this part of the state to get this change as part of our permit," says Babatola. "We're getting inquiries about it from as far away as Canada."

ENERGY CREDITS

The extra efforts at Santa Cruz have won local and national honors. The plant is a member of the Monterey Bay Area Green Business organization, cited for "exceeding environmental regulatory requirements, preventing pollution and conserving natural resources."

The green-business group credits the plant with replacing bathroom fixtures with low-flow models, upgrading fluorescent lighting, installing occupancy sensors for lighting and computer work stations, promoting paper recycling and reduction, using earth-friendly cleaners, auditing heating and cooling systems for leaks and insulation integrity, monitoring greenhouse gas emissions, and implementing a climate action plan and environmental policy statement.

In 2014, the plant ranked 25th nationally in the U.S. EPA Green Power Partnership, primarily for reducing its dependence on outside power sources. The energy reduction programs may also result in designation under the ISO 50001 international energy management standard.

"We've been documenting energy use and greenhouse gas emissions for many years," says Seidel. "The data shows improved performance year over year, as well as our commitment to continual reduction, and can be used to become an ISO 50001 facility. We are researching the requirements to becoming certified."

Performance and aspirations like this bespeak committed staff members who communicate and work together. "We've broken down the silos between the laboratory, maintenance, electrical and operations," says Seidel. "Everybody works together. We're an integrated professional team."

Adds Babatola, "I'm impressed with all my colleagues. Not all ratepayers recognize the investment of effort to make an award-winning facility. But our legacy is that all of our staff members recognize that the core mission of our plant is to control pollution." **tpo**

“When you make adjustments on a single process step or piece of equipment, submetering tells you the impact. It lets you see what the energy change is in real time.”

GREG GALVIN

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A CAREER DISCOVERED

SENIOR OPERATOR STEVE McTARNAGHAN CAME TO THE INDUSTRY LATE
BUT FOUND A GREAT OUTLET FOR HIS PLANNING, MECHANICAL AND PEOPLE SKILLS

STORY: **Trude Witham**
PHOTOGRAPHY: **Mike Bradley**

STEVE McTARNAGHAN LEARNED VALUABLE skills at 16 while working for his father in the excavation business. His grandfather and father-in-law were also mentors, from whom he learned the value of hard work.

He also picked up drywall, carpentry and electrical skills that have come in handy during his 33 years with the Geneseo Village Water and Sewage Treatment Plants in Geneseo, New York.

McTarnaghan started at Geneseo in 1982 as an operator trainee and worked his way up through the ranks. Today, as senior water and wastewater treatment operator, he applies his management, budgeting and planning skills in successfully serving 18,000 customers in five towns.

His accomplishments include a water tank project that improved water quality and flow to residents outside the village, and new water and sewer lines that improved quality and flow while reducing infiltration. A master meter installation project reduced water loss by 23 percent, and an upgrade to the wastewater plant's nine biosolids drying beds significantly reduced drying and cleaning time.

By doing much of the work in-house, the operations team has saved the village thousands of dollars per year. They also produce a high-quality product: 0.1 NTU average turbidity of finished drinking water, and a 95 percent removal rate for BOD and TSS at the wastewater plant.

For his efforts, McTarnaghan earned the 2014 Uhl T. Mann Award for Excellence in wastewater treatment operations and maintenance from the New York Water Environment Association (NYWEA) among plants with capacities from 1.1 to 10 mgd.



Steve McTarnaghan, senior water and wastewater operator, heads off to a work site in Geneseo, New York.

RUNNING TWO PLANTS

The 1.5 mgd trickling filter wastewater plant was built in 1958 and upgraded in 1972 and 2003-05. The new equipment includes:

- Influent building with an Auger Monster and Muffin Monster (JWC Environmental) and PISTA grit chamber (Smith & Loveless)
- Weirs and paddles in all four clarifiers
- Recirculation tanks to help enable adequate flow to the trickling filters
- Distribution arms and plastic media in the trickling filters
- Recirculation pumps (Gorman-Rupp)
- Fiberglass covers and a new mixing system and pump for the digesters

- New spiral heat exchanger for digester heating

Other plant equipment includes a rotary arm distributor system (WesTech Engineering), WEMCO supernatant pumps (Weir Specialty Pumps) and sludge pumps (Carter Pump).

The 3.0 mgd conventional water plant has been upgraded several times, most recently in 2014. New equipment includes the computer system, effluent flowmeter, mixing system in the 3-million-gallon storage tank, a distribution line from the tank, several miles of new water main, and master meters in new locations. Other equipment includes effluent and low-service pumps (Peerless Pump Company), chemical feed pumps (Grundfos Pumps and ProMinent Fluid Controls) and Trident MicroFloc filters (WesTech Engineering).

A staff of five operates and maintains both plants. Besides managing day-to-day operations, McTarnaghan oversees major infrastructure projects and spot machine and pipe repairs. Initially trained in water treatment, he cross-



Steve McTarnaghan, Geneseo (New York) Water and Sewage Treatment Plants



POSITION: | **Senior water and wastewater operator**

EXPERIENCE: | **33 years**

EDUCATION: | **Monroe Community College,
Rochester, New York**

CERTIFICATIONS: | **2A, C, D water treatment; Grade 3
wastewater treatment**

MEMBERSHIPS: | **Genesee Valley Chapter New York
Water Environment Association,
New York Rural Water Association,
New York AWWA Section Southern Tier**

GOAL: | **Retire and enjoy more time with wife and
grandchildren**

GPS COORDINATES: | **Latitude: 43°14'9.19"N;
Longitude: 77°34'29.46"W**

“I really enjoy planning for the future success of operations. ... I have the authority to decide what projects should be done, but I also believe in doing them as soon as possible and not waiting for a crisis situation.”

STEVE MCTARNAGHAN



TOP OF PAGE: Steve McTarnaghan speaks with a representative of a local company about pH readings. RIGHT: The Geneseo treatment plant has seen several upgrades; five staff members give it tender loving care.

trained in wastewater treatment when the water and sewer departments merged in 1987.

He took water and wastewater treatment classes at Buffalo State College and wastewater classes at State College of New York at Morrisville. He also completed correspondence courses from California State University and Michigan State University. At Geneseo, he received hands-on training in water operations from Don Jerals, water plant foreman, and in wastewater operations from Tom Linsner, wastewater plant foreman, and Charlie Parent, senior water and wastewater operator.

MUCH BETTER JOB

Water treatment was not McTarnaghan's first career choice. He attended Monroe Community College in Rochester as a criminal justice major. He then worked as a supermarket stock clerk, in shipping/receiving at a local manufacturer, and as manager of automotive service stations in Geneseo.

He knew people at the Geneseo Department of Public Works, saw potential for a good career path, and so applied for a job. "It has been a much better job than I ever expected, because it allows me to use my planning and mechanical skills," he says. "I really enjoy planning for the future success of operations. That includes budget, staffing, equipment functionality, water quality and preparing to meet future demands on our system. I have the authority to decide what projects should be done, but I also believe in doing them as soon as possible and not waiting for a crisis situation."

Least enjoyable is finding money for necessary projects. These are funded by water and wastewater revenue, but because the water rates in Geneseo are 65 percent lower than in other area municipalities, there is limited room for improvements and required maintenance.

McTarnaghan offers high praise for his staff: "They do everything at the plants, from putting vinyl siding on the garage and sealing blacktop, to sealing fiberglass digester covers and patching holes around the drying beds."

The team includes those with heavy-equipment operation, gas pipeline installation, and electrical and carpentry skills. "We do all our own motor repair and laying new waterlines," says McTarnaghan. "We even do tree removal." Besides McTarnaghan (Grade 2A, C, D water, Grade 3 wastewater certification), the team includes:

- Foreman Dan Quinlan (Grade 2A, D water, Grade 3 wastewater, 24 years at Geneseo)
- Operator Matt McTarnaghan (Grade 2A, D water, Grade 2 wastewater, eight years)
- Operator trainee Chris Dermody (one year)
- Maintenance employee Steve McLean (Grade 2A water, Grade 1 wastewater, 26 years)

Says McTarnaghan, "They have the knowledge and ability to run both plants smoothly. They answer emergency calls quickly and solve problems on their own with little or no additional assistance. Customer service is their top priority."

MANY IMPROVEMENTS

Over the years, McTarnaghan and his team have launched and completed many improvement projects. In 2013, they designed and installed the new mixing system for the 3-million-gallon water tank and installed the new distribution line from the tank. The \$225,000 project reconfigured the tank's

intake and outlet piping to solve a stagnant water problem. Hazardous chemical residues would build up in the tank, requiring frequent flushing. The improvements were designed to allow water to flow through the tank and constantly renew itself.

The tank was removed from service for more than a month while improvements were made. To maintain water service, the plant had to match what it was pumping to what the towns were drawing and what the village was using.

"We had two 8,000-gallon portable pressure tanks parked at the water tank, which equals about 15 minutes of storage," recalls McTarnaghan. "That was the only storage we had. We also had eight pressure-relief valves on hydrants, which needed to be constantly trickling water so we would be sure there was water everywhere in our system." As long as they knew when each town was going to pump, they could increase the flow leaving the plant. Meeting demand meant coordinating with the towns and staffing the water plant around the clock.



Steve McTarnaghan (left) with Jason Frazier, Public Works superintendent, check on a job involving a possible burst pipe.

Another project improved the biosolids drying beds. "We had been using sand drying, but we black-topped three of our nine beds after visiting a plant that was successfully using this method," McTarnaghan says. "It has worked out wonderfully." Instead of three men working three hours to shovel each bed, the cleaning process was reduced to one man working an hour with a small tractor. A roof over the beds keeps them dry, while clear panels on one side of the roof allow sunlight to speed up the drying process. Drying time has been reduced from up to five weeks to about two weeks.

LEADING BY EXAMPLE

McTarnaghan prefers water to wastewater treatment: "It's more challenging. The source water changes daily, and you have to know

your plant down to the smallest degree to properly and consistently produce quality water." His trained ears tell him when equipment needs service. "You need to know what each piece of equipment's noise means so that you can hear when there is a potential problem," he says.

As a manager, he sets a positive example. "I started as low man, always being the first one in the ditch," he says. "Today, I don't hesitate to be one of the guys in the ditch. When we're sealing digester covers in the sun and it's 90 degrees with no breeze, I'm right there beside my team."

Although it's not officially part of his job, he still walks house to house and reads water meters: "I repair and replace meters at the same quota as my team members. I believe work should be shared equally regardless of title or seniority."

McTarnaghan's track record in planning and execution is the reason he won the Uhl T. Mann Award. "I think I was nominated because several people on the NYWEA Genesee Valley Chapter Board of Directors know me and the plant and know what my team has been doing to improve our system's operations," he says. "Sometimes we can't get it all done in a normal workday, but the staff has no problem working overtime."

HOMETOWN FEEL

As for water distribution and wastewater collection infrastructure, much of the village's oldest piping has been replaced. On the water side, that has reduced winter breakage and leaks, but there is still more to do. "Around 8,000 feet of waterline and 8,000 feet of sewer line will need to be replaced in the near future," McTarnaghan says. "Some is bad pipe and some is too small to meet demand."

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During flow and smoke testing of the sewer system to check for infiltration, the team found many trouble spots: "We've fixed the easy stuff first, and now we are replacing lines." Funding will continue to be a challenge.

"Our Village Board is very responsive, but sometimes it's hard to get them to grasp the situation, like a pipe in the ground that they can't see," McTarnaghan says. He did secure funding for a sewer line project on Main Street in which the new sewer line was to be routed through residents' back-

“Kids don't dream of growing up to be a treatment plant operator. But what it lacks in glamour it makes up for in importance. This is a vital service to our society both now and in the future.”

STEVE McTARNAGHAN

yards and then connected to a mainline through a side yard. "I went house to house and was able to get easements for every line," says McTarnaghan. "My relationships with the people helped. One guy talked to his neighbors and said, 'You can trust Steve. If he tells you this, this and this, it will happen just that way.'"

This trust comes from years of exceptional customer service. A March 2015 letter to the editor in the *Livingston News* voiced appreciation for the job McTarnaghan's team does every day. It came from a customer who awoke one cold morning to discover that she had no running water. She told how the village crew worked tirelessly in subfreezing temperatures with no lunch break to restore her water. Her letter ends with praise for the "kind, considerate and dedicated men" who deserve the respect of the citizens of Geneseo.

Based on his own experience, McTarnaghan offers advice to those interested water careers: "Take the test! Don't hesitate to explore your opportunities for a municipal job. Working at a small plant has a great hometown feel. You have the chance to meet a lot of residents, and there is a great deal of satisfaction and pride in what you can accomplish. Kids don't dream of growing up to be a treatment plant operator. But what it lacks in glamour it makes up for in importance. This is a vital service to our society both now and in the future." **tpo**



McTarnaghan credits his staff for much of his success. He sees them as self-starters willing to take on any task to keep the facilities running efficiently.

A SPORTING LIFE

Steve McTarnaghan has always been a good organizer. That has served him well in planning numerous community sporting events and has been key to his success at the Geneseo Village Water and Sewage Treatment Plants.

As a child living on Conesus Lake in Groveland, New York, McTarnaghan organized community softball games. "I had to gain the participation of kids who lived by the lake 3 miles away and also secure a field to play in," he says.

For 23 years, he played in a men's and co-ed softball league and a tournament softball team, which often made it to the finals. "I grew up around the game," he says. "My dad played fast-pitch softball and pitched four scoreless innings when he was in his 50s, against the world famous The King and His Court team. He was also inducted into the International Bowlers Museum and Hall of Fame in St. Louis."

Besides taking after his father in softball and bowling, McTarnaghan was an avid hunter and water and snow skier. Although he no longer plays softball, he still enjoys bowling and golf. For the past eight years he has organized a yearly golf trip for friends. "I take care of the whole thing; all the golfers need to do is show up and get on the plane."

Powering the Cloud

IN A PILOT PROJECT, BIOGAS FEEDS A FUEL CELL THAT POWERS A MICROSOFT MODULAR DATA PLANT AND PROVIDES ELECTRICITY AND HEAT FOR A WATER RECLAMATION FACILITY

By Doug Day

The Dry Creek Water Reclamation Facility has an unusual new neighbor.

A \$112 million Microsoft modular data plant, almost the size of a shipping container, houses 200 computer servers next to the plant in Cheyenne, Wyoming. It gets its electricity from a fuel cell powered by the Dry Creek plant's biogas in a system that produces carbon-free electricity to benefit both facilities.

The \$7.6 million biogas demonstration project was funded by Microsoft with the help of \$1.5 million in assistance from the Wyoming Loan and Investment Board. The data plant will use about two-thirds of the power from the 250 kW fuel cell. The rest goes to Dry Creek, along with 200,000 Btu/hr of heat for the plant's anaerobic digesters.

"It's all technology that exists," says Randy Bruns, CEO of Cheyenne LEADS, the economic development group for the city and Laramie County that coordinated the deal. The difference is that the technologies have never been combined in such a decentralized approach. Local officials believe the Cheyenne installation to be the world's first waste-to-energy data center.

CONCEPT TESTING

Microsoft already has a large data center and operations facility in a business park owned by Cheyenne LEADS and is adding a \$274 million expansion to meet growing demand as people and businesses store data and programs on cloud-based services.

Such centralized data centers require large amounts of electric and fiber optic capacity that isn't available in all areas. Smaller, decentralized data

A 250 kW fuel cell is at the heart of the CHP system (right) that powers a modular data center (left) in Wyoming.



Seeking ways to create carbon-neutral data centers, Microsoft has placed a modular center with 200 computer servers next to the Dry Creek Water Reclamation Facility. The treatment process provides the electricity for the center.

“As cool as all this is at a technical level, the most powerful part of the project, in my mind, is the people it has brought together and the willingness to explore other ideas.”

RANDY BRUNS

plants provide more flexibility in location, and that is the concept being tested in the 18-month demonstration project in Cheyenne.

"Everybody needs to see how the economics work out before deciding the next step," says Bruns. "There continues to be a lot of interest, even by some players not involved at the moment. But all of that is to be determined." Microsoft says it intends to eventually donate all the infrastructure to the participants in the project.

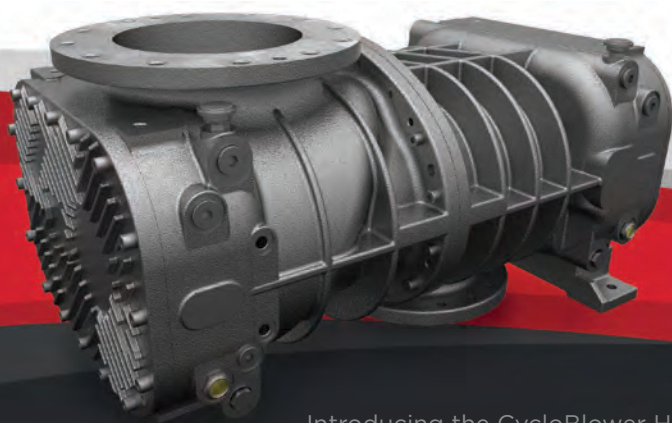
Clint Bassett, water conservation specialist for Cheyenne's Board of Public Utilities, says Dry Creek will make decisions about the future of the biogas system after the demonstration project is complete. Dry Creek is the

larger of the city's two water reclamation facilities and provides the solids treatment for both. The plants provide about 200 million gallons a year for irrigation of more than 230 acres of public land through a 12-mile distribution system.

The modular data plant went online in November 2014 after operating on natural gas for about six months. The servers are used by the University of Wyoming, another partner in the project. Other participants are the Cheyenne Board of Public Utilities, Cheyenne Light, Fuel and Power Company, Western Research Institute, the Wyoming Business Council, Siemens, and FuelCell Energy Inc.

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GOING RENEWABLE

With a goal of creating carbon-neutral data centers, Microsoft approached FuelCell Energy in 2012. “The idea of powering a data center with completely renewable biogas from a wastewater treatment plant really excited them,” says Anthony Leo, FuelCell Energy vice president of applications and advanced technology.

The project uses FuelCell Energy’s DFC 300 self-contained combined heat and power (CHP) system. The company also has larger systems of 1.4 MW and 2.8 MW. “The treatment plant was making biogas but wasn’t using it,” says Leo. “We had to connect to that biogas supply, install a gas cleanup system, and put in a system to get the waste heat from fuel cells back into the digesters.”

The small unit at Dry Creek requires only 60 cfm of biogas. With low or zero emissions, fuel cells are just as environmentally friendly as renewables such as wind and solar, but generate electricity continuously. Compared to power from the grid in Wyoming, the Dry Creek fuel cell project reduces annual emissions by 3.5 tons of NO_x (smog), 3.5 tons of SO_x (acid rain) and 2,910 tons of CO₂ (carbon dioxide, a greenhouse gas).

A power monitoring system (Siemens) controls power dispatch to the data plant and the treatment plant while tracking biogas volumes, electrical generation and output. The fuel cell is connected directly to the data plant and to the electrical grid.

“The power quality from the fuel cell is inherently very good,” says Leo. “We’ve been testing the way the fuel cell provides power to the data center



PHOTO COURTESY OF CHEYENNE LEADS

Local officials are briefed on how biogas and fuel cells power a modular data center during a “cable cutting” ceremony in November 2014. The data center can operate even when disconnected from the grid.

when it is connected to the grid, when it’s disconnected from the grid, and when the data center is ran at different levels of use.”

PULLING IT TOGETHER

Before construction could begin, it took about a year to develop a contract between all the agencies. That’s where Cheyenne LEADS made a difference. “It’s not what wastewater treatment plant managers do, it’s not what data center operators do,” says Bruns. “It was outside everybody’s specific field, yet they all had to play together. One of our roles is to be a connector of dots, a clearinghouse of information, and to get the right people talking to one another.”

That will be necessary again as decisions are made about the future. “Whether this continues to power a data center or something

else, our hope is that what we’ve learned makes it easier for more biogas to be used in a meaningful way,” says Bruns. “Demands are going to change, resources are going to change. We have to think openly about that, not limit ourselves. As cool as all this is at a technical level, the most powerful part of the project, in my mind, is the people it has brought together and the willingness to explore other ideas.”

He sees potential beyond how to use biogas, such as finding ways to deploy decentralized generation and use the power on site, as at Dry Creek, rather than transmitting it over wires. “Once you start down that path, it would seem that there are thousands of opportunities,” says Bruns. “The real power of this is having people from all these different disciplines working together and thinking about other solutions.” **tpo**

Partners in Production

ESSEX JUNCTION'S WASTEWATER PLANT TEAM AND A LOCAL FARMER COMBINE RESOURCES TO ENHANCE SOIL AND CROPS WHILE PROTECTING THE WATERS OF LAKE CHAMPLAIN

STORY: **Pete Litterski**

PHOTOGRAPHY: **Oliver Parini**

WHEN JAMES JUTRAS GETS TOGETHER WITH DAIRY farmer Lorenzo Whitcomb, it's a lot like a team meeting. The two have worked closely for much of the past two decades.

Whitcomb uses biosolids from the Essex Junction (Vermont) Water Resource Recovery Facility to help fertilize the corn he grows on his family's farm to help feed nearly 300 dairy cows. Jutras is water quality superintendent for Essex Junction.

It's definitely a win-win relationship. Whitcomb receives a high-quality soil amendment that helps him boost yields and sustain the soil's organic matter content. Essex Junction benefits by having a single customer, almost next door. On top of that, good application practices limit runoff from the Whitcomb land, helping protect Lake Champlain from nutrient pollution.

TRUE BELIEVER

Whitcomb's belief in the value of biosolids helped him overcome a controversy that for a time halted application on his land. After he had used biosolids for several years, media reports that Whitcomb describes as inaccurate tainted public perceptions about the practice. That made it difficult for farmers to continue using biosolids to supplement commercial fertilizers.

Still, Whitcomb never lost interest in biosolids. "Six or seven years ago I came to the realization that the biosolids were going up to Quebec, where they were making good use of them," he says. That's when he talked to Jutras about restarting application.

In resuming their relationship, the two have come up with a mutually beneficial arrangement. For Jutras, the Whitcomb farm is a blessing as it dramatically reduces the cost of transporting biosolids. "He's just a 1/2 mile down the road," Jutras says.

For Whitcomb, Essex Junction is a partner, providing the biosolids on a schedule that fits his needs and limitations. There are two key times to apply biosolids to the 200 acres permitted for that purpose: in spring after the ground thaws and the runoff from snowmelt is done, and in autumn after the corn harvest but before the ground freezes.



James Jutras, Essex Junction Wastewater Water Resource Recovery Facility water quality superintendent.



Dairy farmer Lorenzo Whitcomb land-applies biosolids from the Essex Junction Water Resource Recovery Facility (Challenger tractor, Caterpillar).

“Both of us were pretty proactive. Lorenzo even did some early work on anaerobic digestion of manure before applying it to his land.”

JAMES JUTRAS



Essex Junction (Vermont) Water Resource Recovery Facility

BUILT:

1986 (upgraded 2012)

POPULATION SERVED:

9,700

PLANT FLOW:

3.3 mgd design

BIOSOLIDS PROCESS:

Anaerobic digestion

VOLUME RECYCLED:

650,000 to 700,000 gallons twice per year

BIOSOLIDS USE:

Land application

CITY WEBSITE:

www.essexjunction.org

GPS COORDINATES:

**Latitude: 44°29'27.12"N;
Longitude: 73°6'41.39"W**



Essex Junction facility team members include, from left, Paul Douglass, operator I; Joyce Stannard, administration professional; Howard Kimball, operator I; James Jutras, water quality superintendent; Chelsea Mandigo, environmental technician; and Patrick Boutin, operator II. Team members not pictured: Bernie Fleury, assistant chief operator; and Maddie Barry, administration professional.



Operator Howard Kimball runs a check on an Accumet pH meter (Cole-Parmer).

Because Essex Junction has storage tanks with 2 million gallons of capacity, Jutras can hold the liquid biosolids until Whitcomb is prepared for application. The tanks are uncovered concrete structures on the wastewater treatment plant site.

PROTECTING THE LAKE

The storage of the biosolids as liquid is another example of the two operations working together. When Whitcomb resumed applying biosolids, he sought the best way to keep excess nutrients from running off his land and down the Winooski River to Lake Champlain. Whitcomb, who operates the last active farm in Essex Junction, invested in a 9,600-gallon manure injector (Jamesway) that injects biosolids (as well as liquid manure from his dairy herd) into the ground.

Besides the environmental advantages of the injector, Whitcomb had to consider the bottom line for the family farm, which also involves his brother. The injector actually makes more effective use of the nutrients in the biosolids and manure, reducing the amount of commercial fertilizer the operation needs and helping justify the machine's cost.

Whitcomb's decision to inject the material himself benefits the village because, as Jutras points out, village employees and equipment "don't have to do the land application. He's actually serving as a subcontractor."



Patrick Boutin and other operations team members benefit by working in a facility that has seen significant upgrades.

The treatment plant staff delivers 650,000 to 700,000 gallons of biosolids to Whitcomb's farm twice a year. "Operationally, that's been a significant portion of what we produce," Jutras says. The village in 2012 completed a \$15 million rehabilitation of the plant, and operators don't have enough

runtime with the new facility to determine biosolids production accurately.

PLANT FACELIFT

The rehabilitation — the first major construction project since the plant was commissioned in 1986 — included upgrades to the primary and secondary clarifiers and aeration tanks, new tertiary filters (Aqua-Aerobic Systems), an Alfa Laval G2 centrifuge for biosolids dewatering, new chemical feed pumps, refurbishment of the two existing Infilco Degremont anaerobic digesters (SUEZ), and a new grit collector system.

The project also included the addition of a second combined heat and power system (2G Energy Inc.) that burns biogas to heat the digesters and generates electricity, reducing greenhouse gas emissions. After resolution of a few technical issues at startup, the facility is now ready to get "maximum energy return from the digestion process," Jutras says.

Modernization of the plant's control systems helps the operators track performance and identify issues sooner. "One thing that has been real helpful is that the SCADA analytical processes are much more thorough and they provide more consistent data," Jutras says. "If something pops up we can immediately evaluate the problem."

Although the Whitcomb farm receives biosolids as liquid, the plant upgrade included the Alfa Laval centrifuge because the village has to be prepared to send its biosolids elsewhere if Whitcomb can't use the full amount or for any reason has to stop receiving the material.

Any biosolids that Whitcomb does not need or cannot handle can be dewatered and delivered as cake at 25 percent solids to other farms permitted for land application. It can also be composted at a nearby facility operated by Casella Organics, a company based in Portland, Maine, that specializes in beneficial use and recycling of organic and mineral resources.

MEETING THE STANDARDS

Because Vermont's standards for biosolids quality and runoff from farmland are even more stringent than U.S. EPA regulations, the state standards have primacy, Jutras says. The Essex Junction facility consistently meets or beats those standards, and Whitcomb does as well. "Our digester process is

KEEPING THE NEIGHBORS INFORMED

When dairy farmer Lorenzo Whitcomb decided to resume applying Essex Junction biosolids to his fields, he took a proactive approach to dealing with his residential neighbors. He sent them a letter outlining his plans and describing the precautions and the testing involved in the biosolids recycling. The letter read:

To: Our Essex Neighbors
From: Whitcomb Family Farm
Date: Aug. 20, 2009
Re: Use of Local Biosolids as Fertilizer

We are writing to share some information about our dairy farm and the proposed use of biosolids as fertilizer to grow livestock feed. About six years ago, we approached Jim Jutras of the Essex Junction Wastewater Treatment Plant about using Essex biosolids as fertilizer on our farm. At the time, the biosolids were being trucked to Canada.

We currently farm in two locations, Essex Junction and North Williston. Our milking herd is in Williston and our young stock in Essex. The cows at our Essex Farm don't make enough manure to fertilize all the crops. We are currently relying on commercial fertilizer to supply our additional needs.

The idea of using a safe, locally produced fertilizer is very appealing both economically and as a community service. Keeping any farm sustainable involves keeping the soil nutrients at optimum levels and not depleting the nutrient levels of the soil. We have the experience and equipment to handle the biosolids in a timely and environmentally safe way.

Whitcomb Farm has previously used biosolids with very good results. The biosolids would be used for cow crops only. The biosolids and groundwater will be tested by the Village of Essex Junction, and the soil testing will be done by Whitcomb Farm's private crop consultant.

Since Whitcomb Farm will be applying the biosolids, we will adhere to all setbacks and site criteria. Biosolids would be tilled into the soil after application. Biosolids will come exclusively from the Essex Junction Wastewater Treatment Plant. In no way should treated biosolids be mistaken as raw sewage.

(Signed)
Lorenzo Whitcomb

Whitcomb says the reaction to his letter was generally positive. James Jutras, water quality superintendent for Essex Junction, agrees that keeping people informed is the best way to maintain public confidence. "Our job has always been to protect public health," Jutras says. "Environmental groups often look at us as polluters, but our job is taking pollution out."

He says education of the public about the biggest sources of pollution in local waters and Lake Champlain often falls to him and his colleagues in stormwater and wastewater treatment: "Half of what we have to do is educate people about how professional water quality operators improve the water we recycle back into the environment."



Biosolids from Essex Junction help dairy farmer Lorenzo Whitcomb preserve his soils and improve his feed crop yields.

“Six or seven years ago I came to the realization that the biosolids were going up to Quebec, where they were making good use of them.”

LORENZO WHITCOMB

new Total Maximum Daily Load standards for phosphorus in 12 segments of Vermont's Lake Champlain shoreline.

Although their region will have to reduce releases of phosphorus, Jutras says Essex Junction and the Whitcomb farm will feel little impact from the new standards. Working through a local solid waste management district, Whitcomb and Essex Junction contract with Casella Organics to monitor biosolids application on the farm. "They are in charge of all of the permitting," says Jutras. "They do all the testing of our soils and monitor the groundwater through test wells."

The monitoring has found no problems arising from Whitcomb's injection of the biosolids on his permitted 200 acres (out of 460 total acres). Jutras is not surprised: "Both of us were pretty proactive. Lorenzo even did some early work on anaerobic digestion of manure before applying it to his land." **tpo**

very efficient, and we beat all those standards with ease," says Jutras. Although the Essex Junction product exceeds the criteria for Class B biosolids, that is the top rating the plant can get due to the process used.

Operators remain vigilant about the quality of both biosolids and plant effluent because "both of our products can impact the lake." Nutrient runoff reaching Lake Champlain remains under close scrutiny by the EPA and Vermont officials. In August, the EPA issued a draft report setting

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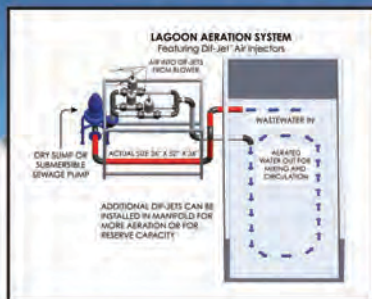
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Successful Standby

A STANDBY POWER SYSTEM ISN'T WORTH MUCH IF YOU CAN'T COUNT ON IT TO DELIVER WHEN NEEDED. HERE ARE SOME IDEAS FOR SETTING UP A SYSTEM THAT'S ALWAYS READY TO RUN RELIABLY.

By Mark Sweeney

A reliable standby power system is vital to any water or wastewater treatment plant. Without one, a storm or other event can knock the facility offline and put the drinking water supply or local water resources at risk.

Just having a generator on site is not enough — it needs to be sized to fit the facility's needs, installed properly and maintained effectively. Managers, supervisors, operators and technicians share responsibility for ensuring reliable emergency power. When installing a new generator or upgrading an existing one, three components are especially important:

- Meeting the National Electrical Code (NEC)
- Identifying the proper motor starter
- Integrating the generator with the entire plant operating system

MEETING CODE

Ask your consulting engineer to confirm the type of emergency power system your plant needs. The requirements are dictated by the NEC. The required generator size varies with specifics of the operation and the amount of equipment that needs to run at any given time.

An accurate load schedule and sequence of operations is critical to proper generator sizing. A sizing tool can help in verifying different sizing approaches. When choosing a generator, make sure it is sized for a full load, meaning it has capacity to power all equipment in the facility at one time. It's rare that all components (pumps, blowers, dryers and more) will operate at the same time, but it's important to be prepared in case that should occur.

A treatment plant can choose a generator with less capacity than the plant's full load if certain equipment or processes can be taken offline or cycled.

Various other code requirements must be considered. These include a 60-second startup time and on-site signage indicating the generator type and

Managers, supervisors, operators and technicians share responsibility for ensuring reliable emergency power.

location — this is vital if first responders need to locate the generator and obtain operating data.

Additional considerations were added after poor generator performance during relatively recent natural disasters, such as hurricanes. These codes aim to ensure that standby power systems can support mission-critical operations for extended periods. Here are five actions your consulting engineer should consider:

- Perform a risk assessment.
- Ensure full-load, 72-hour continuous alternate power sources by having ample diesel fuel storage on site, and consider dual fuel standby.



All-weather enclosures help ensure reliable emergency generator performance. Enclosures can also be sound-attenuated to limit the effects of noise on neighboring properties.

- Review all sources and circuits for grounding compliance.
- Protect against damage, such as flood-proofing (installing generators in a high location) or selecting a wind-rated, aluminum-coated enclosure to protect against saltwater damage.
- Understand special requirements. Consult your authority having jurisdiction for local or state requirements.

MOTOR-STARTING CAPABILITIES

The vast majority of treatment plant components are driven by motors, and that makes it important to choose the appropriate motor starter for a generator. There are three basic motor starters: across-the-line starter, variable-frequency drive (VFD) and reduced-voltage drive.

VFDs require the least power to start the generator and allow sustained operation at varying operating speeds, making this a user-friendly option. VFDs can also help lower energy consumption and costs. VFDs can reduce energy usage by as much as 70 percent while extending equipment life.

An across-the-line starter, the simplest and least expensive option, quickly applies full voltage to the motor. However, reaching full voltage that quickly increases torque, creating mechanical stress that could reduce generator service life. It also stresses the power supply, leading to voltage dips that may impair equipment operability.

Reduced-voltage starting is designed mainly to avoid the large mechani-

cal pulses that go with starting a motor. It is older technology, largely replaced by soft starters, which offer a greater range of torque at a more attractive price. Reduced voltage still has a place as it tends to work best with high-horsepower motors occasionally found in water and wastewater facilities.

There are numerous reduced-voltage starters, each with its own advantages and ideal fits:

- Autotransformer or solid-state starters work well with medium-voltage motors. Autotransformer starters also fit well with motors larger than 200 hp.
- Primary-impedance motors are suitable for lower-horsepower motors.
- Part-winding or wye-delta starters require motors with special windings, which means a more intricate, expensive and involved design.



Generation capacity must be sized to meet the facility's needs in case of a power failure. Capacity requirements can be met by a single unit or by multiple smaller units.



The right controller for an emergency generator helps ensure that multiple functions within the plant work together harmoniously.

Soft-starter technology entails an electronic, reduced-voltage motor starter. It can ramp up voltage to the generator, creating a softer loading that helps limit voltage and frequency dips.

CONTROLLER INTEGRATION

Water and wastewater treatment plants contain many types of machinery, all incorporated into one building management system. A standby generator must integrate with this machinery. Choosing the right controller helps ensure that all components work together.

Controllers are standard on most generators, but each controller offers various options that can affect operations. For example, a traditional controller configuration may have separate controllers for individual functions.



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More modern controllers integrate all functions into one hardened controller.

A controller interface may also have varied capabilities. A traditional configuration may have a limited display with a reliance on fault code numbers. Newer models offer a more comprehensive display with touch-screen monitors and diagnostic screens.

Controllers also offer different levels of data logging and trend identification. Older models log outage events and alarms together, which can result in normal events displacing alarms. They are also limited in their ability to identify outage trends. Modern controllers boast high-speed data capture with time-stamped event and alarm logs that enable them to fully track any trends in plant power.

Predictive maintenance, a newer function in controllers, can significantly enhance generator reliability. With predictive maintenance, team members can monitor filters, batteries, belts and other components and estimate their remaining life so that they can be serviced or replaced at the optimum times.

A WORD ABOUT MAINTENANCE

No one factor determines the right emergency power system for a given treatment plant. It's important to consider all factors when sizing, installing and configuring the generator that will best keep the plant up and running when utility power fails.

One constant, though, is maintenance. Many generators come with an engine maintenance schedule supplied by the manufacturer. It's important to have a preventive maintenance plan in place. Routine engine exercising and maintenance helps keep your generator operating safely and properly over a long period of time, preventing downtime at your plant.

ABOUT THE AUTHOR

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Not Out of Mind

AN INDUSTRIAL PRETREATMENT COORDINATOR BECAME AN ADVOCATE OF OUTRIGHT BANS ON MICROBEADS IN PERSONAL CARE PRODUCTS

By Ted J. Rulseh

We can't see them, but they are in some personal care products many of us use, and their impacts on the environment are raising concerns.

Plastic microbeads used in products such as soaps, toothpastes and makeup are showing up in vast quantities in the ocean, the Great Lakes and other waters. The beads, as small as 0.1 micrometer in diameter, can pass through most traditional settling and filtration processes in wastewater treatment plants. So, once sent down household drains, they are largely destined for waterways.

Feeling pressure from environmental groups, clean-water agencies and consumers, some major personal care product manufacturers have pledged to phase out microbeads. Meanwhile, various state and national governments are looking at microbead bans.

The microbead issue has caught the attention of clean-water operators, including industrial pretreatment coordinators. Among those concerned about the issue is Ed Gottlieb, industrial pretreatment coordinator for the City of Ithaca (New York) Area Wastewater Treatment Facility. He talked about microbeads, the environmental concerns and potential remedies in an interview with *Treatment Plant Operator*.

tpo: Why are microbeads a concern for the clean-water industry?

Gottlieb: Microbeads are a classic example of an emerging contaminant. There is no definition of a safe level that needs to be achieved, and there is no regulation of them. As with pharmaceuticals, we don't know what constitutes a safe trace amount of microbeads in the environment. We have evidence that they are harmful to microorganisms and possibly to larger aquatic and terrestrial organisms, and we can logically assume they

are harmful to humans, as well, but there is no limit placed on them.

tpo: What are some of the observed or potential impacts of microbeads in lakes, streams and oceans?

Gottlieb: Once microbeads are in the environment, over time they tend to attract pollutants to their surfaces and hold on to them. That includes persistent nonpolar organic pollutants like PAHs, PCBs and DDT. Many or most of these beads are tiny enough to be consumed by aquatic organisms. So you have pieces of plastic that have collected toxic compounds inside of organisms, thus introducing those compounds into the food web, where they will bioaccumulate.

tpo: Why are microbeads used in personal care products?

Gottlieb: Microbeads have replaced materials like pumice, oatmeal, walnut shells and almond shells as the abrasive in many personal care products. They are being added to some products not for functional reasons but because they can make the product sparkly or colorful. Products containing microbeads are very common. One product we were using at our plant for hand cleaning contained hundreds of microbeads per use. They were listed as the second ingredient.

tpo: Why are microbeads able to pass through basic wastewater treatment processes?

Gottlieb: Because microbeads are very small and their specific gravity is very close to that of water, they tend to not settle out and they tend not to float. If the wastewater has any flow velocity at all, the microbeads will be carried along.

tpo: What if a plant has some kind of tertiary treatment?

Gottlieb: It depends on what tertiary process they have. We have tertiary treatment here, but it's a chemical/physical removal process and it does not remove a significant amount of microbeads. We add a metal salt and a polymer, and we use a fine-engineered sand as a ballast to create heavier particles that settle out. We do not use tertiary filtration. If a plant was doing microfiltration, that could very well remove microbeads, but I would imagine the number of wastewater plants using microfiltration is on the very low end.

tpo: Why should industrial pretreatment coordinators be concerned about this issue?



Ed Gottlieb



Microbeads in personal care products come in a variety of sizes, colors and compositions.

Gottlieb: It's our job where possible to prevent anything from coming down the pipe that might cause problems for our plant or for the environment. That's our job description. I've been fortunate to have had time to work on emerging contaminant issues like pharmaceuticals and microbeads. I became involved with microbeads mainly because other people at our plant worked with the New York state attorney general to study the issue.

tpo: Has your state taken any action toward microbead regulation?

Gottlieb: I am very proud that our attorney general, Eric Schneiderman, has taken a strong stance by proposing a microbead ban that promises to be very effective. The state Assembly has passed his version of a bill with only one dissenting vote. The state Senate has not yet acted, and both houses need to pass an identical bill for it to be signed into law.

tpo: In your view, what provisions of this bill would make it effective?

Gottlieb: The attorney general's version of the bill does not limit the ban to non-biodegradable plastics. It would ban all plastic microbeads in personal care products. It also does not prohibit local governments from taking their own regulatory action.

tpo: What is wrong with a ban that applies only to non-biodegradable microbeads?

Gottlieb: If there is an exemption for biodegradable microbeads, that opens the door to a whole range of plastics. The existing standards for biodegradability do not specifically apply to microbeads in water environments. They generally apply to biodegradability in aerobic compost piles, in soil or in other conditions like outdoor weathering.

So, for example, a plastic is biodegradable under the ASTM Standard D6400 if it breaks down in a municipal or industrial compost facility, where the material is exposed to high temperature in the presence of oxygen. That's not a condition you're going to find in a natural water environment, so that's a huge loophole.

tpo: Have governments elsewhere taken actions related to microbeads?

Gottlieb: Of the eight states that have enacted bans on plastic microbeads in personal care products, only New Jersey's does not include the exemption for biodegradable beads. Along with New York, California is considering a strong ban including biodegradable plastics.

Those that have passed microbead bans other than New Jersey are Colorado, Connecticut, Illinois, Indiana, Maine, Maryland and Wisconsin.

And last July, the Canadian government announced that it will develop regulations to prohibit the manufacture, import and sale of personal care products containing microbeads. In fact, they plan to add microbeads to the Canadian Environmental Protection Act's list of toxic substances. They are doing this after reviewing more than 130 relevant scientific papers and consulting numerous experts.

tpo: What actions have you and your colleagues in Ithaca taken on this issue?

Gottlieb: We took part in a study funded by the attorney general's office and conducted by the State University of New York at Fredonia. Influent and effluent samplers were set up so that a certain volume of water per minute would pass through a sieve able to trap all but the smallest microbeads. The test was run continuously for 24 hours to get a representative sample. The results were fairly conclusive that microbeads are passing through our plant and entering the environment. That helped inform the attorney general's decision to support a ban.

Dr. Jose Lozano, our lab director, continues to collect baseline data on microbeads at our plant. We have also formed partnerships with researchers from Ithaca College who are investigating the environmental impacts of plastic microbeads on aquatic organisms in Cayuga Lake.

tpo: What is known so far about the prevalence of microbeads in the Great Lakes?

Gottlieb: In 2013, the first major study of microbeads in the Great Lakes was conducted by researchers from SUNY at Fredonia. The research found wide variation ranging from 575 to 1.1 million microbeads per square kilometer. Lake Michigan had an average of 17,000. Ongoing studies include sampling at wastewater plants and major tributaries to determine where the beads are coming from.

tpo: What actions would you suggest clean-water professionals take on this issue?

Gottlieb: We should all lobby to get effective state or local bans on plastic microbeads in personal care products – and make sure any legislation we support does not have that biodegradability loophole. And if a bill is introduced at the federal level, it will be up to us to present a united voice against any bill containing that loophole.

tpo: Have major industry associations taken a stand on this issue?

Gottlieb: Ithaca is a member of the National Association of Clean Water Agencies. Microbeads have been a regular topic at the national industrial pretreatment workshops they put on every year. It doesn't seem to have as much prominence as the flushable wipes issue. I think that is because wipes have a noticeable impact, increasing our maintenance costs when they clog our machinery. Operationally, plastic microbeads are invisible. But certainly for those of us who are focused on environmental quality, microbeads are a real issue. The plastic and personal care product industries have been very involved. The fact that seven of eight state bans include the biodegradable loophole shows how successful their lobbying has been.

“Because microbeads are very small and their specific gravity is very close to that of water, they tend to not settle out and they tend not to float. If the wastewater has any flow velocity at all, the microbeads will be carried along.”

ED GOTTLIEB

tpo: On a day-to-day basis, what concrete steps can clean-water operators and pretreatment coordinators take toward limiting microbeads in waterways?

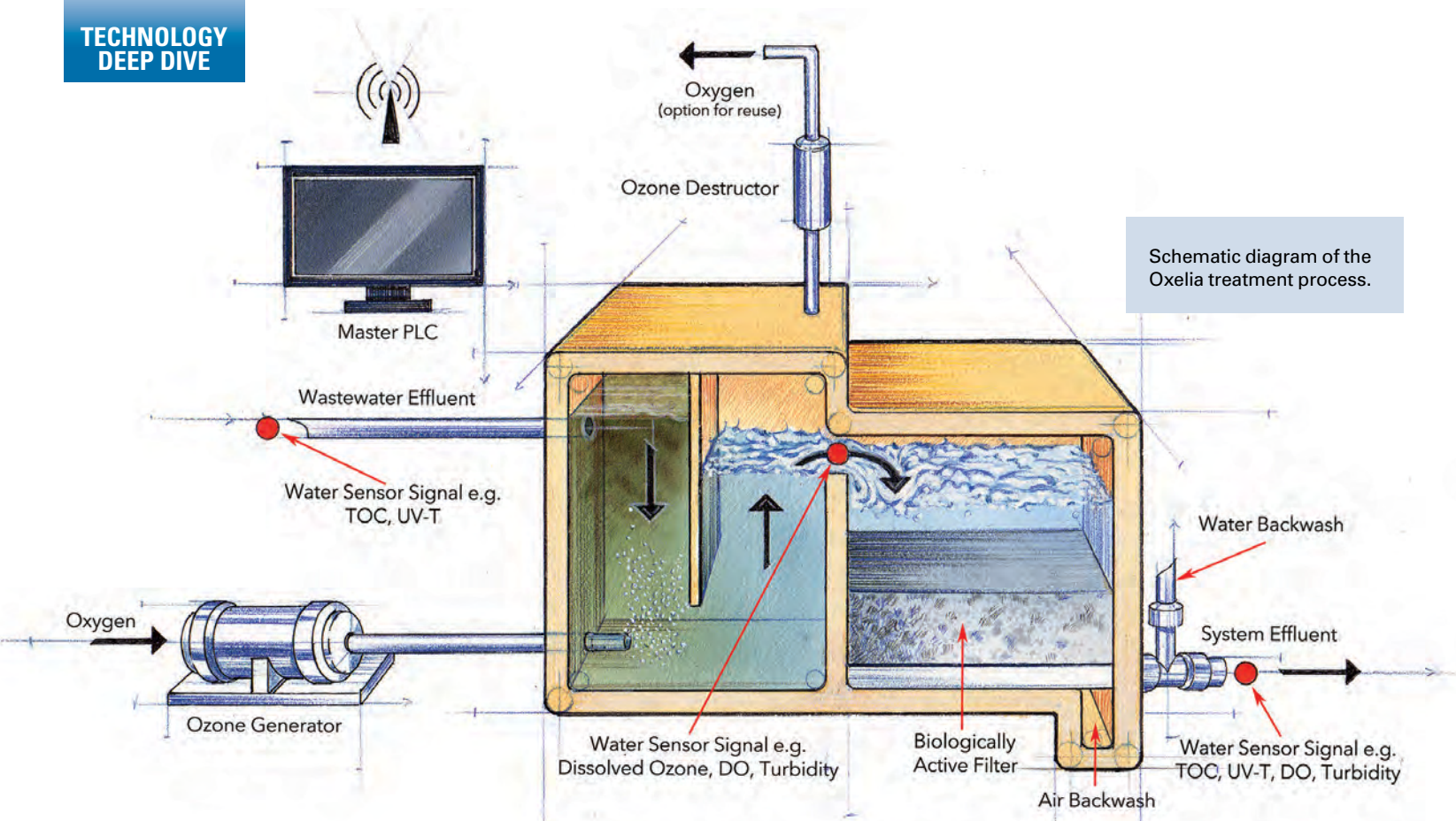
Gottlieb: We can make sure our own plants don't use products that contain microbeads. There are still some cleaning products that use pumice or agricultural products as abrasives. You don't have to use a microbead-containing soap to get your hands clean.

tpo: Is there a way to find out which products contain microbeads and which do not?

Gottlieb: An app called Beat the Microbead lets you look up products to see if they contain microbeads. The North Sea Foundation and the Plastic Soup Foundation launched it in 2012. In 2013, the United Nations Environment Programme and a United Kingdom-based organization called Fauna and Flora International joined the partnership to make the app available internationally. It has been a key factor in convincing a number of multinational companies to stop using microbeads.

tpo: So, there is some movement among manufacturers to eliminate microbeads?

Gottlieb: Yes. Some major manufacturers have pledged to phase out microbeads from their products. They include The Body Shop, Johnson & Johnson, L'Oreal, Procter & Gamble and Unilever. Readers can visit www.beatthemicrobead.org/en/industry to view statements from companies that are ending the use of microbeads in their products. **tpo**



Integrated Treatment

OXELIA TECHNOLOGY FROM XYLEM COMBINES OZONE FOR OXIDATION WITH BIOLOGICAL MEDIA FILTRATION TO RID WATER OF DIFFICULT-TO-TREAT ORGANIC COMPOUNDS

By Ted J. Rulseh

Wastewater reuse today looks beyond irrigation to include direct and indirect potable reuse. That calls for treatment approaches more advanced than biological treatment followed by media or membrane filtration.

Xylem now offers the Oxelia ozone-enhanced biologically active filtration system designed for reuse applications. The company also offers variations on the same basic process for drinking water and industrial wastewater treatment.

In each case, the process first uses an oxidant to break down recalcitrant organic compounds into biodegradable components. Then, naturally occurring microbes attached to media in a fixed-bed filter provide aerobic biolog-

The process integrates offerings from three or more Xylem brands under a central control system that optimizes filter operation based on oxidant dosage and effluent water quality. Tony Callery, lead product manager for Xylem's Leopold and Sanitaire product lines, described the technologies in an interview with *Treatment Plant Operator*.

tpo: What was the driving force behind bringing these offerings to market?

Callery: There are different value propositions for the three versions of the technology. On the water reuse side, value is driven by scenarios involved with drought, population growth, urbanization and requirements for smarter reuse water source management. The aim is to take wastewater effluent and treat it to where it is suitable for direct or indirect potable reuse.

That raises issues with trace organic contaminants that may pose health concerns. These include pharmaceutical and personal care product residuals that pass through the treatment process. They can be grouped under total organic carbon contaminants — a long list of substances that are regulated or are intended for regulation sometime in the future.

“The system uses online sensors in a multi-loop configuration to automatically adjust the process to achieve treatment goals at an economical cost.”

TONY CALLERY

ical treatment of the partially oxidized organics, leading to essentially complete destruction of total organic carbon (TOC), trace contaminants and oxidation byproducts.

tpo: So this technology is not aimed at water reuse for irrigation but specifically for return to the potable water supply?

Callery: That's right. In treating water for irrigation use, you're concerned mainly with vector attraction and BOD and COD loadings. Those are generally handled well within regulatory requirements by a good secondary treatment process, commonly followed by tertiary filtration and a UV disinfection system. Oxelia technology is for potable reuse where you're typically discharging to a reservoir and ultimately a water treatment plant. In the case of Europe, it's applicable to discharge into sensitive waters used for fishing and other recreation.

tpo: What is the function of ozone in this process?

Callery: Ozone breaks down naturally occurring and synthetic organic compounds to a biodegradable state so they can be destroyed in a biologically active filter. The filter also serves to significantly reduce ozonation byproducts. The total process avoids issues related to the creation of a waste stream that then needs to be managed.

tpo: Please describe how the process works from start to finish.

Callery: Effluent from secondary wastewater treatment enters a contact chamber where ozone is added to start the breakdown of the organic contaminants. The water then travels to a downflow filter, generally with anthracite, sand, or sand and anthracite media, depending on the application and the type of contaminants to be removed. Backwash times are extended. We bump the filter from time to time to clear any buildup of gases or contaminants. We calculate the runtime based on the contamination level and the filter's biological health. The final effluent is near or at potable water quality, based on the regulatory parameters.

tpo: How is the process controlled?

Callery: The system uses online sensors in a multi-loop configuration

“We've done a tremendous amount of pilot work with very good results. We've also participated in Water Research Foundation studies, so we have verifications from third-party sources in how well the systems operate.”

TONY CALLERY

to automatically adjust the process to achieve treatment goals at an economical cost. UV sensors are placed in three locations: at the inlet to the ozone contact chamber, where the water passes to the filter, and at the filter outlet. An algorithm uses those three inputs to control the ozone dosage, which is critical from a water-quality perspective and for economics, as well.

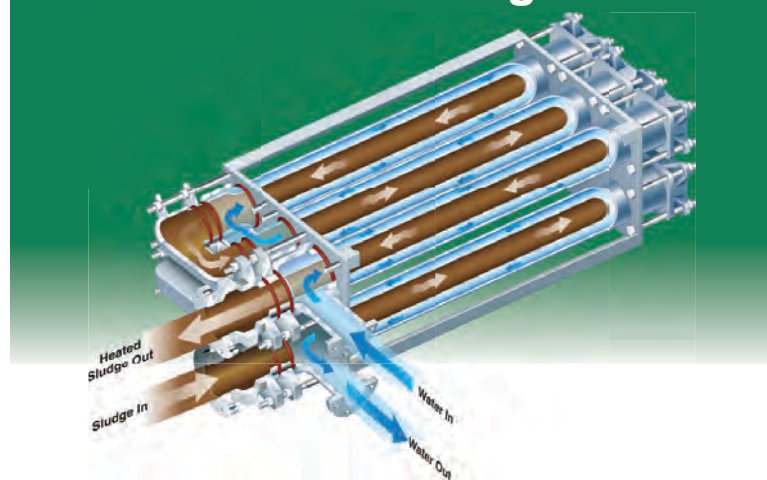
tpo: How do the treatment issues differ in using Oxelia for drinking water as opposed to reuse applications?

Callery: In drinking water, the common concern tends to be taste- and odor-causing pollutants, and a second target is recalcitrant organic micropollutants. These are often man-made, from pharmaceuticals or personal care products, but natural micropollutants also can form, such as from algae beds on a lake in early summer. Pesticides can find their way into water supplies, along with NDMA, MTBE, 1-4 dioxane and other organics that aren't easily handled by conventional filtration. Biostability in the water sent to the distribution system is also a concern.

tpo: In view of that, how is the Oxelia process for drinking water different?

Callery: It still uses a downflow filter and a very similar control algorithm. However, the oxidant used may differ with the application. For example, if not looking for removal of any specific micropollutant, just a general taste and odor application, we would use ozone and a biological filter. For a seasonal condition like algae in a lake or a chemical leakage in the area that

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poses concern about water contamination, we would look at ozone plus hydrogen peroxide as the oxidizing agent — that is much faster and stronger than ozone by itself.

tpo: How were these technologies developed?

Callery: As separate companies, we've been doing this for years. Wedeco would put in the ozone systems, Leopold would install the biofiltration, and YSI or WTW would sell sensors into a specification on projects. Over the past few years we have pooled our expertise to tie these offerings into an operative whole that allows us to offer process performance guarantees.

tpo: What has been done to prove these technologies?

Callery: We've done a tremendous amount of pilot work with very good results. We've also participated in Water Research Foundation studies, so we have verifications from third-party sources in how well the systems operate.

tpo: In a nutshell, how does the industrial version of Oxelia differ from the others?

Callery: On the surface it looks like the same process, but it's really quite different. We use ozone as the oxidant, but we use an upflow aerated biological filter with a Leopold underdrain system that provides the aeration — there is no need for a separate aeration grid. The primary application is the reduction of COD in the paper mills, oil and gas and other heavy industry sectors, especially in developing countries.

tpo: What size facilities are best suited for these technologies?

Callery: Generally speaking, our experience indicates that the technology is best suited to plants with flows of 1 mgd and up. Practically speaking, many applications will be in much larger regional plants. **tpo**

Fine-Tuning Aeration

TURBO BLOWERS WITH VARIABLE-FREQUENCY DRIVES HELP A SMALL IOWA PLANT SAVE ON ELECTRICITY WHILE RESOLVING INTERMITTENT ODOR ISSUES

By Jeremy S. Bril, Ph.D., EIT, and George L. TeKippe, PE, PLS

The Fredericksburg (Iowa) Wastewater Treatment Plant has faced challenges from change in its industrial flow and from upgrades to aging equipment.

A key operating objective has been to limit electricity costs while still providing adequate aeration for treatment. In 2014, as part of a plant upgrade, the city replaced two old centrifugal blowers with a pair of turbo blowers outfitted with variable-frequency drives.

The new configuration enables more effective control of dissolved oxygen concentrations in the plant's three aerated lagoons. It is projected to save \$30,000 per year on electricity and has ended an intermittent odor issue caused by low oxygen conditions in the lagoons.

FLEXIBLE OPERATION

Fredericksburg, in northeast Iowa, is home to just over 900 residents. Its treatment plant, designed for an average dry-weather flow of 0.35 mgd, is unique in having three possible discharge modes.

The plant was designed and built in the early 1980s to treat wastewater from the city and a large cheesemaking operation. It originally included two 200 hp centrifugal blowers to provide air for an aerated lagoon facility with one treatment cell (24-day detention), two large aerated storage cells (135-day total detention) and a double center-pivot irrigation system (no discharge to surface waters).

Since the plant went online, conditions have changed considerably. The cheesemaker left the city and two other industries moved in. The plant has been modified to allow much more versatile operation. In 1994, the plant's firm blower capacity was increased by 100 percent with the addition of a third 200 hp centrifugal blower. An outfall line, discharge management structure and flow rate control system were added in 2001 to permit controlled discharge to the East Fork of the Little Wapsipinicon River.

Today, the plant can operate as an aerated discharge lagoon (continuous discharge), a controlled discharge facility, or a no-discharge facility (effluent to irrigation only). The effluent can be beneficially used for crop production, stored during periods of natural environmental stress in the receiving stream, or discharged when additional flow would enhance the stream.



A dissolved oxygen meter continuously monitors lagoon oxygen levels.



One of the city's new 150 hp Aerzen turbo blowers (left) next to an older 200 hp centrifugal blower installed in 1994.

EYE ON ELECTRICITY

With the addition of the river outfall, the plant was re-categorized as a continuous discharge aerated lagoon. However, because the cells have ample storage capacity, it operates mainly as a controlled discharge lagoon (discharged typically twice a year).

Because of the plant's operational flexibility, operator Ray Armbrecht has used electricity consumption as a basis for controlling the aeration blowers, which are often a plant's largest power consumer. Armbrecht's strategy was to find a balance between minimizing electricity costs and providing enough air to maintain proper wastewater treatment.

"For many years, the blowers were operated continuously Monday through Friday and turned off on the weekends to save energy when the plant loadings were less," Armbrecht says. "The blowers were also turned off during the winter months when the lagoons were frozen over."

Because the blowers could only operate fully on or fully off, this strategy did save on electricity. However, when the blowers were restarted, the plant often experienced odor problems for one or two days because of the oxygen-depleted environment in the lagoons.

As the two original blowers neared end of life, the city evaluated options for upgrading the equipment and increasing plant efficiency. Working with the Fehr Graham engineering firm, the city replaced the old blowers with

“Because of the increased efficiency, we now provide air to the lagoons 24 hours a day, seven days a week. The continuous air supply has eliminated our odor problems — an added benefit due to our proximity to the golf course.”

RAY ARMBRECHT

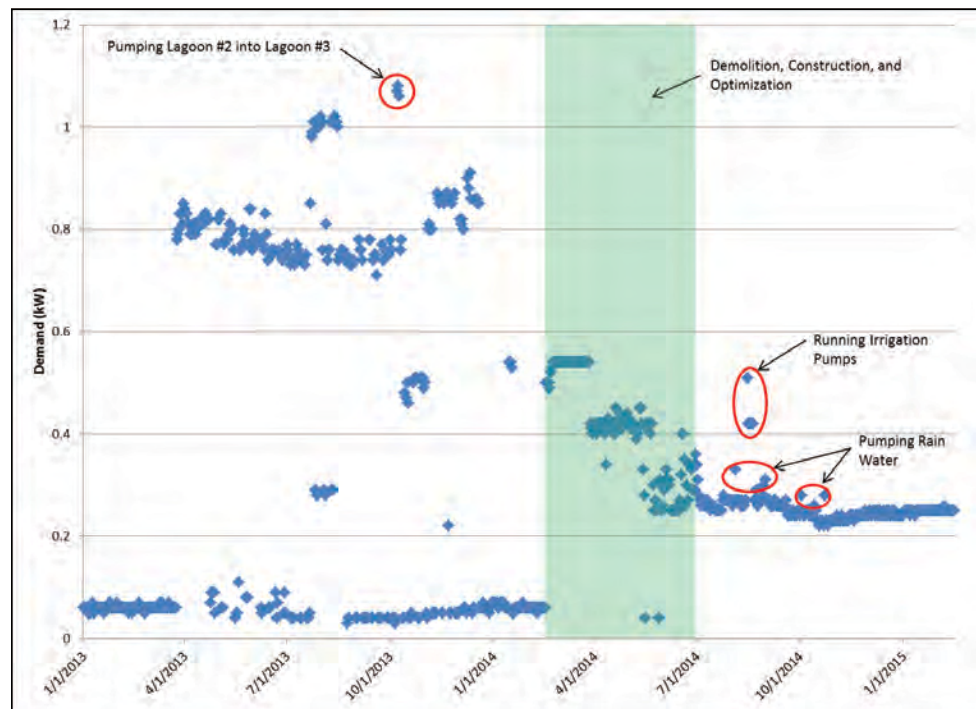


FIGURE 1: Electrical demand for the treatment plant from January 2013 through January 2015. Demand readings include the aeration blowers, lagoon transfer pumps and lift station pumps. The highlighted portion shows demand during demolition of the old centrifugal blowers, and construction and optimization of the new turbo blowers.

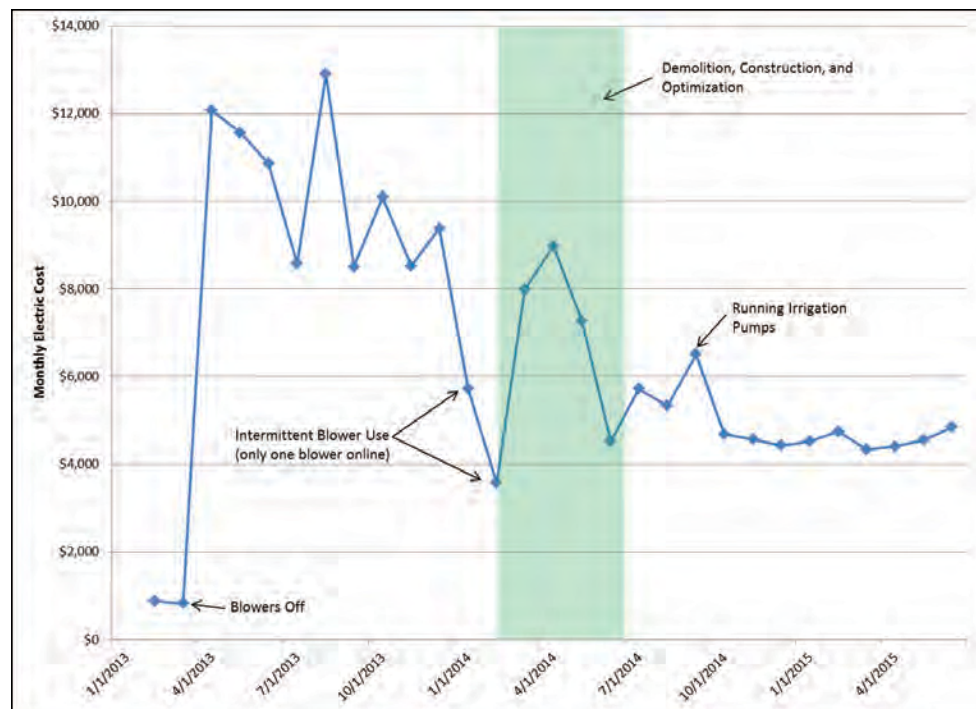


FIGURE 2: Average monthly electricity costs from January 2013 through January 2015. The intermittent blower use refers to only one centrifugal blower operating (typical operation was two blowers). The highlighted portion shows the demand during the demolition of the old centrifugal blowers and construction of the new turbo blowers.

two turbo blowers (Aerzen model TB150-0.8S). Replacement began in spring 2014, and the new blowers were online that summer.

RAPID RESULTS

The turbo units provide the same aeration capacity as the original blowers but draw only about 130 hp at full capacity. With variable-frequency drives for each turbo blower, Armbrecht can more efficiently match blower output to the plant’s oxygen needs.

With the turbo blowers in operation for less than a year, the city already had documented significant reductions in electricity demand (Figure 1) and energy consumed (Figure 2).

Bryan O’Day, mayor of Fredericksburg, observes, “Based on the first year’s figures, we are seeing more than a 30 percent reduction in electricity demand.”

Armbrecht strongly supported the high-efficiency blowers: “Having come from an industrial plant where our team always focused on efficiency, I strongly encouraged the city to consider blowers that could reduce our electrical demand. Even though the capital costs were higher, the city and its taxpayers would see the benefit in the long run.

“Because of the increased efficiency, we now provide air to the lagoons 24 hours a day, seven days a week. The continuous air supply has eliminated our odor problems — an added benefit due to our proximity to the golf course.” A dissolved oxygen meter allows Armbrecht to constantly monitor lagoon oxygen levels.

Armbrecht plans to continue pursuing ways to increase plant efficiency and performance. In the blower building, he recently designed a filter system to prevent dust buildup and maintain a clean environment. He is also working to address infiltration in the collections system and plans to evaluate using effluent to irrigate the nearby golf course.

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The Big Squeeze

A WET WASTE SEPARATOR HELPS A MARYLAND COUNTY UTILITIES DIVISION PROCESS DEBRIS FROM LIFT STATION WET WELLS INTO MATERIAL SUITABLE FOR LANDFILL

By Ted J. Rulseh

In Maryland's Anne Arundel County, the proliferation of wipes in the sewers has created a problem beyond the clogging of pumps: disposal of the material once it is removed from lift station wet wells.

The mix of wipes, rags, plastics and other debris, along with grease, has to be suitably dry before it can be landfilled. In fact, such waste typically needs to pass a paint filter test, documenting that it contains no free water, before sanitary landfills will accept it.

Anne Arundel County was exploring ways to process its lift station wet well waste when Utilities Division staff members encountered Stephen Toft, who had been handling various mechanical contracting projects for the county.

Toft offered to build a prototype wet waste separator if the county would allow him to deploy and test it on its wastewater collections system. After about a year of testing, the device has reliably produced waste material suitably dry for landfill disposal.

GROWTH IN NON-DISPERSIBLES

Anne Arundel County, south of Baltimore and home to about 530,000, operates seven wastewater treatment plants and a collections system that includes 257 lift stations, according to David Watts, utility administrator.

"Within the last four to five years, we have seen a huge increase in the level of non-dispersible wipes in the system," says Watts. "It has grown exponentially. We needed a way to get that material out of the system and dispose of it. We had the ability to pump it through and remove it at the headworks of the treatment plants. However, that was clogging pumps and air relief valves and causing over-time labor."

The alternative was to use vacuum trucks to remove the material from the lift station wet wells, but that involved drying the material before landfilling. "We don't have the privilege of large drying beds where we could dump the material and allow it to dry," says Watts. "We could always find someone to take the grease, but we couldn't find a way to process the wet well debris with plastics, rags and grease combined."

The county had all its pump stations on a cleaning schedule, ranging



The waste separator has a rotary screen with different zones and flight configurations, a wet sump to trap smaller particles, and an oil/water separator that captures floatable grease.

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DAVID WATTS

from monthly to annual. Debris vacuumed was hauled to the largest pump stations, and from there pumped through to the treatment plants.

DESIGNING A SOLUTION

Toft observed the debris accumulations in the wet wells and came up with the concept for a solution. "The county Utilities Division is a very progressive and innovative group," he says. "I told them I thought I could solve the problem and would be willing to do it with my own money, but if I was going to build something, I had to be able to test it."

"I said, 'Will you allow me to deploy my machine at one of your plants or lift stations and send your vacuum trucks to it? Everything will be at no

charge. My promise is that if I make a mess, I'll clean it up."

When the county staff agreed, Toft and his company, Old Line Environmental, went to work. In consultation with Watts, utility line superintendent Shawn Moulden and other division superintendents, Toft built a base unit. "We tested it and made several modifications until we came up with the prototype," says Toft. "At that point, it worked pretty efficiently."

The unit is deployed on a trailer at a major, centrally located lift station. It measures 6 feet high, 7.5 feet wide and 18 feet long; a portable enclosure and a shelter for a dump container occupy a total 25- by 30-foot space.

SIMPLE PROCESS

The county operates two primary wet well vacuum trucks with 3,000-gallon tanks. On arrival at the waste separator, the truck driver connects to it with a standard 6-inch vacuum pressure line, then hoists the tank to a nearly vertical position. "The driver then opens the valve on the truck," says Toft. "Our unit is equipped with a pneumatic valve that enables us to control the flow from the truck."

The material first enters a rotary screen with different zones and flight configurations. Water and materials 1/8 inch and smaller pass through that screen into a wet sump. The water then flows to an oil/water separator that captures the floatable grease. All the wastewater then enters the lift station and is pumped on to the treatment plant.

The separated solid material is delivered to a custom-fabricated dewatering conveyor with compression rolls that squeeze the free water out. The dewatered material is conveyed to a 4-cubic-yard dump container, identical to those used at the treatment plants' headworks. A front-load truck picks up the full container and carries it to the landfill.

An Old Line Environmental operator staffs the unit eight hours per day, Monday through Friday. "When the truck hooks up it's just a matter of starting the unit with a couple of push-buttons," says Toft. "The process is very visible and is easily adjusted based on the flow. In terms of electricity usage, our draw is normally 21 amps at 480 volts."

The unit processes 150 to 200 gpm, and in its first nine months of operation separated 167 cubic yards of dewatered debris, according to Watts. The device is designed to also process septage and digester cleanings, although Anne Arundel County has not used it for those purposes.

Watts says the unit at a lift station about 75 yards from a townhouse community has drawn no odor or noise complaints. The main sound from the process comes at the end of the cycle when the truck operator turns on the vacuum briefly to draw out liquid from the hose.

"I understand from talking to the vacuum truck operators and the maintenance people that the process has cut down a great deal of emergency maintenance by preventing the damage the wipes and debris have done to the pumps," Toft says.

ADVANCEMENTS PLANNED

The device is now being re-engineered for commercial production. The commercial model will be about 4 feet longer than the prototype, at 22 feet, to enable greater throughput, Toft says. It will also be fully automated with a touch-pad system so that the truck drivers can use it without an operator on site. **tpo**

Share Your Ideas

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

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

industry news

Spirax Sarco launches online distributor site

Spirax Sarco released Anytime, an online ordering platform for distributors. The site enables distributors to check pricing and generate quotes, check inventory, track shipments, browse products, locate marketing literature, generate orders and view inventory history.

DeZURIK releases valve selection guide

The Knife Gate Valve Selection Guide from DeZURIK is available on the company's website, www.dezurik.com. The guide enables users to navigate DeZURIK's products based on general specification requirements, common media and specific industry applications. Printed copies are available by request.

BASF signs distribution agreement

BASF signed an exclusive distribution agreement with Hawkins throughout the Midwest for its Water Solutions portfolio. Product lines include BASF's Zetag, Magnafloc LT, Burst, Magnasol and Antiprex brands.

Hydraulic Institute publishes guidelines for rotodynamic pump efficiency

The Hydraulic Institute published guidelines for users, specifiers and purchasers of pumps to understand what variables, design and selection factors affect the efficiency of rotodynamic pumps. The efficiencies are those obtained using common manufacturing practices and are based on a survey of pump manufacturers. The guideline is available at www.pumps.org.

Blacoh Industries launches surge control, metal solutions companies

Blacoh Industries launched Blacoh Surge Control and Blacoh Metal Solutions. Blacoh Surge Control provides customized engineering solutions for large-scale pressure vessels. Blacoh Metal Solutions provides servicing for metal tubing and pipe products. Frank Knowles II was named executive vice president for Blacoh Surge Control, and Steve Mungari was named business development manager. Peter Wang is executive vice president of Blacoh Metal Solutions.

Endress+Hauser, Eastern Controls name representative

Endress+Hauser and Eastern Controls have teamed up to provide customers with a single-source supplier for all sales and services in all markets and industries in the Mid-Atlantic area. Eastern Controls is also the new home of Endress+Hauser's process training unit (PTU), providing 5,000 square feet of classroom and training space.

Sensaphone celebrates 30th anniversary

Sensaphone celebrates its 30th anniversary as a provider of remote monitoring systems. The late Ken Blanchard envisioned the first Sensaphone product in response to losing his unattended boat, which sank after a storm when the bilge pump failed. Blanchard believed there had to be a way to create a remote device that could notify people when their property was in trouble. **tpo**



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Education Day Sessions

Wednesday, February 17, 2016

NAWT

National Association of Wastewater Technicians

Rooms 234-236

- 8 a.m. Basics of Septic System Control Panels
- 9:30 a.m. Using Septic Control Panels to Troubleshoot Systems
- 11 a.m. Inspecting Concrete Sewage Tanks
- 1:30 p.m. An Exercise in Septic System Troubleshooting
- 3 p.m. The Basics of Inspecting Drip Systems
- 4:30 p.m. NAWT Ask the Experts Panel Discussion

SSPMA

Sump and Sewage Pump Manufacturers Association

Rooms 133-135

- 8 a.m. Understanding Pumps and Common Pumping Issues
- 9:30 a.m. Evaluation and Installation of Backup Pump Systems
- 11 a.m. Best Installation Practices for Trouble-Free Pump Controls
- 1:30 p.m. Troubleshooting Pumps, Panels and Switches with Digital Multimeters
- 3 p.m. Sizing Guidelines for Sump, Sewage and Grinder Pumps
- 4:30 p.m. SSPMA Ask the Experts Panel Discussion

Business Strategies

Rooms 140-142

- 8 a.m. How Much Should I Charge?
- 9:30 a.m. Business Game Changers: Top 5 Secret Strategies for Massive Growth in Your Service Business
- 11 a.m. The Un-Business Plan — Making Your Business Less Complicated But More Profitable
- 1:30 p.m. How to Use Superior Customer Service to Increase Sales
- 3 p.m. Reward the Right Stuff: Finding, Training and Keeping Great Team Members
- 4:30 p.m. Is Your Business Prepared for a Crisis?

Industry Safety

Rooms 237-239

- 8 a.m. Pre-Engineered Shoring Systems for Cross-Trench Utility Challenges
- 9:30 a.m. Excavation Safety
- 11 a.m. OSHA Confined Space, Air Monitoring and Fall Protection Explained

SSCSC

Southern Section Collection Systems Committee

Rooms 231-233

- 8 a.m. Positioning Yourself for Promotion and Succession Planning
- 9:30 a.m. Step Up Your Game! Taking Current CCTV Inspection Technology to the Next Level
- 11 a.m. Trailer Jetting — Getting the Most Out of Your Equipment
- 1:30 p.m. Vacuuming: the Other Half of the Combination Unit
- 3 p.m. Sewer System Maintenance — Challenges and Solutions
- 4:30 p.m. SSCSC Ask the Experts Panel Discussion

NOWRA

National Onsite Wastewater Recycling Association

Rooms 240-242

- 8 a.m. Introduction to Soils
- 9:30 a.m. Onsite Septic System Loading Rates and Site Layout
- 11 a.m. Making Infiltration Decisions — Understanding Soil Surface Design
- 1:30 p.m. Soil Dispersal Comparison
- 3 p.m. Introduction to the Elements of Onsite System Design and Regulations
- 4:30 p.m. Onsite Septic System Hydraulics and Pump Design

Portable Sanitation

Rooms 136-138

- 1:30 p.m. Marketing Basics: How to Effectively and Efficiently Grow Your Portable Sanitation Sales
- 3 p.m. Trust — How to Build it and Use it to Grow Your Portable Sanitation Business
- 4:30 p.m. Portable Sanitation Forum: Current and Future Critical Issues Affecting the Industry Discussion

NASSCO

National Association of Sewer Service Companies

Rooms 130-132

- 8 a.m. Cleaning Nozzle Technology
- 9:30 a.m. Large vs. Small-Diameter Pipe Cleaning
- 11 a.m. The Lower Lateral — The New Frontier in Sewer Rehab
- 1:30 p.m. Chemical Grouting Technologies
- 3 p.m. The Growth of the UV Cured CIPP Process
- 4:30 p.m. NASSCO Ask the Experts Panel Discussion

Treatment Plant Operator

Rooms 243-245

- 8 a.m. Effective Strategies for Collections System Management
- 9:30 a.m. Sustainable Innovation in Biosolids Management
- 11 a.m. Pretreatment and Wastewater Lagoon Management
- 1:30 p.m. Septage Collection and Treatment
- 3 p.m. Large Scale FOG/Septage Receiving Station — Lantern Environmental Project Case History
- 4:30 p.m. Progress in Electrochemical Water Treatment in Last Century

WJTA-IMCA

Water Jet Technology Assoc. - Industrial Municipal Cleaning Assoc.

Rooms 237-239

- 1:30 p.m. Proper Industrial Truck Maintenance Can More Than Pay for Itself in Productivity and Safety
- 3 p.m. Air Conveyance Through an Industrial Vacuum Truck
- 4:30 p.m. Vacuum Excavation Applications and Opportunities

Women in Business

Rooms 136-138

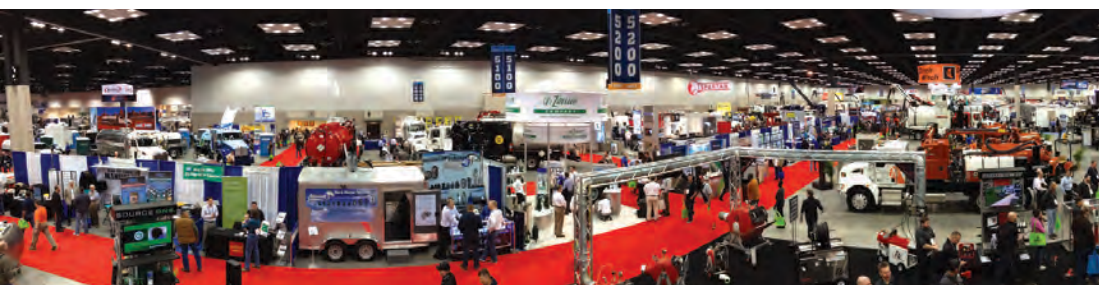
- 8 a.m. Marketing to Women
- 9:30 a.m. Women of Wastewater: Building a Community of Allies
- 11 a.m. Women in Wastewater Roundtable

Vacuum Truck Equipment and Operation Training

presented by **NAWT** National Association of Wastewater Technicians

Rooms 109-110 8 a.m. - 5 p.m.

This day-long session will discuss in detail the equipment on vacuum trucks and how to operate them. Pumping terms will be covered, as will safety principles, materials often encountered on the job and government regulations.



WWETT Education Sessions

Thursday, February 18, 2016

Liquid Waste Treatment & Disposal

Rooms 130-132

- 8 a.m. Analysis of Drainfield Failures and Restoration Methods
- 9:30 a.m. Cash In on Community System Operations and Maintenance
- 11 a.m. Ultra-Efficient Inspection Technique to Locate Leaks on Septic Systems

SSCSC Sewer & Drain Cleaning Course

Rooms 231-233

- 8 a.m. Hands-On Nozzle Technology
- 10 a.m. Hands-On Jetter Hose Maintenance — Care and Repair

Sewer & Pipe Rehabilitation, Relining & Repair

Rooms 234-236

- 8 a.m. Take Control of Inflow and Infiltration in Manholes
- 9:30 a.m. When Things Go Wrong on a Lining Job
- 11 a.m. Taking Small-Diameter Drain Lining Inside Infrastructure

Sewer & Drain Cleaning, Inspection & Repair

Rooms 133-135

- 8 a.m. Using the Clean Water Act to Grow Profits
- 9:30 a.m. Winning Trench Warfare — Finding Profitability in Sewer/Septic Work
- 11 a.m. Your Best Shot at Sewer Success — How to Get the Most From Inspection Technology

Onsite Septic Installation, Repair & Design

Rooms 237-239

- 8 a.m. Overview of Application, Design, Installation and Operation of Drip Dispersal Systems
- 9:30 a.m. Onsite System Pump Design Made Easy
- 11 a.m. The Onsite Wastewater Industry and Our Carbon Footprint

Treatment Plant Operator

Rooms 243-245

- 8 a.m. Smart Water Technology in Theory and Practice
- 9:30 a.m. Dissolved Ozone in Municipal Collection, Treatment and Disposal
- 11 a.m. Municipal Biological Waste Treatment

Business Strategies

Rooms 136-138

- 8 a.m. How Self-Employed People Can Make More Money
- 9:30 a.m. Growing Your Business in a Tough Economy
- 11 a.m. Staying in Front of Your Customer

NOWRA Design Course

Rooms 240-242

- 8 a.m. Mound and At-Grade Design
- 9:30 a.m. Low-Pressure Pipe in Drainfield Distribution
- 11 a.m. Subsurface Drip Irrigation

Municipal Sewer & Water

Rooms 140-142

- 8 a.m. How to Recover Non-Revenue Water
- 9:30 a.m. Phased Assessment Strategy for Sewers - Understanding Sewer Condition Quicker with Fewer Resources
- 11 a.m. The Science of Pipe Cleaning — Flow and Pressure



Many states approve WWETT education sessions toward fulfilling required certified education units or professional development hours.

See wwettshow.com for a list of approved states and courses.

Friday, February 19, 2016

Liquid Waste Treatment & Disposal

Rooms 130-132

- 8 a.m. | Fact vs. Fiction: The Top Ten Septic Myths
- 9:30 a.m. | All About Facultative Bacteria
- 11 a.m. | Brown Grease Recovery From Grease Trap Waste: Science and Economics

Industry Safety

Rooms 140-142

- 8 a.m. | Identifying and Managing Risk in a Septic or Sewer Business
- 9:30 a.m. | How Well Do You Know Your Cleaning Hose?
- 11 a.m. | Pathogen Exposures to Workers in the Onsite Industry

Business Strategies

Rooms 240-242

- 8 a.m. | Creating a Data-Driven Strategic Marketing Plan
- 9:30 a.m. | What Every Sewer and Drain Contractor Needs to Know About Asset Protection, Tax Reduction and Estate Planning

Municipal Sewer & Water

Rooms 240-242

- 11 a.m. | GIS: Empowering Water, Wastewater and Waste Removal Organizations

Sewer & Drain Cleaning, Inspection & Repair

Rooms 133-135

- 8 a.m. | Advanced Pipe Bursting
- 9:30 a.m. | Low-Latency, High-Definition Video Over Coaxial Cable for Remote Inspection
- 11 a.m. | Plumbers vs. Technicians: The Slow Decline of the Tradesman

Municipal Sewer & Water

Rooms 231-233

- 8 a.m. | Using Acoustic Inspection to Prioritize Sewer Cleaning
- 9:30 a.m. | Evaluation of Automatic Filters for Nozzle Protection in Recycled Water Applications
- 11 a.m. | Flow Monitoring — How to Make Your Program Successful

Treatment Plant Operator

Rooms 243-245

- 8 a.m. | Insights into Ozone Water Treatment Plants
- 9:30 a.m. | Wastewater Microbiology
- 11 a.m. | How to Ensure Gold is the Result — Choosing the Right Dewatering Equipment



Business Software & Technology

Rooms 136-138

- 8 a.m. | Know the State of Your Business Using Business Charts and Reports
- 9:30 a.m. | Using Software to Save Time and Increase Profits
- 11 a.m. | Using Mobile Devices for Business

Sewer & Pipe Rehabilitation, Relining & Repair

Rooms 234-236

- 8 a.m. | Buying Back Capacity
- 9:30 a.m. | Successful Reduction of I&I Using the Holistic Approach to Sewer Rehabilitation
- 11 a.m. | Large Scale Centrifugally Cast Concrete Pipe Culvert Rehab in CO Dept. of Transportation Region 1

COLE Publishing's Onsite Installer Course

Rooms 237-239 8 a.m. - 5 p.m.

This day-long session will walk professionals through an introduction to proper installation practices for the sustainable use of onsite treatment systems

Detailed session information available at:
www.wwettshow.com



Energy Management and Sustainability

By Craig Mandli

Asset Management

ENVIRONETICS DIRECTOR II

Director II tank baffles from Environet-ics are designed for tank-based waste treatment operations. Made from heavy-duty, reinforced geomembrane materials to improve flow patterns in new or existing circular or rectangular tanks, the baffles are made to reduce maintenance and energy costs. **815/838-8331; www.environeticsinc.com.**



Director II tank baffles from Environet-ics

FLUID CONSERVATION SYSTEMS INTELLIGENS WW

The Intelligens WW from Fluid Conservation Systems is an intrinsically safe data logger designed to work safely in hazardous areas. It uses ultrasonic measurement that is noncontact, non-contaminating and low maintenance. Two-way connectivity with integral SMS/GPRS telemetry enables the unit to be reprogrammed remotely without the need for expensive site visits. When in alarm mode, the device can send alerts to up to 16 telephone numbers and provide accelerated dial-in and sampling functionality to make data rapidly available. It has additional channel capability for logging temperature, pressure/depth, level or flow with an external device if required. It uses low-power electronics to extend battery life to five years. The device accepts external battery packs or solar power



Intelligens WW from Fluid Conservation Systems

sources, increasing system longevity and data transmission frequency. **800/531-5465; www.fluidconservation.com.**

PHOENIX CONTACT ROGOWSKI COIL

Rogowski Coil solutions from Phoenix Contact provide a current transformer (CT) alternative that can measure alternating currents in eight ranges, from 0 to 100 amps to 0 to 4,000 amps. They are flexible, lightweight and can provide eight DIP switch-configurable CT ratios with one part number. The principle of operation eliminates dangerous open-circuit voltages and the need for CT shorting blocks. The measurement coil is designed as an open-ended loop, allowing the coil to be installed quickly on an existing conductor. There are no tools to handle and no hardware to lose, thanks to a bus bar mounting clamp and a simple bayonet latch on the coil housing. There are two available transducers that connect to the measurement coil. Customers have the option of a 0 to 1 amp CT output or a standard 0 to 10 volt/4-20 mA analog output. The outputs are universal and can be integrated with equipment from virtually any manufacturer. **800/322-3225; www.phoenixcontact.com.**



Rogowski Coil solutions from Phoenix Contact

Automation/Optimization

MARKLAND SPECIALTY ENGINEERING SUSPENDED SOLIDS DENSITY METER

The Suspended Solids Density Meter from Markland Specialty Engineering provides real-time knowledge of primary, secondary, return activated and backwash sludge/silt concentrations in pipes, clarifiers and tanks, and helps automate biosolids removal. It helps operators reduce polymer and energy waste by optimizing flocculent dosages for preferred feed densities and enhancing dewatering equipment performance by programming underflow pumps to shut off before biosolids density becomes too thin. Both nonintrusive inline pipe spool piece and throw-in style versions are simple to install, calibrate and clean. The safe ultrasonic sensor needs no permits/no approvals. Readings are not affected by color. **855/873-7791; www.sludgecontrols.com.**



Suspended Solids Density Meter from Markland Specialty Engineering

ORENCO CONTROLS OLS CONTROL PANEL

Corrosion-resistant OLS Series Control Panels from Orenco Controls contain integrated variable-frequency drives to optimize system operation, reduce energy usage and decrease hard starts and water hammer. They are ideal for any pumping application where consistent flow and



OLS Series Control Panels from Orenco Controls

energy-efficient operation are essential, such as lift stations, dewatering or sludge pumping. They can also be used as a SCADA patch, connecting peripheral equipment to an existing SCADA system. Multiple drives can be configured through one user-friendly human-machine interface. Engineers preprogram user interfaces to the site-specific needs of an installation, making the panel virtually plug-and-play. Maintenance staff can easily adjust settings and monitor the system

remotely. These outdoor-rated control panels, housed in a weatherproof enclosure, also offer circuit protection, heat dissipation systems (fan or A/C), phase and voltage protection, and level controls. **877/257-8712; www.orencococontrols.com.**

ORIGINCLEAR ELECTRO WATER SEPARATION TECHNOLOGY

Electro Water Separation Technology from OriginClear is an electrochemical technology platform designed to do the heavy lifting of clarifying high-turbidity waters rapidly and on site. The platform uses electrocoagulation, electroflotation and electro-oxidation processes in single or multiple stages to achieve high-speed and low-energy primary water treatment, with minimal consumables use. It removes up to 99.9 percent of free oil and 99.5 percent of suspended solids from water, making it an ideal pretreatment for downstream high-quality polishing. **877/999-6645; www.originclear.com.**



Electro Water Separation Technology from OriginClear

PRIMEX ECO SMART STATION

The ECO Smart Station control system from PRIMEX provides energy-efficient pump control in municipal lift station applications using VFD technology. The EnergyView Controller with kW Logix Software uses an efficiency auto-tune algorithm that searches for the pump speed that will consume the least amount of energy per gallons of liquid pumped. The pump motor power is monitored by the VFDs and transmitted to

the controller. No power meters are required. The auto-tune program accounts for the reduction in flow and head characteristics of the pump resulting from speed reductions to determine the best efficiency frequency. When the best efficiency frequency is found, the pumps will operate at this speed during every cycle. This eco mode of operation is efficient during low and normal in-flows to the pump station. **844/477-4639; www.primexcontrols.com.**



ECO Smart Station control system from PRIMEX



Rotoverter from Ronk Electrical Industries

RONK ELECTRICAL INDUSTRIES ROTOVERTER

The Rotoverter from Ronk Electrical Industries is designed to operate pump motor loads that may vary considerably. Its tapped winding allows the pump motor currents to be balanced for maximum motor life. Units include automatic starting with HOA switch. The LS version is furnished in a pad-mount fiberglass enclosure with

louvers, heat exhaust fan and locking provisions. Designed for use on duplex sewage pump stations and duplex water booster stations, the units are

sized to run 2 to 40 hp motors to handle most lift station applications where three-phase power is needed and only single-phase power is available. **800/221-7665; www.ronkelectrical.com.**

SENTRY EQUIPMENT ISOLOK

ISOLOK automatic samplers from Sentry Equipment effectively sample sludge from a pressurized line, capturing fixed sample volume at fixed time intervals for uniformity and consistency. An isolation valve, ISOVALVE, allows the samplers to be removed for inspection or servicing while process lines remain pressurized. The sampler is designed to be safe, clean, reliable and simple to use, increasing plant efficiency and greatly decreasing labor costs. **262/567-7256; www.sentry-equip.com.**



ISOLOK automatic samplers from Sentry Equipment

Biogas

JDV EQUIPMENT DOUBLE MEMBRANE BIOGAS HOLDER

The Double Membrane Biogas Holder from JDV Equipment Corporation allows variable biogas storage within the inner membrane at constant pressure during gas production and usage, while the air-inflated outer membrane provides gas pressure and protection. The outer membrane is constructed of a high-tech cross-woven fabric, coated with PVC and UV protection. Sensors monitor gas volume, allowing operators to optimize the use of biogas to feed generators or heating systems. **973/366-6556; www.jdvequipment.com.**



Double Membrane Biogas Holder from JDV Equipment Corporation

KSB AMAPROP 1000

Midsized Amaprop 1000 hybrid mixers from KSB can serve as part of an optimized mixing procedure that can reduce operational energy needs, increasing energy output and revenues for the plant. They are

optimized for each mixing task to ensure a specific flow volume and deliver enough thrust to move the medium through all sections of the fermenting tank. Use of multiple, properly positioned mixing units, each of which processes the reduced, diluted material created by other units, can help prevent short-circuiting flow paths and support the best possible transformation process. They combine all the benefits of an agitator with the turbulence generation of a traditional mixer. If substrate viscosity increases, they can adjust the conveying action to offset the increase and maintain optimal flow. **804/222-1818; www.ksbusa.com.**



Amaprop 1000 hybrid mixers from KSB



Ultrastore membrane gasholders from Ovivo USA

OVIVO USA ULTRASTORE

Ultrastore membrane gasholders from Ovivo USA are used to store the biogas generated from anaerobic digesters. The dual membrane gasholder consists of a pressurized external air membrane and an inner gas membrane, which are fabricated from basket weave polyester fabrics and sized to accommo-

date various volumes of biogas. They are available for installation in two configurations — on a new or existing tank as a gasholder or on a concrete slab for expanded gas storage. They can be used when space is an issue and a plant wants to increase gas storage capacity. **801/931-3000; www.ovivowater.com.**

WESTECH ENGINEERING DUOSPHERE

The DuoSphere Dual Membrane Gasholder from WesTech Engineering offers flexible designs for digester gas storage and alternatives for conventional digester covers. The gasholder structures are strong, lightweight and versatile, which provides ideal biogas storage for municipal or industrial applications. **801/265-1000; www.westech-inc.com.**



DuoSphere Dual Membrane Gasholder from WesTech Engineering

Compressors

JENNY PRODUCTS ELECTRIC TWO-STAGE, HORIZONTAL-TANK STATIONARY AIR COMPRESSOR

Electric two-stage, horizontal-tank stationary air compressors from Jenny Products can be used for applications requiring greater pressure, as the line displaces between 9.1 and 107.0 cfm at 175 psi. Two-stage units providing greater than 10 hp operate on 208-, 230-, 460- or 575-volt three-phase power and come with 120- or 240-gallon tanks. The 15 hp model displaces 72.4 cfm, while 20 hp units displace 92.6 cfm. The largest units provide 25 hp and displace 107.0 cfm at 175 psi. They have a heavy-duty, two-stage cast iron compressor pump; powder-coated ASME certified tank; manual tank drain; tank gauge; large canister intake filter with replaceable filter elements; and a pressure-relief safety valve. Each unit is splash



Air compressors from Jenny Products

lubricated with Jenny Ultimate Blue Compressor Pump Oil. A large fly-wheel provides for extra cooling and easier startup, and special unloading valves further assist the motor in starting. A directional air shroud helps reduce pump temperatures. The thermal-overload protection feature saves the motor from overheating by preventing it from drawing too much current. **814/445-3400; www.jennyproductsinc.com.**



S-energy lubricated rotary screw air compressors from Sullair

SULLAIR S-ENERGY

S-energy lubricated rotary screw air compressors from Sullair can significantly reduce operating and energy costs over the entire life cycle due to a number of factors: the unit's air end with a low-restriction inlet valve, a premium efficient drive motor design, and a low-pressure drop air-fluid separation system to prevent energy loss. Units offer high performance with low energy usage. They are available from 40 to 100 hp and 100 to 175 psi, and optional variable-speed drive units offer maximum efficiency and operating consistency. Units are easily installed, and their compact design makes routine maintenance easy. **800/785-5247; www.sullair.com.**

Drives

ABB ACQ550

The ACQ550 drive from ABB is available from 1 to 550 hp and seamlessly integrates as a NEMA1, NEMA-12 or outdoor-rated NEMA-3R solution. A library of pre-programmed startup assistants provides commissioning for submersible, centrifugal or positive-displacement pumps, and application macros simplify configuration of inputs, outputs and parameters. It is suited for the simplest pumping application through the most demanding, resulting in significant cost savings. On centrifugal pump applications, for example, the power requirement of the pump varies by the cube of the speed. Electronically reducing the pump speed by 20 percent via the drive will typically cut energy costs in half. **800/752-0696; www.abb.com.**



ACQ550 drive from ABB



Eddy Current drives from DSI Dynamatic

DSI DYNAMATIC VARIABLE-SPEED EDDY CURRENT DRIVE

Eddy Current drives from DSI Dynamatic can be used as a reliable means of controlling pump speed by regulating a DC excitation coil on a magnetic rotor, rotating concentrically within a steel drum, driven by the motor at full speed. The slip between the input drum and the output rotor produces a slip loss, proportional to speed.

By applying the eddy current efficiency to a centrifugal pump, the resulting loss is less than 10 percent of rated power. There are no input harmonics to induce losses in feeders, transformers and harmonic mitigation equipment or harmonic losses in the motor. Air conditioning is also not required. **800/548-2169; www.dynamatic.com.**

VACON 100

The 100 AC drive from Vacon can be integrated with existing automation systems using built-in Modbus RTU (RS485) or Modbus TCP

(Ethernet). Integration over Profinet IO or Ethernet IP systems is made possible through software options. Click-in fieldbus options facilitate integration to traditional systems using Profibus DP, DeviceNet, CANOpen and LONWorks. Fieldbus technology ensures increased control and monitoring of the process equipment with reduced cabling. **717/261-5000; www.vacon.com.**



100 AC drive from Vacon



MV1000 drive from Yaskawa America

YASKAWA AMERICA MV1000

The MV1000 from Yaskawa America is a medium-voltage AC drive that enables easy application and installation. Its Smart Harmonics Technology input isolation transformer and nine-level output for 4 kV drives (17 level line-to-line) help solve traditional MV drive issues. It is a compact, all-in-one package including optional input switchgear, ideal for new or retrofit installations with available models ranging from 175 to 16,000 hp. **800/927-5292; www.yaskawa.com.**

Generators

KOHLER POWER SYSTEMS MOBILE PARALLELING BOX

The Mobile Paralleling Box from Kohler Power Systems enables users to combine different size generators with different fuel types. Designed for use with Kohler's gaseous and diesel mobile generator line, four boxes can be used to parallel up to eight generators. The Decision-Maker 3500 digital controller, standard on all gaseous and Tier 4 Final diesel mobile generators, provides the paralleling intelligence and network communications. **800/544-2444; www.kohlerpower.com.**



Mobile Paralleling Box from Kohler Power Systems

Heat Exchangers/Recovery Systems

ALFA LAVAL SLUDGE SPIRAL HEAT EXCHANGER



Sludge Spiral Heat Exchangers from Alfa Laval

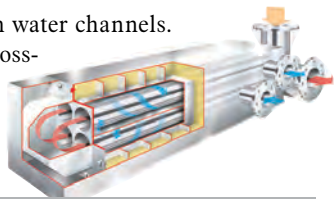
Sludge Spiral Heat Exchangers from Alfa Laval can help keep a digester warm, preheat sludge before dewatering, pasteurize sludge and perform a wide range of other sludge heating applications. The compact, energy-efficient unit is self-cleaning, reducing operating costs. Maintenance costs are reduced due to easy access and its small size means less heating medium is required. It has high heat transfer efficiency and low pumping power consumption, with the ability to handle two highly fouling fluids. Every unit is fully drainable. **866/253-2528; www.alfalaval.us.**

CLEANTEK WATER SOLUTIONS VSV SLUDGE/WATER HEAT EXCHANGER

The VSV Sludge/Water Heat Exchanger from CleanTek Water Solutions is a "tube in shell" heat exchanger used to heat and cool biological sludge. The 316 stainless steel sludge tubes are surrounded by duplex

stainless steel rectangular cross-section water channels.

The flow of the sludge and the water is cross-current for high efficiency. Each heat exchanger is designed for each application to optimize heat transfer and physical size. The mixing action in the sludge-turning chambers equalizes the thermal profile in the sludge tubes for efficient heat transfer. The units are constructed in accordance with Section VIII, Division I, of the ASME Pressure Vessel Code. In the sludge/sludge configuration, two units are connected with a closed water loop, allowing for recovery of the energy lost when cooling digested sludge to be used to heat up undigested sludge. **886/929-7773; www.cleantekwater.com.**



VSV Sludge/Water Heat Exchanger from CleanTek Water Solutions



Heat exchangers from DDI Heat Exchangers

DDI HEAT EXCHANGERS NON-PLUG EXCHANGER

Wide-gap non-plug heat exchangers from DDI Heat Exchangers have a rectangular channel structure with large gaps of more than 6 inches, allowing for a double layer between sewage and potable water.

Recovered energy can be used for heating in winter and cooling in summer. **514/696-7961; www.ddi-heatexchangers.com.**

KRUGER USA BIOCON

The BioCon thermal dryer from Kruger USA processes wastewater treatment plant biosolids into a marketable biosolids end product specific to local market needs. It is a dual-belt dryer, designed for safe and efficient operation, creating an end product dried to a minimum solids content of 90 percent that meets Class A requirements. The end product is suitable for final disposal via most agricultural routes, providing economic benefits to municipalities. The end product can be enhanced with particle-sizing equipment that can alter characteristics such as density. The enhanced dried product is then screened to meet specific size requirements. The unit can be paired with an end product storage system such as a bagging station or silo system for handling the dried product. **919/677-8310; www.krugerusa.com.**



BioCon thermal dryer from Kruger USA



Gm Series biogas blowers from Aerzen USA

High-Efficiency Motors/Pumps/Blowers

AERZEN USA GM SERIES

Gm Series biogas blowers from Aerzen USA are available in a variety of different sizes with intake volume flows of 35 to 1,500 icfm and positive pressure up to 15 psig. They are used for the compression of biomethane and biogas, landfill gas, and natural gas. **610/380-0244; www.aerzenusa.com.**

EURUS BLOWER BLOWER PACKAGE

Bilobe (MB Series) and trilobe (ZG Series) blower packages from Eurus Blower are rated for 15 psig pressure or 15 inches Hg vacuum, providing airflow up to 3,950 cfm. They have integral-shaft ductile iron impellers, dual splash lubrication, oversized cylindrical roller bearings,

piston ring air seals, lip-type viton oil seals, and low vibration and noise. The packages come with a high-efficiency integrated intake filter/silencer with washable polyurethane filter media; combination base and heavy-duty integrated discharge silencer for smaller footprint and assembly; and a V-belt drive and guard with auto-tensioning for reduced maintenance costs and vibration dampeners. Options include motors up to 200 hp, check valves, safety valves, flexible connectors and sound enclosures. **630/221-8282; www.eurusblower.com.**



Bilobe (MB Series) and trilobe (ZG Series) blower packages from Eurus Blower



VR Series pumps from Franklin Electric

FRANKLIN ELECTRIC VR SERIES

VR Series vertical, stainless steel multistage pumps from Franklin Electric deliver clean water under pressure. These booster pumps are available with a flow range up to 600 gpm and 750 feet total dynamic head. Each has all 316 stainless steel hydraulic components for durability, efficiency and performance in corrosive water applications. Impellers and diffuser stages are fabricated from heavy-gauge stainless steel. The oversized ball bearing/coupler assembly

eliminates the need for stack height adjustment and supports the axial thrust load. The elimination of axial thrust allows

the pumps to use industry-standard motors instead of the high-thrust motors. **800/701-7894; www.franklinwater.com.**

PENTAIR HPE

The HPE oil-cooled, premium efficient submersible solids-handling pump series from Pentair provides wire to water efficiencies resulting in substantial energy savings. The oil-cooled design runs up to 104 degrees F cooler than air-cooled pumps for longer motor life. Hydromatic seal leak probes provide early warning moisture detection to minimize unplanned maintenance costs. A shaft-grounding ring protects against VFD-induced currents to prevent premature bearing failure. They have quick disconnect cables, cartridge seals and terminal blocks, and permanently lubricated bearings, all designed to simplify maintenance and reduce downtime. **419/289-1144; www.hydromatic.com.**



HPE pump series from Pentair

SMITH & LOVELESS STAR ONE



STAR ONE non-clog pumps from Smith & Loveless

STAR ONE non-clog pumps from Smith & Loveless operate at anywhere from a 3 to 5 percent higher efficiency than previous models. They have an oversized, stainless steel shaft that minimizes overhang, reducing shaft deflection and improving pump efficiencies. This is achieved through minimal pump heights and rigid construction. Shaft endplay is limited to bearing shake. Shaft run-out is limited to 0.003 inch.

Close tolerances are tighter than NEMA specifications. By trimming the impellers inside the shrouds, the pump leaves the back shroud full diameter to prevent stringy material from winding around the shaft and reducing efficiencies. **913/888-5201; www.smithandloveless.com. tpo**

By Craig Mandli

Plant uses microturbines to generate heat and power

Problem

When energy bills at the York (Pennsylvania) Wastewater Treatment Plant topped \$63,000 per month and service of the plant's four internal combustion engines required 110 gallons of oil every 700 hours, city officials knew it was time to update the plant's 23-year-old cogeneration system.

Solution

The York City Sewer Authority selected a **CR600 Power Package** from **Capstone Turbine Corporation** for the 600 kW combined heat and power system. Separately, they purchased a C1000 Power Package for 1 MW of additional capacity based on the facility's fluctuating demand. The CR600 operates on digester methane; C1000 is a low-pressure dual-mode unit fueled by utility-supplied natural gas.



RESULT

York officials estimate the cogeneration system generates more than 2.5 million kWh annually, reduces energy costs by \$278,000 per year, and lowers carbon dioxide emissions by more than 1.5 million pounds annually. "We were looking for an opportunity to invest in future infrastructure development, not look to the past," says J.T. Hand, sewer authority chairman. 818/734-5300; www.capstoneturbine.com.

Generator sets use biogas to power treatment plant

Problem

The Encina Wastewater Authority (EWA) in Carlsbad, California, serves 350,000 customers in north San Diego County. Faced with the challenge to operate economically and maintain high quality, EWA decided it needed to be more energy efficient.

Solution

Biogas fuels four **G3516 engine-generator sets** from **Caterpillar**, supplied by local dealer, Hawthorne Power Systems, which also provided application engineering and documentation, engine monitoring and control systems, and electric power distribution and monitoring.



RESULT

On a typical day, the generator sets run on biofuel; one unit runs on natural gas alone for four to eight hours during peak rate times. Producing about 12 million kWh per year, the units meet about 71 percent of the authority's energy needs. 309/675-1000; www.catelectricpowerinfo.com.

Solids handling pump rectifies clogs caused by flushable wipes

Problem

The Town of Salem, Wisconsin, manages 25 lift stations that serve its population of 12,000. Lift station 18, a triplex station, was clogging weekly due to flushable wipes. Brad Zautcke, utility district manager, says his team had to unclog the pump by pulling out the rags with needle-nose pliers; this meant confined-space entry with a three-man crew. Each service call cost at least \$300.

Solution

Crane Pumps & Systems provided a **Barnes 4SHVA** 30 hp solids handling pump as a demonstration replacement for the station in September 2013. The pump was installed a month later. The next time the pump was pulled was October 2014 for its annual maintenance. The pump has a non-recessed vortex impeller.



RESULT

The pump paid for itself in the first six months and continues to operate clog-free. 937/778-8947; www.cranepumps.com.

Renewable fuel and cogeneration combined at Georgia plant

Problem

Columbus (Georgia) Water Works (CWW) supplies drinking water and wastewater treatment for 230,000 residents. The utility was exploring biogas-fueled cogeneration.

Solution

Cummins Energy Systems Business North America provided generator sets, switchgear and waste heat recovery systems along with supporting equipment. The company also helped design the generator set room and provided engineering for heat recovery and utility mains switching. The company installed two 1.75 MW C1750 N6C lean-burn gas generator sets, managed by a DMC300 digital control system, along with remote monitoring and switchgear. The generator sets can run on digester or natural gas.



RESULT

Since the utility has gas storage, it operates the system at the base-load rating for about 12 hours per day; the system operates for 4,000 hours a year. 800/888-6626; www.cumminspower.com.

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Water authority prevents VFD-induced bearing damage with shaft grounding rings

Problem

The City of Hutchinson, Kansas, had just completed a 10 mgd reverse osmosis water treatment plant. Within two months, one of the 250 hp vertical hollow-shaft motors that pump to the water towers was making the tell-tale whine of fluted bearings. After that pump's bearings were replaced, the rest of the plant's motors began making the same noise.

Solution

Plant personnel concluded that VFD-induced shaft voltage was the cause of the problem and began shipping motors to Independent Electric Machinery (IEMCO), a repair shop with a process to prevent electrical bearing damage in vertical hollow-shaft motors. After replacing damaged bearings, IEMCO installed an **AEGIS Shaft Grounding Ring** from **Electro Static Technology** next to the motor's guide (lower) bearing and applied ceramic insulation to the carrier that holds the thrust (upper) bearing in place at the motor's drive end.

RESULT

Before long all 17 pump motors had been protected. All are still running without any problems. **866/738-1857; www.est-aegis.com.**



Filter manufacturer improved metering pump accuracy

Problem

New Logic Research in Emeryville, California, provides high-performance membrane filtration systems. Series i VSEP systems, used in applications from brine minimization and landfill leachate treatment to chemical process clarifications, have a clean-in-place cycle that requires leak-free, accurate dosing of chemical cleaners.

Solution

The manufacturer selected **Bran+Luebbe ProCam** double diaphragm metering pumps from **SPX** for use on chemical totes. The pumps have variable stroke length and are available in five models with flow rates up to 158.5 gph and operating pressures up to 150 psig. They use mechanically actuated dual PTFE diaphragms to ensure safe, reliable, corrosion-resistant operation.



RESULT

The pumps deliver consistent dosing rates during the cleaning cycle, minimizing chemical usage and ensuring thorough membrane cleaning. They have operated reliably and reduced the risk of emissions. **800/252-5200; www.spx.com.**

(continued)

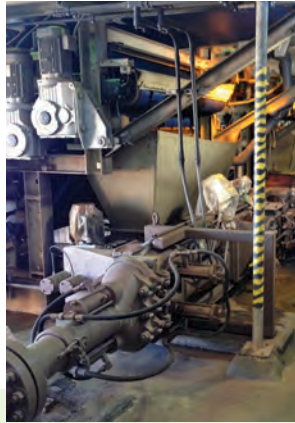
City replaces piston pumps with new efficient model

Problem

The Stockton (California) wastewater treatment facility operations/maintenance staff had to keep aging equipment functional. The two 20-year-old KSP 25 piston pumps supplied by Schwing Bioset in the biosolids dewatering building moved dewatered cake to the truck-loading building several hundred feet away.

Solution

The city replaced the old pumps with **Schwing Bioset's KSP 25** high-efficiency piston pumps. The new pump systems have hydraulic power packs, twin screw feeders and control systems. The pumps were replaced in a series to phase out the old system while the plant continued to operate.



RESULT

A brand-new turnkey cake pumping system was turned over to the city during 2015. 715/247-3433; www.schwingbioset.com.

United Water solves data problem with magnetic flowmeter

Problem

United Water operates regulated water systems in eight states and provides contract services to over 5 million people. The company needed to pinpoint and stem water loss quickly and easily, even in no-power situations, to save water and energy and improve its bottom line.

Solution

The **SITRANS FM Mag 8000 flowmeter** from **Siemens Industry** provides accurate water balance data, pinpointing line breaks and saving water. The 10-year battery life provides consistent monitoring, and the remote mounting enables freedom for installation, making maintenance easier and safer.



RESULT

With the data from the flowmeters, United Water operators can see water used, consumed or lost in the EOps system, helping to pinpoint leaks. A spike in usage indicates a leak, and the flow data is fed back to the model to triangulate where the leak is. Operators saw a water savings of 1 mgd and detection times shortened to less than 24 hours. 800/365-8766; www.usa.siemens.com.

Brewery uses produced thermal energy for factory boiler

Problem

The Birra Peroni Group brewery in Bari, Italy, was expanding production, and its wastewater treatment plant from 1995 was inadequate and outdated. The challenge was to revamp, install and start up a new plant without interfering with normal production operations.

Solution

RWL Water inserted an **Expanded Granular Sludge Bed** anaerobic reactor, which, with two existing anaerobic digesters, produces biogas for the factory boiler. The plant also provides aerobic treatment and final clarification.



RESULT

RWL Water provided a cost-effective design and installed it without disrupting production. The system capacity is 580,800 gpd. 800/879-3677; www.rwlwater.com.

Online total solids measurement enhances gravity belt thickener operation

Problem

The City of Lethbridge (Alberta) Wastewater Treatment Plant processes waste activated sludge from its secondary clarifiers through a gravity belt thickener before anaerobic digestion. Controls including timed pumping of the sludge and polymer dosing required constant operator input and maintenance.

Solution

Tecumseth, a **Valmet Automation** distributor, recommended adding online measurement of the waste activated sludge solids using the **ValmetTS Total Solids Analyzer**. It was installed on the common header from the secondary clarifiers feeding the thickener. The device provides a constant measurement of the total solids, used to automatically dose polymer.



RESULT

Plant operators optimized mixing and dosing, reducing polymer usage by at least 25 percent. Operator attention, manual sampling and unplanned maintenance were greatly reduced. Enhanced thickening has improved digesting operations. 360/608-1585; www.valmet.com/automation. tpo

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A First in Sustainability

A TREATMENT PLANT EXPANSION AND UPGRADE INCLUDES A CONSTRUCTED WETLAND THAT DOUBLES AS A COMMUNITY NATURE STUDY RESOURCE

The wetland ponds are surrounded by hundreds of young trees and shrubs, and about 20 strategically placed white spruce and white pine saplings will grow into a windbreak.

By Jeff Smith

A sewage lagoon being converted into a wetland and nature preserve at the Grand Bend Area Wastewater Treatment Facility in southern Ontario has solved treatment capacity and budget problems while gaining widespread recognition for its sustainable design.

The new 0.65 mgd facility was the first wastewater treatment project in the world to be certified under the Envision Sustainable Infrastructure rating system, sponsored by the Institute for Sustainable Infrastructure (ISI). It is also the first Envision-verified project in Canada.

FITTING THE BUDGET

Located on the shore of Lake Huron, the Grand Bend facility is jointly owned by the municipalities of Lambton Shores and South Huron, and is operated by Operations Management International. The original four-cell sewage lagoon facility was built in 1979 with a rated capacity of 0.5 mgd. By 2008, population growth and increasing septic system failures were causing effluent discharges that adversely affected surface and groundwater quality.

To solve the capacity problem, the communities in 2008 began design and contracting of a new tertiary-level treatment plant, but major budget overruns forced a stop to that project and brought alternatives into the picture.

"In 2012, the municipalities decided to abandon the originally designed sewage treatment facility because of the high capital cost and find a more affordable design," says Brent Kittmer, director of community services for Lambton Shores. In 2013, they chose the Ontario-based design firm Stantec for its design plan to convert one of the four lagoons into an extended aeration mechanical treatment facility for biological nutrient removal with a constructed wetland and nature preserve.

ABUNDANT PLANTINGS

This year more than 2,600 plants and shrubs were planted on the 31-acre converted lagoon site. Two wetland ponds are joined by a spillway lined

with riprap. The ponds are surrounded by 200 shrubs, such as service berry, bottom bush, swamp rose and dogwood, plus 200 deciduous whips, such as sugar and silver maple, tulip tree, aspen, cherry, oak and basswood. Twenty strategically placed white spruce and white pine saplings provide a windscreen.

Along the shore and on the water of the kidney-shaped ponds are 2,170 native plants, including Canada anemone, Canada blue aster, sedge and Canada blue joint. Floating species like water lily and clumps of broad-leaf pondweed complement emergent plants that include water plantain, spike rush, wild calla and bull rush. Occasional clusters of boulders break the waterline, and sunken logs are placed in each pond at irregular intervals. A deep-water refuge of more than 12 feet has been excavated in each pond.

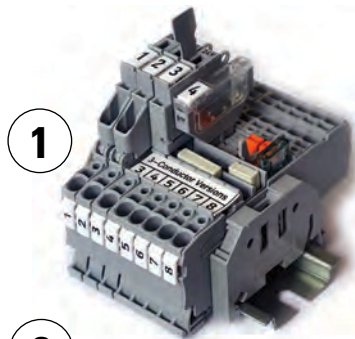
A berm of topsoil and gravel creates a turtle habitat along a portion of one shore. Turtle-basking logs and rootwad are nearby in the water. Half a dozen pits and topsoil mounds, a tall-grass prairie habitat, and high and low marsh areas dot the surrounding area.

Near the edge and along the perimeter of the wetland will be a gravel-surfaced hiking trail. A picnic area and a gravel parking area will be near the trailhead. Also planned are interpretive signage and a stone seating area at a learning center near the edge of the wetland. The public will be invited to tour and visit the wetlands.

“We were thrilled about the wetland component of our project because it provided other opportunities for collaboration with community groups.”

BRENT KITTMER

(Continued on page 63)



1. WAGO FUSE AND DISCONNECT TERMINAL BLOCKS

The TOPJOB fuse and disconnect terminal block from WAGO Corporation is a pivot-style terminal block in a three-conductor variant that allows a second conductor to be connected on the field side. **800/346-7245; www.wago.us.**

2. ELECTRO STATIC UNIVERSAL MOUNTING BRACKETS

Universal mounting brackets from Electro Static Technology, an ITW company, are designed for installation of AEGIS, iPRO, AEGIS iPRO-MR and AEGIS WTG bearing protection rings on large motors. Specially engineered brackets attach to iPRO or WTG rings with screws and have slotted legs that accommodate bolt circles (2.64 to 7.79 inches in diameter) for mounting to the motor. Brackets include 1/2-, 1- and 1 1/2-inch standoff spacers. **866/738-1857; www.est-aegis.com.**

3. SENSAPHONE REMOTE MONITORING SYSTEM

The Sentinel PRO remote monitoring system from Sensaphone supports the Modbus communications protocol (RTU/485 and TCP) and

includes a second relay output. The system monitors, delivers alarms and data logs input/output points from third-party Modbus sensors, transducers and programmable logic controllers. Alerts are sent via phone, email or text. Data values can be viewed in real time via sensaphone.net or the Sensaphone iPhone/Android app. **877/373-2700; www.sensaphone.com.**

4. SUBARU INDUSTRIAL POWER PRODUCTS TRASH PUMPS

Trash pumps from Subaru Industrial Power Products are designed to move high volumes of trash water without clogging. Powered by an overhead cam gasoline engine, the centrifugal-type pumps are available with 2-, 3- and 4-inch discharge outlets. The 2-inch PKX20IT delivers 185 gpm, the 3-inch PKX30IT delivers 314 gpm, and the 4-inch PKX40IT delivers 499 gpm. The 2-inch model handles up to 3/4-inch debris. The 3- and 4-inch models handle up to 1 1/4 inches of solid debris. **800/277-6246; www.subarupower.com.**

5. GORMAN-RUPP SOLIDS MANAGEMENT SYSTEM

The Eradicator solids management system from the Gorman-Rupp Co. is designed for the Super T Series of self-priming centrifugal trash pumps. The system includes inspection cover, back cover with plate and obstruction-free flow path, self-cleaning wear plate and teeth designed to clear material from the eye of the impeller, including sanitary wipes, plastic bags, feathers, hair, sludge and other clog-prone material. Update kits are available for existing Super T Series installations. **419/755-1011; www.grpumps.com.**

6. TRIMBLE POCKET-SIZED GNSS RECEIVER

The R1 pocket-sized global navigation satellite system (GNSS) receiver from Trimble provides submeter precision to any Bluetooth-connected mobile device, including smartphones, tablets and a Trimble hand-held computer. The receiver supports multiple GNSS constellations (GPS, GLONASS, Galileo, QZSS, BeiDou) and can utilize satellite-based augmentation services (SBAS), Trimble ViewPoint RTX or virtual reference station (VRS) correction sources. **800/234-3458; www.trimble.com.**



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wastewater: product spotlight



Submersible line (SL) pumps from Grundfos Pumps

Submersible pumps designed for large flows and unscreened sewage, including wipes

By Ed Wodalski

The **submersible line (SL) of wastewater pumps from Grundfos Pumps** are designed to handle raw, unscreened sewage, effluent, large volumes of surface water and process water in municipal, utility and industrial applications.

The pumps, made for submerged installation, are available with a SLV/SuperVortex impeller or SL1/S-tube impeller that can accommodate up to 4-inch solids and large flows of raw sewage.

"The biggest difference is the SL1 is a tube-style impeller that is completely enclosed, whereas the SuperVortex or SLV is a recessed impeller," says Russell Smith, wastewater large product manager for Grundfos.

"Whether you choose a tube-style impeller or a vortex-style impeller has to do with the hydraulic design condition of your lift station and the type of installation," he says. "Both are very capable of handling solids. Both produce certain types of flows and heads. It just depends on what the station is looking for. The enclosed impeller can produce higher efficiencies and flows. A vortex impeller typically delivers lower flows at higher head conditions but is not as efficient as an enclosed impeller."

The entire range of SL pumps can handle flows up to 5,000 gpm and spherical solids up to 6.25 inches, including wipes.

"Flushable wipes inside wastewater lift stations is a growing concern within the wastewater pump community," Smith says. "Wipes alone are not difficult to deal with, but when they combine with grease, oils and other types of material it causes the wipes to grow in size. That's why it's important when you install a wastewater pump that you install one that not only can handle the wipes but can handle larger-size debris, such as grease and wipes when combined together."

The SL pump features IE3 premium motor components, quick removable pump housing clamps, cartridge seals, quick removable plug-in cord, and smooth exterior components for optimal performance and easy service. The modular design enables cartridge shaft seals, cable plugs, wear rings and other components to be shared across the product line, reducing the amount of inventory required and overall cost of ownership.

The pumps are available in standard, FM-approved explosion-proof models and FM-approved explosion-proof sensor models. Sensor options within the pump enable the operator to monitor stator temperature, seal chamber oil status, moisture penetration, bearing temperatures and vibration either locally or remotely from a computer. Certain models can also be configured in a dry pit submersible with a closed-loop cooling jacket, and mounted either horizontally or vertically. **800/921-7867; us.grundfos.com.**

(Continued from page 61)

COOPERATIVE VENTURE

Gary Deonarine, Stantec project manager, says the willingness of Lambton Shores and South Huron to include sustainable solutions enabled the design team to provide a wetland and nature preserve. "Through enhancement of local habitat geared toward native species, we hope to encourage the public and educational programs to enjoy this feature and become more environmentally conscious and understanding of infrastructure in their communities," he says.

Stantec used the ISI Envision framework during the design to integrate sustainable features. The system sets a framework for planning, designing, evaluating and rating infrastructure projects against the needs and values of the community. It evaluates the economic, social and environmental costs and benefits of all types and sizes of projects, helping owners, designers and policymakers undertake consistent, objective and holistic planning.

Key sustainable features include the constructed wetland and a flexible design that makes the facility responsive to changing wastewater flows. The project also received sustainability credit for low construction and operating costs gained through efficiency, construction of the project within the original facility's footprint to save nearby prime farmland, and creation of trails and interpretive signage.

During design, horticultural and conservation groups were engaged for their ideas on what the wetland should look like. Those groups helped with the planting phase. Says Kittmer, "We were thrilled about the wetland component of our project because it provided other opportunities for collaboration with community groups, which is a key part of our organizational culture." **tpo**

Share Your Ideas

TPO welcomes news about your facility's grounds, signage or buildings for future articles in this column. **Send your ideas to editor @tpomag.com or call 877/953-3301.**

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water: product spotlight

Portable crane rolls through doorways, lifts up to 2,400 pounds

By Ed Wodalski

The **portable crane** from **EzRig Crane** is designed to lift heavy loads from unique positions and hard-to-get-at locations. It has a push-button 110-volt electric winch (220 volt available) with 135 feet of 1/4-inch stainless steel aircraft grade cable that can lift or lower 2,400 pounds. Powder coated in safety orange, the crane has a vertical reach of 19 feet and can lower equipment up to 13 stories. A jib boom enables the lift length to be extended 4 feet while reducing load capacity.

The mini-crane rides on 8-inch-diameter polyurethane locking caster wheels and can fit through 3-foot doors and standard elevator openings.

"You don't have to take the door off the hinges," says Jim Owens, president, EzRig Crane. "You can just roll the crane through. It'll collapse down and roll through."

Water treatment plant applications include removal or installation of deep well pumps, equipment buried underground in vaults or in places where equipment is hard to reach, such as a motor in a bank of pumps.

"The boom extends manually, it telescopes out," Owens says. "It's a tube inside of a tube with cross pins. You extend the boom out to whatever length you want. There are three positions (19, 16 and 13 feet) you can select from. A load chart on the side of the boom dictates what loads you can lift and at what extension and degree of angle when it's in operation."

The crane easily disassembles and reassembles when moving from one level to another.

"Two men can do it in an hour," Owens says.

Weighing 1,050 pounds when assembled, the crane fits fully assembled into a 1/2-ton or 3/4-ton pickup with the tailgate down, or a 1-ton cube van with an inch or two to spare at the sliding door. Assembled and folded, the crane is 118 inches long, 34 inches wide and 64 inches tall. When in use, the legs extend out 10 feet. **844/395-4387; www.ezrigcrane.com.**



Portable crane from EzRig Crane

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James Penner, left, owner of In The Round Dewatering, explains the mechanism behind his horizontal biosolids dewatering system to attendees at the 2015 WWETT Show. The system rotates once every two hours, dewatering 18,000 to 25,000 gallons at a time.



PHOTO BY CRAIG MANDLI

Faster Drying

A SLOW-ROTATING DRUM IN A HORIZONTAL BIOSOLIDS DEWATERING SYSTEM PROMISES CONSISTENT, HIGH-QUALITY RESULTS

By Craig Mandli

James Penner asks professionals to think outside the box about dewatering. His invention, the horizontal biosolids dewatering system from In The Round Dewatering, was on display at the 2015 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show in February. He believes it is the next evolution in roll-off dewatering boxes.

"This unit will speed up the dewatering process and give you a more uniform, consistent result," says Penner. "We think it is a great fit across several industries, including septage and municipal dewatering. We are even testing it right now on frac and tailings waste from mining areas."

The unit's stainless steel drum with perforated plastic tile lining is mounted on a roll-off frame. Water trays contain 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.

"As the water drains, the unit rotates one complete turn every two hours," says Penner. "Typically you let the unit run overnight and by morning you have dry material ready for disposal or transport. Then you fill it back up and do it all over again. It's very energy efficient, so you just fill it up and let it go."

The unit is 90 inches wide by 20 feet long. It has a stainless steel drum, powder-coated frame and plastic filter tiles. Tie-down straps are included. The unit can typically be filled in 1 1/2 to 2 1/2 hours. Dewatered biosolids

typically contain 18 to 24 percent solids, septage 28 to 40 percent, and grease trap waste in between those levels.

Penner is still beta testing the unit on frac wastewater and tailings but is encouraged by the results so far. Dryness is greatly affected by the exact conditions and polymer

used. Each load of solids typically weighs 4 to 7 tons.

Penner says the unit's efficiency is getting the attention of companies and municipalities: "We are talking with a lot of private contractors, but with the regulations for land application always changing, a lot of cities are looking at ways to create more uniform biosolids. A lot of municipal operators at WWETT were interested in demonstrations. This is great for them because it eliminates drying beds, saving time and space."

Penner looks forward to attending the WWETT Show every year for the diverse audience: "It not only fits the septic guy, but also the municipal operators and gas and oil crowd. I get more follow-up contacts from this show than any place else I go. These people are very knowledgeable of the industry, and they know what works and what doesn't. That's why I'm always excited to get here." 317/539-7304; www.itrdewatering.com. tpo

“... with the regulations for land application always changing, a lot of cities are looking at ways to create more uniform biosolids.”

JAMES PENNER

wwett
Water & Wastewater Equipment,
Treatment & Transport Show
www.wwettshow.com
Education Day: Feb. 17, 2016
Exhibits: Feb. 18-20, 2016
Indiana Convention Center, Indianapolis

people/awards

David Mutombo joined Hatch Mott MacDonald's Water and Wastewater Practices consulting engineering firm in the company's office in Burlington, Ontario.

The Encina (California) Wastewater Authority's Encina Water Pollution Control Facility received a Platinum Award from the National Association of Clean Water Agencies.

Bowling Green Municipal Utilities' Wastewater Treatment Plant received an Operational Excellence Award for the fifth consecutive year from the Kentucky/Tennessee Water Environment Association. The plant also received the Control Authority Pretreatment Excellence Award.

Ron Wolf, Bowling Green Municipal Utilities water/wastewater crews superintendent, received the Golden Manhole Award from the Kentucky/Tennessee Water Environment Association for dedication to the wastewater collections field.

The **Greer (South Carolina) Commission of Public Works** received a Peak Performance Gold Award from the National Association of Clean Water Agencies.

The **Clayton County Water Authority's Shoal Creek Water Reclamation Facility** received a Wastewater Plant of the Year award from the Georgia Association of Water Professionals.

The **Immokalee Water and Sewer District** received the 2015 Florida Water and Pollution Control Operators' Outstanding Website Award.

The City of Bloomington, Illinois, named **Robert Yehl** water department director. Yehl has worked for the city since 2013 as assistant city engineer.



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events

Dec. 8-9

North American Water Loss 2015 Conference, Georgia International Convention Center, Atlanta. Visit www.gawp.org/event/NAWL15.

Dec. 8-10

POWER-GEN 2015, Las Vegas Convention Center, Nevada. Visit www.power-gen.com.

Dec. 15-17

National Groundwater Association Groundwater Expo, Las Vegas Convention Center. Visit www.groundwaterexpo.com.

The Ohio Water Environment Association presented **Josh Holton** from the Southwest Licking Water and Sewer District with the P.W.O. Award, honoring front-line workers who contribute practical applications, professionalism and dedication to their wastewater treatment systems. Holton is a Class III operator at the 4.3 mgd Gale Road Environmental Control Facility.

The Long Beach (California) Board of Water Commissioners named **Christopher Garner** general manager of the Long Beach Water Department. He replaces Kevin Wattier, who retired in October after 35 years with the department.

The **Bristol (Tennessee) Regional Wastewater Treatment Plant** was recognized by the Kentucky-Tennessee Chapter of the Water Environment Association for operational excellence during 2014. This is the sixth time the plant has received the award.

TimkenSteel Corp. won gold and silver awards for its water treatment program from the Ohio Environmental Protection Agency for using a new compound that reduces chemical use by 90 percent, saving the company 777,000 pounds of chemicals per year. It also reduces solids by more than 2 million pounds annually and saves \$30,000 per year.

The California Association of Sanitation Agencies presented an Achievement Award for Organizational Excellence to the **San José-Santa Clara Regional Wastewater Facility** capital improvement program for managerial excellence during startup and validation of a \$1.5 billion, 10-year program, the first part of a \$2.1 billion improvement plan over a 30-year period.

The San Francisco Bay Regional Water Quality Control Board presented the **Central Contra Costa Sanitary District** with the WuHoo! Award, in memory of former board employee Dr. Teng-chung Wu, an early advocate for pollution prevention. The award recognizes the district's leadership in public education about problems caused by flushable wipes.

The American Society of Civil Engineers San Luis Obispo Section recognized the **City of Paso Robles** wastewater treatment plant upgrade as its Project of the Year. The new treatment process will serve the city for 30 to 40 years and enable future production of high-quality recycled water. The \$47 million upgrade is the largest infrastructure project in the city's history.

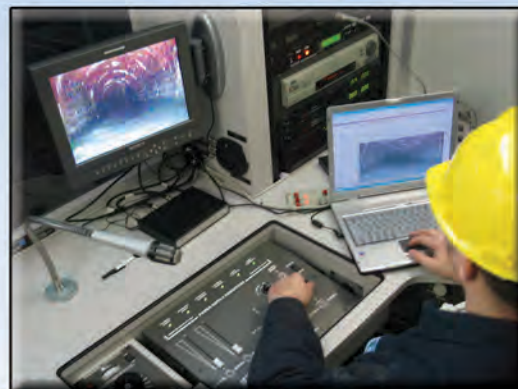
Jim Maynes was appointed superintendent of the new wastewater treatment plant in Sioux City, Iowa.

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