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Be Right™

On Cutting Corners

In the workplace, wrong is wrong and needs to be made right as soon as possible (“When a Colleague Cuts a Corner,” *TPO*, November 2015).

Policies, rules and regulations are there for a reason. I frequently encounter a situation where sampling techniques start differing because someone decides to make a change on their own. It may be modifying the sample location. It may be shortening the prescribed flushing interval or volume. It may mean using any old sample bottle. Either way, results become inconsistent from the actual process conditions or from sample to sample.

Many of these types of issues do not even involve personal safety, public welfare or even permit compliance if the samples are strictly for process control. It could involve less than optimal efficiency, which translates to cost. A bad sample or reading could result in additional cost if it is a factor in the design of facility upgrades or improvements. I have witnessed this one and struggled with operation of a facility that was overbuilt due to one bad number.

Issues involving regulatory compliance are covered by our training and eventual certification as operators. Nowhere in the training I have received has it been conveyed that regulatory requirements are open to modification as someone sees fit. The idea that the rules can be circumvented late on a Friday before a planned vacation is not mentioned in the plant permit. If we want to be considered professionals, we must act professionally.

Safety is everyone’s responsibility. Violations, whether major or minor, need to be rectified. If the violator is a subordinate or peer, I think a direct conversation about the issue is warranted. If the violator is higher ranking, then reporting to a higher authority, even if anonymously, should be the course of action.

I have been in this industry for over 30 years, the vast majority in a supervisory capacity. I have been around many mishaps during that time. From inadvertent hypodermic needle sticks, to hands caught between belts and pulleys when equipment starts automatically, to fatalities (note the plurality of that last one).





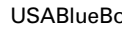

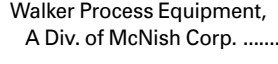
All of these instances have in common a protection program in place that was not followed. I carry the burden of questioning my own actions in the cases where I was in responsible charge. What could I have done differently to convey the importance of the appropriate safety procedures? How could I have better described the imminent danger? I cannot imagine the guilt of having a serious accident happen that involved my inaction.

I spend a significant amount of training time on chlorine safety. My experience has been that chlorine incidents generally involve either an employee who is inexperienced, or a very seasoned veteran. Inexperience, while not a justification, is at least, understandable. Experienced veterans though, are subject to complacency, cutting a corner. Guess what you have now when a seasoned veteran is charged with training a new employee. What you do not have is assurance that everything the newbie needs to know is properly conveyed.

**Vick Pedregon, Plant Superintendent
Fred Hervey Water Reclamation Plant
El Paso, Texas**

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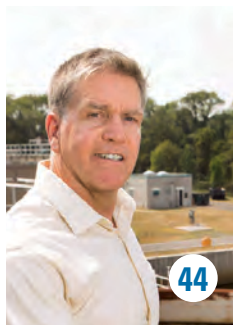


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on the cover

The Eustis (Florida) Wastewater Treatment Plant uses step-feed biological nutrient removal (BNR) and tertiary filtration to create effluent that is 100 percent reused for irrigation and plant processes. Team members including Sophia Swoboda, lab manager, keep the facility running right. (Photography by Roberto Gonzalez)

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Where There's a Will ...

Operators and political leaders team up to win full state funding for badly needed wastewater and drinking water infrastructure upgrades in Tallulah, Louisiana.

By Ted J. Rulseh

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Quality Pays

The Dyno Dirt program in Denton, Texas, creates high-value compost, soil and mulch products that have generated millions in revenue.

By Jim Force

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Rapid Renewal

A new water plant, a private partner and a devoted staff help a New Jersey township deliver exceptional water and earn industry recognition.

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Step by Step

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Tourist Attraction? Yes, Indeed.

The Jones Island Water Reclamation Facility has logged more than 20,000 visitors in Historic Milwaukee's Door Open program and other public events.

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4 Days of Growth

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By Luke Laggis

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By Doug Day

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By Ted J. Rulseh

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A Manitoba town teamed with Ducks Unlimited on an innovative approach that turned an obsolete lagoon treatment system into a community asset.

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feed system maintains constant chemical injection

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Wastewater Biosolids: Program excellence in North Battleford, Saskatchewan

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» How We Do It: Biosolids stabilization at a Florida district

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» In My Words: A new training center for Kansas utilities

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» Technology Deep Dive: Integrated pump/motor control

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PADDLE ON!

A Kayaking Mission for Clean Water

With each stroke of their kayak paddles and each pedal of their bicycles, Gary and Linda De Kock are raising money for Water for the People. Find out how this extraordinary couple brought awareness to the global need for clean water while contributing more than \$27,000 to the cause.

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SPOOKY SPECTACLE

Zombies and Spooks and Ghouls, Oh My!

Let's face it: It can be difficult to get the public excited about infrastructure and wastewater and water treatment. See how Louisville Water combined a crisp fall night with a few dozen wispy spiderwebs and some bloody zombies to create a spectacular public education event that had the city talking.

[Tpmag.com/featured](#)

OVERHEARD ONLINE

“Perennial attendees agree, the best thing about the show is networking with others in the industry.”

[6 Reasons Why Operators Should Attend the WWETT Show](#)
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SOMBER DAY

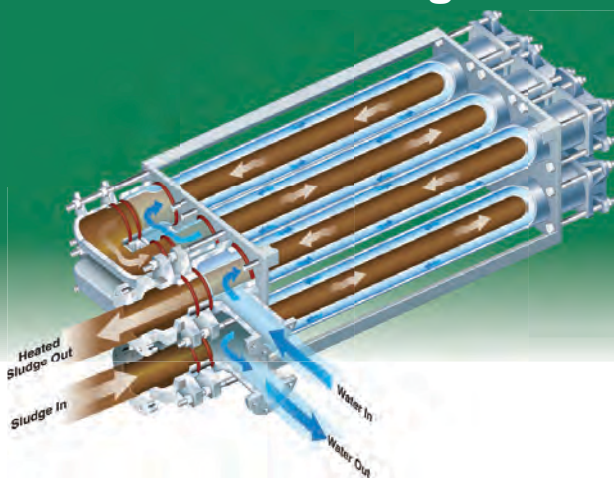
Remembering Baby Doe

When the body of a young girl washed ashore near a Boston wastewater treatment plant, employees were shocked. Find out how the staff at the Deer Island Sewage Treatment Plant tenderly reacted to the tragedy by raising funds for a memorial. “We have a great group of people,” says Ria Convey, the authority’s communications director.

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let's be clear

It's Not That Simple

SEWAGE OVERFLOWS ARE BAD FOR THE NATION'S WATER RESOURCES. PUBLIC AGENCIES NEED TO INVEST IN THEIR PREVENTION. AND YET ...

By Ted J. Rulseh, Editor



One frustrating thing about environmental communication is that the advantage always goes to the simple — or simplistic — argument.

I see this often in the way clean-water agencies get beat over the head about sanitary sewer overflows. Here in Wisconsin, radio talk shows and headline-grabbing political office seekers have regularly thumped on the Milwaukee Metropolitan Sewerage District when a major storm leads to a release of untreated sewage to Lake Michigan.

I'm not suggesting that sewer overflows are just fine and can be ignored. I just don't like the way they get politicized and the way responsible agencies get tarred by the media publicity and the public response.

icized and the way responsible agencies get tarred by the media publicity and the public response.

A COMPLEX ISSUE

At least three things bother me about the way these incidents get treated. First, the news stories and the editorial comments sensationalize the event by reporting, with little or no explanation, the millions of gallons discharged. Rarely is it mentioned that most of what overflowed was essentially rainwater.

If it had rained twice as much, presumably that would have doubled the volume that overflowed, yet the amount of actual waste discharged would have been about the same. Or to think of it differently, if you took a nearly empty bottle of whiskey and filled it with water, then drank it, would you have consumed a fifth of liquor? The intent here is not to trivialize overflows but to add perspective.

Second, the wastewater agencies get the blame, as in "The XYZ Sanitary District has again discharged millions of gallons ..." In a sense the district is in fact responsible, because it is the party charged with protecting the waterways. But in another sense the district gets blamed for the effects of a natural event and for things that happened upstream.

How many residents seeing the news report and shaking their heads with disgust at the district have broken sewer laterals or sump pumps plumbed into their basement drains? In part, the agency gets blamed for the fact of living at the end of the pipe.

Third — and this point is closely related to the second — the blame game ignores the facts of how major wastewater treatment systems are designed.

MAKING COMPROMISES

Major new wastewater systems are built because old systems are undersized or in bad repair. In addition, in many cases the city was built with combined sewers that must be separated. However, these new systems are never designed to accommodate the effects of any storm that can be imagined — that would be horrendously expensive.

Instead, systems are built after a careful analysis of costs and benefits, and with the realization that overflows will likely occur after the most severe rainstorms. Typically, this point is forgotten once the systems become operational. Any bypassing then creates a hue and cry, and the clean-water agency gets vilified.

This has happened and still happens in Milwaukee's case. I used to live in a community on Lake Michigan about 90 miles north of the city. Almost anytime we had a blue-green algae die-off on the shoreline or a health warning because of high *E. coli* at the beaches, I heard someone blame Milwaukee.

I sometimes gently tried to get the person to take a broader view. From those experiences, I learned that it's a whole lot harder to convey what I've described above than to shout "millions of gallons of raw sewage." People would rather decry a public agency's supposed incompetence than contemplate the full scope of the issue.

PUT IT IN CONTEXT

Is all this just a fact of life? Maybe, but the trouble is that agency-bashing tends to poison the atmosphere when it's time

How many residents seeing the news report of sewer overflows and shaking their heads with disgust at the district have broken sewer laterals or sump pumps plumbed into their basement drains?

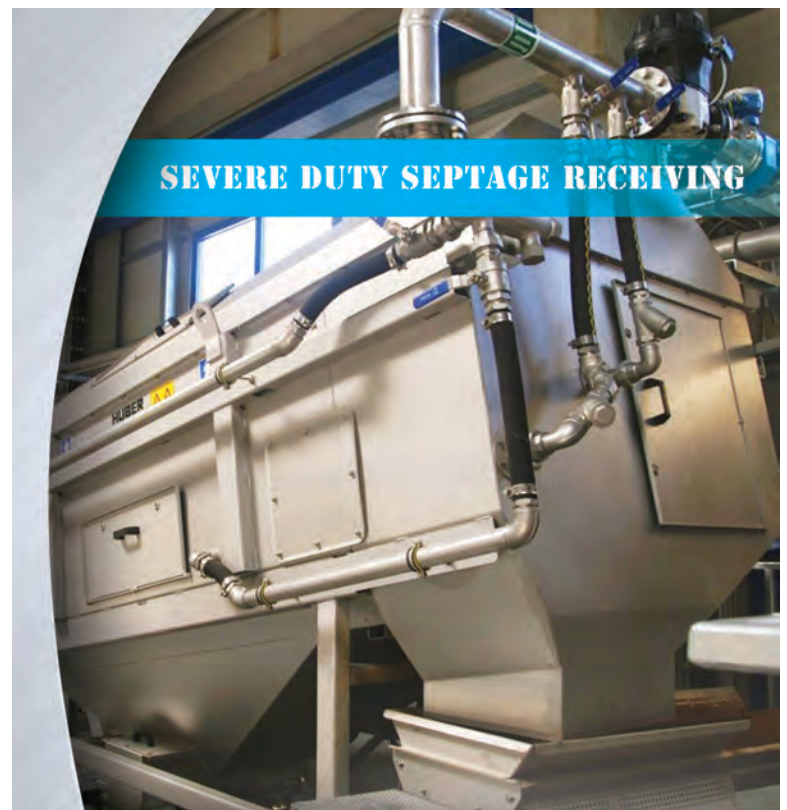
to make important decisions about maintaining and rebuilding infrastructure. It's tough for an agency that has been defamed as an inept polluter to get support for a raise in rates to pay for an infrastructure project.

I guess the only answer is for clean-water agencies to talk — relentlessly — about the good they do, so that when adverse events happen, they are seen in context. Some years ago a page headline on the Milwaukee Metropolitan Sewerage District website read, "Without the deep tunnel, 61.3 billion gallons of wastewater would have overflowed into Lake Michigan since 1994."

They didn't say it was highly diluted wastewater, but I guess sauce for the goose is sauce for the gander. So here's a (highly diluted) toast to the district and its communications staff. Cheers! **tpo**

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THE DYNO DIRT PROGRAM IN DENTON, TEXAS, CREATES HIGH-VALUE COMPOST, SOIL AND MULCH PRODUCTS THAT HAVE GENERATED MILLIONS IN REVENUE

STORY: **Jim Force** | PHOTOGRAPHY: **Olivia Ogren-Hrejsa**



Heavy-equipment operators move material around the Pecan Creek treatment plant compost facility, which contains windrows, finishing piles, screener piles and product inventory piles. INSET: A Dyno Dirt product sample.

IT'S A COMMON PROBLEM: TOO MUCH BIOSOLIDS volume, not enough storage space, and landfill costs becoming prohibitive.

The team in Denton, Texas, 30 miles north of Dallas, solved the problem with an innovative biosolids recycling program that produces compost, soil blend and a variety of mulches. Besides biosolids from the city's wastewater treatment plant, the composting operation diverts yard waste and clean construction lumber from the landfill.

The program is branded Dyno Dirt and, according to Gayla Wright, beneficial reuse manager, the name doesn't refer to prehistoric creatures or comic

book heroes: "It's taken from the city slogan, Dynamic Denton. We thought the name would tie in with the slogan and be memorable, as well."

It has worked, but not just because of the name. Early in the development of the Dyno Dirt products, Denton's beneficial reuse staff listened to customers and came up with a range of products to meet their needs:

- Dyno Dirt, a nutrient-rich compost made from biosolids and ground yard waste
- Dyno Soil, a mixture of compost with sandy soil
- Dyno Landscape Mulch, containing 20 percent Dyno Dirt and 80 percent wood chips
- Dyno Lite composted yard waste
- Dyno Double Grind, a wood mulch made from recycled construction lumber
- Dyno Deco-Colored Mulch, a variety of mulches made from construction lumber and available in brick red, brown, black and cedar

AMPLE EXPERIENCE

Area residents and professionals have used Dyno Dirt products since 1997 for applications including landscape planting and mulching, lawn establishment and maintenance, flower gardens, nursery crop and greenhouse production, and turf and sod production. The products meet all requirements of the Texas Commission on Environmental Quality (TCEQ) for uncontrolled use as a soil conditioner and organic fertilizer.

Wright started at the treatment plant as an administrative assistant in 1992 and was involved in the development of the Dyno product line right from the start. Back then, the biosolids were land-injected and the brush and lumber were landfilled. "We would eventually need to purchase more land for biosolids injection, and the wet weather made it difficult to land-inject in the fields," Wright says.

Research on other ways to manage the biosolids and yard waste began in 1991. The city staff investigated a number of processes and performed some demonstration projects to evaluate their feasibility. The staff chose composting to create a beneficial product. "In 1994 we started giving the compost away to city departments, and in 1997 we began marketing the compost to the public," Wright says.

“In 1994 we started giving the compost away to city departments, and in 1997 we began marketing the compost to the public.”

GAYLA WRIGHT



Dyno Dirt program, Pecan Creek Water Reclamation Plant, Denton, Texas

FOUNDED: | 1994

POPULATION SERVED: | 123,000

PLANT FLOWS: | 21 mgd design, 15 mgd average

BIOSOLIDS PROCESS: | Anaerobic digestion, composting

BIOSOLIDS VOLUME: | 3,500 dry tons per year

BIOSOLIDS USE: | Dyno Dirt composting products

WEBSITE: | www.cityofdenton.com/dyno

GPS COORDINATES: | Latitude: 33°11'42.43" N; longitude: 97°5'4.69" W





Pecan Creek Dyno Dirt team members include, front row, from left: Monica Benavides, administrative assistant; Gayla Wright, manager; Janice Ross, customer service representative; and Calvin Patterson, heavy-equipment operator; middle row: Kevin Marshall and Brian Rushing, heavy-equipment operators; and Darrell Baker, field service supervisor; back row: Billy Downey, crew leader.



Brian Rushing records the temperature of a compost windrows and logs measurements into his tablet.

QUALITY PROCESS

At the 21 mgd (design) Pecan Creek Water Reclamation Plant, biosolids are anaerobically digested, thickened with polymer, dewatered to cake on a belt press and pumped into a holding bin. Front-end loaders empty the bin and transport the biosolids to an on-site composting area. Wright estimates biosolids production at 3,500 dry tons per year.

The city solid-waste department collects residential yard wastes at curbside; residents and landscapers can also bring clean brush and lumber to Denton's compost facility. The wood waste is ground by an outside contractor and used in a variety of recycled products. McCloskey screens are used for both compost and mulch.

The Dyno Dirt compost process follows TCEQ and EPA regulations. The ground wood material is first placed in windrows 400 feet long, 18 feet wide and 5 feet tall. An operator then makes a concave V-shape down the middle of each row. Bio-

solids are then picked up with the loader (Volvo) and placed in the V of the windrow at three parts wood to one part biosolids, then covered with the ground material. The biosolids provide the moisture and nitrogen needed to create the heating process.

After the windrow is complete, the operator turns the row once using an 18-foot Scarab International windrow turner. One-half cubic yard of Harvest Quest inoculant (Ecoverse) is added to each end of the windrow, and then the entire windrow is capped using unscreened compost. The inoculant works its way into the pile and reduces the frequency with which the pile must be turned.

Temperatures are taken the next morning throughout the windrow. When the temperature reaches 131 degrees F (55 degrees C), the pathogen-reduction process has begun. The windrow stays at or above that temperature for 28 days and is turned once more after that. If needed, moisture is added using a water truck.

After the windrow completes the 28-day cycle, the material is hauled to a curing area where it sits in a static pile until it is ready to be passed through a 3/8-inch screener and turned into marketable products.

Seven full-time employees staff the reuse facility: Darrell Baker, field service supervisor; Billy Downey, crew leader; Brian Rushing, Kevin Marshall and Calvin Patterson, heavy-equipment operators; Janice Ross, customer service representative; and Monica Benavides, administrative assistant.

IT'S ABOUT MARKETING

Homeowners and other customers can pick up Dyno Dirt and the other materials at Denton's Beneficial Reuse Compost Facility from 7 a.m. to 3 p.m., Tuesday through Saturday. Dyno Dirt costs \$25 per cubic yard (quantity discounts are available). The material is also sold in 1-cubic-foot bags at a local farm store and a building products outlet.

It's one thing to make useful products out of bio-

solids; it's another to successfully get them out the door. The answer is marketing. Wright pulls out all the stops. Dyno Dirt is featured in advertising and news coverage in the local media, in brochures, and even in commercials at the local movie theater and cable TV outlets.

Social media buffs learn about Dyno Dirt on YouTube. Promotional items such as trowels, T-shirts, pens and pencils promote the products. Wright and her staff exhibit Dyno products at festivals and events. Each year, special mailings go out to groups like the Texas Nursery and Landscape Association. Property owners receive Dyno Dirt flyers in their electric bills.

It's a far cry from the beginning, when Dyno Dirt was promoted by word-of-mouth from satisfied customers. But partnerships with customer groups are still an important part of the "sell." Wright lists the local solid-waste department, parks and recreation departments, watershed protection groups, and environmental and community beautification organizations as special people her staff interacts with regularly. *(continued)*



Compost facility product samples at sales area.

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LESSONS LEARNED

With more than 20 years' experience making and marketing biosolids products, Denton has learned a lot. Many lessons have to do with the compost curing piles and temperatures. "Back in the day, we didn't have as much room as we have now, and the compost curing piles were piled up too high," says Wright. "That caused them to on occasion catch fire."

Now the rule is to limit the height of the piles and to keep breaks in the piles so that operators can get to them easily if need be. Every Friday, workers take the temperature of the piles and try to identify any hot spots.

Denton has learned a thing or two about odors, as well. In February 2015, the beneficial reuse facility staff began using the Harvest Quest inoculant, which reduces turning and potential odor emissions. Piles are turned twice

in 28 days, versus five times in 15 days before the inoculant was used.

"Quality control is crucial," Wright says. "Removing plastics and other contaminants from the yard waste is essential in creating a clean product."

That brings up a point Wright makes over and over: "Listen to your customers. They will tell you what they want and whether there is a problem. We listen to them."

Diversity in the customer base is another lesson. In a webinar sponsored by the Water Environment

“Quality control is crucial. Removing plastics and other contaminants from the yard waste is essential in creating a clean product.”

GAYLA WRIGHT

Federation a few months ago, Wright listed her many customer groups: homeowners, landscape contractors, commercial nurseries, home builders and developers, commercial gardens, the local school district, the Texas Department of Transportation, city departments such as parks and recreation, garden clubs, and other municipalities.

BOTTOM LINE

The Dyno Dirt program has generated significant revenue. "In our first year, we netted \$19,000," Wright says. "Since inception, we've had over \$6 million in sales."

In 2013-14, she reports over 43,000 cubic yards of marketable products were produced from biosolids and yard waste. While the production and sales statistics are impressive, Wright is just as proud of the amount of mate-



Gayla Wright, manager of Dyno Dirt operations, is proud of the amount of material recycled over the last 18 years.

rial recycled: "Over the past 18 years, we've diverted over 1.1 million cubic yards of waste materials from the landfill."

Pretty dynamic. **tpo**

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Kevin Marshall loads material from the finishing piles into the screener (McCloskey International).

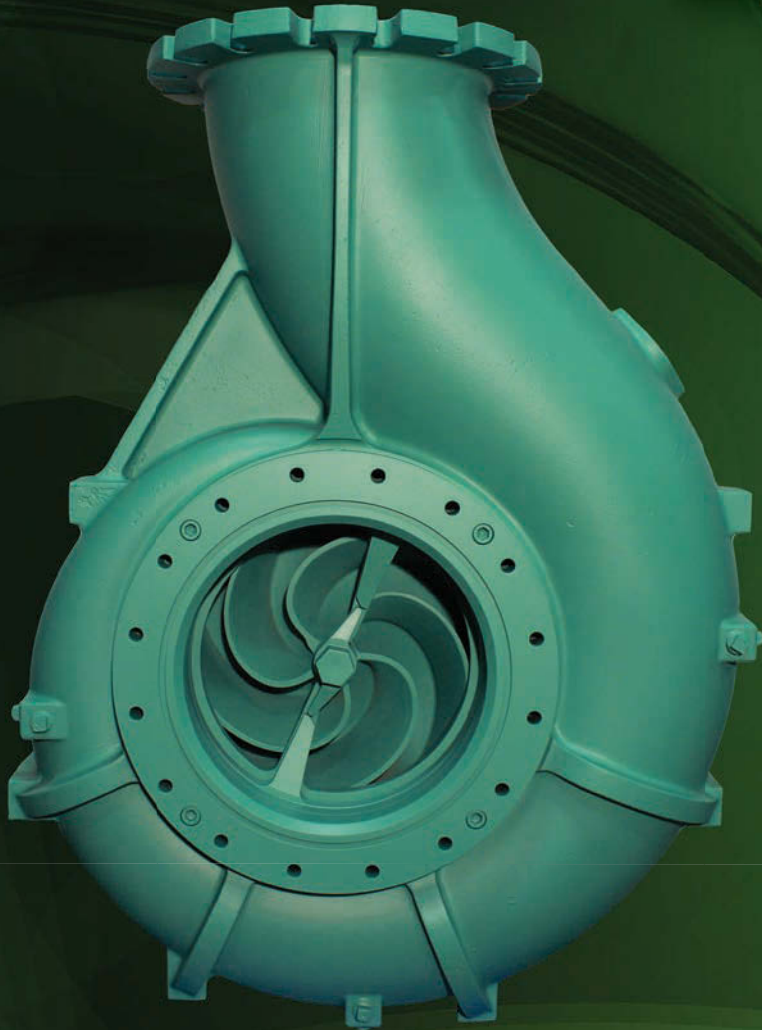
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PHOTOS COURTESY OF VEOLIA NORTH AMERICA

The Jones Island plant on the shore of Lake Michigan provides a key stop for Doors Open Milwaukee tours. Visitors learn the importance of wastewater treatment.

Tourist Attraction? Yes, Indeed.

THE JONES ISLAND WATER RECLAMATION FACILITY HAS LOGGED MORE THAN 20,000 VISITORS IN HISTORIC MILWAUKEE'S DOORS OPEN PROGRAM AND OTHER PUBLIC EVENTS

By Craig Mandli

In Milwaukee, you can explore motorcycle history at the Harley-Davidson Museum. And catch a ball game at Miller Park. And then tour one of the city's wastewater treatment plants. Seriously!

The city's Jones Island Water Reclamation Facility is creeping up the tripadvisor.com rankings as more people learn about its historic significance and the roles it plays daily in protecting the health and environment in Wisconsin's largest city.

The plant hit the milestone of hosting 20,000 visitors during a recent annual tour that offers a close-up view of the wastewater treatment process. "I think part of the allure is that you are seeing a process that is typically behind closed doors," says Joyce Harms, community relations manager with Veolia Water Milwaukee, which operates and maintains the plant under contract with the Milwaukee Metropolitan Sewerage District.

"That mysterious context, combined with a high level of stewardship toward Lake Michigan from the people of this area, brings people out and has them asking questions."

“I think part of the allure is that you are seeing a process that is typically behind closed doors.”

JOYCE HARMS

A DAY OF EDUCATION

During Historic Milwaukee's Doors Open tour on Sept. 22, more than 2,100 visitors walked through the reclamation facility, which has been in operation since 1926 and was designated a National Historic Civil Engineering Landmark in 1974 by the American Society of Civil Engineers.

"The tour program at Jones Island is certainly the cornerstone of our outreach," says Harms. "The annual Doors Open event is a great way to showcase our high standards for water reclamation. It is a lot of work for our staff but also one of our favorite days of the year, because it lets visitors see just how important the facility is while learning something about modern wastewater treatment."

The plant, on the shore of Lake Michigan, presents a unique backdrop for the Doors Open program and for the many visitors who have toured the facility over the years. The site was previously home to a small, ramshackle village for commercial fishermen, and many Milwaukee residents can trace their lineage to those who lived or worked on the island.

SITE OF INNOVATIONS

"A century ago, fishing was a huge part of the city's economy," says Harms. "Milwaukee has always been a city built around the water, and Jones Island has always been pretty much in the center of it."

The plant's landmark designation recognizes its innovations. For one thing, Jones Island was one of the first facilities in the world to produce a marketable fertilizer — named Milorganite — from wastewater treatment solids. Says Harms, "This facility has been on the cutting edge of some pretty major advances within the industry. They were green here before it was cool."

Last year, facility employees and dozens of other volunteers provided two tour options: a 30-minute guided bus tour that hit on the main points of the treatment process and the site's historical significance, and an hour-long hard-hat version that also included a walking tour of the plant and an inside look at the Milorganite process.

Other attractions included a historical exhibit, an electron microscope demonstration, a large machinery display, and a waste-

water-themed maze for younger participants. “The goal was to have an event that appealed to all ages,” says Harms. “The people were excited, and many told us they planned on coming back next year.”

GETTING THE WORD OUT

Doors Open is not the only time Veolia provides tours. Since the company started operating Jones Island seven years ago, more than 20,000 visitors from 22 countries have toured the facility. According to Harms, more than 4,000 people tour it each year now.

“When Veolia came on board, one of our big goals was to help demystify

As part of the hard-hat tour conducted by Veolia and MMSD volunteers, Doors Open visitors viewed the making of Milorganite fertilizer.





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the wastewater treatment side of the water cycle,” says Harms. “In just the few years we’ve participated in the Doors Open event, we’ve seen our visitor numbers grow from 400 the first year to more than 2,000. We’re enthused with the results.”

Besides facility tours, Veolia works with Milwaukee area technical schools and high schools on a career development program that urges students to consider water science as a career path. There’s also a Water Box program for elementary schools that gives teachers a kit of 20 water-themed science experiments that children can easily perform.

“We want young people to know how water touches them throughout their schooling,” says Harms. “We feel that’s why it’s so important to offer programs aimed at different age groups. You never want students to lose sight of the importance of water.”

FEEDING CURIOSITY

That’s why Harms encourages other treatment plants to open their doors. While they may not be typical tourist destinations, treatment facilities often have strong historical backgrounds. “People are curious, so if you

open your doors and let them in, they’ll show up just to scratch that itch,” says Harms.

“The key is to make your program inviting and interesting. If it’s good, more will come. Take pride in what you’re doing and talk about it in a way that a regular person can understand. It’s all about making outreach accessible.” **tpo**



Many Doors Open visitors walked a giant wastewater maze created by a local artist, providing an overview of the treatment process.

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.

Step by Step

UPGRADES AND AUTOMATION KEEP THE PROCESS RUNNING SMOOTHLY AND EFFLUENT IN COMPLIANCE FOR THE OPERATIONS TEAM IN EUSTIS, FLORIDA

STORY: **Ted J. Rulseh**

PHOTOGRAPHY: **Roberto Gonzalez**

Operator Michael Brundage measures a clarifier sludge blanket.

“Through the years, I’ve tried to give operators ownership of their process. Once we instill the knowledge they need to control the plant, I let them do their job. ... Having ownership gives them pride in their work.”

RICK HOUBEN



THE EUSTIS WASTEWATER TREATMENT PLANT WENT ONLINE IN 1959 WITH A 1.0 mgd trickling filter process. Fifty-seven years later, it's a 2.4 mgd facility with sophisticated step-feed biological nutrient removal (BNR) and tertiary filtration; 100 percent of the effluent is reused for irrigation and plant processes.

Periodic upgrades have kept this central Florida plant in step with increasingly strict permit requirements. The latest upgrade in 2012 established the BNR process, controlled with advanced automation and overseen by an experienced and thoroughly trained staff of 18.

"During the upgrade we did an entire retrofit of our SCADA system and lift station monitoring," says Rick Houben, utility supervisor. "The SCADA system now can do plant monitoring, alarm notifications and process control. It also provides notification of alarms to our standby staff by text message, enabling quicker response."

The plant received a 2013 Domestic Wastewater Operations Excellence Award from the Florida Department of Environmental Protection (DEP) for outstanding operation, maintenance and compliance. It also won the 2015 Earle B. Phelps Award from the Florida Water Environment Association for outstanding performance and professionalism.

MAINTAINING STABILITY

Eustis is an inland lake community of 23,500 about one hour north of Orlando. The treatment plant's flow is residential except for contributions from a vegetable processor and local restaurants.

Eustis (Florida) Wastewater Treatment Plant



BUILT: | **1959, latest upgrade 2012**

POPULATION SERVED: | **23,500**

EMPLOYEES: | **18**

FLOWS: | **2.4 mgd design, 1.07 mgd average**

TREATMENT LEVEL: | **Tertiary**

TREATMENT PROCESS: | **Step-feed biological nutrient removal, cloth media filtration**

RECEIVING WATER: | **100 percent reuse (irrigation)**

BIOSOLIDS: | **Dewatered, taken to contractor for beneficial use**

ANNUAL BUDGET: | **\$1.6 million (operations)**

WEBSITE: | **www.eustis.org**

GPS COORDINATES: | **Latitude: 28°51'31.64" N;
Longitude: 81°40'35.15" W**



The Eustis plant's step-feed biological nutrient removal process went online in 2012. Tertiary filtration polishes the effluent for distribution through a reuse system that serves golf courses, parks, sports fields and residential landscapes.

The original trickling filter plant was expanded in 1970 to its current 2.4 mgd design capacity to accommodate growth. As permit requirements tightened, it was converted in 2000 to an extended aeration process. "That process used a series of surface aerators that were troublesome to maintain," says Houben. "We were unable to nitrify, and no denitrification system was in place to denitrify. The tertiary filters did not have the necessary modes to have a denitrification system installed."

In 2012, the step-feed BNR process went online. Existing tanks were retrofitted for that purpose, and the surface aerators were replaced with turbine blowers and a fine-bubble diffusion system for aeration, nitrification and ammonia conversion. Tertiary filtration polishes the



**Eustis (Florida) Wastewater Treatment Plant
PERMIT AND PERFORMANCE**

	INFLUENT	EFFLUENT	PERMIT
BOD	221 mg/L	1.8 mg/L	20 mg/L
TSS	260 mg/L	1.0 mg/L	20 mg/L
Total nitrogen	N/A	4.5 mg/L	10 mg/L
Total phosphorus	N/A	2.0 mg/L	Monitor only
Fecal coliform	N/A	< 1 CFU/100 mL	25 CFU/100 mL

The Eustis Wastewater Treatment Plant team includes, front row, from left: Bill Johnston, superintendent; and Rick Houben, utility supervisor; second row: Herb McNealy, utility worker III; and Walt Linton, utility foreman; third row: Sophia Swoboda, lab manager; Jim Eaton, utility worker II; and Keith Leflore, environmental compliance inspector; back row: Michael Brundage, operator B; Jerry Johnston, operator B; Cory Savage, operator C; J.D. Styles, operator C; Luther Bodie, lift station operator; Vicky McGhee, administrative assistant; and Dan DeLeon, lead operator.

effluent for distribution through a reuse system that serves golf courses, parks, sports fields and residential landscapes. Relatively consistent influent and extensive automation help keep the process highly stable, ensuring consistent effluent quality.

CONTROLLING QUALITY

Forty-three lift stations deliver wastewater to the plant’s master pump station, equipped with four 30 hp submersible pumps (Flygt - a Xylem Brand). Pump speed is controlled with variable-frequency drives (VFDs) to keep the flow balanced through the plant. “One reason that is so critical is that we use our influent flowmeter to stabilize and adjust all our chemical feed rates, internal recycle pump rates and sludge return rates,” says Houben. “The more even we can keep the flow, the better our process performs.”

Preliminary treatment consists of bar screens (Parkson Corp.), a cyclone de-gritter (Ovivo) and an auger (WesTech Engineering) that removes the grit for disposal. The secondary process is split into a 1.4 mgd Phase 1 and a 1.0 mgd Phase 2. At present, only Phase 1 operates as it readily handles the 1.07 mgd daily average flow. “However, we can easily divert flow to Phase 2 when

required, as it has sectioned common wall construction,” Houben says.

In the BNR process, air is delivered by four VFD-equipped Aerzen TB turbo blowers through more than 700 fine-bubble diffusers (Aquarius Technologies). Inline sensors (Hach) communicate with the blowers by way of the SCADA system to keep dissolved oxygen and ORP at optimum levels. The DO ranges are maintained at less than 0.4 mg/L in the anoxic basins and 2.0 mg/L in the aerobic basins. The ORP is maintained at -100 mV to +100 mV in the anoxic basins and greater than +100 mV in the aerobic basins.

After the secondary clarifiers (Ovivo), the water travels to four AquaDisk cloth media filters (Aqua-Aerobic Systems). “TSS and turbidity are analyzed before chlorination,” says Houben. “We have standardized with Hach analyzers for these and for chlorine residual measurement.” The reuse water is then highly disinfected using bleach (Odyssey Manufacturing) in two chlorine contact chambers to ensure that disinfection reaches the farthest residential user.

Waste activated sludge from the clarifiers (about 25,000 gpd) is pumped to two aerobic digesters and then to a belt press (Alfa Laval Ashbrook Simon-

“The SCADA system now can do plant monitoring, alarm notifications and process control. It also provides notification of alarms to our standby staff by text message, enabling quicker response.”

RICK HOUBEN

Hartley) that dewater the biosolids to 14 to 16 percent solids. That material is trucked in 30-cubic-yard trailers to a contractor for composting and other beneficial uses.

THE STEP-FEED PROCESS

The Eustis plant's step-feed process responds to a total nitrogen permit limit of 10 mg/L. Wastewater alternates between anoxic and oxic zones. Low-speed mixers (WILO USA) are installed where the former aeration basins were converted to anoxic basins.

Internal recycle pumps (dry-pit submersibles, WILO USA) were added to recirculate highly nitrified mixed liquor back to the anoxic tanks at a flow ratio of 2-to-1 (recycle-to-influent) for denitrification and to stabilize metabolic rates. A swing zone between the aeration basins further denitrifies the mixed liquor. The recycle rate is regulated automatically based on the influent flowmeter reading.

“It's the same thing with the return activated sludge (RAS) coming from our clarifiers,” says Houben. “We use the same type of dry-pit submersible pumps for our activated sludge, which we return at a 1-1 ratio to the influent flow rate, based on the influent flowmeter output.”

“We added VFDs to the internal recycle pumps and the RAS pumps to enhance functionality and to meet the return flow ratios required for denitrification and biological processes. The combination of the new pumps, turbo blowers and VFDs has reduced our overall electrical consumption by about 30 percent per year. It has also improved our effluent quality to far below permit requirements for nutrients, CBOD and TSS.

“An added benefit from updating our process is that the waste sludge is much more concentrated. The mixed liquor suspended solids inventory operates at 4,000 mg/L, rather than the 2,000 mg/L range we used when operating an extended aeration plant. That has increased the waste activated sludge concentration introduced to the digesters to 8,000 to 9,000 mg/L.

“As a result, we enhanced dewatering capabilities on the belt press, reducing our polymer consumption by 50 to 60 percent. In the past, we used two

Water in the Eustis facility, from influent to final effluent.



DELIVERING THE WATER

The City of Eustis, Florida, operates an extensive distribution system for tertiary-treated effluent from its wastewater treatment plant. Initially, reuse water supplied irrigation for golf courses, and excess effluent was applied to a 264-acre sprayfield.

Effluent was delivered to lined receiving ponds. “For golf course irrigation, the water really didn't have to be as high in quality,” says Rick Houben, utility supervisor. “But an open pond allowed a lot of contaminants to degrade the water quality.”

As irrigation expanded to include residential properties, it became more important to protect the reuse water. Two years ago, the city installed a 2-million-gallon inground storage tank about 1.5 miles from the treatment plant to replace the ponds. Now all the reuse water first goes there, except for what treatment plant personnel use on site.

From that point, a system of distribution pumps and hydro-pneumatic tanks maintains pressure to serve nearby ball fields and residential neighborhoods. A second storage tank holding 1/2 million gallons serves homes and golf courses farther from the treatment plant.

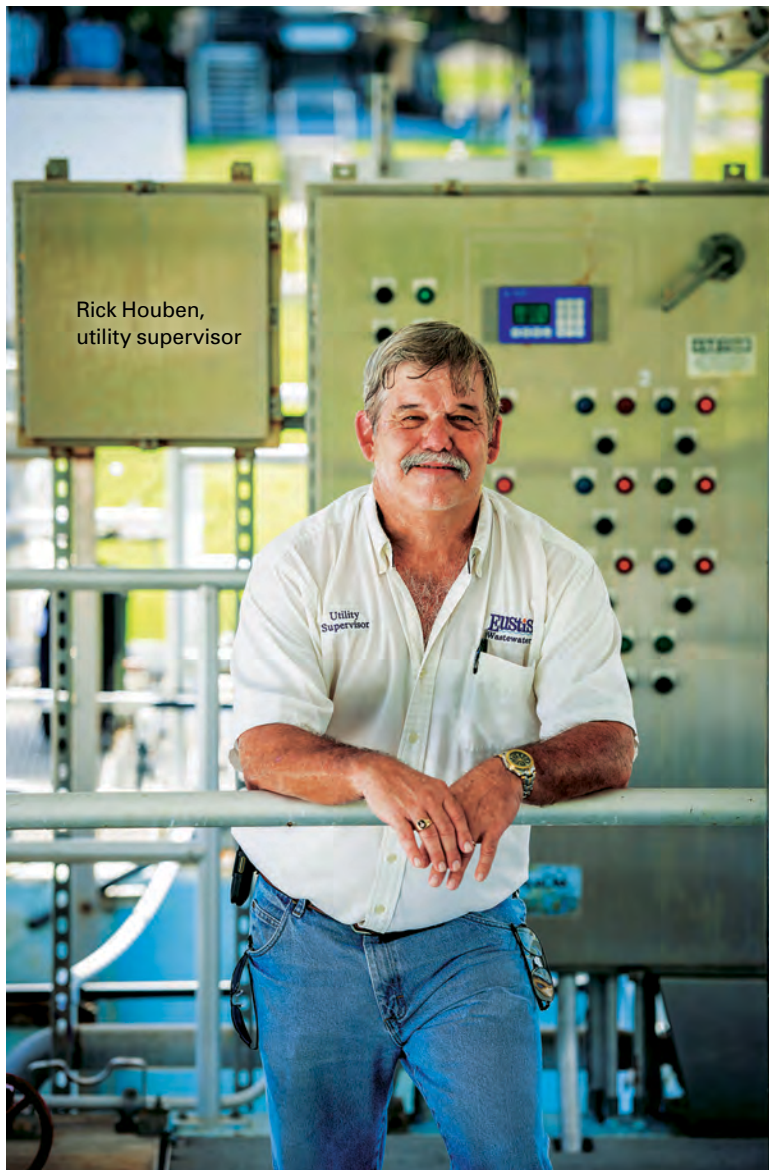
“We keep the effluent chlorine residual relatively high, at about 5 ppm, to eliminate any possibility of pathogens,” Houben says. “Because our system extends close to 10 miles, we need to ensure that our residential users have adequate residual chlorine at the point of use.” The effluent residuals are measured by Hach CL17s chlorine analyzers.

From the chlorine contact chambers, an effluent pumping station with four Deming vertical turbine pumps (Crane Pumps & Systems) sends the reuse water into the distribution system.

A side benefit of increased reuse water demand is reduction in the size of the sprayfield, notes Bill Johnston, treatment plant superintendent. “We've just started leasing 200 acres of the sprayfield for cattle grazing,” he says. “It was a large area that had to be mowed, and that cost a lot of money. Now we're getting paid for use of the land, and it's being grazed for us.” Revenue amounts to \$15,000 a year, on top of \$20,000 savings on mowing expenses.

Operator Jerry Johnston calibrates the plant's dissolved oxygen analyzer (YSI, a xylem brand).





Rick Houben,
utility supervisor

to three 55-gallon drums of polymer per month, at a cost of about \$560 per drum. Now we use about half a drum per month for a monthly savings of about \$1,000.”

Dan DeLeon, lead operator, notes that the process includes a backup carbon source feed system, which to date has not been used.

MAKING THE TRANSITION

A key to adapting to the step-feed process was training the team. “Most of the operators at the time were new and had never run a facility before,” says Houben. “Training them up from extended aeration to a more advanced process and getting them comfortable with the new equipment and process controls was a pretty good challenge. They have adapted well, and they’re progressing readily on their advanced certifications.”

Senior personnel, notably DeLeon, laboratory manager Sophia Swoboda and utility foreman Walt Linton, led the in-house training and worked side by side with the newer people while they mastered the processes. The city also sent operators to training classes offered by the University of Florida’s TREEO Center, the Florida Water and Pollution Control Operators Association, and the Florida Rural Water Association.

The plant’s automated systems helped the team adjust quickly. The new SCADA system uses Evolution iFix 32 software (GE Intelligent Platforms). “Technically, we are supposed to be staffed 16 hours every day, but because of our SCADA controls, the DEP granted a variance to be staffed one shift per day, seven days a week,” Houben says. “The plant is monitored by SCADA

from beginning to end. We have a SCADA room where the operators can monitor the process, and we do two physical walk-throughs per day.”

A Sci-Text system (Sanders Company) monitors the lift stations and other outlying facilities, including the water reuse distribution network. That system automatically sends alarms by text message to operators’ smartphones. They can then dial in to the system for more details about the issue. In addition, supervisors and operators on standby duty have laptop computers that enable them to make equipment and process adjustments remotely.

“We were among the first plants in the state to employ something this unique, whereby we get alarms sent to each individual who is on call as a text message,” says Bill Johnston, plant superintendent. “It has been a big plus for us.”

“The combination of the new pumps, turbo blowers and VFDs has reduced our overall electrical consumption by about 30 percent.”

RICK HOUBEN

Lab analysis also helps keep the process in control. Swoboda heads a nationally accredited lab that performs all analytical functions including chemical and microbiological testing. The lab also analyzes groundwater samples taken from wells around a sprayfield where excess final effluent was applied before demand for reuse water reached 100 percent of supply.

“We follow TNI standards (The National Environmental Laboratory Accreditation Conference Institute) which are based on the ISO 9000 international quality-control manual,” says Swoboda. “The quality-control requirements are substantial. We perform quality-control checks daily, weekly and monthly.”

EFFECTIVE TEAM

Houben credits his staff for the plant’s success. Besides DeLeon, Swoboda, Linton and Johnston, they include:

- Operators: Ray Richardson, Class A; Jerry Johnston and Michael Brundage, Class B; Cory Savage and J.D. Styles, Class C
- Lift stations: Luther Bodie and Pete Cyr, operators; Dana Marshall, mechanic
- Utility: Jim Eaton and Herb McNealy, utility workers
- Laboratory: Kathy McDonald, technician
- Environmental compliance inspector: Keith Leflore
- Administrative assistant: Vicky McGhee

“Through the years, I’ve tried to give operators ownership of their process,” says Houben. “Once we instill the knowledge they need to control the plant, I let them do their job. Even though they may make a slight error, I let them do it so they can learn from it. Having ownership gives them pride in their work.”

The city encourages team members to pursue higher state certifications from Class C (lowest) to Class A. “For each one of those licenses, we increase their pay,” says Houben. “That gives them incentive to increase their knowledge. And eventually as us older guys retire, they’ll have the training and better ability to fill our positions, so that’s another incentive.”

Challenges lie ahead for the team. Johnston notes that a solar biosolids drying process may be in the city’s future. Meanwhile, Houben expects demand for reuse water to exceed supply, which may warrant exploring the addition of stormwater to the reuse system: “That would take some further treatment, but it would give us the possibility of additional supply.”

A stricter total phosphorus limit — possibly 1.0 mg/L — may be in the offing for the next permit, to be issued in 2018. Meeting that likely would mean some form of chemical treatment. Whatever may come, Houben has confidence in his team.

“You don’t have to give them a list of tasks and work orders,” Houben says. “They find the work themselves. They’ll do the job as they see what comes up. We don’t have a mowing crew, but we have acreage that needs mowing.



Herb McNealy tends the plant's belt press (Alfa Laval Ashbrook Simon-Hartley), which delivers biosolids at 14 to 16 percent solids for beneficial use.

The staff has no problem using equipment to maintain the grounds on their own initiative. They'll pressure-clean tanks, do maintenance on equipment, whatever is required. They perform very professionally.” **tpo**

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Hands-on exhibits, educational seminars, Kickoff Parties and an Industry Appreciation Party await attendees at the 2016 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show.



4 Days of Growth

THE 2016 WWETT SHOW PROMISES LEARNING OPPORTUNITIES AND INNOVATIVE EQUIPMENT TO HELP ENHANCE YOUR OWN AND YOUR FACILITY'S PERFORMANCE

By Luke Laggis

Last year, the Water & Wastewater Equipment, Treatment & Transport (WWETT) Show was spilling out of the exhibit hall at the Indiana Convention Center. This year, it's pouring into Lucas Oil Stadium.

The 2016 WWETT Show runs Feb. 17-20 at the Indiana Convention Center. It starts the same as every year, with the industry's best slate of courses on Education Day, Wednesday, Feb. 17. Presenters from the top manufacturers and associations will lead more than 50 classes on a wide range of topics, many of special interest to water and wastewater treatment professionals.

KICKOFF PARTY

When class lets out, the party gets started. Just walk over to Lucas Oil Stadium (it's connected to the convention center) for the WWETT Show Kickoff Party. Check out the exhibitor sponsor displays and enjoy a cold beverage and complimentary hors d'oeuvres while networking with exhibitors and peers.

"One of the main requests we receive from attendees year in and year out is for more networking opportunities," says Brad Bisnette, show coordinator. "The Kickoff Party presents this opportunity in a unique, convenient and exciting atmosphere."

On Thursday the exhibit hall opens. Every year, products introduced at the show become important components in professionals' toolboxes and equipment fleets. More than 9,400 people representing 4,200 companies and 54 countries attended the 2015 show, visiting 597 exhibits.

COVERING THE FLOOR

This year's exhibits will occupy all 560,000 square feet of the convention center, in addition to classrooms, the stadium and the Sagamore Ballroom. "Right now it's a daily challenge trying to figure out how we're going to fit

“One of the main requests we receive from attendees year in and year out is for more networking opportunities. The Kickoff Party presents this opportunity in a unique, convenient and exciting atmosphere.”

BRAD BISNETTE

this much equipment on the floor," Bisnette says. "It's going to be very impressive when the lights turn on and the doors open for showtime."

When that moment comes on Thursday morning, there's a ton to see. It's the perfect day to take another class or two, get an overview of the show floor and formulate a plan for the next two days. When the floor closes, you can head back to Lucas Oil for the second night of the Kickoff Party.

Friday brings more education and another full day on the exhibit floor — a chance to zero in on tools, equipment and conversations that can make a difference for your facility. At 5 p.m., the Sagamore Ballroom opens for the annual Industry Appreciation Party, with 25-cent tap beer and a concert by country music star Jerrod Niemann, whose hits include "Blue Bandana," "Drink to That All Night" and "Lover, Lover."

Saturday brings another full day of exhibits.

There's also plenty to do outside the show. Indianapolis offers dozens of museums, entertainment venues and shopping opportunities, plus hundreds of restaurants within walking distance of the convention center. And with 4,700 hotel rooms connected to the Convention Center by skywalks, weather won't be an issue.

You can view the complete WWETT Show schedule along with an exhibitor list, floor plan, travel information and more at www.wwettshow.com. **tpo**

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By KELLER

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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

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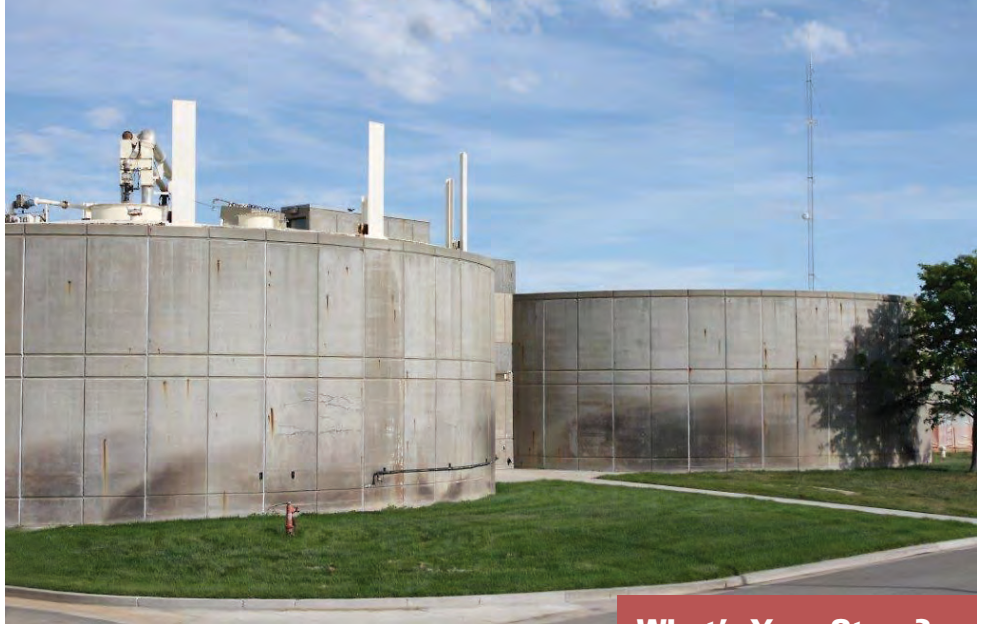
Rooms 237-239 8 a.m. - 5 p.m.

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





Fuel for the Fleet

A COLORADO COMMUNITY TURNS BIOGAS INTO COMPRESSED NATURAL GAS FOR VEHICLES AND GENERATES SIGNIFICANT SAVINGS ON GASOLINE AND DIESEL FUEL

By Doug Day

Many municipal vehicles in the Colorado City of Grand Junction now run on fuel that costs the city just \$1.50 a gallon.

The city no longer has to worry about oil markets now that the fuel price is locked in with a system at the Persigo Wastewater Treatment Plant that converts biogas into compressed natural gas (CNG) fuel.

The CNG system will pay for itself in eight years by providing 400 gallons of fuel per day for city vehicles.

NO MORE FLARING

Built in 1984, the 12.5 mgd (design) plant used to flare much of its biogas. “We produce about 128,000 cubic feet of gas per day and were using about 16 percent of that to heat the anaerobic digesters,” says Dan Tonello, wastewater services manager. Jointly owned by Grand Junction and Mesa County, the plant treats wastewater for about 80,000 people.

The city chose the CNG project after a 2006 engineering study. “We looked at fuel cells, which had an 81-year payback,” says Tonello. “We looked at microturbines, which had about a 10-year payback, but there wasn’t that much bang for the buck. It was a \$750,000 project with \$75,000 a year in positive revenue.”

The plant already had cheap electricity at 6.5 cents per kWh, so those two alternatives didn’t offer much margin. While more expensive, the \$2.8 million BioCNG system (Unison Solutions) offered a better payback financially and environmentally. The project was funded in part by a \$500,000 state grant from the Colorado Department of Local Affairs.

LITTLE PLANT IMPACT

The CNG system went online April 16, 2015, and required only the addition of the BioCNG conversion equipment. “We tied into our existing anaerobic digesters and just diverted the gas from the existing flare to the new scrubbing equipment, where it is compressed and put into the pipeline to the fueling station,” says Tonello.

The CNG equipment doesn’t affect plant operations other than minor tweaks to the system during startup. “In the beginning it was a little scary,” says Tonello. “Would we be able to run it or did we need a contractor? The

ABOVE: Producing 128,000 cubic feet of biogas daily, the digesters are heated with some of that gas, while the rest is now used to produce compressed natural gas for fueling the community’s growing fleet of CNG vehicles.

little upsets at startup gave our operators such a familiarity with it. We have so many other things here that are much more complicated than that gas treatment skid. It’s been a good thing.”

The cleanup and compression equipment accounted for \$1.5 million of the cost. The rest was for the 6-mile pipeline to the fueling station near the lot where the CNG-fueled vehicles are parked overnight. A cost-benefit analysis showed that it was cheaper to build the pipeline than to drive vehicles to the plant for refueling. The fueling station is also on an existing natural

“If someone looked at CNG several years ago, they need to look at it again because the technology is just amazing.”

DAN TONELLO

gas line, so fuel is available even if the CNG supply from the treatment plant is interrupted.

The new system includes a flare for excess gas, but Tonello doesn’t expect it to be used. “If we need gas storage, we’ll certainly go with that. Our demand is probably going to exceed our production.”

FINANCIAL ARRANGEMENTS

The production cost of the biofuel system is about \$1.04 per gallon. Renewable energy credits will greatly speed up the time to recover the investment. “For every gallon of biofuel we put into a vehicle, we get about 83 cents from renewable energy credits,” Tonello says. “That means we’ll be making gas for about 21 cents a gallon.”

The utility will charge \$1.50 per gallon to the city and county until the project is paid off. At that point, the price will be renegotiated and likely go down, providing long-term savings and a stable price.

Before going into the project, the city had no CNG vehicles and no fueling facility. The \$1 million fueling station was completed in 2011 with help from

What’s Your Story?

TPO welcomes news about environmental improvements at your facility for the Sustainable Operations column. Send your ideas to editor@tpomag.com or call 877/953-3301.

\$850,000 in grants. In the meantime, 10 city-owned refuse trucks due for retirement were replaced with CNG vehicles, and Grand Valley Transit began converting its fleet of 28 buses to CNG as buses reached their end of life.

GROWING FLEET

“There were so many moving parts,” says Tonello. “I’m grateful that the city council had the foresight to see the value in this. Going from diesel fuel to natural gas has saved hundreds of thousands of dollars per year in fuel expenses.”

The savings continue to grow now that the CNG system is online and more CNG vehicles are added. They do cost more, but Tonello says the extra



After biogas is cleaned and compressed, it is piped to a CNG fueling station so employees don’t waste fuel and time driving 6 miles to the wastewater treatment plant.



The Persigo plant also uses renewable energy with a 98 kW Sunsense solar photovoltaic system installed in 2011.

expense is worth it. “When you have vehicles with high fuel use, they pay back very quickly. Currently, we have one car, one street sweeper, 10 refuse trucks that get about 2 miles to the gallon, 10 pickup trucks, six dump trucks, and four transit buses.” More are being added; at the end of 2015, the city was expected to have 38 CNG-fueled vehicles.

Converting to CNG also has environmental benefits. “We were burning gasoline in the vehicles and flaring the biogas at the wastewater facility,” says Tonello. “We’ll offset the gasoline use by about 35 percent, or 146,000 gallons a year.” Carbon emission will be cut by about 88 percent, or 3 million pounds per year.

“We started looking at this internally more than 10 years ago,” says Tonello. “The technology in this field has come so far. What was available then and what’s available now, it’s just a huge difference. If someone looked at CNG several years ago, they need to look at it again because the technology is just amazing.” **tpo**



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OPERATORS AND POLITICAL LEADERS TEAM UP TO WIN FULL STATE FUNDING FOR BADLY NEEDED WASTEWATER AND DRINKING WATER INFRASTRUCTURE UPGRADES IN TALLULAH, LOUISIANA

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Justin Sellers**



Sewage technician Kelvin Brooks checks the lines encompassing Tallulah's 316-acre overland flow treatment plant, which is being replaced by a new facility.

THE LOUISIANA CITY OF TALLULAH PROSPERED FOR MANY YEARS, UNTIL the 1970s, when a large lumber mill closed down and the newly built Interstate 20 diverted east-west traffic around the community.

As the local economy declined and the tax base dried up, critical infrastructure — water, wastewater and streets — fell into neglect. The wastewater treatment facility frequently exceeded effluent permit limits. Failing lift stations led to flooding and sewer backups during rain events. The drinking water treatment plant slowly deteriorated, requiring frequent repairs, and a breakdown in early 2014 left the community without water for 26 hours.

Today, Tallulah's water infrastructure is well-positioned for the future. An upgraded wastewater treatment facility goes online early this year, and

plans and funding are in place for a new drinking water system to be commissioned in 2019.

It's all paid for, to the tune of nearly \$23.5 million, through the state's Capital Outlay Fund for infrastructure, and without the customary 25 percent local match. "The matching funds were a major issue," says Mayor Paxton Branch. "As a small rural community with a low tax base, we couldn't afford it." A persistent lobbying initiative involving the mayor's office, operations personnel, city council members and citizens persuaded the state Legislature to waive the local match requirement.

BIG RELIEF

Branch made water infrastructure improvements the cornerstone of his 2014 campaign for mayor. From the time he assumed the office, it took 14 months to

Tallulah (Louisiana) Wastewater Treatment Plant



BUILT: | 1989, upgraded 2015

POPULATION SERVED: | 13,100

EMPLOYEES: | 5

FLOWS: | 2.5 mgd design, 1.1 mgd average

TREATMENT LEVEL: | Secondary

TREATMENT PROCESS: | Aerated lagoon

RECEIVING WATER: | Roundaway Bayou

BIOSOLIDS: | Contract hauled for beneficial use

ANNUAL BUDGET: | \$1.7 million (water and wastewater operations)

WEBSITE: | www.cityoftallulah.org

GPS COORDINATES: | Latitude: 32°24'2.05"N; longitude: 91°11'2.14"W



Carlton Whitaker, chief water and wastewater operator

arrange the funding — \$1.5 million for wastewater improvements and \$22 million for the new water system.

“The \$1.5 million grant for the wastewater plant improvements was awarded under the previous administration,” Branch says. “However, it had been sitting idle for years. Once I knew that it was there, I took a look at the engineers’ plans. They assured me the plans would work, and we recommitted the money toward the wastewater plant upgrades.”

For Carlton Whitaker, chief water and wastewater operator, it was a major relief. “I’ve been through a lot of mayors as an operator for Tallulah in different capacities,” he says. “I’d been preaching for years that we had to do something and do it quick. Mayor Branch took the bull by the horns and went out there and made this thing happen. He got on the end of the rope with me and we all pulled together.”

First in line were \$400,000 in improvements for the lift stations. Four of the city’s eight stations received a total of four new 50 hp pumps (Gorman-Rupp Company). The main lift station, which delivers influent to the treatment headworks, received an 8-inch, 75 hp Gorman-Rupp submersible sewage pump rated at 3,600 gpm, as well as a new 50 kW diesel emergency generator to keep the pumps operating through utility power outages.

BETTER TREATMENT

Next in line was a \$1.25 million wastewater treatment upgrade. The existing facility included a facultative pond for primary treatment, followed by overland flow across 260 terraced acres planted with coastal Bermuda grass

The Tallulah team includes, from left, Kelvin Brooks, sewage technician; C.J. Oney, city superintendent; Eddie Blanson, sewage operator; and Johnny Robertson, sewage technician.



PROMOTING EXCELLENCE

Improvements to Tallulah’s water and wastewater systems don’t stop with new infrastructure.

Mayor Paxton Branch has launched an operator training initiative to help the city’s personnel advance their skills and advance to high-level licenses.

The city arranges for operators to attend training courses offered by the American Water Works Association and the Louisiana Rural Water Association. “We need trained people on the job, and it’s hard sometimes to get operators to take advantage of the training that’s

available,” says Carlton Whitaker, chief water and wastewater operator. “The mayor has been making use of resources that we had never used before.”

The wastewater operations team in addition to Whitaker includes Ed Kline, treatment plant operator; Eddie Blanson, sewage operator; and Johnny Robertson and Kelvin Brooks, sewage technicians.

The water plant team consists of Michael Goods, David Moore and Tommy Jobe, operators; and Charles Fines, Edward Jones, Elvis Meadows and Robert Neal, water technicians.



A portable colorimeter (Hach) is used to test a water sample.

for evapotranspiration. Excess effluent discharged to Panola Bayou.

“Overland flow had biological and ecological disadvantages,” says Whitaker. “We had problems with effluent ammonia, nitrates and nitrites exceeding our parameters. We never consistently met our permit because we had very little control over the process. The terraces held water, and migratory birds would come in the wintertime, inundate the area and deposit their fecal matter.”

The new 2.5 mgd (design) treatment scheme replaces the overland flow phase with aeration in the existing pond, followed by a secondary clarifier. Influent passes through a 3-D Wheelabrator bar screen to a Parshall flume before flowing to the 17-acre pond, lined with 100 mil Buna-N rubber. Air for biological treatment is delivered by an all-aluminum, motor-driven floating aeration system (Airmaster Aerator LLC).

Two pumps then deliver the water to the circular clarifier. Clarified effluent is disinfected with chlorine gas, dechlorinated with sulfur dioxide, and sent 150 yards through a ditch to Roundaway Bayou. Waste activated sludge from the clarifiers is hauled out by a contractor for beneficial use.

COMMUNITY COMMITMENT

Securing funding for the improvements wasn't easy. The state budget was deep in deficit, and the Legislature tended to focus on major problems facing much larger cities, Branch says. In addition, matching fund waivers were rare.



Pumps move water through the 17-acre stabilization pond at the Tallulah Wastewater Treatment Plant (floating aeration system from Airmaster Aerator).

Whitaker and Branch, both with strong local ties, approached the challenge with conviction. Branch, a native of Madison Parish (of which Tallulah is the seat of government), had been parish president for eight years while working as a district manager with Holiday Inn Worldwide. “I understood how government works, and as a businessman I also understood cash flow and the importance of planning, setting timelines and sticking to them,” he says.

Branch came into the mayor's office while the city faced administrative orders from the Louisiana Department of Environmental Quality (LDEQ) to improve the wastewater treatment process. “The system wasn't going to

David Moore, lead plant operator, checks lime levels at the Tallulah Water Treatment Plant.



THE WATER SIDE

Last September, the City of Tallulah won approval for \$22 million from Louisiana's Capital Outlay Fund for infrastructure to build new drinking water wells, a water transmission pipeline, and a new water service facility.

The project, fully state-funded, will replace an antiquated treatment plant and provide much higher-quality source water that will require a far less complex and chemical-intensive treatment process, according to Carlton Whitaker, chief water and wastewater operator.

The Upper Mississippi Alluvial Aquifer from which the city now draws source water is naturally high in arsenic and barium (both above U.S. EPA maximum concentration limits) and in iron and manganese, says Whitaker. The new plan is to tap the Cockfield Aquifer, about 30 miles from the city.

"We expect to draw more pristine water that doesn't have the constituents our source water has now," Whitaker says. "We have high hopes of getting water that will require only disinfection and possibly light filtering. We also hope to sell water to other smaller communities along the route of the trunk line to Tallulah."

The new water service facility will replace a 66-year-old plant that uses enhanced lime treatment followed by mixed-media filtration. That plant is showing impacts of aging that include metal corrosion, metal fatigue and leakage. Replacement parts are hard to find. In addition, lime floc carryover from the settling process leads to frequent blinding of the filters and excessive backwashing.

The new water service facility will double current capacity to 3 mgd and is expected to meet the city's needs for 20 years. The water system project is to be completed in three years.



Kelvin Brooks at the wastewater treatment plant's effluent pump station.

get any better," he says. "It was only going to get worse. That became my priority, because water is the common denominator for this entire community."

Whitaker, a Tallulah native, has been with the city as an employee or contract operator for the past 31 years, except for three years working with a U.S. government contractor during the Iraq war, coming home in 2010. He holds Class 4 (highest) licenses in water production, treatment and distribution and in wastewater treatment. He is also a member of the American Water Works Association and the National and Louisiana Rural Water associations.

ALL-OUT EFFORT

Lobbying for the fund-matching waiver meant extensive preparation, followed by heavy activity during a 45-day legislative cycle. The initiative reached directly to the grass roots. City officials held community meetings, engaged the news media, and circulated petitions supporting the waiver. Residents and officials wrote letters to legislators describing their experiences with water and wastewater system failures.



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“Everything was about the timeline,” says Branch. “Our city council was very supportive. They were not hesitant. They helped us in getting the community involved, securing the letters of support that we needed. All members did what they needed to do within their districts.”

One key step was a meeting with the LDEQ. Says Whitaker, “We took an entourage including myself, the mayor and our engineering consultants. We explained all the problems we’d been having and showed them our plan of action.”

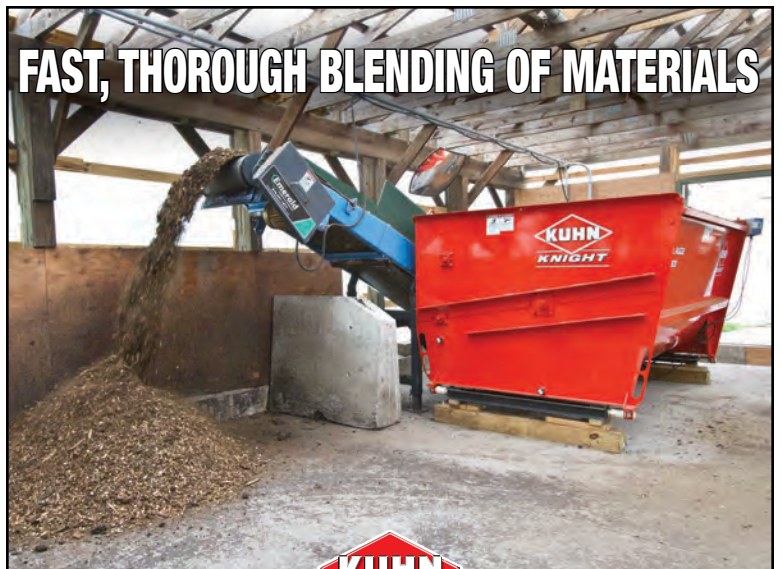
“The system wasn’t going to get any better. It was only going to get worse. That became my priority, because water is the common denominator for this entire community.”

PAXTON BRANCH

The result was that the LDEQ gave the city a letter of endorsement to be used with legislators. Branch recalls, “That and the many other letters of support we received really got us over the top. We had written documentation that we were facing a health issue.”

City officials lobbied legislators throughout the floor session. “We were there every other day, making sure our voices were heard,” Branch says. “That was the biggest thing — just being there and letting them know how serious our problems were.” The local legislative delegation of Sen. Francis Thompson and Reps. Andy Anderson and Charles “Bubba” Chaney strongly advocated for the city.

“Evidently it worked, because when it came time for the vote, the measure passed unanimously and the waiver was given,” Branch says. “Many people were amazed that a town our size was able to procure such a magni-



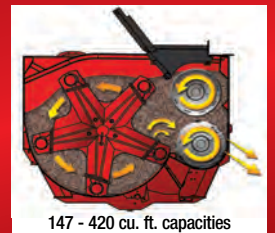
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tude of funding. It was hard work. We understood process and followed it all the way through to the very end.”

LESSONS FOR OTHERS

Whitaker and Branch agree that their experience can serve as an example to other communities struggling to fund large and essential water infrastructure projects.

“What I would tell anyone is that you have to be able to analyze and prioritize,” says Branch. “That is the key. Once you get your plan, stick to it, no matter what. If you don’t, you’ll find yourself wavering. Take the time out to plan and research and know what you need to do.”

As an elected official, he saw the importance of acting early in his four-year term: “You may not be fortunate enough to win another term. Then someone comes in and has brand-new ideas, and your hard work just goes out the window.”

Whitaker, meanwhile, learned persistence: “My perspective is never to give up on a plan, even if it looks 20 years into the future. If you have a plan, stick to it. Be consistent. Be consistent with the press. Be consistent in everything you do in the water business. If you do, eventually you will reap the benefits.” tpo

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Calling In the Pros

WHEN SHOULD WATER AGENCIES INVEST IN PROFESSIONAL COMMUNICATIONS SERVICES? WHAT LEVEL OF SUCH SPENDING IS APPROPRIATE? A NACWA COMMITTEE AIMS TO SET GUIDELINES.

By Ted J. Rulseh

Private companies are rarely criticized for hiring public relations firms to promote their image or advertising agencies to push their products.

But when public entities like water and wastewater agencies hire such firms for communications support, they can encounter a backlash. “You’re a monopoly,” goes the argument. “Why are you spending tax or ratepayer dollars just to make yourself look good?”

That argument doesn’t withstand scrutiny — public agencies rarely engage in mere image polishing. Money they spend on communications generally goes toward legitimate exercises in public education or public participation, sometimes required by law.

But when is it legitimate to bring in professional consultants? Or to dedicate staff to a public outreach campaign? At what point does spending for these purposes become excessive? And how can agencies deal with citizens’ concerns about communications investments?

Finding answers to those and similar questions is on the agenda for the Communications and Public Affairs Committee of the National Association of Clean Water Agencies (NACWA).

The association is dedicated to strengthening its strategic communications and outreach, and is expanding efforts to communicate the essential contributions clean-water agencies make to public health, the environment, the economy and quality of life.

Andrew Bliss is vice chair of the communications committee and community outreach manager for Capital Region Water, a municipal authority that owns and manages the water systems and infrastructure in and around Harrisburg, Pennsylvania. Bliss shared his perspectives in an interview with *Treatment Plant Operator*.

tpo: How did you come by your interest in public outreach?

Bliss: I come from a natural resources and geography background. I have a personal and academic interest in how we manage resources. While attending Bloomsburg University in northeast Pennsylvania, I was involved in grass-roots organizing for converting the coal steam boiler on campus to more renewable fuel sources. I went to graduate school at the University of Arizona but never finished my degree. There was a job opening as the Pennsylvania grass-roots coordinator at the Chesapeake Bay Foundation here in Harrisburg, and I grabbed it. That was a great job, working on clean-water projects throughout the state.

tpo: How would you describe the role of Capital Region Water?

Bliss: Formerly The Harrisburg Authority, Capital Region Water took over Harrisburg’s water systems in late 2013. We took on this challenge knowing that the systems had suffered from years of deferred maintenance.

Our goal is to invest in our community and become the region’s premier water utility. It’s our responsibility to provide safe, clean and reliable drinking water, wastewater treatment and stormwater management.

On the drinking water side, we have about 250 miles of water mains, a 20 mgd water treatment plant, and about 8,000 acres of forestland around a beautiful reservoir. On the wastewater side, we have 130 miles of sewer pipe in a combined sewer system and a wastewater treatment plant that is being upgraded. The design flow is 40 mgd, and we receive on average about 20 mgd.



Andrew Bliss

tpo: Where community outreach is concerned, what issues does your agency have?

Bliss: One reason we do community outreach is for regulatory requirements. We’re in the process of obtaining an MS4 stormwater permit since we have some separate stormwater systems. And as part of the NPDES permit for our combined sewer system, we have pollution prevention education, public participation and public notification requirements.

We could simply do the bare minimum, but our CEO Shannon Williams and our board want to make a genuine effort and investment in really edu-

“We say, ‘If only people understood the value of what we do.’ But if we want them to understand, there’s a cost associated with that. If you want to do it right, it takes a lot of resources, a lot of staff time, and a lot of reaching out to people.”

ANDREW BLISS

cating people about the systems that serve them. People have a right to know what we’re doing with their system and how we’re putting the water bill revenue to work. If they are better educated, they can help us make better decisions.

tpo: Beyond public education and participation, are there other priorities for communications?

Bliss: We want to do outreach and education because our board has an interest in hiring employees from the community we serve. We believe that

if we work more with the schools, offer more programs and get in front of people at fairs and festivals, we could start developing a channel of people who go from growing up in the community to working in our organization. We're not unique in that we have an aging workforce, especially among our operators and field crews. We'll definitely need to hire people continuously in the years ahead, and we want to do that locally as much as we can.

tpo: What do you observe about the role of communications in the industry today?

Bliss: There is definitely a trend, especially with some leaders like the Northeast Ohio Regional Sewer District, DC Water, and the San Francisco Public Utilities Commission, toward really investing in communications. The aims are to educate customers about pollution prevention, to help them understand where their bill payments are going, and to get them to appreciate the value of their services.

We talk about how there has been a lack of investment in infrastructure. There are a number of reasons for that, including less federal funding. But I would argue one reason is that we haven't educated people on the importance of those investments and the importance of the services provided. We say, "If only people understood the value of what we do." But if we want them to understand, there's a cost associated with that. If you want to do it right, it takes a lot of resources, a lot of staff time, and a lot of reaching out to people.

tpo: How is the NACWA committee addressing this issue?

Bliss: Our first project is trying to set standards for communications investments by clean-water utilities. We're trying figure out, relative to the size of the service area, what types of projects and what types of materials and what levels of spending on consultants are appropriate so that an agency that gets questions about its spending from the public can say, "This is in line with industry practices." The ultimate goal is to create a toolkit that prepares utilities to address questions or concerns about what they're spending for communications.

tpo: Are utilities actually experiencing pushback from the public about their expenditures for communications?

Bliss: During the first conference call our committee held with utility communications specialists, we asked if that had been an issue in their service area. About 20 percent of those on the call said, "Yes, we've had concerns raised, we've had questions, we've had media reports done." Then we asked, "Is this something you're worried about?" And another 30 to 40 percent of those on the call said yes. So a majority of the communications professionals were saying they wanted to be prepared for any questions about those investments.

tpo: Has Capital Region Water received any pushback from the public or elected officials about your communications programs?

Bliss: We haven't seen negative feedback yet, but with long-neglected and aging systems, our board is extremely cautious about using money appropriately — although they are totally on board with having an educated customer base.

tpo: What arguments do you recommend making toward justifying communications investments?

Bliss: First, some of our communications are to fulfill regulatory requirements — these are things we have to do to protect water quality and notify our customers. Second, it's better for us to proactively communicate projects and potential service changes than to try to put fires out or react. I try to make the argument that there

are ways to be visible without spending a lot of money. Third, our customers have a right to know what their water bills go toward and participate in major plans and decisions. Fourth, customers expect improved service when paying bills, reporting service issues, and being notified. All of this work requires staff time, materials and other resources.

tpo: What are some examples of lower-cost forms of communication?

Bliss: One of our engineers and I built a tap water bar out of wood pallets. It cost about \$100. It's something people want to have at their community events. There's a little tap on it and we pour water for people. It's a great vehicle for starting conversations about issues. We also have carnival games like a Can the Grease Toss, which is a great way for us to talk to people about the impact that FOG can have on our sewers.

“We're trying figure out, relative to the size of the service area, what types of projects and what types of materials and what levels of spending on consultants are appropriate so that an agency that gets questions about its spending from the public can say, 'This is in line with industry practices.'”

ANDREW BLISS

tpo: Would you agree that there is a time and a place to hire professional communications services?

Bliss: There is no question about that. I don't want to diminish the importance of professional services by saying, "Oh, you can just do it by making little stuff yourself." You hire professionals for a reason. When The Harrisburg Authority became Capital Region Water two years ago, before I came on board, they hired a small advertising firm to develop branding, a logo, and a website. Sometimes, if you want to do things right and see results, you need to hire professionals, just like you do for other functions.

tpo: What did you learn in your previous roles as a grass-roots organizer that informs your belief in communications?

Bliss: A presenter at a recent board meeting said a utility's job is to protect public health, protect the environment, and be a platform for economic development. I think utilities could do a lot more to get that message across to people. Working at an environmental nonprofit you see how much people value clean water and you talk about it in a different way. I think we can learn a lot from those groups.

tpo: When is it right and not right to use outside professional services?

Bliss: I can't answer that. I think the NACWA committee is trying to figure out exactly what kinds of projects we should invest in communications for. For any project, a utility needs to figure out: What's the most cost-effective way to do this? Where can we save money while still doing a good job?

tpo: What is the timetable for the NACWA committee's work?

Bliss: We have finished the draft of a survey, and we'll be sending it out to NACWA members and other utilities. I don't know if we'll get there, but what I hope we find out is, based on the service area population, or number of miles of sewers maintained, or the gallons of wastewater treated, this is what utilities are spending on average, here are the top activities they are investing in, and here are the reasons why utilities are investing in these projects. I hope that information will turn into a toolkit that utilities can use as a resource. **tpo**

Share your opinions

NACWA invites comments on its efforts to address citizens' concerns about investments in public outreach programs. Thoughts and ideas may be sent to NACWA staff representative Robin Davis, director of marketing and digital media, RDavis@nacwa.org.



- 1) The Mobile Research Center contains eight reactor vessels that enable testing of a variety of odor-control approaches.
- 2) The 53-foot trailer will remain at host sites for six months to a year to enable thorough testing of biological odor-control processes tailored to actual facility air streams.

Cleansing the Air

A MOBILE RESEARCH CENTER PROVIDES AN ON-SITE LABORATORY FOR DEvisING OPTIMUM BIOLOGICAL TREATMENTS FOR ODOROUS ORGANICS IN TREATMENT AIR STREAMS

By Ted J. Rulseh

Clean-water plants increasingly rely on controls to limit odors to surrounding neighborhoods and limit nuisance complaints.

Chemical and biological controls are proven effective against common gases such as hydrogen sulfide, but air streams containing odorous organic compounds can be more challenging to treat. Now, BioAir Solutions has created a Mobile Research Center (MRC) that it will deploy on treatment plant sites to test new biological odor-control technologies and help provide customers with treatments tailored to their own applications.

The laboratory, constructed in an over-the-road trailer, enables testing of biofilter technologies under operating conditions that can be varied and closely controlled. Biological media can be tested under different process conditions and treatment performance can be quantified under each scenario.

Louis le Roux, company president, says the MRC will also help the company develop next-generation, sustainable biological solutions for treating air streams from municipal and industrial wastewater facilities. He talked about the mobile facility in an interview with *Treatment Plant Operator*.

tpo: Why did you develop the Mobile Research Center?

le Roux: Since our founding in 2006, we have made our mark with bio-

logical trickling filter technology for control of hydrogen sulfide odor. But we also want to be able to treat all odors coming from wastewater facilities, municipal or industrial, with biological technology.

Air streams can contain a lot of organic odorous compounds, and there are many unknowns about how well these can be treated by biological means. So about a year ago we decided to further the science of how to remove these compounds.

“Air streams can contain a lot of organic odorous compounds, and there are many unknowns about how well these can be treated by biological means. So about a year ago we decided to further the science of how to remove these compounds.”

LOUIS LE ROUX

tpo: Why did you decide to create a mobile research facility instead of studying the removal processes in a laboratory?

le Roux: To get real-life data, it is preferable to take research to the field instead of trying to simulate things in small cylinders in the lab. A full-scale research trailer lets us experiment with many media types, biological pro-

cesses and process parameters, with a goal to develop biological odor control that targets volatile organic compounds, and in particular organic sulfur compounds. It will help us bring to market technologies that set the standard for what is achievable. The goal is to have systems that can treat the whole cocktail of odors biologically.

tpo: Where odor removal is concerned, what are the limitations of lab-based research?

le Roux: The problem with lab testing is that it's very controlled. You might find something that works in the lab, but then you take it to the field and find out there are interferences between the various odor compounds, so it may not actually work under field conditions. We decided to venture into new and somewhat virgin territory and discover what will work in live situations. That way we know the solutions we develop will work and are not just theoretical concepts.

tpo: How do the agencies that host the mobile lab benefit from the research?

le Roux: They get access to a proven biological technology that meets the specific needs of their application. That could mean they now have a technology to replace chemical scrubbers or carbon treatment with a biological technology that is very low in operating expense and has a compact footprint, and so is extremely cost-effective.

tpo: How long will the MRC stay at any given host site?

le Roux: Six months to one year. When you deal with a biological process, you don't get reliable results overnight. We would never rely on a short-term study for developing processes. It's essential to see what happens in the longer term.

tpo: What equipment does the MRC contain?

le Roux: The MRC is a 53-foot-long semi-trailer that we converted to a laboratory. It has eight reactor vessels that enable us to treat the same air stream in different ways. We can add different biological media types, and we can operate each reactor independently but on the same air so we don't add another variable. We can also test different operating parameters and process conditions in each reactor. By having control over the process, the media and the microbiology, we can truly optimize the biological process for the application.

tpo: What are some examples of the ways in which you can control the process parameters in the different reactors?

le Roux: We can control the moisture going into each vessel. We can vary the biochemical additives – the nutrients we use boost the system's performance. We can run the airflow with or counter to the water flow. We can also regulate the pH. The biological oxidation of many compounds leads to acid production. We can manipulate the pH so we don't have a self-destructive process where the pH becomes too low and bacterial growth is hindered.

tpo: How is this research facility staffed?

le Roux: Dr. Ashraf Hassan, our senior process engineer, is responsible for the MRC and will spearhead the development of the biological processes. He has a Ph.D. from the University of Cincinnati in the biological odor-control field. Working with him is Timur Dunaev, senior technologist, who has a master's degree in environmental engineering from Villanova University, with a focus on biotechnology. I will also assist. I have a Ph.D. in engineering from the University of Illinois at Urbana-Champaign and will monitor the development work.

tpo: Does this research facility have applications on the industrial as well as the municipal side?

le Roux: Yes. There is potential to bring it, for example, to industrial

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customers whose production capacity is being limited by air emissions. If we can help them limit their discharges, we can enable them to add capacity. So then we're in a different realm where we add value to production by reducing emissions.

“By having control over the process, the media and the microbiology, we can truly optimize the biological process for the application.”

LOUIS LE ROUX

tpo: How do you measure the effectiveness of approaches developed in the MRC?

le Roux: There are different ways to quantify and qualify odors. There is speciation analysis in which we collect and analyze bag samples of untreated and treated air from various operating conditions. This helps us determine how well we remove particular odorous compounds like methyl mercaptan, dimethyl sulfide and dimethyl disulfide.

This form of analysis is most applicable in the industrial market, where specific compounds are regulated according to concentration. In municipalities, odors are more often a nuisance issue rather than a regulatory concern. So here we send bag samples to an olfactometry lab where they perform smell tests and express results in terms of odor units. **tpo**

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The completed wetland after its conversion to a treatment system using plant-based remediation.

A Better Route to Remediation

A MANITOBA TOWN TEAMED WITH DUCKS UNLIMITED ON AN INNOVATIVE APPROACH THAT TURNED AN OBSOLETE LAGOON TREATMENT SYSTEM INTO A COMMUNITY ASSET

By Jeff Smith

Through an unconventional approach to decommissioning a two-cell wastewater treatment lagoon covering 30 acres, the Manitoba Town of Niverville nearly halved its decommissioning cost, created a visitor attraction and won an award for innovation and sustainability.

“Bioremediation was the answer to our problem,” says Ryan Dyck, town operations manager, who oversees the newly converted wetland. When the town built a larger four-cell lagoon system as a replacement across town in 2007, its license required decommissioning the old lagoon. Traditionally, that would have meant removing settled solids to a landfill site or applying it to cropland. Either option would have been costly.

In search of a solution, the town partnered with the Native Plant Solutions (NPS) consulting branch of Ducks Unlimited Canada. The parties worked together on an alternative: treating the material on site using wetland plants.

“The intention of the Town of Niverville was to decommission the lagoon in an environmentally friendly, sustainable and economic manner. And with the help of NPS, we did that.”

RYAN DYCK

FIRST IN CANADA

Lisette Ross, senior wetland specialist with NPS, says that because this method of bioremediation at the end of a lagoon’s life had never been used before in Canada, the project had to be backed by sound science to get the support of provincial regulators. NPS partnered with researchers from the University of Manitoba to design a study investigating the approach.

A three-phase research project began in 2012 to assess contaminant reduc-

tion in wastewater solids using wetland and upland phytoremediation. “To date, both the greenhouse and field phases of research, which focused on cattails and switchgrass, are complete,” says Ross. “The third research phase focuses on harvesting the reusable biomass and recapturing the nutrients and trace metals.”

In summer 2012, excavators, bulldozers and other earth-moving equipment went to work altering the original lagoon design. Removed solid material was relocated and contoured to support plant growth. Heavy equipment placed wetland plants — mainly cattails and switchgrass — during winter when the plants were dormant and less vulnerable to damage.

A portion of the second cell of the original lagoon was converted to a holding pond used to control the water level in the new wetland and as a control cell for ongoing research. The remainder was converted for upland phytoremediation.

SUPPLYING WATER

Winter snowpack, spring melt and surface runoff redirected from the town provided some initial water to the wetland for the first growing season in 2013. The rest came from the holding pond. Water availability was critical to the wetland during the first growing seasons, and it was necessary to manipulate the water supply to allow new plants to germinate. The wetland is designed to function at a stable water level, and since the initial growing season little manipulation has been required.

“We mechanically pump water into the wetlands from the holding pond when required,” Dyck says. “If we ever need to drain the wetland, it is set up to drain back using gravity.” After three years of plant growth and wetland operation, research results show a decline in nitrogen, phosphorus and trace element concentrations.



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Winter excavation during the early phase of wetland construction.

Dyck says Niverville’s approach to bioremediation set a new standard for decommissioning a lagoon responsibly. In 2014, the town received the Manitoba Excellence in Sustainability Award in the category of Innovation and Research for Sustainability.

COMMUNITY ASSET

Future plans for the wetland are to integrate it into a nearby 91-acre town park that is a focal point of community use for sports, picnicking, hiking and biking. Trails through the wetland will lead to an interpretive site



Town staff members visit the original lagoon after closure but before conversion into a wetland.

for school groups and citizens. Bird watchers already enjoy species such as horned grebe, red-winged black-bird and mallard ducks.

“The intention of the Town of Niverville was to decommission the lagoon in an environmentally friendly, sustainable and economic manner,” says Dyck. “And with the help of NPS, we did that.” **tpo**

Share Your Ideas

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

Rapid Renewal

A NEW WATER PLANT, A PRIVATE PARTNER AND A DEVOTED STAFF HELP A NEW JERSEY TOWNSHIP DELIVER EXCEPTIONAL WATER AND EARN INDUSTRY RECOGNITION

STORY: **Trude Witham**

PHOTOGRAPHY: **John O'Boyle**

THE NORTH BRUNSWICK WATER TREATMENT PLANT has come a long way in 50 years. When the 1963 gravity filter system surpassed its useful life, leaders in the New Jersey township knew they had to upgrade to meet new turbidity standards.

In 2002, they contracted with American Water to operate the plant and coordinate a two-year, \$19 million upgrade. The new 10 mgd plant, completed in 2010, includes six dual-media gravity filters, a new control room, office and laboratory, and new automation and control.

The staff ran the old plant while starting up the new one, meeting all regulations even as the old filters were failing and new ones were being tested, along with the chemical feed system and other equipment. Another challenge was converting the two existing filter backwash holding tanks to thickeners – that meant operating with one tank while the other was being retrofitted.

The effort was well worth it: Finished water turbidity has improved from 0.1-0.2 NTU to 0.01-0.02 NTU. Residuals handling has improved, and a 60 kW rooftop solar system supplies 5 percent of the plant's electricity. Meanwhile, the operations team began working toward Partnership for Safe Water awards and developed a complete set of standard operating procedures. The plant signed on to the Partnership in 2012 and won the Phase III Directors Award in June 2015.

NEW IDEAS

When American Water stepped in, team members found the operations staff struggling to meet Department of Environmental Protection regulations with the old gravity filter plant and pressure filter plant, now mothballed. "We had no way to determine filter head loss or flow from each of our eight gravity filters," says Jim Grootenboer, general manager. "Because they

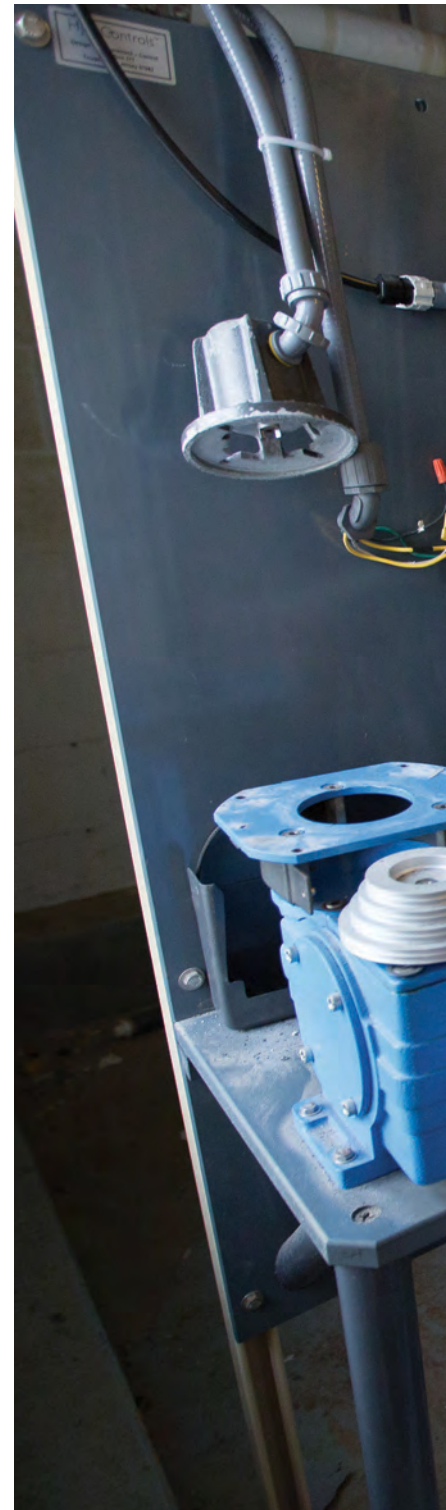
“ We have an open-door policy between management and staff. The operators are always encouraged to discuss new ideas, findings and problems.”

TONY CAPP

backwash automatically based on hydraulic conditions, operators had no way of knowing if a filter was backwashing.”

As a filter failed to meet turbidity standards, it was removed from service. "It was labor-intensive for operators to determine what caused the turbidity fluctuations," recalls Grootenboer. "The pressure plant required the section head created by the gravity plant, so it was important to keep at least a few filters in service." The gravity plant also posed a challenge. With no individual filter flow controls, the cleanest filter received most of the flow. The automated controls had failed, so two operators were required to wash the filters manually.

The new plant changed all that, with new gravity filters, sludge thickeners, sodium hydroxide chemical feeder, inline mechanical mixer, backwash equalization basins and SCADA system. The plant still uses the original clarifiers.





Operator Anthony Liscio calibrates the chemical feed rate on a Wallace and Tiernan Encore 700 pump (Evoqua Water Technologies) in the chemical feed building.



North Brunswick (New Jersey) Water Treatment Plant

BUILT: | 1963

POPULATION SERVED: | 40,000 (11,700 metered customers)

SOURCE WATER: | Delaware and Raritan Canal

TREATMENT PROCESS: | Conventional

DISTRIBUTION: | 75 miles of pipeline

SYSTEM STORAGE: | 8.5 million gallons

KEY CHALLENGE: | Optimize filter performance; apply for the Presidents Award

ANNUAL BUDGET: | \$2.9 million (operations)

WEBSITE: | www.amwater.com

GPS COORDINATES: | Latitude: 40°29'38.06"N; longitude: 74°26'44.33"W

The new plant helped in meeting Partnership for Safe Water goals, but equally important is the plant's culture. "We have an open-door policy between management and staff," says Tony Cappa, plant supervisor. "The operators are always encouraged to discuss new ideas, findings and problems."

During the self-assessment phase, management surveyed the staff. "We asked about plant culture, leadership, safety and operations," says Grootenboer. "We got some great feedback."

Standard operating procedures also helped. The operators walked through each process, then reviewed them in a staff meeting and offered input. "Now, the operators have specific goals for each process and know what to do if things go outside specification," says Grootenboer. "It's a much more proactive approach."

“The operators don’t just run the plant according to management telling them what to do. They enjoy a project they can take ownership of.”

JIM GROOTENBOER

Anthony Liscio checks the energy meter for the treatment plant’s 60 kW rooftop solar power system.

MANY IMPROVEMENTS

The new treatment plant was built to meet current regulations and serve a growing population. The plant serves 40,000 people with 11,700 metered connections in North Brunswick. New development includes townhomes, a mall and an Amtrak rail station.

Raw water from the Delaware and Raritan Canal flows by gravity through two traveling screens (Link-Belt) into a suction well. Three vertical turbine low-lift pumps (Flygt - a Xylem Brand) move water from there to three Permutit upflow clarifiers/precipitators (Evoqua Water Technologies). The water is treated with powdered activated carbon (Cabot Norit) if needed for taste and odor control, and with caustic soda if needed for pH and alkalinity control. It is then treated with aluminum chloride hydroxide sulfate as a primary coagulant. If required, operators can add a polymer for color removal.

The water is mixed with the inline mechanical mixer (Hayward Gordon) and sent to three upflow clarifiers, which remove most solids before filtration. A floc aid polymer is added before the water enters the precipitators. Sludge blow-off and filter backwash are fed to a sludge wet well and processed through sludge thickeners (Envirodyne Systems). Thickened sludge is dewatered in a press and land-applied.

Next, the water is filtered through the gravity, dual-media filters (Leopold - a Xylem Brand). Backwash water discharges to equalization basins and is gravity fed to the sludge wet well. The filtered water is treated with polyphosphate for sequestering and corrosion control, then treated with sodium

hypochlorite. Filtered water enters the effluent wet well, is pumped to a 1-million-gallon clearwell, and is delivered to the distribution system with four horizontal split-case high-lift pumps (Flygt - a Xylem Brand).

BETTER CONTROL

In late 2009 there was a rush to place the new plant online. Although the operators were familiar with gravity filtration, not all were comfortable with SCADA technology. “There was a learning curve, especially with running reports and changing alarm setpoints,” says Cappa. “The operators went to the manufacturer’s site (Emerson Process Management) in Connecticut for several days of training.”

Standard operating procedures for the SCADA system show the screen shots, and as operators go through the procedure each readout is fully explained. “In the past, we had to have a set of eyes on all the meters and monitoring equipment. Now, we have real-time control and can react immediately,” says Grootenboer. This is especially important in monitoring fluctuations in raw-water turbidity. The Delaware and Raritan Canal is shallow, and although turbidity averages 5 to 10 NTU, runoff during storms can raise turbidity to over 100 NTU.

The SCADA system provides detailed filter profiles and enables monitoring of filter runtimes and turbidity. Operators still observe backwashing to make sure there are no air gaps and no bed rise. They also perform a quarterly filter inspection and an annual media core sampling.

David Soltis flushes a hydrant as part of the town's distribution system maintenance program.



The team at the North Brunswick Water Treatment Plant includes, clockwise from bottom left, Kameron Miller, James Connelly, Peter Peterson, David Soltis, Ronald Parsons, Stephen Koblos, Anthony Liscio, Jim Grootenboer and Tony Cappa.

CONVERTING TO THICKENERS

Residuals handling has improved. The old facility used backwash holding tanks and overflow lagoons. The lagoons were removed, and the tanks were converted to sludge thickeners. Supernatant overflow weirs allow continuous flow back to the head of the plant. The slope of the thickener floors was increased to allow settled solids to flow to the center discharge pipe, and the rake arm drive units were replaced.

This all posed an operations challenge. "We had to regulate flow through the one thickener and install turbidimeters on the supernatant return lines to monitor possible upsets," says Grootenboer. "These were caused by the return of solids to the head of the plant during high flow and large volumes of solids accumulating in the thickener." The team isolated one side of the equalization basin to act as a temporary backwash holding tank. Until the SCADA system was installed, operators constantly monitored flow, sludge levels and return-water turbidity.

Now when operators perform a backwash, the waste and the sludge blow-down enter the thickeners, and the clear supernatant flows back to the head of the plant. The heavier solids settle to the bottom and are pumped to the existing belt press. "The thickener process is a continuous trickle operation that allows sludge to sit in the tank longer, so we end up with thicker solids," says Grootenboer.

The process is now partially automated. The sludge pumps operate based on the level in the wet well. The sludge level in the thickeners is measured continuously using an ultrasonic device, and return turbidimeters are now alarmed.

MEETING CHALLENGES

Five certified operators and a lead senior mechanic keep the plant running smoothly. Besides Grootenboer (Level 4 water treatment and water distribution, Level 1 industrial waste treatment certifications, 10 years at the

STORM MANAGEMENT

Operators at the North Brunswick Water Treatment Plant have seen their share of hurricanes, producing severe flooding and power outages. "The team can be without power in their homes, but are always available to pitch in and work together," says Jim Grootenboer, general manager.

During hurricanes Irene (2011) and Sandy (2012), the area lost power for five to six days. "We were able to supply water since we had generators, but there was such a demand for diesel fuel that we had our American Water supply chain representative arrange to deliver the fuel within 10 to 15 minutes," recalls Grootenboer.

In case another hurricane blows through, the plant has an evacuation plan. It also helps that the new administration building lies just outside the flood zone.

plant) and Cappa (Level 2 water treatment, four years), the team includes:

- James Connelly, Ronald Parsons, John Bryant, Alan LeFave and Anthony Liscio, operators
- Stephen Koblos, lead senior mechanic
- Peter Peterson, distribution supervisor
- David Soltis and Kameron Miller, distribution field service representatives
- Sammy Ferrante, meter reader
- Alisa White, senior secretary

They are not afraid of challenges, which include algae growth in the clarifiers (mainly April through June) and sludge thickening issues in winter. "Ultrasonic waves have been successful in killing algae, and we are looking at a possible test situation at our plant," says Grootenboer. "We have also invested in a lab instrument called a FEEM (fluorescence excitation emission matrix) spectrophotometer to determine the species of algae and chlo-

Jim Grootenboer,
general manager



rophyll levels and estimate algae activity and growth.”

The staff also uses the FEEM device to help determine coagulant dosages. “Our current procedure based on previous testing is to raise our primary coagulant to remove both turbidity and algae,” Grootenboer says.

Plant staff has been testing sodium permanganate as a pre-oxidizer to help oxidize and destroy algae without using chlorine, which can cause disinfection byproducts. They also increased prefilter disinfectant to maintain a chlorine residual post-filtration.

Heavy ice on top of the thickeners and clarifiers in winter also affects operations. “We lose the use of our ultrasonic sludge level monitors in the winter and have to keep an opening in the ice so we can monitor this manually,” says Grootenboer.

To estimate the amount of sludge produced, operators use a formula based on raw-water quality and the amount of coagulant. “We do our best to keep up with production during the winter,” Grootenboer says. “We empty and clean each thickener before winter and again in the spring. We also monitor the belt press camera so the operator has eyes on the process. Polymer is added ahead of the belt press to help produce a heavier sludge.”

TAKING OWNERSHIP

The operators’ greatest strength is their sense of ownership and team involvement. “The operators don’t just run the plant according to management telling them what to do,” says Grootenboer. “They enjoy a project they can take ownership of.”

For example, the operators worked as a team to improve the polyaluminum chloride (PACl) dosing. In the past, they would continually perform jar tests on the raw water to determine the dosing rate, but that was time-consuming. “The team began plotting turbidities and dosages for both low-color and high-color turbid waters,” says Grootenboer. “They created a graph so they could look up the turbidity and determine a dosage rate. Operator Jim Connelly was instrumental in developing that tool.”

Operators often go above and beyond. During a Christmas night snowstorm, the air compressor that runs the PACl pumps failed, and PACl from

Stephen Koblos, uses an infrared thermometer (OAKTON Instruments) as part of predictive maintenance on a pump motor (Marathon Electric Motors).

the underground storage tanks could not be pumped to the day tank. With the day tank level dropping, operator John Bryant and former distribution field service representative Dominic Carra unbolted the storage tank lid and used a bucket to fill the day tank. They also installed a temporary pump to operate until the compressor was repaired.

FUTURE PROJECTS

The township and American Water are busy planning for future improvements, which include new clarifiers and a larger solar power system next to the plant. Distribution system improvements include new billing software, leak detection equipment, and water tank inspections.

In the meantime, the plant team will be busy optimizing filter performance and possibly applying for the Partnership Presidents Award. Says Cappa, “Ongoing communication and training as well as empowering the team to make operational decisions with confidence are going to make all the difference.” **cpo**

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Stuart Sebright of Bright Technologies shows the mechanism of his company's belt press to a WWETT Show attendee. The polyester belts convey biosolids through a mechanism that applies even pressure to squeeze out liquid.



PHOTO BY CRAIG MANDLI

Drier Is Better

SKID-MOUNTED BELT PRESS HELPS MUNICIPALITIES AND INDUSTRIES DEWATER MATERIALS EFFICIENTLY AND KEEP HAULING AND HANDLING COSTS IN CHECK

By Craig Mandli

With municipal utilities facing tight budgets, efficiency is paramount. Water and wastewater treatment machinery must save energy and lower operating costs.

One answer for those concerns is a skid-mounted belt press displayed by Bright Technologies, Specialty Division of Sebright Products, at the 2015 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show.

"Landfill fees are continuously increasing," says Stuart Sebright, general manager of Bright Technologies. "Our belt presses efficiently dewater a plant's solids, leaving a higher-solids product. Hauling less water means lower transportation costs and fewer loads to landfill."

The press uses polyester filter belts and mechanical pressure to dewater or solidify wastewater biosolids or industrial slurries. "We target municipalities and industrial contractors, both of whom are represented at this show," says Sebright. "It's a product that we designed to help keep costs under control for them."

The press is designed for long-term value and ease of operation. A stainless steel frame and roller construction are standard; an Allen-Bradley touch screen and PLC integrate the press and support equipment, enabling unattended operation and integration into SCADA systems. Optional press-mounted operator walkways and handrails are easily removable for press maintenance and allow operators good visibility to the process.

"Of course, the mobility of the unit is a big help, too," says Sebright. "It can be moved to different areas of the plant to dewater instead of having to bring all the non-dewatered material to it. It's also a great fit for companies

that perform contract dewatering, as setup is quick and easy."

The press handles hydraulic loadings up to 150 gpm per meter of belt width, dewatering primary sludge to up to 37 percent solids and aerobically digested biosolids up to 24 percent solids. Lagoon biosolids loadings of 2,500 pounds per hour per meter of belt produce material at 20 percent solids.

“Landfill fees are continuously increasing. ... Hauling less water means lower transportation costs and fewer loads to landfill.**”**

STUART SEBRIGHT

On slurries from industrial and mining applications, it can produce cake at 50 to 70 percent solids at rates of 6,000 pounds per hour per meter of belt; on lime-treated septage it yields cake at up to 47 percent solids at 1,400 pounds per hour per meter of belt.

"We believe it's a great fit among a variety of applications," says Sebright. "It can even be used with hydrovac waste, as long as the material is pre-screened." Sebright says the 2015 WWETT Show was a big success, generating multiple solid leads, plus opportunities to explain the benefits of the press system to hundreds of attendees.

"This has been a great show with a very nice mix of municipal employees and private contractors," he says. "More people than ever are looking at what they can do to streamline and save costs. That's where our product comes in. I think finding efficiencies in dewatering and hauling will only increase in popularity. The market at this show is diverse, but it hits all our targets." 800/253-0532; www.brightbeltpress.com. tpo



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

Up With Efficiency

GREELEY TREATMENT PLANT USES SMART BUDGET PLANNING TO REPLACE AGING EQUIPMENT AND DRIVE DOWN ENERGY COSTS BY 37 PERCENT

By Neil Kolwey and Frederica Kolwey

The City of Greeley (Colorado) Water Pollution Control Facility has reduced its total energy consumption by 37 percent since 2011, achieving annual energy cost savings of \$190,000.

Under the leadership of Tom Dingeman, plant manager, the efficiency improvements were achieved mainly by leveraging the facility's five-year capital-budgeting plan to replace aging equipment.

The main energy efficiency projects were the replacement of the aeration system blowers with high-speed turbo blowers, installation of a new biosolids dewatering system and replacement of aging facility lighting with LED lamps.

BETTER BLOWERS

To replace the existing centrifugal blowers, Greeley chose six 300 hp turbo blowers from Aerzen USA. The new blowers are 27 percent more efficient and save an estimated \$100,000 per year on electricity. The \$790,000 project cost about 20 percent more than if Greeley had chosen new centrifugal blowers, but Xcel Energy, the local electric utility, provided a \$121,000 rebate that offset most of the cost difference.

The new biosolids dewatering system saves an additional \$69,000 in annual energy costs. The Aldec G3 centrifuge (Alfa Laval Ashbrook Simon-Hartley) has an innovative design that improves throughput and allows for lower horsepower motors. The main motor for the new centrifuge is rated at 100 hp with a 50 hp back-drive motor. It replaced an old centrifuge with 250 hp and 75 hp motors.

All told, the new centrifuge is 45 percent more energy efficient than its predecessor. The initial cost of the new system was about the same as for a less energy efficient alternative.

EFFICIENT LIGHTING

On the lighting front, the city replaced its outdoor pole-mounted lighting (metal halide and some high-pressure sodium lamps) and wall-mounted outdoor metal halide lamps with LEDs. The LED lighting saves \$7,000 per year, and the longer-life LED lamps also reduce the cost of changing lamps, especially for the pole-mounted fixtures.

Additional energy efficiency projects in the past five years include:

- Replacement of 10 pump variable-frequency drives with new and more efficient units.
- Upgrades to heating and air conditioning equipment.



PHOTOS BY FREDERICA KOLWEY

Tom Dingeman, left, Water Pollution Control Facility manager, explains the costs and benefits of the 500 kW solar array with Neil Kolwey, CIEC program.



New blowers from Aerzen save the facility about \$100,000 per year in energy costs.

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- Installation of an energy data management system that allows Dingeman and his staff to monitor the plant's electricity consumption on a daily basis.
- Dingeman also championed the installation of a 500 kW solar energy project, which saves \$7,500 per year, in return for an initial investment of \$10,000.

TAKING THE CHALLENGE

In December 2011, the Greeley plant joined the Colorado Industrial Energy Challenge (CIEC), a voluntary program managed by the Southwest Energy Efficiency Project. The plant set a goal of 20 percent energy savings from 2011 to 2016.

“If we don't do these kinds of improvements, our operating budget keeps going up.”

TOM DINGEMAN

In May 2015, Jeff Ackerman, director of the Colorado Energy Office, presented Greeley an Excellence in Energy Efficiency Award on behalf of the CIEC program for outstanding energy efficiency achievements and for exceeding its energy goal two years early. According to Dingeman, substantial energy efficiency improvements do not happen on their own: “Each organization

needs a champion to spearhead the effort,” says Dingeman.

The Greeley plant uses a capital-budgeting process, or master plan, that is reviewed and updated every five years. Dingeman says some of his success comes through taking full advantage of the budget process. When he plans process upgrades or equipment replacements, he compares the life cycle costs of the alternative technologies or equipment, including maintenance and energy costs. That typically enables him to choose the most energy efficient and environmentally sound technology.

“If we don't do these kinds of improvements, our operating budget keeps

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going up,” says Dingeman. He advises against waiting for something to break before looking into replacing it. “It is always better to be proactive than reactive.”

ABOUT THE AUTHORS

Neil Kolwey is a senior associate with the Southwest Energy Efficiency Project (SWEEP) and Colorado Industrial Energy Challenge program manager. Frederica Kolwey is a SWEEP intern. tpo

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Process Chemistry and Laboratory Analysis

By Craig Mandli

Algae Control

ECC FLOATING BIRD BALL BLANKET

Floating bird ball blankets from ECC help solve difficult liquid storage problems. Hollow plastic balls placed on the surface of a liquid automatically arrange themselves into a close-packed formation to cover 91 percent of the surface area. **910/245-2241; www.eccllc.us.**



Floating bird ball blanket from ECC

GEOMEMBRANE TECHNOLOGIES RETRACTABLE COVER



Retractable covers from Geomembrane Technologies

Structurally supported, retractable covers from Geomembrane Technologies can help reliably control algae. They consist of a high-strength sheet of coated fabric tensioned across a low-profile aluminum arched frame that spans the tank opening. This design controls algae while providing easy access for plant operators to inspect and maintain tanks, basins and tube settlers. By blocking

sunlight, a water treatment plant can reduce the amount of disinfectant chemicals required during the treatment process. Chemical reduction not only minimizes the formation of disinfectant byproducts to improve water quality, but it also yields significant cost savings. Temperature is better controlled and maintenance associated with algae cleaning is simplified. **855/484-4630; www.gticovers.com.**

Biological Stimulants

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Micro 14, a blend of 14 natural ingredients from Bionetix International, is designed to stimulate activity in nutrient-deficient soils, groundwater or wastewater. Applications include oil spill cleanup, wastewater treatment, sludge treatment, lagoons and ponds. **800/436-7832; www.bionetix.ca.**



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IXOM MIEX RESIN

MIEX Resin from Ixom is a solution to DBP compliance and can be monitored to reliably predict final disinfection byproducts. For a specific wastewater plant, correlate dissolved organic carbon to ultraviolet and graph multiple points to the corresponding byproducts (using simulated distribution conditions) so that the plant can use ultraviolet as an indirect indicator of byproduct compliance during seasonal variability. Each water sample is characterized and treated at variable rates to reduce the dissolved organic carbon. The target level is then evaluated for chlorine demand, and subjected to disinfection conditions. Disinfection with multiple chemicals (both free chlorine and chloramine) can be evaluated. Total oxidant demand is assessed and samples are incubated and analyzed for DBPs. Once detailed via report, a roadmap is provided for process control or modifications and process/equipment evaluations. **303/268-5243; www.miexresin.com.**



MIEX Resin from Ixom

Laboratory Supplies and Services

BIOSCIENCE CHEMICAL OXYGEN DEMAND TESTING

Chemical Oxygen Demand (COD) from Bioscience is a test method for determining the level of total oxidizable organic matter in a water sample. Chromic acid contains chromium ion in a +6 valence state. This ion has an orange color and is a strong oxidizing agent. When chromium +6 reacts with an oxidizable compound it is reduced to chromium +3, a blue-green ion, and the pH increases proportionately with the oxidation. Various compounds are added to eliminate the effects of interfering reactions. The results are quantified using the colorimetric method (measuring the change in color) or titrimetric method (measuring the increase in pH). The accu-TEST COD Reagents contain a precisely measured reagent in spectrophotometric glass vials. They are heated at 302 degrees F for two hours in the accu-TEST Reactor, which creates an internal reflux within the sealed vials. The vials are cooled and read on a colorimeter or titrated to obtain the final results. **800/627-3069; www.bioscienceinc.com.**



Chemical Oxygen Demand (COD) testing from Bioscience

CHEMTRON RUST INHIBITION PROCESS

Chemtron has a two-step process to protect submersible pumps and metal structures found close to wastewater or seawater from rust, corrosion and harsh environment conditions. The first step involves getting rid of the existing rusted, corroded or oxidized condition of the metal by applying a chemically reacting liquid coating, CT-337 RUST X SUPER, which transforms rust into a stable



Rust inhibition process from Chemtron

metal complex that will no longer rust unless physically removed. The application doesn't require any special surface preparation and does not need heat to cure. The second step, which can follow 20 minutes later, requires the application of CT-491 PAN PATCH, in liquid or aerosol spray, to cover and protect the metal substrate. It is formulated with a combination of rubber, plastic and oligomer hydrocarbons to adhere strongly to the substrate and render the surface completely impermeable to water and the environment. **954/584-4530; www.chemtron.com.**

HEMCO CORPORATION UNIFLOW FUME HOOD

UniFlow Fume Hoods from HEMCO Corporation are available in sizes from 30 to 96 inches wide in bench-top and floor-mount models, with custom sizes addressed to suit special needs. They have a unitized construction entirely of chemical-resistant, fire-resistant, self-extinguishing, nonmetallic composite resin materials. The fume chamber is molded one piece seamless with all corners covered for easy cleaning and light reflectivity. They include low-flow constant volume air bypass and variable air volume VAV models, which are UL 1805 certified. Other process-specific models include auxiliary air, perchloric acid, PVC acid digestion, trace metals, radioisotope, and dual-entry hoods. A selection of electrical, plumbing and ventilation accessories are available, in addition to counter tops and base cabinet options. **800/779-4362; www.hemcocorp.com.**



UniFlow Fume Hoods from HEMCO Corporation

METTLER TOLEDO SMARTPAN



SmartPan weighing pan from METTLER TOLEDO

The SmartPan weighing pan from METTLER TOLEDO offers precision balances to weigh to three decimal places without the need of a draft shield. It is designed to minimize the effects of air current, with high stabilization speed along with improved repeatability. Even in turbulent environments such as fume hoods and under air conditioning vents, it enables stable, accurate weighing results. Minimum weights are significantly improved, a useful advantage when working with expensive or toxic substances, and a necessary compliance requirement when adhering to ISO or GMP protocols.

It disassembles quickly and cleans up easily. **800/638-8537; www.mt.com.**

Sampling Systems

CHEMETRICS V-2000

The V-2000 Photometer from CHEMetrics is an LED portable water analyzer that measures over 50 analytes using Vacu-vials self-filling reagent ampoules. Operator safety is ensured with no sample preparation, mixing or chemical contact. It displays concentration, absorbance or percent transmittance.

Wavelength accuracy is plus-or-minus 2 nm. It has automatic wavelength selection, with a photometric range of 0 to 2 A. It stores up to 100 data points with date/time tags for later download to a lab computer or printer (RS232 output). It has Web-based



V-2000 Photometer water analyzer from CHEMetrics

upload capacity for quick updates. Tests include ammonia, COD, copper, DEHA, hydrazine, molybdate, phosphate and sulfide. It's rugged, waterproof (IP67), lightweight and battery operated. **800/356-3072; www.chemetrics.com.**

ELECTRO-CHEMICAL DEVICES DC80

The DC80 DeChlorination Analyzer from Electro-Chemical Devices is a panel-mounted, ready-to-use instrument designed to monitor very low levels of total chlorine in municipal drinking water, helping ensure the chlorine has been removed after water treatment to within



DC80 DeChlorination Analyzer from Electro-Chemical Devices

allowable levels before discharging the water. It relies on a zero-shift design for measurement of chlorine from 0 to 20 ppm. It is assembled with a total chlorine analyzer, which is fitted with a chlorine-dosing pump that feeds a metered amount of chlorine into the outfall of a constant head flow controller. The analyzer's offset feature allows the zero point to be shifted by the amount of chlorine that is added. The total chlorine sensor measures 3 to 5 ppm of total chlorine, which provides for a reliable measurement, and the analyzer displays the concentration of total chlorine present in the sample. **800/729-1333; www.ecdi.com.**

IN-SITU AQUA TROLL 600

The Aqua TROLL 600 multiparameter sonde from In-Situ offers water quality and quantity measurements in a single probe for establishing baseline conditions in reservoirs or monitoring sentinel parameters for source water quality impacts from algal blooms, pollution or storm events. Customizable sensor options combined with long-lasting internal power



Aqua TROLL 600 multiparameter sonde from In-Situ

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make it usable for spot-checking, sampling and long-term groundwater or surface water deployments. It can be used for vertical profiling in dynamic water conditions as well. It helps establish an early warning system to detect and address potentially harmful water-quality issues with real-time telemetry and data services options. **800/446-7488; www.in-situ.com/tpo.**

INDUSTRIAL & ENVIRONMENTAL CONCEPTS WAVE

The WAVE water sampling and analysis instrument from Industrial & Environmental Concepts enables fast and instantaneous detection of pollutants and their indicators in large bodies of water in real time with highly detailed and colorized mapping. It can pull and analyze samples for multiple pollutants at boat speeds up to 40



WAVE water sampling and analysis instrument from Industrial & Environmental Concepts

mph. Its software enables an individual to pull thousands of data points and create high-resolution maps with concentration gradients in minutes. It can sample, analyze and map 500 square miles in a day. **952/829-0731; www.ieccovers.com.**

(continued)



NASCO SLUDGE JUDGE

The Sludge Judge from Nasco can be used to take accurate readings of settleable solids, 5 percent or less, in a variety of liquids to any depth.

It is ideal for sewage treatment plants, chemical plants and food-processing facilities where accurate sample levels of settleable solids in noncaustic materials are needed. The unit holds approximately 3 ounces per foot. It comes in 5-foot sections of 3/4-inch plastic pipe with screw-type connectors. The top section includes

Sludge Judge from Nasco

a nylon rope for raising and lowering the sampler. Individual sections can be combined as required to achieve the length needed. Do not use in liquids over 165 degrees F. **800/558-9595; www.enasco.com.**

SENTRY EQUIPMENT CORP ISOLOK

ISOLOK automatic samplers from Sentry Equipment Corp help plant operators take control and conserve plant resources by safely, cleanly and effectively sampling from pressurized lines. These durable and rugged samplers consistently capture fixed sample volumes at fixed time intervals from a flowing process stream. Each sampler cycle consists of an extension and retraction. During plunger extension, the annulus is extended into the process stream and filled with a sample. The plunger then is retracted into the sampler body, capturing a sample volume. Finally, the sample is deposited into a sample collection container for analysis. **262/567-7256; www.sentry-equip.com.**



ISOLOK automatic samplers from Sentry Equipment Corp



SWAN ANALYTICAL AMI SAC 254 ANALYZER

The AMI SAC 254 Analyzer from SWAN Analytical provides photometric measurement of organic material load in drinking water based on DIN EN 38404-4. Spectral Absorbance Coefficient UV254 measurement with turbidity compensation enables process adjustments to cost-effectively adjust clarification chemical feed to reduce final effluent natural organic material loading. This reduces disinfectant demand and disinfection byproduct formation, improving water quality. The dissolved organic carbon formed from natural organic material such as humic acid, lignins and other organic material can also be directly correlated. When UV disinfection is employed, the UVT value can be used to optimize the disinfection process. It comes mounted on a back plate for easy and time-saving installation and operation. **847/229-1290; www.swan-analytical-usa.com.**

AMI SAC 254 Analyzer from SWAN Analytical

It comes mounted on a back plate for easy and time-saving installation and operation. **847/229-1290; www.swan-analytical-usa.com.**

Testing Equipment

ABS MATERIALS INFINITY SPE

The Infinity SPE cartridge for solid phase extraction from ABS Materials is efficient at capturing analytes from water samples, even those with high suspended solids. It doesn't need a prefiltration step, saving



Infinity SPE cartridge from ABS Materials

time and eliminating the loss of analytes during filtration. Equipped with a sorbent media, the cartridge provides rapid sample processing with no clogging or blinding by organic matter. It is compliant with EPA method 3535A and all affiliated solid phase or liquid-solid extractions, including methods calling for C18 or Divinylbenzene medias. It helps maximize lab throughput and reduce overall cost of wastewater sample analysis. **330/234-7999; www.absmaterials.com.**



AT5 circuit analysis instrument from ALL-TEST Pro

ALL-TEST PRO AT5

The AT5 hand-held electric motor circuit analysis instrument from ALL-TEST Pro performs a comprehensive assessment of a motor's health for troubleshooting, predictive maintenance and quality control of in-service, stored and incoming motors. On-screen, menu-driven prompts guide users through the testing process. Perform tests directly at motor terminals or, for hard-to-reach motors (such as submersible pumps), from distances up to 1,000 feet. It is ideal for low-, medium- and high-voltage AC motors and DC motors, as well as generators and transformers. **860/399-4222; www.alltestpro.com.**

HF SCIENTIFIC CLX

The low-maintenance CLX online residual chlorine monitor from HF scientific is ideal for municipal, chemical or industrial processes that require continuous monitoring and control of residual free or total chlorine levels. It has user-selectable cycle times, 4-20mA and RS-485 with Modbus output that can be used to control feed pumps, and user-selectable alarms that allow complete manual or automatic control of chlorine dosing. It is housed in a strong, shatterproof case with easy access to all service functions and reagents. It allows for unattended operation and low chemical usage. **239/337-2116; www.hfscientific.com.**




CLX online residual chlorine monitor from HF scientific



MD 100 COD Set from Lovibond Tintometer


LOVIBOND TINTOMETER MD 100 COD SET

The MD 100 COD Set from Lovibond Tintometer comes with everything the user needs for measuring chemical oxygen demand in wastewater samples. COD vials are offered in packs of 25 or 150 tubes, and meet U.S. EPA testing requirements. **800/922-5242; www.lovibond.us. tpo**



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Online effluent monitoring helps automotive plant stay in compliance

Problem

An automotive plant in Ohio needed to treat wastewater for COD removal. Under new regulations, the sequential batch reactor system needed real-time performance data to comply with a new COD discharge limit.

Solution

AppliTek proposed an **AppliCOD online monitor**, using a titrimetric method for COD measurement. Three months of side-by-side comparison of data from the lab and AppliCOD system showed that the AppliCOD data was about 12 to 18 percent higher than the standard method. The AppliCOD system was mapped for 0 to 1,200 ppm COD with a 4-20mA scale. The high limit was set at 800 ppm and a second high limit was set at 1,000 ppm with alarm relay. The system can be retrofitted or work in tandem with an existing PLC system.



RESULT

The plant's average discharge limit of 1,500 ppm COD was met and the quarterly compliance samples were also within the discharge limit. After a year, the plant remains in compliance. 317/625-4216; www.applitek.com.

Time-released bacteria used to eliminate FOG buildup

Problem

Elimination of FOG buildup in lift stations was time-consuming and costly for the utility in Spotsylvania, Virginia. The utility tested various products from lift station degreasers to enzyme formulations without success.

Solution

The utility installed **Biostim's BioPlugs**, made from multiple strains of bacteria embedded in a food-grade carrier. The material is simply floated in the lift station and takes two minutes to replace every 30 days. The time-release material dissolves over 30 days and converts FOG to carbon dioxide and water.

RESULT

The utility has used BioPlugs since 2011. "The BioPlugs have drastically reduced the amount of grease in our lift stations and have reduced or eliminated the routine cleaning for the stations," says William Bowers, utility foreman. "By reducing the frequency and amount of cleaning per station, the county has saved a significant amount of time and money." 800/338-8812; www.biostim.com.

Plant reduces recycled phosphorus levels with biostimulation

Problem

A Texas utility struggled with elevated levels of sidestream phosphorus recycled to the treatment plant headworks from the aerobic digesters. The plant had documented increased phosphorus from decant and from downstream centrate, elevating effluent phosphorus and potentially affecting permit compliance. Staff investigated using a biostimulant in the digesters to improve biological phosphorus uptake and remove excess through the centrifuged biosolids.

Solution

The plant team treated the aerobic digesters with **Byo-Gon PX-109 biostimulant** with an initial shock dose, then daily feed via metering pumps. The OMRI-certified organic product is designed to increase microbial respiration and improves biological performance.

RESULT

DNA sampling of the digester solids before and during addition showed a significant increase in phosphorus-accumulating organisms. Increasing ATP levels indicated higher biological activity, contributing to improved nutrient uptake. As decant clarity improved, sidestream and centrate phosphorus fell to less than 3 ppm, odors were greatly reduced in the centrifuge room, and biosolids production was reduced. An extended treatment evaluation was undertaken to evaluate continued use of the product in the digesters. 800/580-5509; www.byogon.com.

Aerators solve buildup and algae issues in lagoon

Problem

The City of Monroeville, Alabama, had aeration and mixing issues, a biosolids buildup and an algae problem in the sewage lagoon. This resulted from a 90 percent decrease in influent after closure of a garment manufacturing facility.



Solution

DO2E Waste Water Treatment provided two 5 hp floating aerators and two 3 hp floating mixers (suspended shearing digesters/aerators). The sludge buildup cleared almost immediately; in one week the algae had been removed from the treated part of the lagoon.

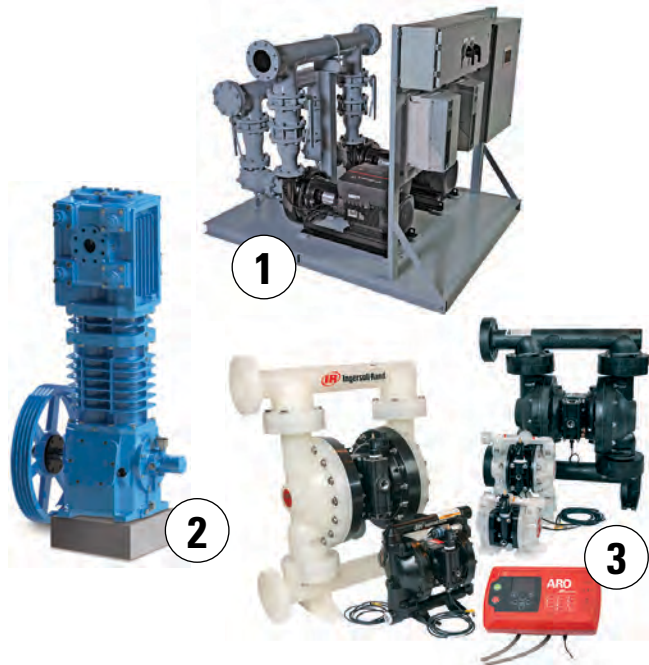
RESULT

From January 2010 through September 2015, no algae was present. The dissolved oxygen levels varied from 8.5 to 12 ppm over that period. The success is attributed to the increase in dissolved oxygen in the lagoon, destratification of the water column due to the draw from the aerators, shear forces from the aerators and floating mixers, and increased reactivity as solid particulates were reduced in size and therefore increased the surface area to interact with microbial enzymes present in the naturally occurring bioflora. 251/937-8200; www.do2e.com. tpo

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Triple-seal HD943 and HDL943 oil-free reciprocating gas compressors from Blackmer, part of PSG, a Dover company, feature a double-distance piece design with three individual sets of packing to prevent oil migration and maintain product purity. The compressors feature high-efficiency ductile iron valves with PEEK valve plates, ductile iron head and cylinders, three sets of self-adjusting filled PTFE packing sets on each piston rod for maximum leakage control, self-lubricating PTFE piston rings, precision-ground crankshaft and pressure-lubricated crankcase. **616/241-1611; www.blackmer.com.**

3. INGERSOLL RAND PUMP CONTROLLER

The ARO pump controller from Ingersoll Rand can be integrated with many existing ARO EXP pumps when an electronic interface package is added. It offers a fully automated multi-pump system for batching and container tank filling. The multi-pump controller can be programmed with remote triggers customized to the application in which it's being used. The controller can perform auto shutdowns when necessary, sending data and service alerts to the operator. It can also operate two pumps simultaneously, detect leaks, sense and respond to liquid levels, control portions, and control flow rates. **704/655-4000; www.ingersollrand.com.**

KOCH ENERGY-EFFICIENT MEMBRANE BIOREACTOR

The PULSION energy-efficient membrane bioreactor from Koch Membrane Systems pulses a large bubble through a chambered fiber bundle creating a pumping action that results in lower air and aeration energy requirements than traditional air scour methods. The result is a 40 percent reduction in energy consumption and a 25 percent smaller footprint. **888/677-5624; www.kochmembrane.com. tpo**

water: product spotlight



Proportional feed system from Blue-White Industries

Blue-White proportional feed system maintains constant chemical injection

By Ed Wodalski

The **proportional feed system** from **Blue-White Industries** is designed to maintain constant chemical injection to water flow ratio regardless of changes in the flow rate or pressure.

"In most water treatment applications you're going to be injecting a chemical into a flow stream. And that flow stream is typically not a consistent flow rate," says Bill McDowell, sales engineer, Blue-White Industries. "Coming out of a water well, the flow rate might be consistent if you have a well pump that is operating at, let's say, 100 gpm. Typically you can put a 'dumb' pump in there and set it for a specific flow rate. It can inject maybe 1 ounce per gallon. But if the flow starts to vary, for instance, if you're using a variable-speed well pump, then the chemical pump has to vary its output as well."

The proportional feed system includes a Digi-Meter F-2000-PC digital paddlewheel flowmeter; Star Tanks in 7-, 15- or 30-gallon capacity; and a Chem-Feed C-1500N diaphragm-type or Flexflo A-100N peristaltic-type chemical-metering injection pump.

"All the user has to do is fill the tank with chemical and they're ready to go," he says.

The square Star Tanks can fit in a corner. They also have a vented lid to prevent vapor lock and shelf where the pump mounts. Accessories connect through the sidewall of the tank.

"Our F-2000 flowmeter has a number of ways to drive the pump," McDowell says. "It has an electrical switch that enables the user to program the meter. For example, every time 10 gallons goes through your pipe the relay would energize and turn on the metering pump. The flowmeter can also count the batches and the number of times the pump was energized. That allows you to determine how much chemical you injected."

The C-1500N diaphragm series of metering pumps can deliver up to 125 psi and flow rates of 228 gpd (600 mL/min), while the A-100N series of self-priming peristaltic metering pumps can pump slurries and gaseous chemicals.

"If you're pumping chlorine or hydrogen peroxide or any kind of fluid where bubbles come out, you want a peristaltic pump," McDowell says. "However, a peristaltic pump has pressure limits because it's a squeeze tube that's going to wear out and needs to be changed. Depending on your application, the tube might last from a few weeks to a year or two."

Each system is factory wired and tested for trouble-free installation. **714/893-8529; www.blue-white.com.**

wastewater: product spotlight

Flygt adjustable, submersible mixer for adapting to changing loads, seasonal demands

By Ed Wodalski

The **Flygt 4320** low-speed, submersible **wastewater mixer** from **Xylem** features built-in speed regulation to optimize control over the mixer's thrust for continuous process results and lower energy consumption. Adjusting thrust to meet changing loads or season variations can reduce energy cost by 50 percent. It also reduces stress and wear on the mixer during low power periods. Coupling an integrated drive with a synchronous motor, the mixer eliminates the need for an external variable-frequency drive.

"Our research and development team has succeeded in developing a mixer that offers optimum efficiency and simplicity of operation," says Andreas Lindberg, product manager for mixers at Xylem. "A key reason for this is the mixer's adjustability. Once installed, the mixer thrust or speed can be altered to that facility's specific conditions; this can dramatically reduce energy consumption. Because motor speed can be altered when mixing demand increases or decreases, it future-proofs a facility's mixing efficiency."

Wastewater applications include activated sludge treatment, sludge holding tanks and digesters, as well as biogas applications. Mixers have a variable speed of up to 70 rpm and are available in two- or three-blade models with a range of propellers from 4.6 to 8.2 feet in diameter. The backswept design ensures clog-free operation.

"The propeller's backswept blade design improves its ability to deal with material such as fibers or rags, which could cause the mixer to stop or result in reduced performance," Lindberg says.

Speed controls can be adjusted using a small operator panel mounted tankside or in the control room for easy accessibility. Remote communication enables the mixer to be accessed from a central control system.



Flygt 4320 from Xylem

"Speed regulation is an integrated feature of the product," he says. "The speed can be changed either via a simple keypad connected to the power cable's control leads via Modbus remote communications protocol or via the power cable's control leads."

The mixer includes soft start and soft stop features that regulate motor revolutions, increasing the stability of the mixing system and reducing wear on mechanical and electrical components for longer life and reduced maintenance.

"Traditional mixers stop and start abruptly, which can place mechanical stress on installation equipment, as well as on the mixer itself," Lindberg says. "Traditional mixers start 'direct online' with strong electric inrush current, which places higher requirements on cables and fuses. The Flygt 4320 has no inrush current and slowly increases speed to the required level, reducing wear on the mechanical and electrical equipment." **855/995-4261; www.xylem.com/treatment.**

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- Koch Membrane Systems PULSION membrane bioreactor
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people/awards

John Cruz, Big Valley Rancheria Tribal System operator, received the 2015 Tribal Water/Wastewater Operator of the Year award from the Inter Tribal Council of Arizona National Tribal Water and Wastewater Operator Program.

The **Padre Dam Municipal Water District** in Santee, California, received the District of Distinction accreditation from the Special District Leadership Foundation for sound fiscal management. It provides wastewater, water, recycled water and recreation services to about 100,000 residents and treats 2 mgd of wastewater at its Ray Stoyer Water Recycling Facility.

Jim Maynes started his new position as wastewater treatment plant superintendent for Sioux City, Iowa.

Two employees of Alliance Water Resources were honored at the Missouri Water and Wastewater Conference. **Bart Downing**, a division manager, received the A.V. Graf Award, and **Jordan Hayworth**, plant operator in Elsberry, received the Young Professionals Award.

The **Manchester (Washington) Treatment Plant** received the Wastewater Treatment Plant Outstanding Performance Award for the 20th year in a row. It's the only plant in the state to receive that award every year since its inception.

New Jersey American Water appointed **Shawn Bunting** as vice president and deputy general counsel for American Water, and divisional general counsel and secretary for the company's Northeast Division.

events

Jan. 24-27

New England Water Environment Association 2016 Annual Conference and Exhibit, Boston Marriott Hotel/Copley Place, Massachusetts. Visit www.newea.org.

Jan. 25-28

Indiana Section AWWA 2016 Annual Conference, Marriott Hotel, downtown Indianapolis. Visit www.inawwa.org.

Jan. 25-28

AWWA 2016 International Symposiums – Potable Reuse and Biological Treatment, Renaissance, Long Beach, California. Visit www.awwa.org.

Jan. 27-28

Nebraska Water Environment Association Snowball Conference, Holiday Inn and Conference Center, Kearney. Visit www.ne-wea.org.

Kip Peters was hired as water and wastewater utilities director in Hudson, Wisconsin. He previously served as utilities director at Fox Lake, Wisconsin, for 14 years.

The **Bristol (Tennessee) Regional Wastewater Treatment Plant** was recognized by the Kentucky Tennessee Chapter of the Water Environment Association for operational excellence in 2014. The honor is for plants that have no more than one NPDES permit excursion during the calendar year.

Tyler White, wastewater operator III with the City of Sequim, Washington, received the Wastewater Operator IV Certification from the Washington State Department of Ecology.

The **Houlton (Maine) Water Company** was named a 2015 Utility of the Year by the New England Water Works Association in the medium-sized systems category.

The U.S. EPA recognized the **Sonoma-Marín Saving Water Partnership** as the Professional Certifying Organization Partner of the Year for its Qualified Water Efficient Landscape professional certification program. The **Municipal Water District of Orange County (California)** received an Excellence Award for its Sprinkler Spruce-Up campaign promoting WaterSense labeled weather-based irrigation controllers.

Connecticut Water Company received a 2015 Management Innovation Award from the National Association of Water Companies for its Customer Protection Program.

The Mississippi Water Environment Association recognized the **Long Beach/Pass Christian Wastewater Treatment Plant**, managed by **Larry Moxley**, as its Wastewater Plant of the Year.

Brent Reneau, Hamilton (Illinois) Water Department head operator, was named Surface Water Operator of the Year by the Illinois Potable Water Supply Operators Association and the Illinois EPA.

Rebecca F. West, chief operating officer with Spartanburg (South Carolina) Water, was named a Fellow of the Water Environment Federation.

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



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industry news

Yaskawa Celebrates 100th Anniversary

Yaskawa Electric Corporation, a world leader in industrial robotics, electrical drives and frequency converters, celebrated its 100th anniversary this past year. The company arranged special events worldwide to mark this special milestone. In Finland, Yaskawa participated in the Technologia 2015 exhibition in Helsinki together with its Finnish subsidiary, The Switch, which it acquired in 2014.

Endress+Hauser Announces Southwest Territory Changes

Effective Oct. 12, Instrumentation and Controls LLC became Endress+Hauser's exclusive representative for Arizona and strategic markets of New Mexico including the greater Albuquerque area.

SUEZ Group Launches Water-Conditioning Service

SUEZ Group has launched aqualead, a complete water-conditioning range focused on the industrial water cycle. It covers water-conditioning products for the treatment of all aspects of industrial water management to dedicated wastewater, cooling and boiler water conditioning services.

Ovivo Partners With Microdyn-Nadir

Ovivo USA LLC signed a multi-year agreement with Microdyn-Nadir to service the membrane bioreactor market. The agreement secures access to BIO-CEL membrane technology and includes a collaborative venture to build private-label membrane equipment. This partnership is expected to rapidly drive innovation, increase quality, reduce costs and improve delivery times.

Xylem Awarded Contract for Texas Golf Course Irrigation

Xylem, a global water technology company, has been awarded a \$1.25 million contract to provide advanced treatment technology to the South Wastewater Treatment Plant in McAllen, Texas. The plant provides 240 million gallons of reclaimed, treated wastewater annually to the McAllen Palm View Golf Course for irrigation purposes. Xylem's technology will help to ensure consistent quality at the plant as it treats up to 10 mgd of wastewater.

FVOP Hires 7 Operators

F&V Operations and Resource Management has hired seven new employees for its expanding operations. Three senior project managers — George Regan, Jay Ouzts and Stewart Beach, who have F-1 water licenses — are among the new hires. Four operations specialists — Donald Bicknell, Michael Prout, Eric Barnowski and Rob Pearson — have also been hired. FVOP is a subsidiary of Fleis & VandenBrink and provides operations and management services for municipal, industrial and environmental systems in 20 communities in Michigan and Indiana.

UV Pure Releases How-To Videos

A new series of how-to videos from UV Pure provides step-by-step instructions for completing procedures on Upstream and Hallett 15xs systems. In each video, UV Pure Service Manager Alex Zammit describes the parts and tools needed for each procedure. The video library provides instructions for replacing the quartz sleeve, blower, circuit board, circuit board cooling fan, purge valve, UV sensor and lamps in UV Pure Upstream and Hallett 15xs systems. More videos are on the way for other UV Pure systems. Subscribe to the UV Pure YouTube channel to receive notifications for new videos. **tpo**

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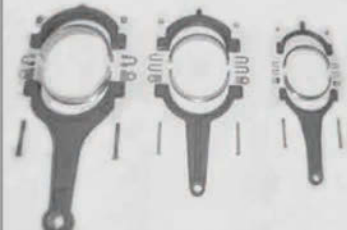
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Bob Gentile
 Superintendent
 Struthers WWTP
 Struthers, OH



Struthers Wastewater Treatment Plant in Ohio is making tremendous strides toward going green. Through their installation of a methane-powered generator system that uses methane collected from their anaerobic digesters, they've increased the efficiency of their plant, while committing to saving hundreds of thousands of dollars on utility costs in future years.

Since the completion of the generator system, funded by \$5.4 million stimulus dollars from the Ohio EPA through the federal American Recovery and Reinvestment Act, Struthers has seen big savings on energy costs. Superintendent Bob Gentile shared, "Our electrical costs are down from about \$25,000 monthly to only \$13,000 or \$14,000. Plus... our gas bills have dropped from about \$1,700 per month to around \$500."

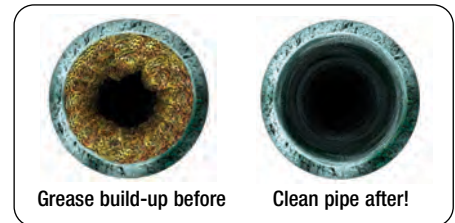
"We rely on USABlueBook for all of our MRO supplies."

In order to ensure their system's continued success, proper maintenance will be crucial. "While the installation of the generator system was handled by contractors, we rely on USABlueBook for all of our MRO supplies. We just recently had to change out a motor on one of our recirculation pumps, and you guys were able to help us out. USABlueBook is great. Your book has everything we need, and our orders are always shipped very nicely. We buy everything we can from you guys," said Bob.

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2 EHC-33 Bioenzyme

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DESCRIPTION	STOCK #	EACH
25-lb Pail of 8-oz Quick-Dissolve Bags	48165	\$ 399.95

3 Big Blue Bio-Blocks

Dissolve over 30 to 90 days to continuously add grease-fighting bacteria. Perfect for lift stations or wet wells.



DESCRIPTION	STOCK #	EACH
5-lb Block	49828	\$ 99.95
10-lb Block	49829	199.95
30-lb Block	49831	399.95



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