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JULY 2013

Raymond Bryant
Chief Systems Operator
Courtland, Va.

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A VIRGINIA TEAM MAKES A SUCCESSFUL TRANSITION TO A NEW PLANT AND 5-STAGE PROCESS

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Operators at the Southampton Regional Water Reclamation Facility had a lot to learn when their new five-stage Bardenpho plant started up in 2010. Now, they're in the driver's seat. Raymond Bryant, chief systems operator, is shown in front of the newly upgraded facility in Southampton County, Va. (Photography by Rob Ostermaier)

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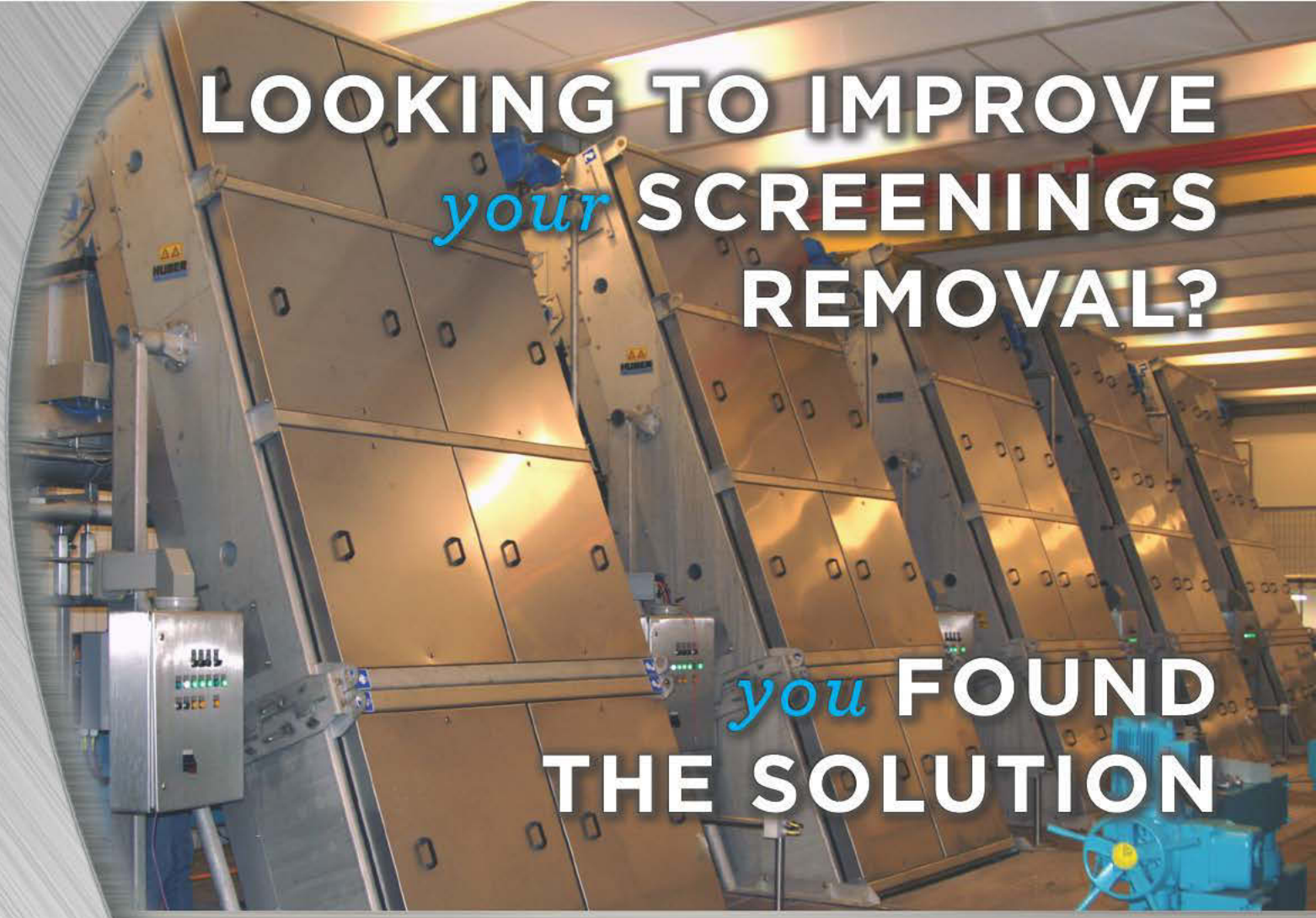

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Figuring Fracking

JUST WHEN IT SEEMED LIKE CLEAN-WATER PLANTS HAD ENOUGH CHALLENGES, HERE COMES A NEW ONE: DEALING WITH WATER FROM NATURAL GAS EXTRACTION

By Ted J. Rulseh, Editor

So you've completed a plant upgrade. You've come into compliance with nitrogen and phosphorus limits — or have plans in place to do so. Now — if you happen to be in one of the nation's natural gas boom areas — you may face a dilemma on what to do with wastewater from the process known as fracking.

North America is enjoying record high natural gas supplies, and thus record low prices, because of fracking (short for hydraulic fracturing). Here in Wisconsin, we're not producing gas, but we are seeing an explosion of mining for the sand used in fracking operations in places like North Dakota — and concerns about the environmental effects of these loosely regulated mines have been raised.

In the gas-producing regions themselves, concern is growing over how best to handle fracking wastewater. If your plant is in one of those areas, *Treatment Plant Operator* would like to hear about your experiences with — and opinions on — the issue of treating this kind of influent. Do you do it? If not, why? If so, how does it affect your plant?

THE BASICS

Fracking is used to extract natural gas from shale formations deep underground. The process involves drilling down, and most often also horizontally, to reach the shale layer. A mix of water, sand and chemicals is then injected at high pressure to fracture the rock and create pathways through which trapped natural gas can escape and be harvested.

As much as four-fifths of the injected water returns to the surface, where it is collected as wastewater. Some gas producers reuse this water. Others inject it into deep storage wells, and still others transport it to municipal wastewater treatment plants. Some plants accept this wastewater, which can contain high levels of pollutants like benzene (a human carcinogen) and barium; others do not.

In an article last spring, *Chemical & Engineering News* reported on a research study suggesting that treatment plants may not be able to handle this water adequately. The results seemed to indicate that effluent from plants that treat fracking water still contains elevated levels of chemicals from gas production.

The article noted that in May 2011, "the Pennsylvania Department of Environmental Protection (DEP) asked that the state's treatment plants voluntarily stop processing fracking wastewater. The request came in response to public concern over elevated bromide levels in the Pennsylvania Monongahela River watershed, an area with facilities that treat water from natural gas production."

Fracking waste has not been definitively cited as the source of the bromide, but there have been limited studies of how such wastewater affects effluent quality.

LOOKING DEEPER

The magazine reported that a graduate student and colleagues at the University of Pittsburgh analyzed water from Pennsylvania treatment plants that first took in fracking water and then later stopped, in line with the DEP request. Then they analyzed samples from plants in the state that treated water from the nearby Marcellus Shale region.

The researchers tested for substances that are found in fracking water but don't normally appear in other industrial wastewater. Generally speaking, they found that levels of fracking contaminants dropped significantly once plants stopped taking fracking water.

"But when the plants still handled the waste, levels of several of the chemicals exceeded drinking water standards set by the U.S. EPA," the magazine reported. At one plant, barium measured 5.99 mg/L on average (versus an EPA drinking water standard of 2 mg/L) and strontium at 48.3 mg/L (versus 4 mg/L.

In the gas-producing regions themselves, concern is growing over how best to handle fracking wastewater. If your plant is in one of those areas, *Treatment Plant Operator* would like to hear about your experiences.

Does that indicate a health risk? Not likely, because of course wastewater effluent is not used directly for drinking, and it would be significantly diluted in the receiving stream. But how might those elements affect aquatic ecosystems?

YOUR PERSPECTIVES?

That question and others may need answers as fracking proliferates. I'm not in any informed position to weigh in against fracking. Its impacts concern me, but at the same time it's because of fracking that natural gas for my home and propane for a seasonal cottage cost a lot less than a few years ago.

What are your thoughts — on fracking in general, but more importantly, on how fracking wastewater affects treatment? Send an email to editor@tpomag.com. I promise to respond, and we will report on the submissions in a future issue of the magazine. **tpo**

Plant visitors rode on a trolley of the kind used for touring historic sites in Springfield.

PHOTO COURTESY OF SPRINGFIELD METRO SANITARY DISTRICT

IDEA OF THE MONTH:

Residents take a riding tour of an upgraded clean-water plant

By Ted J. Rulseh

THE FIRE CHIEF PROJECT

One way to attract people to a clean-water plant tour is to do something a little different. So, here's a hat tip to the folks at the Springfield (Ill.) Metro Sanitary District. On April 27, they gave tours of the newly upgraded Spring Creek Wastewater Treatment Plant that included a 15-minute ride around the grounds in a trolley usually used to take tourists around to places such as the home of Abraham Lincoln.

"There's a company in town that runs trolley routes around the historic sites in Springfield," says Gregg Humphrey, executive director of the district. "The trolleys have windows on the side. They're open-air trolleys, but if the weather is bad you can roll down the plastic windows.

"The trolleys run during the summer, and we made an inquiry as to whether a unit would be available to us. People came to our administration building, and in there they watched a video of the plant and how it operates. After that they got into the trolley for a 15-minute driving tour around the plant.

"We had our people narrating as they went, explaining the components and processes people saw on the video — the primary clarifiers, the activated sludge tanks, the secondary clarifiers, and things like that. For safety and security reasons we didn't want people wandering around the plant on their own."

The upgrade replaces a previous plant that had operated since the 1920s. It encompasses the first three phases of a four-phase project costing $120 million. The new facility has been operating since last July.

How do you conduct plant tours? Is there anything you can do to make the experience more interesting and more pleasant for your visitors?

Showing your plant to residents — and doing it in a unique and classy manner — helps further the two aims of The Fire Chief Project:

- **Raise clean-water operators to the stature of the fire chief**
- **Make young people grow up wanting to be clean-water operators**

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Send ideas for The Fire Chief Project to editor@tpomag.com

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editor's choice

Find other useful and timely information on the *TPO* website

TPO aims to bring you stories that help you and your plant perform better. Now we do more of the same at www.tpomag.com. There you'll find stories that appear only online — and that are current, because they're not subject to the lead times involved in the print magazine. Here are a few online exclusives recommended by the *TPO* editorial team:

OPERATOR INGENUITY PAYS OFF AT ILLINOIS WASTEWATER TREATMENT PLANT

When the treatment plant in New Lenox, Ill., faced an expansion, operators saw that it was not as simple as expected. Adding three primary clarifiers increased capacity from 0.75 to 1.5 mgd. The clarifiers reduced solids loading by 60 percent and BOD loading by 30 percent. But when the clarifiers went online, operators had to solve a few problems. See how their ingenuity paid off and what you could learn from their experience.

WATER PURIFICATION DEMONSTRATION PROJECT BOOSTS RECYCLED WATER INITIATIVE

The City of San Diego, with its Water Purification Demonstration Project, is one step closer to using purified water for reservoir augmentation. Completed in 2012, the project showed that advanced technology could provide safe and reliable drinking water. The 1 mgd Advanced Water Purification facility uses microfiltration/ultrafiltration, reverse osmosis, and UV light with hydrogen peroxide for disinfection.

EPA AWARDS $560 MILLION IN FUNDING TO STORM-DAMAGED WASTEWATER AND DRINKING WATER FACILITIES

The U.S. EPA will provide grants of $340 million to the state of New York and $229 million to the state of New Jersey to improve water and wastewater treatment plants harmed by Hurricane Sandy. The money will help communities recover from the Oct. 29 storm, which left some treatment facilities too damaged to function. The states can use the funds to reduce flood risks and harden facilities against future storms.

PLANT TOURS CHANGE THE FACE OF NEW JERSEY SEWERAGE AUTHORITY

The Rahway Valley (N.J.) Sewerage Authority has boosted its plant tour program. "The best way for us to get the word out about the positive things we do for the environment is through the children," says Jim Meehan, executive director. The kids then go home and tell their parents how much effort it takes to clean water and why the resource is precious. Tours target kids in seventh grade through high school.

ENSURING WATER QUALITY IN WEST VIRGINIA

As the state celebrates its 150th birthday, the West Virginia Environmental Training Center heads into its 28th year providing certification programs for water and wastewater system operators. Since 1985, it has been led by Richard Weigand, director of environmental training. A Certified Environmental Trainer, Weigand is one of the country's leaders in training for water professions. He is excited about national training guidelines under development by the Association of Boards of Certification (ABC).

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Ready to Grow

THE TEAM IN COURTLAND, VA., MADE A TRANSITION TO A NEW PLANT AND 5-STAGE BIOLOGICAL PROCESS. THEY'RE MEETING THEIR PERMIT CONSISTENTLY AND ARE READY FOR WHAT THE FUTURE HOLDS.

By Jim Force

Team members at the Southampton facility include, from left, Keith Jackson and Bruce Whichard, operators; Dennis Beale, lead operator; Raymond Bryant, chief systems operator; and Milton Billups and Tim Christenson, operators. (Photography by Rob Ostermaier)

profile

Southampton Regional Water Reclamation Facility, Courtland, Va.

BUILT:	2010
POPULATION SERVED:	600 customers
SERVICE AREA:	10 square miles (eastern part of county)
FLOW:	1.25 mgd design
TREATMENT PROCESS:	5-stage Bardenpho process
RECEIVING STREAM:	Nottoway River
BIOSOLIDS:	Aerobic digestion, dewatering, cake to compost
AWARDS:	2012 System of the Year, Virginia Rural Water Association
ANNUAL BUDGET:	$3.7 million
WEBSITE:	www.southamptoncounty.org
GPS COORDINATES:	Latitude: 36°34'43.90" N; Longitude: 77°12'46.79" W

OPERATORS AT THE SOUTHAMPTON REGIONAL WATER RECLAMATION

Facility had a lot to learn when their brand new five-stage Bardenpho plant started up in 2010. Now, having mastered the new processes, they're in the driver's seat. That's because any expansion of the plant, which has a modular plug-and-play design, will simply involve more of the same.

A thorough training program has been the key. The transition was difficult, recalls Raymond Bryant, chief systems operator at the 1.25 mgd (design) plant, in the Town of Courtland in Southampton County, Va. The county's old plant was a 0.3 mgd oxidation ditch with sludge drying beds. "We'd never seen this new process before, myself included," Bryant says. "But we have a good bunch of guys who are dedicated to wastewater treatment."

The previous facility was prone to overflows from I&I and high water in the receiving stream. The new facility includes oxidation ditches and new buildings that house a dewatering centrifuge and step screen.

Adds Ron Eisele of the Timmons Group, Richmond-based designers of the plant, "That was their biggest challenge — training the operators to run these new processes. It was quite an undertaking for these guys, just the size of it, getting your mind around a 50-foot clarifier when you've been used to 20 feet, or going from a small aeration process to the Bardenpho, which is the first five-stage system of its kind in the state."

> "We'd never seen this new process before, myself included. But we have a good bunch of guys who are dedicated to wastewater treatment."
>
> **RAYMOND BRYANT**

Vendors and the Virginia Rural Water Association provided most of the training, which took about two months. Bryant says the trainers provided good leave-behinds, including useful videos: "I still find myself pulling out a video to see if I've missed anything." Mid-Eastern Builders, the contractor, was helpful during startup. "Sometimes when you have problems it's just nice to have somebody pick up the phone at the other end," Bryant says.

OLD TO NEW

For years, the previous plant treated flow from a small number of customers and several industries in the eastern part of this rural southern Virginia county. But the facility was prone to overflows from severe infiltration and inflow to the sewers or from high water in the Nottoway River, the plant's receiving stream.

"The plant was antiquated, and things were breaking down all the time," says Bryant. "We were feeding gaseous chlorine, and we have a trailer park within 1,500 feet of our property." With industrial expansion on the horizon, the county hired the Timmons Group to design the improvements, and the firm used an efficient design-build process to construct an entirely new plant alongside the old one in about 18 months.

"We broke ground just 40 days after signing off on the paperwork," says Eisele. "Design-build is a very efficient approach. Designer, contractor, and owner work hand-in-hand." The new plant was built within the footprint of the old one and was elevated to meet floodplain regulations.

Driven by influent pumps (Gorman-Rupp Co.), raw wastewater enters through a headworks with a stair-step screen (Vulcan Industries) and a screenings compaction and washing unit

"We broke ground just 40 days after signing off on the paperwork. Design-build is a very efficient approach. Designer, contractor, and owner work hand-in-hand."

RON EISELE

Bruce Whichard takes a water sample from the end of the UV disinfection system (Ozonia).

TRAINED TO SUCCEED

Like Rural Water Associations across the country, the Virginia RWA offers valuable support to small water and wastewater agencies.

At the Southampton Regional Water Reclamation Facility, the VRWA helped operators adapt to their new treatment system by teaching a course in electricity for wastewater plant operations. Frank Nadeau, VRWA wastewater technician, coordinates the program.

"We conduct comprehensive training sessions, including affordable GIS, backhoe operations, microbiology, and EPA regulations," he says. "We also provide circuit riders who offer on-site assistance."

The course at Southampton emphasized all phases of electrical operations and issues, including the theory of electricity, arc flash prevention, major switchgear, required clothing and personal protection, fuses and circuit breakers, and lock out-tag out.

"We also cover emergency power hookups, particularly emergencies created by wind storms," Nadeau says. "Our association is primarily here to provide whatever assistance we can to small systems with under 10,000 connections."

(Ovivo). Grit is removed and dewatered in a vortex system (Hydro International).

The five-stage Bardenpho process (Ovivo) provides biological treatment using a series of anaerobic, anoxic, and aerobic zones equipped with submerged mixers. Bryant and his staff carefully control dissolved oxygen to achieve the desired results.

Treated water settles in a pair of 50-foot-diameter clarifiers (Ovivo), and then passes through a cloth disc filter (Aqua-Aerobic Systems). Three banks of UV light units (Ozonia) disinfect the effluent before post-aeration on the way to discharge. Pumps (Gorman-Rupp) are on hand to move water away from the plant to the river in case of storms or floods.

Solids are digested aerobically, thickened, and dewatered in a centrifuge (Alfa Laval). Dewatered cake is taken to a nearby composting site. All plant processes are automated and monitored via a new SCADA system (Systems East).

At startup, the state required the county to staff the new facility 16 hours a day because of the high performance standards. However, once the staff showed competence and met effluent permit limits regularly, that requirement was lifted, and the plant is now staffed on a typical 8-hour shift. "We've never had a violation since startup," Bryant says.

Southampton Regional Water Reclamation Facility PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	150 mg/L	<5 mg/L	15 mg/L
TSS	100 mg/L	<1 mg/L	15 mg/L
Zinc	0.090 mg/L	0.029 mg/L	0.067 mg/L

LIKE A LEGO SET

The county kept the future in mind in planning the new facility, and the Timmons firm took a modular approach to the design. "We essentially built in future expansion using today's money," says designer Eisele. "It's pretty forward-looking."

The current design of 1.25 mgd can easily be expanded to 2.5 and 3.75 mgd, just by adding more units to the processes. "We knew that we didn't need 3.75 right now, but everything is in place to allow us to expand quickly in the future," Eisele says.

Actually, the headworks is already set up for 3.0 mgd, but with the rest of the plant, it's just a matter of adding equipment and opening valves. The design also means the staff will be ready for any expansion because the equipment will simply mirror what's already there.

LEARNING THE ROPES

Besides Bryant, the plant team includes Dennis Beale and Bruce Whichard, lead operators; Keith Jackson and Tim Christianson, operators; and Milton Billups, trainee and pump technician. Charles Hyman, Daniel Fowler, and David Joyner staff another Southampton County plant but are trained on the treatment processes and are available to help out if necessary.

Once trained, Bryant and the staff had to move to the hands-on stage and make things work. The new biological system and SCADA setup proved challenging. "The hardest thing was trying to figure out the proper balance in the biological system, since we had a small load of only about 100 mg/L of BOD coming in," says Bryant. "The food to the system was real limited."

The team had to get the proper dissolved oxygen (DO) and mixed liquor

Keith Jackson examines a return activated sludge pump (Super T Series, Gorman-Rupp Co.).

Jackson analyzes for suspended solids (much of the facility's testing is performed at contract laboratories).

in each of the tanks or zones. "In the Bardenpho process, influent enters the anaerobic zone first, requiring a low DO, then the anoxic zone requiring zero DO," says Bryant. Another anaerobic zone follows, and there the mixers bring DO back to about 0.5 mg/L. Next is a second anoxic zone, and finally the reaeration zone, where DO needs to be at least 2.0.

Bryant sees a lesson from his team's experience for those starting up new biological treatment trains: If you previously had a biological process and it was working fine, apply some of the same numbers to the new system. "Basically, after we got started, we used the same mixed liquor levels we used in the old plant and achieved the same settling ability in the clarifiers," he says.

The SCADA system required another learning curve. "Most of us didn't grow up with a computer," says Bryant. He admits it was difficult until staff understood the workings of the system — it took about six months to work out all the bugs. "It's simple now, and useful," says Bryant. "We can control just about everything from the control room in the lab area."

While most everything worked as planned, the staff made some changes with the aerobic digesters. The three digesters (one small, two larger in size)

BOTH SIDES OF THE AISLE

Raymond Bryant

Raymond Bryant works both sides of the aisle — water and wastewater. He's responsible for the new Southampton Regional Water Reclamation Facility and two other wastewater treatment plants that serve Southampton County, and for the county's water system, which includes a number of wells, and for about a third of the community's water meters — those that are not radio-read. His staff has dual responsibilities, as well.

"I do have good people," he says. "They're licensed both ways, and they like their jobs. It takes a certain kind of person to succeed at water and wastewater. It's not like punching a button on a production line. I don't care where you're at, water and wastewater is on your mind. You go to another town and you notice where the water towers are, where the treatment plants are."

A veteran of 25 years of work in water and wastewater management, Bryant joined the Southampton County team nine years ago. He figures it's his last stop before retirement.

"Basically, after we got started, we used the same mixed liquor levels we used in the old plant and achieved the same settling ability in the clarifiers."

RAYMOND BRYANT

have a combined capacity designed to serve the plant at its maximum flow (3.75 mgd). As existing flows are relatively low, the treatment plant staff started off just using the smallest one. Soon, however, the material from the pumping stations and scum pumps forced a switch to one of the larger digesters.

"That way we could hold the sludge a little longer," Bryant says. "We were pushing it through the small digester too quickly." The change improved the thickening and dewatering properties of the final biosolids product, which averages about 20 percent solids out of the centrifuge.

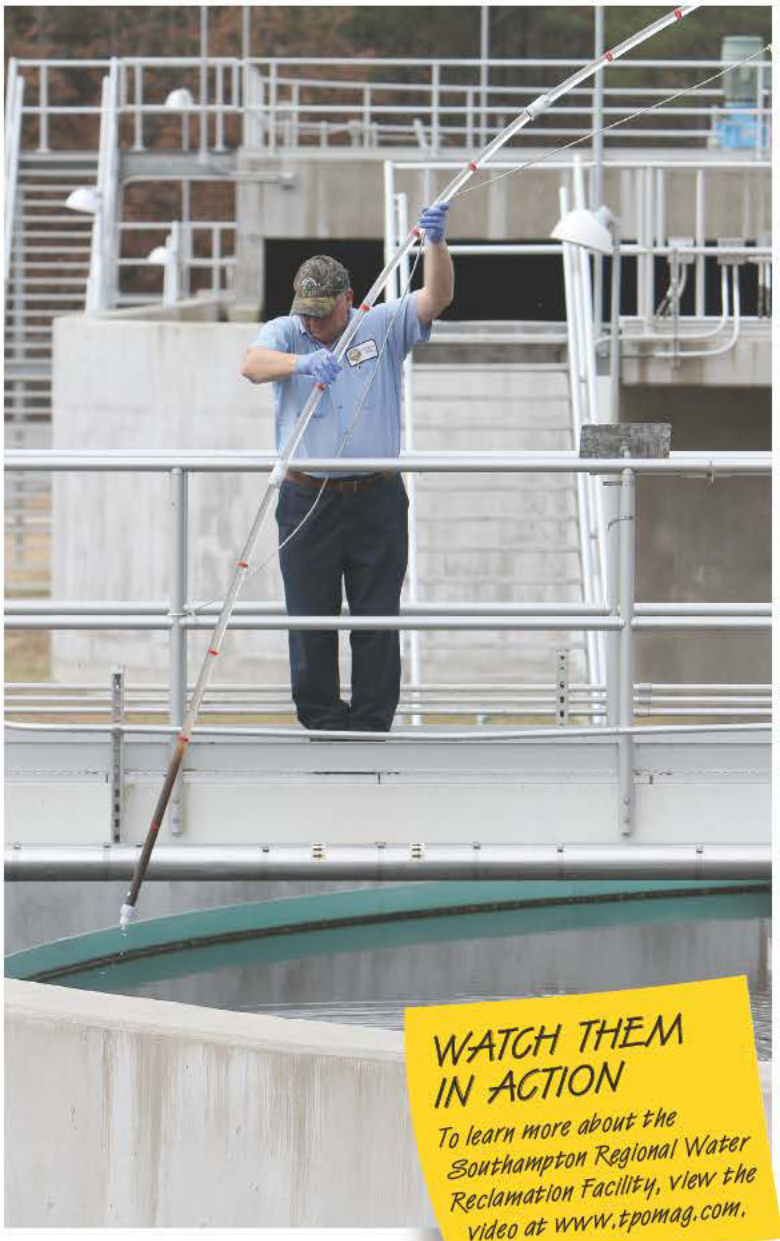
LOOKING AHEAD

With startup and training in the rearview mirror, a Virginia Rural Water Association System of the Year plaque on the wall, and a perfect record of compliance from day one, the staff is well prepared for the future. The plant has no phosphorus or nitrogen requirements yet, but Bryant expects to see those limits down the road. In fact, the plant is designed to meet an expected nitrogen limit of 10 mg/L.

In addition, future industrial expansion will add to the amount of wastewater needing treatment. "A new wood pellet mill will come online fairly soon," explains Bryant, "and it will use a lot of water and produce a lot of wastewater." With the new processes and expandable features of the Southampton Regional Water Reclamation Facility, Bryant and his staff are in a good position to deal with these new challenges.

Meantime, says Bryant, it's just nice to have a new plant: "With the old plant, something was always broken or not running. Nowadays, we don't have to worry about that." tpo

Monitoring of the sludge blanket (done here by Dennis Beale) helps the plant team keep the biological process humming.



WATCH THEM IN ACTION

To learn more about the Southampton Regional Water Reclamation Facility, view the video at www.tpomag.com.

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Water Wheels

SAN FRANCISCO RESIDENTS TOUR WASTEWATER FACILITIES ON BICYCLES AND LEARN THE VALUE OF CLEAN WATER AND THE IMPORTANCE OF INFRASTRUCTURE

By Briana Jones

With a compact city covering 46 square miles, the San Francisco Public Utilities Commission prefers bike tours to explore its wastewater plants, collection system and pump stations with community members. The Second Annual Wastewater Whirl took place last October.

"San Francisco is great because it's seven by seven square miles," says Jean Walsh, SFPUC communications manager, who organizes the tours. "You can get from one end of the city to the other in a short time. It's not a sprawling city. We can cover our whole collection system by bicycle in just an afternoon, so it lends itself very well."

The two-part tour totals 25 miles, although riders can opt out after the first 10 miles. Most information is shared during that first leg when plant staff and community members cycle from the first of three wastewater treatment plants to pump stations, odor-control stacks, capital projects and outfalls.

LEAD THE WAY

Walsh and a handful of staff members lead the tours. The groups stop to gather around each structure and discuss what they see. "For example, the riders may not see anything but a fence and a piece of concrete, but we explain that it's a pump station and why it's important," says Walsh.

The tour begins at the Southeast Water Pollution Control Plant (250 mgd design), then heads up through the city to the North Point Wet-Weather Facility (150 mgd design), and ends at the Oceanside Water Pollution Control Plant (65 mgd design) in the southwest corner of the city.

SFPUC superintendent of operations and avid cyclist George Engel says, "We start with actually riding our bikes through the entire plant, from pretreatment over to our secondary treatment process, basically providing general information."

PHOTOS COURTESY OF SFPUC

Bicycle tour participants enter the North Point Wet-Weather Facility.

Engel uses an analogy of making coffee to explain the wastewater process. Pure water used to make coffee becomes brown water, and if it sits for a little while, sludge and scum are created — that demonstrates primary treatment. The secondary (biological) process corre-

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Tours cover the entire spectrum of the processes, from pretreatment through secondary treatment.

"It's critical to gain public support for what we're doing so people have an appreciation for what goes into the wastewater process, understand just how difficult and complicated it is to work in an urban area and how the costs escalate."

GEORGE ENGEL

Cyclists visit three wastewater treatment plants, as well as pump stations.

sponds to the body digesting the coffee and dispensing a clear to yellowish liquid. "Then we go over to our solids side to see our digesters and actually smell our biosolids before they go onto a truck," he says.

SUPPORTING SPROCKETS

To get the word out about the second annual ride, the SFPUC did substantial online promotion. About 70 people showed up, from teenagers to those in their 60s. "We didn't spend a penny on marketing or outreach for this — it was just a completely grassroots effort," says Walsh. "We made some flyers and rode around on bikes, delivering them at bike shops and coffee shops and places where bike people hang out."

They also sought support from a local bike club. "The main thing we did this year was partner with the San Francisco Bicycle Coalition," says Walsh. "It's a local advocacy group with 12,000 members, and they put the bike tour in their print and digital newsletter."

TELL ME MORE

Riders experience the San Francisco wastewater and water systems in a unique way. "We want to let the public know a lot of work goes on behind the scenes," says Walsh. "There's a lot that we do as an agency, but there's a lot the public can do, too."

Teaching residents where their water comes from and how it is treated and distributed helps the agency gain support for infrastructure projects. "We're entering a 20-year capital program valued at about $7 billion," says Engel. "We want people to understand where their money is going. It's critical to gain public support for what we're doing. We need people to appreciate what goes into the wastewater process, realize how difficult and complicated it is to work in an urban area, and understand how costs escalate."

Walsh adds, "It doesn't magically happen — we have to put money into our aging infrastructure. So we're trying to educate people that this is important. If we didn't have a functioning sewer system, we'd be a third-world country. People are going to see their rates go up and we want to show them why."

The bike tours give residents first-hand knowledge of how their money is being used. Walsh adds, "I think a lot of people turn the tap or flush the toilet, but they have no idea where the water is coming from, where it goes, and all the work that goes into delivering it and treating it to protect our environment and public health." **tpo**

The Fairforest Wastewater Treatment Plant is one of eight water reclamation facilities operated by Spartanburg Water. (Photography by Michael Justus)

Culture of *Excellence*

A SOUTH CAROLINA AGENCY BALANCES THE DEMANDS OF WASTEWATER PLANT OPERATIONS WITH CUSTOMER SERVICE, PUBLIC EDUCATION AND ENVIRONMENTAL STEWARDSHIP

By Trude Witham

SPARTANBURG WATER HAS BEEN AROUND A LONG time. A privately owned company when its original water plant was built in 1887, this South Carolina utility now includes a water system and sanitary sewer district with 250 employees, a $62 million budget and 180,000 customers in three counties.

Its website lists a variety of awards, including:

- National Association of Clean Water Agencies (NACWA) Peak Performance awards and Excellence in Management Recognition Award
- South Carolina Department of Health and Environmental Control Facility Excellence Awards
- South Carolina Water Environment Association (WEA) Golden Manhole award

The utility's eight water reclamation facilities received a combination of silver, gold and platinum awards in 2010 from NACWA for outstanding compliance. But what makes the agency and the plants successful is a culture that equally respects employees, customers and the environment. Twenty-six operations staff members are regularly trained in, and rewarded for, customer service, whether they work in the plant, the field or the office.

"Our employees are committed to the utility and the community," says Sue Schneider, general manager. "They work with the public in a number of ways — supporting industrial customers, helping to clean the watershed, or conducting high school career fairs and plant tours."

COMMITTED TO QUALITY

Rebecca West, deputy general manager of technical and engineering services, observes, "We have good and conscientious operators who apply excellent process control testing and monitoring. We keep our facilities well maintained and work closely with our pretreatment staff to make sure our industrial and commercial customers adhere to their permit conditions."

The management team fosters a culture of excellence, reinforced with technical training and with visits to other plants that have technology or equipment the agency is considering. This helps employees feel connected and motivated and strengthens commitment to their jobs, Schneider and West agree.

Before choosing equipment for an upgrade, management involves the operators in the process. "We're at the point where we will have to rehab and replace equipment, so we tell operators what we are planning and ask what would make their job easier," says West. "We want to make sure operators get what they need to do their jobs." Plant operators are active in the local WEA chapter, attending networking sessions every few months and going to workshops.

ONE GOAL, MANY PLANTS

Although the Spartanburg Water System is separate from the Spartanburg Sanitary Sewer District (overseen by different commissions), the two share

David Hanes, an above-ground technician with Spartanburg Water, checks the packing on a Patterson 900 hp effluent discharge pump, one of several used to move water 12 miles to the Pacolet River from the Fairforest treatment plant.

profile

Spartanburg Water, Spartanburg, S.C.

ESTABLISHED:
1887 (water system), 1929 (sanitary sewer district)

CUSTOMERS SERVED:
180,000

EMPLOYEES:
250

FLOWS:
0.02 to 25 mgd (water reclamation plants)

TREATMENT LEVEL:
Secondary

RECEIVING WATER:
Pacolet River Basin or Tyger River Basin

BIOSOLIDS:
Aerobic digestion, landfilled or land applied

ANNUAL BUDGET:
$62 million

WEBSITE:
www.spartanburgwater.org

ALLI THE ALLIGATOR

Community outreach is important to Spartanburg Water. "We have a long-standing commitment to the community," says Sue Schneider, general manager. "Things don't just happen in our main office, but out in the community."

Spartanburg Water partners with the Spartanburg Chamber of Commerce, the Upstate Alliance, and Ten At The Top, located in upstate South Carolina. The agency gives the chamber and other economic development groups information about the capacity and capabilities of its reclaimed water treatment facilities, collection system and pumping stations, and the water quality, quantity and pressure. The utility also takes part in community activities such as job fairs, plant tours and presentations to school groups.

"We were invited to a high school career fair, so we had a booth near the entrance with a truck and the TV equipment we use to inspect sewer lines," says Schneider. "We also had a demonstration of lab testing equipment and the actual water tests, so we could show students what we do. The kids and parents were amazed because they hadn't seen anything like this before."

The agency's staff visits classrooms to talk about the importance of taking care of the watersheds. "We have a mascot called Alli the Alligator, and a staff member wears an alligator costume at classroom presentations, plant tours and community events," says Schneider. "The kids love it!"

goals, facilities, business offices, employees and the general manager. In 2007, the agency began using the name Spartanburg Water to present one face and one contact source to customers.

The Spartanburg Sanitary Sewer District (formerly the Spartanburg Metropolitan District) was created in 1929 to eliminate discharge of raw sewage to streams. The district's first water reclamation plant was built two years later. Today, eight reclamation plants serve about 90 percent residential and

Gary Vanderford, operator III, checks the sludge blanket in a final clarifier.

10 percent commercial customers in Spartanburg, Reidville, Cowpens and Pacolet. The plants are:

- Clifton Converse, 0.29 mgd, built 1990
- Cowpens, 1.5 mgd, 1979
- Fairforest, 25 mgd, 1933
- Fingerville, 0.02 mgd, 1997
- Lower North Tyger, 2.5 mgd, 2004
- Pacolet, 0.3 mgd, 1992
- Page Creek, 1.0 mgd, 1973
- South Tyger, 1.0 mgd, 2000

The Lower North Tyger and South Tyger facilities discharge to the Tyger River Basin; the others to the Pacolet River Basin. The Fairforest plant was upgraded in 2006 with new solids handling facilities and $10 million in odor-control equipment.

HIGHLY QUALIFIED

An experienced operations team keeps things running smoothly at the plants. Schneider, who holds an MBA from Wake Forest University and has 14

The operations staff and management team at the Fairforest treatment plant include, from left, Lance Johnson, Michael Pruitt, Danny Brown, Keith Hill, Lewis Speight, David Crosby, Celeste Pauley, David Hames, Ken Tuck, Willie Shell, Sue Schneider, Sean Henderson, Jillane Layton, Kevin Wilkie, David Greer, David DePratter, Joshua Smith, Chad West, John Holcomb, Joshua Seay, Rodney Bragg, Michael Russell, Gary Vanderford, William Hughes, Steven Seay and Eric Tisdale.

years of service to the agency, coordinates all the external functions, working with customers and the Chamber of Commerce. West, with 10 years of service, is a certified biological wastewater and biosolids operator. She handles operations, maintenance, engineering and human resources for water, wastewater collection and water distribution.

Ken Tuck, director of water treatment with 12 years of service, is a certified water treatment operator, biological wastewater treatment operator, distribution system operator and biosolids system operator. Josh Smith, reclaimed water treatment manager with five years of service, supervises the water reclamation plants' lead operators. Other operations staff members are:

- Water programs manager David DePratter
- Lead operators Willie Shell and Eric Tisdale
- Operators IV Rodney Bragg, Sean Henderson, William Hughes, James Pierson and Michael Russell; operators III Michael Pruitt, Steve Seay and Gary Vanderford; operators II Danny Brown and David Greer; operator I Chad West; and operator trainee Josh Seay
- Industrial pretreatment coordinator David Crosby, industrial pretreatment specialist John Holcomb, and industrial pretreatment technician Lance Johnson
- Operations data technician Celeste Pauley
- Reclaimed water treatment above-ground maintenance coordinator Kevin Wilkie
- Above-ground maintenance technicians David Hames, Keith Hill and Lewis Speight
- Secretary Jillane Layton

A central water reclamation plant laboratory takes samples to ensure permit compliance. The staff includes a laboratory manager, quality assurance officer, data technician, eight laboratory technicians and three sampling technicians.

A DAY'S WORK

The water reclamation plants operate around the clock; half the operators work at the Fairforest plant, which is considered the operations center. The rest work in routes to operate and maintain the other seven plants and the Lawson Fork pump station. "We're not required to staff these plants 24 hours a day, but since they operate around the clock, we have operators on call to respond to alarms and after hour situations," says West.

During a typical day, plant operators are responsible for producing effluent that meets permit requirements, performing preventive maintenance, and troubleshooting and correcting process control performance issues. Other duties include:

- Calibrating field test meters
- Performing compliance testing and sampling
- Analyzing lab data
- Ordering supplies and chemicals
- Calculating wasting rates
- Digesting, decanting, dewatering and transporting biosolids
- Adjusting feed, dosage and flow rates
- Maintaining grounds and buildings
- Monitoring SCADA and verifying accuracy
- Performing security checks and observations

"An important part of their job is evaluating and recommending efficient and cost-effective modifications, improvements and upgrades to minimize operating expenses," says West. For example, during the 2006 Fairforest upgrade, the design engineer recommended two holding tanks for solids storage. Biosolids staff recommended one large tank that managed the same volume as the two tanks.

"Our reclaimed water operations staff further recommended dividing that tank internally into sections so that multiple processes could occur simultaneously," says West. "This allowed solids transfer from other facilities, land application, and dewatering for landfill disposal. The one tank was also smaller, saving land for future plant expansions."

SOLVING PROBLEMS

Operators work as a team to identify and resolve issues that affect the operation and enlist help from other departments when needed. For example, when the Fairforest plant saw high ammonia nitrogen levels on effluent composite samples, the operators worked together to find out why. They discovered that the spikes happened Tuesday through Thursday each week and that influent ammonia spikes coincided with the effluent levels.

The pattern could not be explained in process side streams, wasting habits or any chemical additions, so the operators asked the industrial pretreatment team to identify possible external sources of the ammonia. Coordinator Crosby and lead operator Shell began sampling the closest manholes in all lines entering the facility. Once they identified a line with elevated ammonia, Crosby teamed with the water quality lab and field technicians to sample for and analyze ammonia in upstream manholes.

Eventually, the team identified the source. Since the discharger did not have an ammonia nitrogen limit in its discharge permit, there was no violation. The discharger agreed to alter the operation that released the elevated ammonia.

"What makes us unique is the dedication and support of everyone in our company to assist each other in whatever capacity is needed," says Shell. "Teamwork is not only expected, it is rigorously exercised."

Lead operator Tisdale adds, "I feel our team is successful because it is just that — a team. The daily communication, talking with each other about operational problems, or something different they tried in the field that day that worked, definitely helps all of us. A free flow of ideas or questions is the key to our strong team."

LEFT: Rebecca West, deputy general manager of technical and engineering services at Spartanburg Water. BELOW: Sue Schneider, general manager, and Ken Tuck, director of water treatment.

Mike Russell, operator IV, checks treatment microbiology.

FUTURE CONCERNS

Schneider anticipates no need for upgrades at the plants in the next five years, although it is a continuing challenge to repair and replace collection lines that are 50 to 100 years old. Nutrient limits are not in the immediate future, but changes in flows and concentrations continue to pose permit compliance challenges.

> "Our employees are committed to the utility and the community. They work with the public in a number of ways — supporting industrial customers, helping to clean the watershed, or conducting high school career fairs and plant tours."
>
> **SUE SCHNEIDER**

Another goal for the agency is to protect the watersheds. "We discharge to waterways that support many communities downstream, so we want to make sure they are as clean as they can be," says Schneider. "If we don't treat them right, they won't be available for future use."

Spartanburg Water just completed a master plan and developed a watershed monitoring model that tracks all public environmental data, generated from landfills or other NPDES discharges within the watershed, so that changes in streams can be identified before permit renewal cycles. That allows staff to better manage future permit challenges.

"We want to encourage better watershed management, such as managing the buffer along the riverside and better siting of landfills," says Schneider. "We're interested in getting people involved who use the watershed, so we host stream clean-up activities and a lake sweep once a year."

It all goes back to the agency's dedication to high-quality service and environmental protection for its communities. **tpo**

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Aerial view of the New Ulm Wastewater Treatment Plant.

A Better Way to Aerate

OPERATORS IN NEW ULM IMPROVE THE TREATMENT PROCESS AND SAVE SIGNIFICANT ENERGY WITH HIGH-EFFICIENCY BLOWERS AND FINE-BUBBLE AERATION

By Doug Day

When an energy audit recommended variable-frequency drives for blowers, team members at the New Ulm (Minn.) Wastewater Treatment Plant weren't so sure that was the best way to reduce energy use.

"I don't think the energy audit took into account the cost of VFDs for motors that size," says Dan O'Connor, wastewater treatment supervisor. The plant had three 900 hp blowers, only one of them used at any time. They were located in a basement, making it difficult to install VFDs in the space available.

In addition, O'Connor thought it might be a waste of money to spend $250,000 on blowers more than 30 years old. When they were installed, the plant was designed to treat 6.7 mgd, but the average flow had declined to about 2 mgd — the blowers were feeding more air than necessary for treatment.

"We decided to remove one of the old blowers and replace it with two 300 hp high-efficiency turbo-blowers from K-Turbo [since purchased by Aerzen]," says O'Connor. They came with VFDs and could interface with the plant SCADA system. One of the new blowers can handle most of the plant's loading, and the second can be activated during times of high demand. The old blowers now serve as backup and are exercised once a year to keep them functional.

PHOTOS COURTESY OF DAN O'CONNOR

New K-Turbo (since purchased by Aerzen) blowers will save the New Ulm plant about $100,000 a year on electricity.

AIR-HANDLING UPGRADES

With new blowers going in, the city also decided to upgrade the plant's air distribution system. "We have four square aeration tanks with a center island," O'Connor says. "Each had 12 headers installed three feet off the tank floor. We basically had aeration throughout the middle of the tanks, but we didn't have very good dispersion."

> "Running the blowers for 11 months last year, we realized a savings of almost $92,000."
>
> **DAN O'CONNOR**

The aeration tanks now have full floor coverage with aerators installed 18 inches off the floor. The system, from Environmental Dynamics International, has a rubber membrane with 2,500 fine-bubble diffusers. "It gives a complete mix and better transfer of air and we don't have dead spots in the corners like we did before," O'Connor says.

One concern is that the tanks have to be drained to replace heads or clean diffusers. "Time will tell how easy that is," O'Connor says. "We put in anaerobic-anoxic tanks in 2008 to treat our phosphorous, and they're a bit temperamental. You can't just drain an 800,000-gallon tank and think it's not going to affect other parts of the plant."

The air distribution improvements went into operation in summer 2011, before the blowers were installed in December. That enabled the plant team to measure the improvement. "It increased our dissolved oxygen by about 2 ppm, so that made our plant more efficient," says O'Connor.

The work also included dissolved oxygen probes (Endress+Hauser) to control the blowers through the SCADA system. The plant can now maintain oxygen levels to avoid over-aerating the tanks in summer. The tanks remain over-aerated in winter, but the blowers run at low speed, so there are still savings on electricity.

PROJECTIONS COME THROUGH

An engineering assessment that estimated annual electrical sav-

New diffusers are providing uniform oxygen dispersion throughout the aeration tanks and have eliminated dead spots.

TOTAL ANNUAL ELECTRICAL COSTS		
YEAR	**COST**	**AVERAGE kWh/MONTH**
2011	$283,023	250,000
2012	$191,541	155,000
Total Savings	$91,482	95,000

ings of $100,000 proved accurate: Running the blowers for 11 months in 2012 saved almost $92,000. The savings could have been higher if not for some operational issues shortly after startup.

New Ulm Public Utilities spent $1.3 million on the project: $150,000 for electrical work and connection to the SCADA system, $488,000 for the aeration improvements, and $390,000 for the new blowers (including removal of the old blower). Another $100,000 went to electrical engineering work to match the reduced electrical demand to the service coming from Heartland Consumer Power District.

BETTER BIOSOLIDS

Another improvement to the facility was a microbe management program that improved treatment and saved energy. The need for improvement was identified in 2006 when the plant's biosolids exceeded the limit for nickel and could not be land-applied.

The source was a grease and tallow company that recycled materials for animal feed and was using a hydrogenated oil that contained a nickel compound as a preservative. O'Connor worked with the company to keep the nickel out of the sewer system, and the contaminated biosolids were slowly blended with new material, which then could be land-applied. The process took almost a year.

> "We were able to take 13 motors out of operation, ranging in size from 2 to 12 hp. That saves roughly $1,500 a month in electrical costs."
>
> **DAN O'CONNOR**

The incident led to discussion about improving microbe management. "We realized we would rather pump 10,000 gallons a day of 4 percent solids versus 15,000 gallons of 2 percent," he says. "When we were able to do that effectively, we were able to change the way we treated it in our autothermal thermophilic aerobic digester (ATAD)."

Adding air to the ATAD boosted microbial activity, which increased the temperature. "It wipes out almost all of the pathogens and gives us about 40 to 50 percent volatile solids reduction," O'Connor says. That allowed the plant to operate two digesters instead of three. "We were able to take 13 motors out of operation, ranging in size from 2 to 12 hp," O'Connor says. "That saves roughly $1,500 a month in electrical costs."

Reduced energy costs and a smaller carbon footprint have helped the New Ulm plant protect the environment even beyond its role of treating wastewater. **tpo**

LIGHTENING THE POWER LOAD

A coincidence worked out well for the New Ulm Wastewater Treatment Plant in fall 2012. The local utility, Heartland Consumer Power District, offered a rebate for installing LED lighting, and the city of New Ulm had LEDs left over from street lighting upgrades.

It so happened there were 16 extra LEDs and the treatment plant had 16 high-pressure sodium vapor exterior lights. "We went from 150-watt light fixtures to 68-watt lights," says Dan O'Connor, wastewater treatment supervisor. "We'll save about $1,500 a year."

With a $5,000 rebate covering half the cost, the project has a three-year payback. "The LED lights last 100,000 hours, compared to about 4,000 hours for the old lights," says O'Connor. "The LEDs also put out a more brilliant light with less wattage. Our plant is lit so much better."

The team also replaced 52 indoor T12 fluorescent light fixtures with T8s, a $7,500 project that earned a $1,900 rebate, saves $2,100 a year, and will pay for itself in less than three years. U.S. Department of Energy regulations call for a phase-out of T12 lamps; production ended in July 2012. Plants that have not yet upgraded can inquire about replacement incentives from their local electric utilities.

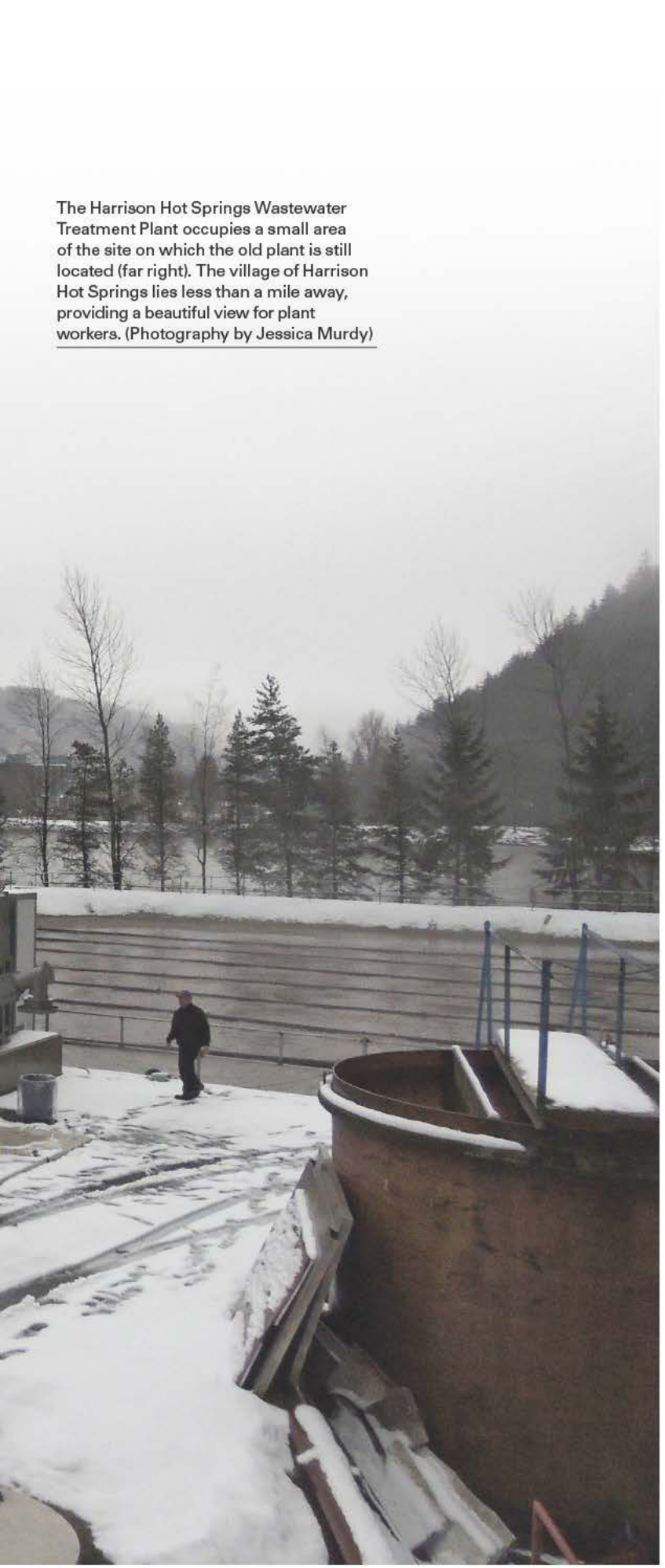
What's Your Story?

***TPO* welcomes news about environmental improvements at your facility for future articles in the Greening the Plant column. Send your ideas to editor@tpomag.com or call 877/953-3301.**

Pristine Product

A NEW MBR SYSTEM MEANT A LEARNING CURVE FOR THE HARRISON HOT SPRINGS TEAM, BUT THE NET RESULT IS EASIER OPERATION AND HIGHER-QUALITY EFFLUENT

By Trude Witham



The Harrison Hot Springs Wastewater Treatment Plant occupies a small area of the site on which the old plant is still located (far right). The village of Harrison Hot Springs lies less than a mile away, providing a beautiful view for plant workers. (Photography by Jessica Murdy)

THE VILLAGE OF HARRISON HOT SPRINGS IN BRITISH Columbia is known for its soothing mineral water, the sandy beaches of Harrison Lake, and scenic mountain vistas. About a mile from this "Spa of Canada" is the Harrison Hot Springs Wastewater Treatment Plant, a gem in its own right.

Keeping the waterways pristine is high priority for the plant team, and they're doing just that. A major upgrade in 2012 added tertiary polishing with a $4 million modular membrane bioreactor (MBR) containing 128 hollow-fiber membrane modules. A UV disinfection system replaced chlorine gas for safety reasons. Final effluent is discharged to the Harrison River, which flows to the Fraser River Basin.

The final effluent quality is extraordinary, with low turbidity and non-detectable BOD and TSS. "We discharge to a fish-bearing river with salmon and sturgeon, so we're pleased to produce such fine effluent," says utilities lead Mark Yasinski. "Before the upgrade, we were just barely meeting our permit spec."

While the new technology created a learning curve for the plant's two operators, the result was well worth it: more manageable operation, better process control and troubleshooting tools. "We've gone from a 100,000 gpd package plant built in 1969 with no solids-handling facilities to a 793,000 gpd plant with the latest and greatest," Yasinski says. "We've evolved to the 21st century."

FROM OLD TO NEW

The original plant consisted of a Stepaire circular steel field-erected treatment plant with an aeration tank, aerobic digester, final settling tank and chlorine contact bin. A 1980 upgrade doubled plant capacity, adding a 2.5-million-gallon equalization basin with aerators, a blower room and aeration piping. Disinfection was through 150-pound chlorine gas cylinders (Brenntag). A 2005 headworks upgrade added a grit chamber and bar screen and 7 mm Hycor Helisieve automatic fine-screen screw press (Parkson Corp.) to remove solids such as leaves, paper and cloth.

"The problem with the old plant is we had no solids-handling facilities, so we were at the mercy of the activated sludge and its settling time," recalls Yasinski. "When solids built up, the equalization basin just got thicker."

In 2007, the village decided to upgrade to meet growth and the possibility of stricter permit specifications. "The village was growing, and with a summer population that doubles or even triples, the system wasn't keeping up," says Yasinski. "The population of 1,600 expands in the summer with campsite, recreational vehicle and hotel occupants."

The 2012 upgrade included:

- MBR with 128 hollow-fiber membrane modules (GE Power & Water)
- 2 mm rotating drum screener (IPEC)
- New diffusers for the equalization basin (Environmental Dynamics International)

profile

Harrison Hot Springs (B.C.) Wastewater Treatment Plant

BUILT:	1969; upgraded 2012
CUSTOMERS SERVED:	1,600
EMPLOYEES:	2
FLOWS:	790,000 gpd design, 360,000 gpd average
TREATMENT LEVEL:	Advanced secondary
TREATMENT PROCESS:	Membrane bioreactor, UV disinfection
RECEIVING WATER:	Harrison River
BIOSOLIDS:	Class B, land-applied
ANNUAL BUDGET:	$348,000 (operations)
WEBSITE:	www.harrisonhotsprings.ca
GPS COORDINATES:	Latitude: 49°17'55.97" N; Longitude: 121°47'04.49" W

Mark Yasinski, left, and Tyler Simmonds are the sole operators of the Harrison Hot Springs plant.

"We discharge to a fish-bearing river with salmon and sturgeon, so we're pleased to produce such fine effluent. Before the upgrade, we were just barely meeting our permit spec."

MARK YASINSKI

- Fine-bubble aeration system (replaced coarse-bubble)
- 100 hp blowers (Aerzen)
- 420 kg/hr decanting centrifuge (Westfalia)
- UV disinfection system (Voltrex UV)

MICRON-LEVEL REMOVAL

Harrison Hot Springs chose MBR technology for its ability to remove turbidity, BOD, TSS, phosphorus and ammonia nitrogen down to very low levels. "Membranes are for micron-level removal," says Yasinski. "Our effluent turbidity is .025 NTU, our BOD is less than 5 mg/L, and TSS is less than 3 mg/L."

The MBR is sized for 793,000 gpd maximum flow, with capability to expand to 1.5 mgd if needed. The system operates at an average flow of 363,500 gpd. System redundancy ensures uninterrupted operation if there is a problem with one of the treatment trains.

Sewage enters six transfer stations in the village and flows through force mains to the plant headworks. It then flows into the equalization basin, where fresh influent blends with activated sludge having an average MLSS of 6,000 mg/L. The mixed liquor is pumped through two submersible pumps (ABS) to the rotating drum screener.

The mixed liquor is gravity fed to the membrane tanks and filtered through the ultrafiltration modules. Two rotary lobe pumps (Boerger) permeate the clear water from the mixed liquor, which is forced into a 3,000-gallon backpulse tank. The permeate then flows into the UV station, through the outfall pipe, and to the river.

A SCADA system ties everything together: "With the old plant, we were turning all the valves by hand," says Yasinski.

GETTING UP TO SPEED

Yasinski has been with the plant for five years, and utilities technician Tyler Simmonds for four years. Simmonds is the main operator, and Yasinski assists when needed. Each holds Level 2 wastewater treatment, Level 1 water distribution, and wastewater collection certification. Simmonds is a captain with the Harrison Hot Springs Fire Department, and both he and Yasinski are paid on-call firefighters.

They ran the old plant for a year while the new plant was constructed alongside. "One of the biggest challenges in operating the old plant while the new one was being built was running the plant with not all the aerators working, and near the end, having no aerators at all," recalls Yasinski.

"GE sent a representative to the plant for a month after the MBR system was installed, and he gave us intensive training. There were a lot of things to get used to, including learning how to balance chemicals with the bioreactor and interpreting the lab results. It took us about three months to feel totally comfortable with the system."

GE also provided hands-on training on the MBR system's programmable logic controller (PLC). "It has an HMI touchscreen that is pretty easy to use, since all the system parameters were pre-programmed," says Simmonds. "But, we had to adjust some of the times and levels to make the plant run smoother."

Tyler Simmonds checks the gauges of the UV disinfection equipment (Voltrex).

Voltrex UV visited to train Yasinski and Simmonds on how to maintain the UV system and bulbs. Yasinski and Simmonds also had to learn about biosolids. "I started learning about how to produce Class 2 biosolids, but it took time to get it to the right dosage," says Simmonds. "After some trial and error, I now get it perfect every time."

Yasinski explains, "We have a waste-activated sludge tank where we build our MLSS up to three to four times thicker than the bioreactor. We do this by pumping into the tank and letting it settle out for two or three hours. We pump more in, and the supernatant spills over until the solids return to the top, and then we stop pumping. We do this two or three times." Next, they pump the solids to the decanting centrifuge and return the centrate to the bioreactor free of solids. They produce four metric tons of 20-percent-solids cake in eight hours. Timbro Contracting trucks the cake to its biosolids handling facility.

Harrison Hot Springs Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	PERMIT	EFFLUENT
BOD	>103 mg/L	10 mg/L	<5 mg/L
TSS	161 mg/L	10 mg/L	<3 mg/L
Fecal coliform	N/A	200/100 ml	<2/100 ml
Ammonia N.	11.5 mg/L	N/A	0.0137 mg/L
Phosphorus	3.65 mg/L	1.0 mg/L	0.326 mg/L
Orthophosphate	1.79 mg/L	0.5 mg/L	0.348 mg/L

EASIER OPERATION

The new system has made life easier for Yasinski and Simmonds, keeping up with demand and producing water that meets permit requirements. "With the new system, if the inflow is faster than normal, we can easily balance our equalization basin," says Simmonds. "We can process the wastewater right away and keep the equalization basin at the same level all the time."

The SCADA system makes things easier by allowing operators to make changes after hours by logging into a remote computer. The membrane system requires some maintenance: "We clean the membranes on Monday and Friday with sodium hypochlorite by backpulsing the membrane," says Yasinski. "This kills any bacteria. We also perform a citric acid backpulse once a week to get rid of scale." Every six months, they perform a recovery clean on one membrane train with higher concentrations of sodium hypochlorite and citric acid.

Yasinski and Simmonds perform their own maintenance on blowers, pumps and screens, some daily and some monthly. An automotive technician by trade, Yasinski easily taught himself how to repair the plant's equip-

HOW THE MBR TREATS WATER

The GE Z-MOD-L192 membrane bioreactor (MBR) system operating at the Harrison Hot Springs Wastewater Treatment Plant is a modular system that contains a biological reactor, hollow-fiber membranes, permeate pump and air blower, permeate and air piping, and a control panel.

Unlike a conventional activated sludge process with primary clarification, activated sludge, secondary clarification, sand filtration and solids digestion, the MBR integrates clarification, activated sludge and digestion in one system. The heart of the system is the membrane module containing thousands of vertically strung membrane fibers with millions of microscopic pores in each strand.

Water is filtered by applying a slight vacuum to the end of each fiber, drawing water through the pores and then into the fibers. The pores form a physical barrier that allows clean water to pass through while blocking suspended solids, bacteria, pathogens and certain viruses.

Particles rejected by the membrane remain in the process and are sent back to the equalization basin through the return activated sludge (RAS) channel. Membrane cleaning prevents fouling and is achieved by draining the tank and backpulsing chemical and permeate into the membranes.

Mark Yasinski inspects the demonstration model of the GE Zeeweed 500D hollow-fiber membrane modules in the bioreactor.

The benefits of MBR technology include high-quality effluent, a compact footprint, and consistent performance even with changes in influent quality. Fewer components translate to less operator attention.

"I started learning about how to produce Class 2 biosolids, but it took time to get it to the right dosage. After some trial and error, I now get it perfect every time."

TYLER SIMMONDS

Picturesque views of the village enhance the beauty of the site.

ment. "So far, we haven't had to repair anything on the MBR, but if there was a pump or another major part failure, we would have to fix it quickly or the equalization basin would fill up," he says. "We would have only a few days to make the repair."

The operators also perform lab work (samples for permit testing are sent to an off-site certified lab), clean and maintain the equipment, buildings and grounds, and conduct plant tours for the public.

As for the future, Yasinski doesn't foresee any major changes: "The new system is working well, and the village is staying small in terms of growth. We will be removing the old plant in a few years to create more space, so maybe we'll build a bigger maintenance building. But for now, we're content." tpo

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Black-bellied whistling ducks are among visitors to the nature sanctuary at the Uvalde Water Recycling Center.

Wildlife Paradise

A NATURAL TREATMENT SYSTEM IN UVALDE, TEXAS, DOUBLES AS A NATURE SANCTUARY AND A MAGNET FOR BIRDWATCHERS AND STUDENTS

By Jeff Smith

The Water Recycling Center in Uvalde, Texas, treats an average of 1.7 mgd (2.5 mgd design) before discharge to the Leona River about 10 miles away. Along the way, it serves as a virtual outdoor classroom for students and visitors and as home to thousands of migratory and nesting birds and other wildlife.

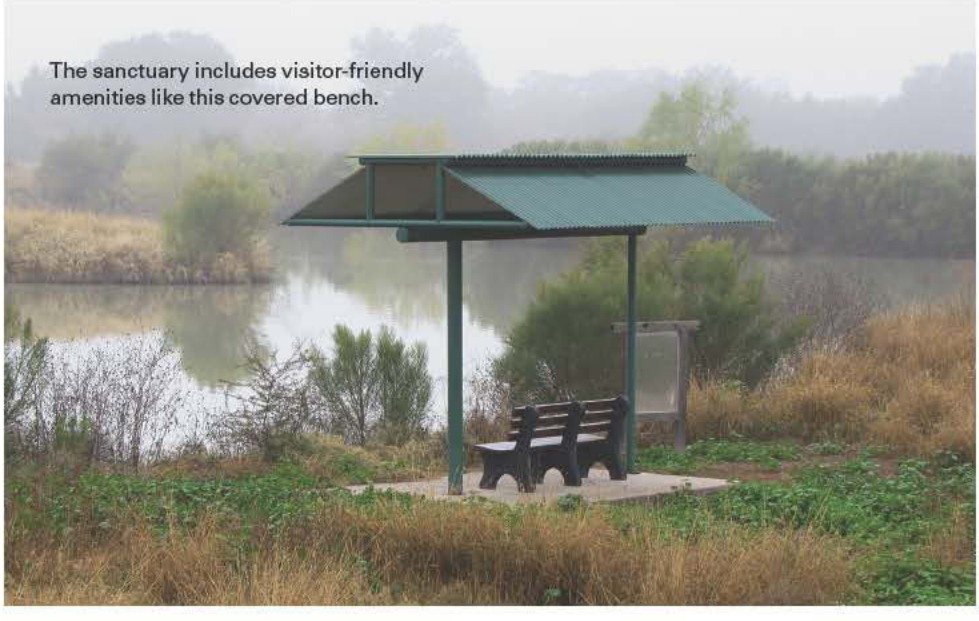
Located next to the 200-acre Cook's Slough Nature Park, a popular southwest Texas birding destination, the plant polishes effluent in 12 acres of constructed wetlands. Complete with 8-foot-wide hiking and biking trails that meander for more than two miles throughout the wetlands, and with eight strategically placed wildlife viewing areas and rest stations, the park is rated by the National Audubon Society as one of the nation's top 25 birding destinations. "It has become a great amenity for the entire community," says plant superintendent Juan Zamora.

Designed for zero discharge with effluent used for irrigation, the plant was upgraded in 1987 to an extended aeration secondary treatment facility. Natural dechlorination is provided by two lagoons that were part of the old treatment system and whose outflow was periodically diverted into the slough to maintain its marshy habitat. But by 2000, increased demand for water reuse and tighter discharge standards challenged the discharge of any water into Cook's Slough.

That's when the city listened to Uvalde resident Ken Cave, owner of the Kenneth M. Cave and Associates environmental consulting firm. Cave's vision was to develop constructed wetlands to improve water quality in Cook's Slough and the Leona River, to insure a wetland water supply, and to provide waterfowl and wildlife habitat in an educational setting. "It took a long time to put all the pieces together, but we did it at a fraction of the cost of a new mechanical system that would have done the same job," says Cave.

Grants from the Texas Park & Wildlife Service and Ducks Unlimited got the project off the ground. Cooperation and donations from many others supported the project. The city donated a 65-acre parcel near the treatment plant that has become part of the wetland park.

Visitors to the nature park navigate over boardwalks and footbridges to view birds like sandhill cranes, painted bunting, collard plover, and quail, as well as bobcats, blue indigo snakes and softshell turtles. Two 46-square-foot covered kiosks with concrete floors provide educational opportunities for students and nature lovers. A series of signs at the kiosks focus on nature study and environmental appreciation. Some define the various birds and



The sanctuary includes visitor-friendly amenities like this covered bench.

Boardwalks make it easy for visitors to tour the property.

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.

wildlife, while others show how a natural wastewater system works. Displays also present tips for managing water usage and explain how an aquifer works.

"The signs were provided by the Edwards Aquifer Authority," says Cave. "They describe the use of property and the value of wetlands."

The primary vegetation in Cook's Slough is typical of southern Texas plains, with willow oak, hackberry, mesquite, clumps of sunflowers and sedges. A grassland portion of the slough is a reclaimed landfill that now serves as habitat for quail and other upland game. The constructed wetland units are on a reclaimed biosolids application site.

"It's not a park that attracts campers and swimmers, but it is a major park for people who take their passive recreation seriously," says Cave. "And it met our goal of improving the water quality, providing for water needs, and educating the public about water conservation." tpo

Making the Connection

THE LAB DETECTIVE TRACES ERRONEOUS WASTEWATER TREATMENT PLANT INFLUENT BOD FIGURES TO THE PRESENCE OF HEAVY METALS IN THE DRINKING WATER SYSTEM

By Ron Trygar, CET

Operators at water and wastewater utilities sometimes forget how connected the two disciplines really are. If you're licensed as both a drinking water and wastewater operator, you may find yourself wearing different hats throughout the day.

Running the water plant, checking chlorine residual readings, adjusting chemical feed rates, and maintaining equipment are all a part of the daily routine. Out in the distribution system, operators may find themselves responding to consumer complaints, flushing hydrants, looking for and repairing leaks, reading meters, collecting monthly samples, and completing state reports.

A dual-licensed operator might then don the wastewater hat. There, duties include running the treatment plant, collecting samples, cleaning clarifiers, running biosolids dewatering equipment, adjusting chemical dosages and maintaining equipment. An operator also may be in charge of checking the lift stations in the collection system and taking monthly samples for state reporting.

NOTICING AN ISSUE

It is during those last duties where there may be a reason to put on the Lab Detective hat. While working as an operator of a water and wastewater utility, the Lab Detective found himself wondering about shortcomings in the wastewater plant. The facility was designed for nitrogen removal using the activated sludge process.

At times during the day, the plant's effluent chlorine residual would drop rapidly, even though there was no decrease in chlorine feed and no problems with the chlorination equipment. Something was causing a significant chlorine demand during certain times of the day, usually in the early afternoon.

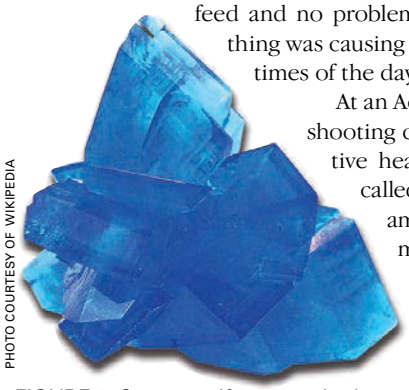


PHOTO COURTESY OF WIKIPEDIA

FIGURE 3: Copper sulfate pentahydrate crystal, also known as Blue Stone.

At an Activated Sludge Process Control and Troubleshooting course at a nearby training center, the detective heard the instructor describe a phenomenon called nitrite lock — a condition where a small amount of nitrite (usually only about 1 to 2 mg/L) makes its way all the way through the treatment processes to the chlorine contact tank.

Since one milligram of nitrite can consume about 5 milligrams of chlorine residual, measuring nitrite becomes significant when battling chlorine residual problems. The detective found this was indeed the root cause of the chlorine residual problems at his wastewater plant. But what was allowing nitrite to remain in solution? Why didn't the nitrite get fully oxidized to nitrate during nitrification?

The detective found that several conditions were allowing the nitrite to persist into the chlorine contact basin. A leading cause was shortened detention time during the oxic (or aeration) period at peak flow conditions. More time was needed to allow complete nitrification while the highest flow of the day was seen inside the plant.

PHOTO COURTESY OF WWW.TORONTO.CA

FIGURE 1: Interior of corroded copper pipe commonly used in older house plumbing.

PHOTO BY RON TRYGAR

FIGURE 2: Influent wastewater can contain lead and copper as well as BOD and TSS.

DO PROBLEMS

Another shortcoming of this facility was the available oxygen output of the centrifugal blowers used for diffused aeration. During the daily peak flow, multiple blowers were needed to maintain adequate dissolved oxygen (DO) in the aeration system, especially during summer when the density of a cubic foot of air is less than in winter.

The detective often wondered why the design engineers hadn't sized the blowers slightly larger. What data had they used when calculating the system's airflow requirement? Doing a little investigating at slow times during his shift, the detective found some of the origi-

nal drawings, plans and criteria used for the treatment plant design.

An interesting figure was used for the organic loading calculation — an unusually low number was used for the annual average BOD loading. Since the plant was built quite a while before the detective began working there, he had to go into the "document dungeon" to find the monthly lab data and state reports that were used in the plant's design.

Since the detective was a chief operator and was a part of all regulatory reporting for the water and wastewater system, he knew the current operating conditions of both sides. On the drinking water side, corrosion control measures had to be taken in certain parts of the distribution system due to elevated amounts of lead (Pb) and copper (Cu) in the sections of town with older homes.

But what about those suspicious low BOD values entering the treatment plant? Could the increased amount of lead and copper interfere with the biology in the BOD analysis?

TRACKING THE SOURCE

While the wastewater treatment plant was being upgraded, the distribution system lead and copper levels remained just below the action levels required by the state for corrosion control. A year or so after the wastewater plant expansion, the utility was required to institute a lead and copper control program in the areas of the water system most affected.

Many of the homes built in the 1970s had copper water lines joined with lead solder, and these heavy metals were slowly eroding (Figure 1). The detective found that the distribution system operators responded to many more reports of water leaks in these areas, as well.

Since the detective collected samples from the digesters and completed the yearly EPA 40 CFR Part 503 biosolids report, he knew what amounts of these same heavy metals were accumulating in the biosolids. Since lead and copper were just two of the metals tested for annually to meet state and federal regulations, it was easy to see the levels increasing over time. It would not be too long before the utility would need to investigate alternative methods of treating and managing the biosolids.

But what about those suspicious low BOD values entering the treatment plant? Could the increased amount of lead and copper interfere with the biology in the BOD analysis (Figure 2)?

A look back through many years of lab results seemed to confirm the detective's hypothesis. When side-by-side analyses of BOD, CBOD and COD were compared, the results fell in line with what appeared to be lead and copper interfering with the biological methods, while the COD analysis stayed constant. Monthly data that surrounded the time frame when corrosion control inhibitor was first added to the water system also confirmed the detective's suspicion.

Referring to the latest edition of Standard Methods for the Examination of Water and Wastewater and discussing this possibility with the certified laboratory manager, the detective found that copper is indeed a source of interference with the biological test methods for BOD and CBOD. Standard Methods recommends avoiding the use of copper lines in laboratory-grade water systems and in distillation units, and also advises against storing reagent-grade water in vessels containing heavy metals.

COLLABORATIVE SOLUTIONS

Copper in particular is a toxic heavy metal known to kill bacteria and algae in water systems, reservoirs, lakes and rivers. Copper sulfate pentahydrate, known as "blue stone" (Figure 3), has been used in many industries, including treatment of lumber to prevent insect degradation. Copper can also affect the results of biological tests like BOD, causing false low BOD levels.

The treatment plant superintendent, certified laboratory manager, utility engineer and Lab Detective concurred that the elevated level of copper in the drinking water, which becomes influent wastewater, was the cause of the reduced influent BOD values. Further, they concluded that these false values were part of the initial loading calculations used to size treatment plant unit processes — blower capacity, aeration tank size, and others.

The outcome of this story is that the treatment plant engineers, operators and lab personnel worked together to gather representative samples and obtain accurate lab results, which then were used to justify newer, more energy efficient centrifugal blowers with higher output than those previously installed. After the new blowers were installed, the facility began to achieve exceptional effluent quality at a reduced cost — a win-win situation!

Note: *The author acknowledges Lisa Saupp of Aqua Pure Laboratory in Silver Springs, Fla., for her help in research for this article.*

ABOUT THE AUTHOR

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What's Your Lab Story?

The Lab Detective feature in *TPO* will help operators learn analytical techniques that help diagnose and solve treatment problems. Are you struggling with a process issue?

Send a note to editor@tpomag.com. Your question may become the topic of a future column.

The Governor Proclaims ...

A CONNECTICUT PLANT SUPERINTENDENT GETS HIS STATE'S HIGHEST OFFICIAL TO PROCLAIM A SPECIAL DAY TO APPRECIATE WASTEWATER TREATMENT AND THE PEOPLE IN THE PROFESSION

By Ted J. Rulseh

On the day he started work in May 2011 as a second-shift maintenance foreman at the Town of Enfield (Conn.) Water Pollution Control Facility, Kevin Shlatz got a surprise.

"On the first Monday, the plant superintendent told me, 'I'm retiring,' " Shlatz recalls. "I said, 'Oh, how long from now?' He said, 'On Friday.'

" 'Friday when?'

" 'This Friday.' "

Being the only member of the team with a Class 4 wastewater operator license (the highest level in Connecticut), Shlatz became plant superintendent. Enfield is his fifth clean-water plant — he was an intern at one and an employee at three others, and at age 36 he has been in the profession for 13 years.

At Enfield, Shlatz has taken inventory of the plant's needs and has come up with a long list of projects. And he has launched a public relations campaign to help build public understanding and support for the money it will take to do what must be done.

As part of that, he secured an official proclamation from the governor, Dannel Malloy, recognizing May 22, 2013, as Wastewater Treatment Appreciation Day. Shlatz talked about his facility's challenges and his public outreach efforts in an interview with *Treatment Plant Operator*.

Kevin Shlatz, at the Town of Enfield South River Street pumping station, which high school students are painting to resemble an old Tuscan village. "The pump station is one of our most visible assets, so we try to make it eye-pleasing," Shlatz says. "It makes for good community relations."

tpo: Why have you found it necessary to reach out to the public?

Shlatz: As people in our profession know, we're the unseen heroes. I've been trying to get the attention of our town officials and have been looking at every way to do it. We need to be recognized because the plant needs work and we need resources.

"We use the Imhoff cone test to show people what we do: After they flush, the water comes to us looking like this; it goes through the treatment process and by the time it goes out to the river, it looks like that."

KEVIN SHLATZ

I wanted to make our voice heard. I invited our local Water Pollution Control Board, which is also our Town Council, to come in for a tour. We gave them a packet and said, "These are all the projects we need to get done." We need approximately $30 million to $40 million worth of work.

That was step one. The second step has been public relations to let people know we're here, in case we have to go to referendum for the funds we need. We want to tell people, "Hey, we're here, and this is what we do." I know people think they flush the toilet and that's it, but obviously there's a little more to it.

tpo: What are some of the major projects that need attention?

Shlatz: We're meeting our permit. The plant was originally designed for 10 mgd with conventional treatment. Our average flow is 5 to 5.5 mgd. But most of our equipment is 40-plus years old. We're looking at doing a series of major projects or doing the whole thing at once.

We need clarifier drive rehabilitation, new solids-processing equipment and some new buildings. We need work done on our aeration tanks and some of the monitoring equipment. We also have 16 pump stations in the system that are in the 40-year-old range that need to be rehabbed. We have three ejector pump stations that are older than I am, and they have seen better days.

tpo: Besides the tour for local officials, what public relations activities have you undertaken so far?

Shlatz: We set up a booth at the town's Earth Day observance in April 2012, and at the town's Family Fun Day last September. We have a banner that says Enfield Water Pollution Control, and we hung it on a 4-by-8-foot table. We had an Imhoff cone test set up, along with a microscope and a settleometer.

The kids enjoy it the most. They can handle a sample of biosolids in a bag, and they get to see a sample of mixed liquor. They say, "What's in there?" I show them pictures of the bugs on a laptop and say, "There are probably about a billion bugs in there." They think that's pretty cool. We use the Imhoff cone test to show people what we do: After they flush, the water comes to us looking like this; it goes through the treatment process and by the time it goes out to the river, it looks like that.

It's Official

Here is the proclamation issued by Connecticut's governor in honor of wastewater treatment and clean-water workers:

On behalf of the State of Connecticut, I, Dannel P. Malloy, Governor, take great pleasure in recognizing May 22, 2013, as Wastewater Treatment Appreciation Day. Wastewater treatment is the process by which contaminants are removed from wastewater and household sewage. Its goal is to produce environmentally safe fluid waste and solid waste that is suitable for disposal or reuse. The day coincides with National Public Works Week, which celebrates the important role of public works in our daily lives, and educates the community on how public works helps build the quality of life in Connecticut. This recognition celebrates the important role of wastewater treatment in our communities. Therefore I, Dannel P. Malloy, Governor of the State of Connecticut, do hereby proclaim May 22, 2013, as Wastewater Treatment Appreciation Day in the State of Connecticut.

what we could do for Wastewater Treatment Appreciation Day. They pushed the idea with other towns.

tpo: Did the Town of Enfield have a plant tour that day?

Shlatz: Yes. We promoted it at Earth Day, in the paper, and we had a 4-by-12-foot banner on our fence. The Town Council also promoted it at their meetings.

Representatives from our engineering firm were here for the tour. Our lab station had a live microscope shot of the bugs. Our microscope has a camera built in, and we projected the picture up on a whiteboard. We worked with neighboring towns to try and get tours set up at the same time, so if people wanted to visit one plant, they could also go see another. We also did an operators' breakfast for our staff that morning, so we could treat those guys and show them some appreciation.

tpo: Do you have any other thoughts to share about the importance of public outreach for the clean-water profession?

Shlatz: Just keep yourself in the limelight. Teachers, fire departments and police departments do it every day — that's why they get the funding. I definitely like to be among the quiet ones, but we need to make ourselves more visible. A lot of people don't like doing that, but with the tight economy it's just a fact of life: If you're the quiet one, you're not going to get anything. tpo

podcast

Check out a podcast with Kevin Shlatz and his community relations initiatives at www.tpomag.com.

"For the governor's proclamation, I didn't have to pull any political strings. You just go to the governor's Web page and they have a link for requesting a proclamation. I asked for it to be issued on the Wednesday of Public Works Week, which was May 22."

KEVIN SHLATZ

tpo: About how many people did you speak to at these events?

Shlatz: For Earth Day, 50 to 100 visitors. At the town festival, probably about 150. Some people are interested and want to talk to you. Others are like, "Who are you?" Some people said, "Well, my water bill is high. Why is that?" And I said, "I'm not the water company." It's a challenging process. We're working on it slowly.

tpo: What else are you doing to reach out to the public?

Shlatz: We're trying to get our website up. That has been one of our biggest projects. We're really trying to do more because we're going through a rate study right now. We hope to give tours on a more regular basis, either on Friday or Saturday mornings, so people can come on in and see where their money is going.

tpo: How did you go about getting a proclamation from the governor?

Shlatz: I read an article in a national public works magazine, and one thing it said to do for National Public Works Week [May 19-25] was get a proclamation from your town council or the state. So we got one from the town.

For the governor's proclamation, I didn't have to pull any political strings. You just go to the governor's Web page and they have a link for requesting a proclamation. I asked for it to be issued for the Wednesday of Public Works Week, which was May 22. And they said, OK. They came up with the wording — they may have worked on it with the Department of Environmental Protection. We received the proclamation about two months later.

tpo: How did you use this proclamation to help generate interest in your facility and the clean-water profession?

Shlatz: We involved our state association, the Connecticut Wastewater Pollution Abatement Association. They have a leadership management program, and last month the topic was communication. I gave a presentation on

WesTech names international business unit leader


Philip Lake

WesTech Engineering named Philip Lake leader of its international business unit. He has 19 years of experience in the sedimentation equipment industry. Lake will be based in the company's headquarters in Salt Lake City, Utah.

Schneider Electric recognizes distributors

Schneider Electric recognized distributors of the year and top performers as part of its Automation & Control Excellence program. Barr-Thorp Electric of Merriam, Kan., was recognized for solutions distributor of the year; Crescent Electric Supply Co. of Columbia, Ohio, was recognized as automation distributor of the year, and Graybar Electric Co. of Houston, Texas, was recognized as control distributor of the year. Top performers in the ACE program were Advantage Industrial Automation of Duluth, Ga.; Border States Electric Supply of Brooklyn Park, Minn.; HD Supply of Tampa, Fla.; Graybar Electric Co. of Winston-Salem, N.C.; Standard Electric Supply Co. of Wood Dale, Ill., and Graybar Electric Co. of De Pere, Wis.

NETZSCH Pumps names business field manager


David J. Fillo

NETZSCH Pumps North America named David J. Fillo business field manager for dosing technology. Based in St. Louis, Mo., he will be responsible for the North American market for the dosing and meter mix industries.

Xylem acquires Multitrode

Xylem acquired Multitrode Inc., a privately held Australian-based water and wastewater technology and services company for $26 million. Multitrode has approximately 60 employees with offices in the United States and United Kingdom.

SJE-Rhombus receives Silver ESOP award

SJE-Rhombus was named a Silver ESOP award winner by The ESOP (Employee Stock Ownership Plan) Association. The award recognizes companies for their work in sustaining an ESOP for 25 years. SJE-Rhombus was one of 26 corporate members to be honored by the association in 2013.

DeZURIK names president, COO

DeZURIK named Bryan Burns president and chief operating officer for the municipal and industrial valve manufacturing company. Larry Korf remains chief executive officer and has accepted a position on the board of directors.

BASF adds US sales contacts


Tim LeTourneau


Scott Caothien

BASF Water Solutions named Tim LeTourneau head of membrane solutions and Scott Caothien technical sales support manager for membrane solutions. LeTourneau has 25 years experience in the water industry and Caothien has 20 years experience.

Koch Membrane Systems hires regional manager

Koch Membrane Systems named Coley Ali regional manager for the western United States and Canada. He will focus on identifying opportunities for growth and developing strategic relationships as KMS prepares to launch a series of new products for the water and wastewater market.

InduSoft releases SCADA software service pack

InduSoft released a service pack for its SCADA software Web Studio v7.1. The free software can be downloaded at www.indusoft.com/blog/?p=1934. Available for InduSoft Web Studio v7.1 users, the service pack adds multi-touch development capabilities for touch-screen enabled devices. Without a keyboard or point device, users can navigate screens and issue commands for an entire system.

Singer Valve adds sales managers


Carlos Garcia


Clinton Smith

Singer Valve named Carlos Garcia and Clinton Smith account sales managers. Garcia has 20 years of water works experience and will be based in San Diego, Calif. Smith will be working out of Surrey, British Columbia.

Headworks names board members

Headworks International, provider of advanced wastewater treatment processes and equipment for municipal and industrial facilities, named Larry Magor chairman of the board as a non-executive director of the company. Debra Coy was named non-executive director and chair of the audit committee and Ian Fagelson was named non-executive director. They join existing non-executive directors Paul Lersch and Susan Farmer and executive directors Michele LaNoue, CEO, and Gerald Seidl, senior vice president.

Vogelsang names director of sales

Vogelsang promoted Rich Owens to director of sales. Owens joined the company in 1998. Vogelsang manufactures pumps, grinders, and related equipment for the municipal, industrial and agricultural markets.

Sauereisen names controller, regional manager


Maureen E. Bankert


Pete J. Jansen

Sauereisen promoted Maureen E. Bankert to controller and Pete J. Jansen to Midwest regional manager. He will be responsible for Michigan, Wisconsin, Minnesota, Indiana, Illinois, Kentucky, Tennessee, Missouri, Arkansas, Kansas, Oklahoma, Texas, North Dakota, South Dakota and Nebraska.

FRAKO capacitors receives Canadian certification

FRAKO Kondensatoren-GmbH LKT series capacitors received Canadian Standards Association certification. The capacitors also are UL approved and comply with EN/IEC requirements. They can be used in fixed or automatic power factor correction systems and harmonic filters.

Kaeser Compressors produces air-topic blog

Kaeser Compressors' blog "Kaeser Talks Shop" (www.kaesertalksshop.com) includes technical articles on various compressed air topics, including piping, adaptive control in blower installations, compressed air audits and energy savings tips for compressed air systems.

Flowserve expands testing capabilities

Flowserve Corp. upgraded the open loop test bench at its Coslada, Spain, manufacturing and testing facility. The test bench covers an area of 19,400 square feet and a depth of 27 feet. It can accommodate flows to 400,000 gpm and a total differential head of 34.4 feet. The addition of a multi-size discharge manifold provides the flexibility to test pumps with discharge ports to 108.3 inches.

FCI flow meter receives approvals

The ST100 Series thermal mass air/gas flowmeter from Fluid Components International received ATEX and IECEx approvals for safe operation in potentially hazardous environments. The enclosure is flame proof and protected from dust ignition.

AEGIS offers handbook for ring motor repair

The AEGIS Shaft Grounding Ring Motor Repair Handbook describes best practices for protecting motor bearings from electrical damage. Available from Electro Static Technology, manufacturer of AEGIS shaft grounding rings, the handbook is available in PDF format at www.est-aegis.com/bearing.

American Water receives Missouri safety award

American Water's Contract Services Group received the 2012 safety award from the Missouri Water Environment Association for its safe operation of the City of St. Charles wastewater treatment facility. American Water has operated the facility since 1984, treating an average of 8,236 mgd.

Brown and Caldwell names vice president, project finalist

Jeff Theerman

Brown and Caldwell named Jeff Theerman vice president. He is the former executive director of the Metropolitan St. Louis Sewer District. The consulting company also is a finalist for the Outstanding Civil Engineering Achievement Award from the American Society of Civil Engineers (ASCE) for its Lake Oswego interceptor sewer project and Brightwater treatment plant in Woodinville, Wash.

UV Pure names wholesale distributor

UV Pure named Preferred Pump & Equipment wholesale distributor for its water system products in the United States. tpo

Bright Alternative

A COLORADO TREATMENT PLANT LAB TEAM ADOPTS A METHOD OF AMMONIA MEASUREMENT AND REPORTING THAT ENHANCES QUALITY AND SAVES TIME

By Ruth Hecker and Derek Walker

The laboratory staff at the wastewater treatment plant in Loveland, Colo., wanted an easier way to analyze and report influent and effluent ammonia levels.

The 10 mgd plant's process reduces influent ammonia of 25-30 mg/L to below 0.1 mg/L in effluent. At those low levels, the staff found it challenging to use the U.S. EPA-approved SM4500-NH3D Ion Selective Electrode (ISE) method for ammonia measurement and compliance reporting.

The staff successfully switched to Hach Method 10205 using TNTplus vial chemistry. "We have saved a significant amount of time in our daily samples and quality control checks," reports analyst Nick Marusin. "We can now run a day's worth of ammonia samples in about 30 minutes, where before it took over an hour and a half, even without electrode calibration problems."

LOOKING TO IMPROVE

The ISE method has a wide measuring range that makes it attractive to many wastewater and environmental laboratories. However, the Loveland lab analysts experienced various issues in using it, including:

- Daily preparation of calibration standards, including a low-level standard of 0.05 mg/L ammonia, taking up to 30 minutes per calibration
- Frequent failures of calibrations or electrode membranes, occurring without obvious cause after several months of routine analysis
- Hours spent troubleshooting and subsequent concerns with sample holding times
- Time and cost required to replace electrode membranes

Pre-packaged, precise reagent dosing and small sample volumes help eliminate measurement errors.

VALIDATING A NEW METHOD

After learning about Hach Method 10205, the lab team investigated the procedure as an alternative to ISE. The TNTplus ammonia method is classified as an EPA Equivalent method, as it uses a slightly modified version of the approved indophenol/phenate chemistry. It can be run in less than 20 minutes, as all required reagents are included in the test vial.

In the process, ammonium ions react at pH 12.6 with hypochlorite ions and salicylate ions in the presence of sodium nitroprusside as a catalyst to form indophenol. The amount of color formed by the reaction is directly proportional to ammonia concentration in the sample. The sample vial with barcode communicates with a Hach DR 5000, which reads the results at a wavelength of 690 nm and displays the ammonia concentration at the end of the test.

The staff at the City of Loveland Water Quality Lab uses an alternative method of ammonia measurement that saves time and labor in producing high-quality, consistent results.

Many states have approved the method without further validation studies. Some states may require a simple validation study before the method is used for compliance reporting. This process is outlined by the EPA and Federal Register in 40CFR Part 136.6, Method Modifications and Analytical Requirements.

Because facilities in Colorado had not yet used the new method for compliance reporting, Marusin took on the task of validation. It included standard quality control samples and procedures typically followed in a laboratory Initial Demonstration of Capability. He ran method comparison studies including the Method Detection Limit, Initial Precision and Recovery, Matrix Spike, and Matrix Spike Duplicate.

"The study was easy to conduct and was a painless process," Marusin says. "We ran about 10 effluent samples, and the study report we sent to the state authority only took about four hours to compile." The accompanying tables show the results of the side-by-side method validation.

By Scottie Dayton

Solids-handling pumps stop clogging

Problem

Wastewater from a nearby casino brings sheets, rubber gloves, shirts and mop heads to the two lift stations at Gila River Indian Reservation in Sacaton, Ariz. Unclogging the solids-handling pumps was an almost daily routine at one station and a weekly event at the other.

Solution

Operators installed a 4-inch **Barnes 4SH solids-handling pump with 7.5 hp motor from Crane Pumps and Systems** in the first lift station. The pump handles 3-inch solids and stringy solids. Its epoxy-coated paint protects against external corrosion, while the plug-and-play cord allows for simplified routine maintenance.

RESULT

The clogging stopped. The next year, operators installed an identical pump in the second lift station. **937/778-8947; www.cranepumps.com.**

CONSISTENT RESULTS

The side-by-side validation study showed that the TNTplus method performed significantly better than the ISE method. Most notably, recoveries of standard additions ("spikes") in both reagent water and effluent matrix were significantly better. Method precision and consistency also improved significantly. The team attributed the greater accuracy and precision to features built into the vial chemistry and spectrophotometers:

- Barcode recognition of the test vial, ensuring that the correct method settings are always used
- Automatic updating of built-in calibration factors
- Automatic 10-time measurement while the vial is rotated, eliminating errors from dirty spots or cracks in vials
- Precise, consistent and convenient delivery of reagents sealed in the vial cap and tube

GOING FORWARD

Based on the validation study results, the lab staff petitioned the state regulatory authority and gained quick approval to use Method 10205. The facility now uses the new method for daily process control and for discharge monitoring reporting. Marusin reports, "Overall, the TNTplus method is awesome and has solved a number of headaches for us."

ABOUT THE AUTHORS

Ruth A. Hecker is water quality laboratory coordinator for the City of Loveland, Colo. Derek Walker is an applications development manager for Hach Company. tpo

Share Your Idea

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

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

Chopper pump solves blockage

Problem

Wet wipes, rags, and increased sewer abuse blocked pumps at the East Hyde Sewage Treatment Works near Luton, U.K.

Solution

Thames Water operators installed a 6-inch **MPTK-I 150 series chopper pump (30 kW, 1,500 rpm) from Landia.** Designed to handle wastewater and sludge with coarse solids, the pump can be mounted horizontally or vertically. Guide traces in the casing prevent dry particles from catching in the pump.

RESULT

The installation was successful; Thames Water purchased two more identical units. **919/466 0603; www.landiainc.com.** tpo

Rotary lobe pump solves cavity pump clogging issues

Problem

The City of Manchester, N.H., Wastewater Treatment Plant utilizes an activated sludge process for treatment, and a fluidized bed incineration system for sludge disposal. To fuel the system, the plant used a progressive cavity pump to feed a mixture of sludge, grease, scum and occasionally oil, to the incinerator. Every spring an excessive amount of bark mulch ended up in the plant scum, causing the cavity pumps to clog. They tried in-line grinding and hose pumps, to no avail. According to the operators, it had been an issue since the incinerator went online in 1994.

Solution

The plant installed a trial **Boerger PL200 oversized, side-mount pump** with a large square inlet port so it could drop directly into the lobes without any restriction.

RESULT

The pump successfully fed scum to the incinerator at 2 rpm. After seeing this success, the Manchester plant purchased one to install permanently. **612/435-7300; www.boerger.com.**

Pumps, Drives, Valves and Blowers

By Craig Mandli

TURBO BLOWER

Generation 5 turbo blowers from Aerzen USA have variable frequency-controlled and oil-free turbos. High energy efficiency and rise-to-surge characteristics result from optimal integration of the permanent magnet motor, inverter, impeller and control system. They operate at up to 60,000 rpm and drive power to 400 hp. **610/380-0244; www.aerzenusa.com.**

Generation 5 turbo blowers from Aerzen USA

LUBE-FREE AIR DIAPHRAGM PUMP

Lube-free air diaphragm pump from All-Flo Pump Company

The lube-free 1-inch air diaphragm pump from All-Flo Pump Company has a non-stall/freeze air system engineered for maximum fluid and chemical compatibility. The bolted design offers ease of maintenance and leak-free operation. It is available in a variety of materials and with options that include a heavy-duty air valve and metallic or non-metallic wetted components. A Max-Pass valve system allows operation under conditions from clean fluids to slurries, to solids up to 3/4 inch. **440/354-1700; www.allflo.com.**

ALL-PURPOSE PORTABLE PUMP

Yakka 150i all-purpose portable pump from AllightPrimax

The Yakka 150i all-purpose portable pump from AllightPrimax has replaceable wear plates and impellers in stainless steel standard and can pass 3-inch solids. Built with an acoustic enclosure, it emits only 65 dBA at 23 feet. The panels are easily removed for maintenance and can be designed with any custom color. The body is impact-resistant and requires minimal maintenance. The tubular frame provides side and end protection and has lockable gull-wing doors for security and easy access. All controls are inside the lockable module. **877/477-4629; www.allightprimax.com.**

LOW-FLOW PUMP

Series 900 pump from AquFlow Metering Pumps

The Series 900 pump from AquFlow Metering Pumps is designed for precise low-flow chemical dosing. Its maximum flow of 0.14 gph can be adjusted down to 0.01 gph. It includes plungers as thin as 0.187 inches to displace the hydraulic oil, which moves the diaphragm to pump the chemical. It has a compact design with modular assemblies that are easy to operate and maintain. It is available in corrosion-resistant materials. **949/757-1753; www.aquflow.com.**

REGENERATIVE BLOWER

Regenerative blowers from Atlantic Blowers

Regenerative blowers from Atlantic Blowers are available in single- or double-stage configurations. The impeller is directly connected to the motor shaft, eliminating pulleys and belts, reducing moving parts and related maintenance. The units provide clean, dry, oil-free air at slightly above ambient temperatures. Air volume ranges from 18 to 1,519 cfm and air pressures from 22 to 313 inches H20. Motors range from 0.16 to 50 hp. **214/233-0280; www.atlanticblowers.com.**

HIGH-SPEED TURBO BLOWER

Turbo Blower from APG-Neuros

The high-speed Turbo Blower from APG-Neuros has an oil-free and non-contact bump foil air bearing that needs no lubricating or related maintenance. A permanent magnet synchronous motor transfers EMF to load with no physical contact between stator and shaft, offering precise motor speed control. It can deliver up to 21,000 scfm with a design discharge pressure up to 15 psig. Models range from 30 to 700 hp; dual-core models (400 to 700 hp) provide a wide flow range with up to 80 percent turndown. **866/592-9482; www.apg-neuros.com.**

PERISTALTIC METERING PUMP

Flex-Pro A2 peristaltic metering pump from Blue-White Industries

The Flex-Pro A2 peristaltic metering pump from Blue-White Industries has a low feed capability for smaller wastewater applications. Its maximum feed is 14 gph at pressures to 125 psi. The self-priming unit has no valves, a one-button prime mode, smooth pumping action, a de-gassing design, automated dosing, dual 4-20 mA input, pulse inputs, remote start/stop, a brushless variable speed motor and NEMA 4X/IP66 washdown. **714/893-8529; www.blue-white.com.**

RESEARCH CONTROL VALVE

Kynar Research Control Valve from Badger Meter

The Kynar Research Control Valve from Badger Meter helps dispense accurate chemical dosage, controlling raw material costs and enhancing regulatory compliance. High chemical resistance limits maintenance and downtime. The unit automatically compensates for line pressure changes that occur as chemical tank levels fall. **800/876-3837; www.badgermeter.com.**

AERATION BLOWERS

Bi-lobe (MB) or tri-lobe (ZG) aeration blowers and packages from Eurus Blower

Eurus Blower offers bi-lobe (MB) or tri-lobe (ZG) aeration blowers and packages for moving bed bioreactors, sludge tanks and equalization tanks. They are rated to 15 psig and offer airflows to 3,950 cfm. They have integral-shaft ductile iron impellers, dual splash lubrication, oversized roller bearings, piston ring air seals, viton lip seals, and low vibration and noise. They include a high-efficiency integrated intake filter/silencer with washable polyurethane filter media, combination base and heavy-duty integrated discharge silencer and vibration dampers. **630/221-8282; www.eurusblower.com.**

MOUNTING KIT

Split Universal Mounting Kit (Split uKIT) from Electro Static Technology

The Split Universal Mounting Kit (Split uKIT) version of the AEGIS SGR bearing protection ring from Electro Static Technology protects the bearings of VFD-driven motors from electrical damage and allows quick and easy retrofitting on almost any AC motor shaft without decoupling attached equipment. Designed to accommodate slingers, shaft shoulders and other end bell protrusions, the kit comes with a split AEGIS ring, the halves of which are held together with a hinge that allows the ring to be opened on one side, then closed and fastened with built-in adhesive-backed aluminum tabs. **207/998-5140; www.est-aegis.com.**

EDDY CURRENT DRIVE

Eddy Current Drives from DSI Dynamatic

Eddy Current Drives from DSI Dynamatic are supplied with an EC-2000 controller that enables digital or analog integration with digital process controls, SCADA systems or PLCs. A flexible keypad enables simple and intuitive programming. The units convert the constant-speed rotary energy of a standard motor to precisely controlled speed or torque without significant electrical conversion. **800/548-2169; www.dynamatic.com.**

POLYMER PUMP REPAIR

CeramAlloy CP+ AC and CeramAlloy CL+ AC from ENECON Corporation

CeramAlloy CP+ AC and CeramAlloy CL+ AC from ENECON Corporation is a two component, 100 percent solids, trowelable polymer system for rebuilding damaged pump components back to their original shape and contour. It provides erosion and corrosion protection on pump wet areas. The high-gloss coating yields a surface that significantly improves pump efficiency. **888/436-3266; www.enecon.com.**

DRUM PUMP MOTOR

Rechargeable S6 drum pump motor from Finish Thompson

The 3-pound rechargeable S6 drum pump motor from Finish Thompson has a corrosion-resistant design for abusive environments. The 12-volt battery provides fade-free power and retains a charge for extended periods. A solid-state electronic control circuit provides reliable operation and long life. Dual cooling fans improve battery performance and life. **814/455-4478; www.finishthompson.com.**

HYPOCHLORITE INJECTION SYSTEM

Chloritrol valveless metering system from Fluid Metering

The Chloritrol valveless metering system from Fluid Metering provides accurate, maintenance-free injection of sodium and calcium hypochlorite. Its valveless duplex high-pressure pump injects material directly into the water main, and a second pump head removes out-gas bubbles from the inlet side of the high-pressure pump head. **800/223-3388; www.fmipump.com.**

WASTEWATER PUMPING SYSTEM

Experior wastewater pumping system from Flygt – a Xylem Brand

The Experior wastewater pumping system from Flygt – a Xylem Brand offers energy savings in a package that is easy to install and operate. Its Adaptive N-technology allows the impeller to move axially upward when necessary to permit bulky materials or tough debris to pass, reducing stress on the shaft, seals and bearings. It is available with efficient motors optimized for wastewater pumping. SmartRun intelligent controls can be pre-programmed to optimize energy use. **704/409-9700; www.flygtus.com.**

HIGH-SPEED CENTRIFUGAL BLOWER

Hoffman Revolution centrifugal blower from Gardner Denver

The Hoffman Revolution high-speed centrifugal blower from Gardner Denver delivers up to 45 percent energy savings and provides high reliability with minimal maintenance. It has an ergonomically designed sound enclosure and a compact footprint,with a 1-meter certified sound rating at below 80 dBA. Features include a single-enclosure housing, high-speed blower/motor unit, direct-driven high-speed motor, self-contained cooling system, air filtration elements, high-efficiency impeller, magnetic smart bearings, and blow-off valve assembly. **724/239-1500; www.hoffmanandlamson.com.**

PORTABLE NON-CLOG PUMP

Dri-Prime NC150 pump from Godwin, a Xylem brand

The Dri-Prime NC150 pump from Godwin, a Xylem brand delivers non-clog performance, high efficiency, and energy savings. The powerful yet compact pump handles flows to 1,767 gpm and discharge heads to 195 feet. It uses Flygt N-technology with a self-cleaning impeller. The automatic self-priming system primes and re-primes from dry up to 28 feet without operator assistance or foot-valve control. The unit has a dry-running high-pressure oil bath mechanical seal with abrasion-resistant silicon carbide faces. It can be customized with a diesel engine or electric motor and can be trailer- or skid-mounted. **800/247-8674; www.godwinpumps.com.**

HIGH-PERFORMANCE VALVE ACTUATOR

Valve actuator from K-TORK Actuators & Controls International

The 1/4-turn high-performance valve actuator from K-TORK Actuators & Controls International has only one moving part. It can operate ball, butterfly and plug valves in wastewater treatment facilities and can be retrofitted to an existing valve without removing it from the pipe. Controls include a mechanical hand wheel and pushbutton manual override, feedback switches and transmitters, high-visibility valve position indicators, open/close controls, and precise modulating controls for pneumatic, analog and bus-network control and monitoring. **214/343-9980; www.ktork.com.**

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PUMP-MOTOR ALIGNMENT SENSOR

SensALIGN machinery alignment sensor system from LUDECA

The sensALIGN machinery alignment sensor system from LUDECA uses intelligent sensor technology to allow instantaneous data acquisition and accurate real-time results under difficult conditions. It automatically considers the effects of ambient vibration, acceleration of rotation, backlash, speed of rotation and other factors in determining the quality factor of alignment readings. **305/591-8935; www.ludeca.com.**

EMERGENCY BYPASS STATION

Reliaprime emergency bypass station from Gorman-Rupp Co.

The Reliaprime emergency bypass station from Gorman-Rupp Co. operates on natural gas. It has a 6-inch Super T Series pump able to pass 3-inch spherical solids, and offers a sound-attenuated lightweight aluminum enclosure with locking door panels. It is a complete back-up package ready for hookup. **419/755-1011; www.grpumps.com.**

IMPELLER TRASH PUMP

S4THL trash pump from Hydra-Tech

The S4THL 4-inch hydraulic drive vortex impeller trash pump from Hydra-Tech offers 3-inch solids handling and head capabilities up to 210 feet. It can be bolted directly into a pipeline or fitted with a suction hose for underwater dredging. It handles flows up to 1,000 gpm and can be used where electric power is hazardous or impractical. **570/645-3779; www.hydra-tech.com.**

GATE VALVE

ZTS Gate Valve from KSB

The ZTS Gate Valve from KSB uses a fine-grained, homogenous hammer-forged body design that can withstand pressures to 8,700 psi and temperatures to 1,200 degrees F. It has a movable double-wedge design that prevents the wedge halves from additional actuating moments and additional loads on the seat/disc interface. The result is flexible and precise wedge movement with reliable operation. **804/222-1818; www.ksbusa.com.**

PROGRESSIVE CAVITY PUMP

Millennium Series progressive cavity pumps from Liberty Process Equipment

Millennium Series heavy-duty progressive cavity pumps from Liberty Process Equipment pump abrasive sludge, grease and slurry in wastewater treatment plants. A heavy-duty cast iron bearing frame and large bearings transmit heavy workloads and provide long service life. The units can pump delicate fluids with entrained solids without emulsifying the liquid. They come with a positively sealed, hardened gear joint assembly, hardened or stainless steel rotors with hard chrome plating, and a wide selection of stators. **847/540-7867; www.libertyprocess.com.**

AIR VALVE

AirPro Max air valve line from Henry Pratt

The AirPro Max air valve line from Henry Pratt has a unique shape to allow a smaller valve vault. The float/linkage design is suitable for higher pressures. The design prevents seat leakage and float mechanism failures. Units come with a large orifice to break vacuum or with a small orifice for air release under pressure. Both types can be combined to maximize pumping efficiency at all times. **877/436-7977; www.henrypratt.com.**

Alpha stainless steel skimmer from Megator

STAINLESS STEEL SKIMMER

The Alpha stainless steel skimmer from Megator removes scum from aeration tanks. It withstands aggressive liquids at varying depths and concentrations, and has a lightweight design with easy one-person operation, an adjustable intake weir, a tri-float design for stability, and a shallow draft to operate in as little as 12 inches of water. It comes with 10 feet of suction hose. **800/245-6211; www.megator.com.**

DRY-PIT VERTICAL PUMP

Fybroc 5530 Series vertical pump from Met-Pro Global Pump Solutions

The corrosion-resistant Fybroc 5530 Series vertical pump from Met-Pro Global Pump Solutions handles difficult dry-pit applications including acids, bleaches and caustics, and is well suited for odor-control scrubber systems. Features include mounting outside of the tank; FRP construction and FRP wrapped shaft (1/8 inch); heavy-duty column, shaft and bearings; and optional high-pressure shaft seal. They are available in 16 sizes with capacities to 1,400 gpm and heads to 400 feet. **215/723-8155; www.mp-gps.com.**

Regenerative Turbine Pump from MTH Pumps

REGENERATIVE TURBINE PUMP

The Regenerative Turbine Pump from MTH Pumps has steep pressure capacity characteristics for overcoming system pressures and friction losses in applications such as seal flushing, water sampling and pressure boosting. It allows for pressures from 10 to 1,000 psi and flows from 1 to 150 gpm. It handles 20 percent vapor by volume and can generate fine micro-bubbles desirable in DAF processes. **630/552-4115; www.mthpumps.com.**

MOTOR CONTROLLER

Allen-Bradley SMC-50 motor controller from Rockwell Automation

The Allen-Bradley SMC-50 solid-state motor controller from Rockwell Automation includes a 3-phase, solid-state, silicon-controlled rectifier (SCR) power structure. It combines advanced monitoring and protection, multiple start and stop options, and expandable control inputs and outputs for controlling motor speed and torque. It has nine standard starting modes, six stopping modes and several slow-speed functions. It uses advanced power monitoring and diagnostics to deliver highly scalable, user-configurable faults and alarms. **414/382-2000; www.rockwellautomation.com/industries/water.**

SLURRY PUMP PACKING

PE1082 slurry pump packing from Palmetto is designed for abrasive and gritty applications. It combines ePTFE/graphite packing with a specially formulated Zenar yarn for strength and a break-in lubricant. It can be combined with other packings for high-pressure slurries. **800/445-4406; www.palmettopackings.com.**

PE1082 slurry pump packing from Palmetto

VALVED FLOWMETER

Model 106-SPI-MV flowmeter from Singer Valve

The Model 106-SPI-MV single-point insertion electromagnetic flowmeter from Singer Valve is installed and calibrated to provide accurate flow measurement. It is available for valves from 4 to 36 inches. With no moving parts and a single-piece design, it is generally immune to clogging by sand, grit or debris. **604/594-5404; www.singervalve.com.**

FRAME PUMP MOTOR

The US Motors 5813 Frame Vertical Titan II motor, manufactured by Nidec Motor Corp., has a cast iron frame. It is custom built to customer specifications and includes WPI and WPII weather-protected enclosures. Ratings range from 250 to 1,750 hp. It is available with hollow or solid shaft in low or medium voltage.

US Motors 5813 Frame Vertical Titan II motor, manufactured by Nidec Motor Corp.

It has oil-lubricated bearings with normal, high and extra-high thrust capacity designs available. **888/637-7333; www.usmotors.com.**

SCREW CENTRIFUGAL PUMP

Triton screw centrifugal pump from Vaughan Company

The Triton screw centrifugal pump from Vaughan Company has an open-channel impeller for handling thick sludge, large or stringy solids, shear-sensitive fluids and delicate or highly abrasive materials. Other features include steep performance curves, non-overloading power characteristics, heavy-duty power frames, and a flushless mechanical seal. A water-flushed mechanical seal or packing is also available. **888/249-2467; www.chopperpumps.com.**

SEMI-TRASH PUMPS

Semi-trash pumps from Subaru Industrial Power Products

Suitable for handling water with small solids and light debris, semi-trash pumps from Subaru Industrial Power Products use a heavy-duty overhead cam gasoline engine and large volute discharge opening. The 2-inch PKX201ST is powered by a Subaru EX13 4.5 hp engine and delivers 153 gpm. The 3-inch PKX301ST delivers 246 gpm and is driven by an EX17 6.0 hp engine. **847/540-7300; www.subarupower.com.**

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ELECTRONIC MOTOR MANAGER

The Contactron Electronic Motor Manager (EMM) from Phoenix Contact monitors the effective power consumed by motors, using the data to analyze errors and provide early warning to the controller. Users can set the parameters to detect dangerous operational conditions, such as overload, underload, pollution and wear. The module provides advanced diagnostics to support informed decisions for predictive maintenance and better operation. It provides easy-to-understand remote indication of system problems. **800/322-3225; www.phoenixcontact.com.**

Contactron Electronic Motor Manager (EMM) from Phoenix Contact

ROTARY LOBE PUMP

The TORNADO T2 rotary lobe pump from NETZSCH Pumps has lobes that run inside a metal housing with a replaceable elastomer liner. The design requires no O-rings or gaskets. A single synchronous-toothed timing belt eliminates a gearbox. A pulsation-reduction system of channels molded into the rubber walls of the pumping element releases lobe energy and dampens pulsation. **610/363-8010; www.netzschusa.com.**

TORNADO T2 rotary lobe pump from NETZSCH Pumps

PORT SLIDING WALL PENSTOCK

Orbinox offers the Model MU square or rectangular port sliding wall penstock sealed on all four sides. It is used for on-off or control applications in wells, tanks and pipe outlets. It has carbon- or stainless steel-fabricated construction, with tight elastomer seals. It is available in a wide range of dimensions and for many pressure heads. **450/622-8775; www.orbinox.com.**

Model MU port sliding wall penstock from Orbinox

ELECTRIC MODULATING ACTUATOR

CMA Series electric modulating actuators from Rotork provide linear, quarter-turn and rotary control for valve and pump applications. They are powered by single-phase or direct current, eliminating air hoses and compressors. Setup and configuration is easy with pushbuttons and an internal six-segment LCD display. Resolution is 0.25 percent on linear and quarter-turn applications and 2 degrees on multi-turn configuration. **585/247-2304; www.rotork.com.**

CMA Series electric modulating actuators from Rotork

ENGINEERED DRIVE SYSTEM

The Altivar Plus engineered drive system from Schneider Electric uses adjustable frequency drives that provide packaged, adjustable-speed solutions. It enables up to 50 percent energy savings on pumping, ventilation, and compression machines. A compact footprint and flexible modular design maximize use of space. The drives include protective NEMA Type 12 enclosures. **888/778-2733; www.schneider-electric.com/us.**

Altivar Plus engineered drive system from Schneider Electric

SLUDGE PUMP

Schwing Bioset's sludge pump can pump dewatered biosolids from belt presses, centrifuges, plate-and-frame presses and screw presses and can also pump scum and grease. Its capacity exceeds 300 gpm at operating pressures to 1,885 psi. It operates with a single-circuit, open-loop hydraulic system. **715/247-3433; www.schwingbioset.com.**

Sludge pump from Schwing Bioset

HIGH-PRESSURE COUPLINGS

High-pressure couplings from Victaulic join sludge-handling lines. With pressure ratings to 4,000 psi, they create reliable pipe joints. The couplings can be installed quickly without flame to create a union at every joint. Assembly involves positioning the gasket and housing segments on grooved pipe ends and tightening the nuts and bolts. **610/559-3300; www.victaulic.com.**

High-pressure couplings from Victaulic

Centrifugal pumps from SRS Crisafulli

SELF-PRIMING CENTRIFUGAL PUMP

Self-priming centrifugal pumps from SRS Crisafulli transfer water and wastes at high capacities. Capacities range from 50 to 18,000 gpm and total dynamic heads from 20 to 280 feet. The pumps can pass spherical solids up 5.5 inches. Models use varied impeller designs with varied blade configurations. **800/442-7867; www.crisafullipumps.com.**

PROGRESSIVE CAVITY PUMP

Progressive cavity pumps from seepex have Smart Conveying Technology (SCT) that provides fast maintenance and low life cycle costs. The pumps do not have to be removed for maintenance. With an integrated retensioning device, a simple readjustment of the stator increases the service life of the stator and rotor. **937/864-7150; www.seepex.com.**

Progressive cavity pumps from seepex

Omni-Sleeve from SIGMA Corporation

CONCRETE WALL PIPE SLEEVE

The Omni-Sleeve from SIGMA Corporation provides a flexible, accurate and cost-effective way to place pipe sleeves in a concrete wall. It fastens directly to the concrete form and has a built-in anchor and waterstop for leak-proof, solid connections. Pipes that pass through are positively sealed using a standard MJ gasket. **800/999-2550; www.sigmaco.com.**

ROTARY LOBE PUMP

The IQ Rotary Lobe Pump from Vogelsang offers advanced flow path technology in a simple and compact package. It handles highly viscous liquids and provides

IQ Rotary Lobe Pump from Vogelsang

pulsation-free flow. It has an easy-access front cover, HiFlo rotary lobes, integrated flanges, high suction lift, and the ability to pass hard solids to 1.3 inches. It is always primed, and can pull a suction lift up to 25 feet. **330/296-3820; www.vogelsangusa.com.**

DRIVE UNIT

WesTechEngineering drive units are delivered to the job site as a single, completely assembled and shop-tested unit, ready to be installed on the thickener or clarifier center column. The unit's flexibility of design allows the engineer to select a drive that will closely match the process and mechanical requirements. **801/265-1000; www.westech-inc.com.**

Drive units from WesTechEngineering

Endura SL (Slim Line) control panel from SJE-Rhombus

SYSTEM CONTROL PANEL

The Endura SL (Slim Line) control panel from SJE-Rhombus has a VFDC-4000 controller for commercial pressure booster applications using a variable frequency drive (VFD) and motor starters. It can be configured for simplex, duplex and triplex pump control using a single VFD for up to three pumps. **888/342-5753; www.vfdpanels.com.** tpo

1. PRECISION DIGITAL LEVEL METER

The PD6801 ProtEX F&I explosion-proof level meter from Precision Digital Corp. is designed for safe and hazardous environments. The 4-20 mA loop-powered input displays the level in feet and inches. A second line shows volume, percent or a custom label. A 20-segment tank level indicator displays height. The meter has FM, ATEX, CSA and IECEx approvals and is housed in a cast aluminum NEMA 4X enclosure. Through-glass buttons permit operation without removing the cover. **800/343-1001; www.predig.com.**

2. SIEMON FIBER OPTIC DUPLEX JUMPER

The LC BladePatch fiber optic duplex jumper from The Siemon Co. eliminates the need to access a latch during installation and removal, avoiding disruption or damage to adjacent fiber connectors. Features include push-pull boot design, a rotating latch that eliminates potential connector and cable damage during polarity changes, and uni-tube cable design to reduce pathway congestion. **860/945-4200; www.siemon.com.**

3. DIALIGHT STAINLESS STEEL LINEAR LED FITTING

The stainless steel linear LED fitting from Dialight is designed to reduce maintenance in hazardous areas as a replacement for conventional Ex fluorescent fittings. Available in both 32-watt and 64-watt versions (2 x 18W and 2 x 36W fluorescent equivalents), the fitting is highly durable and resistant to shock, vibration and corrosion. **732/919-3119; www.dialight.com.**

4. LARSON EXPLOSION-PROOF FLUORESCENT LIGHT

The EPL-48-216 explosion-proof fluorescent light fixture from Larson Electronics delivers 20,000 lumens and is Class 1 and Class 2 Division 1 UL listed. The 4-foot fixture features four T5HO bulbs in a standard two-lamp fixture. **800/369-6671; www.magnalight.com.**

5. ENDRESS+HAUSER CELL DENSITY SENSOR

The OUSBT66 sensor for cell density from Endress+Hauser uses near-infrared light absorbance to monitor cell density in real time, providing an easy and reliable method for measuring biomass concentration. The sensor can be operated continuously up to 158 degrees F and exposed to temperatures up to 275 degrees F with the lamp turned off for CIP, SIP or steam sterilization in an autoclave. **888/363-7377; www.us.endress.com.**

6. PEPPERL+FUCHS KC MODULES WITH SPRING TERMINAL

KC series signal conditioners from Pepperl+Fuchs are 12.5mm wide and available with spring terminals to simplify installation. The SIL-rated modules deliver a broad range with three-port isolation. They can be programmed and configured in the field using the push-button or dip-switch logic functions. Features include limit detection with form C alarm contacts, as well as fault detection and alarm functionality. **330/486-0002; www.pepperl-fuchs.us.**

7. B&B ELECTRONICS INDUSTRIAL ROUTER

The SPECTRE RT 300 series industrial wired Ethernet router from B&B Electronics Manufacturing is designed to securely connect Ethernet and serial equipment in harsh environments. The router can connect a private network to a public one, enabling devices to communicate across the Internet. The 1.7- by 3.1- by 4.5-inch router has an operating temperature range of -40 to 75 degrees F, DIN-rail mount, ability to use 10 to 30VDC power input, and I/O that can be used to monitor door closures or set alarms. **815/433-5100; www.bb-elec.com.**

8. ALLMAX OPERATIONS MANAGEMENT SOFTWARE

The Operator 10 v10 suite of operations information management system from AllMax Software has ribbon-type toolbars for displaying menu options and program features. A new database feature enables users to organize information from multiple components into an easily readable display. Graph, data, gauge and navigation shortcuts can be created for instant access. The software can be linked to SCADA or other compatible systems through OPC/DDE interface applications (available as an add-on). A built-in import function collects data from the LIMS (laboratory information management system) and automatically transfers it into the Operator 10 program. **800/670-1867; www.allmaxsoftware.com/tpo.**

9. IWAKI AMERICA SLURRY BEARING

The SB slurry bearing from Iwaki America is designed for pumping slurry liquids with concentrations up to 10 percent by volume and particle sizes up to 100 microns, including diatomaceous earth, metal oxides and other abrasive liquids. **508/429-1440; www.iwakiamerica.com.**

10. BGB TECHNOLOGY SLIP RING ASSEMBLIES

The SPB 03 line of slip ring assemblies from BGB Technology, designed for use as collector columns within half bridge clarifier and scraper systems, feature standardized components and can be refurbished and rebuilt. The assemblies are compliant to WIMES Directive 2.01 Section 6.12.2 for rotating half bridge scrappers, and are capable of both power and signal transfer. **804/451-5211; www.bgbtechnology.com.**

11. POLSTON MULTI-PURPOSE CLEANING TRUCK

The PAT 949 combination truck from Polston Applied Technologies provides a standalone cleaning system for large diameter lines, digesters, grit chambers, lift stations, water treatment plants, ponds, lagoons and other difficult-to-clean environments. The combination unit delivers up to 425 hp, enabling it to pump/separate sand and water at up to 2,500 gpm and at depths of more than 27 feet. Features include a hydraulic knuckle boom crane with up to 49 feet of reach from the center and 180-degree rotation. **866/862-7271; www.polstonprocess.com.**

12. PENTAIR 14U 14-SLOT AT CA CHASSIS

The Schroff 14U, 14-slot 450/40 family of AT CA chassis from Pentair Equipment Protection deliver 400 watts of cooling capacity per slot in the front of the chassis and 50 watts per slot in the rear transition modules. Features include bussed or radial IPMI, 800-watt electrical power for double-wide blades, redundant power entry modules and redundant push-pull fan tray cooling for fault tolerance. **763/421-2240; www.hoffmanonline.com.**

13. BIRD-B-GONE ELECTRIC BIRD DETERRENT

The Clear Track electric bird deterrent from Bird-B-Gone, part of the Bird Jolt Flat Track line, is effective on both small and large bird pests. The system does not harm birds, but conditions them to avoid an area. The system emits a slight shock when birds land on its surface. Made of clear, lightweight PVC, the 1/4-inch-tall system blends into any colored surface. It can be solar or electric powered and is UV protected for durability. **800/392-6915; www.birdbgone.com.**

(Continued on page 53)

product spotlight

HVT-DG Halmi Insert Venturi differential flowmeter from Primary Flow Signal

System accurately meters low-pressure wet digester gas

By Ted J. Rulseh

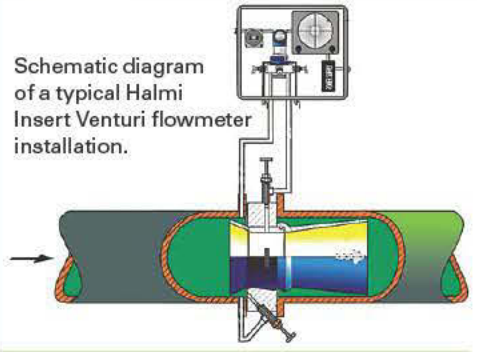
The **HVT-DG Halmi Insert Venturi** differential flowmeter from **Primary Flow Signal** provides accurate measurement of biogas from wastewater treatment digesters. The unit is designed specifically to provide reliable service even with very low line pressure and dirty, wet gas environments.

"The HVT-DG is a custom metering solution designed for the specific conditions of each application," observes Jeff Smith, national sales manager. When installed with the company's PFS-MV Flowmaster fully integrated secondary metering system, the readout compensates for line conditions, greatly improving accuracy.

"To examine biogas-to-energy use, plants must account for a wide range of site-specific conditions affected by biogas quantity and quality," says Smith. "The HVT-DG provides accurate biogas quantity measurements that capture heat energy for process heating or flaring surplus gas, and for energy recovery devices like boilers, engines and microturbines."

The device has no moving parts and no electronic components that could corrode in the harsh biogas environment. A manual vent cleaner enables removal of particles from the meter, helping to ensure that debris does not compromise flow measurement.

It maintains an accuracy of ±0.25 percent based on hydraulic calibration. It is made of non-corrosive materials and can handle temperatures up to 350 degrees F. Units can be recalibrated in the field, should that become necessary. The line size range is unlimited. **877/737-3569; www.primaryflowsignal.com.**



Schematic diagram of a typical Halmi Insert Venturi flowmeter installation.

people/awards

The **North American Development Bank** awarded a $761,000 grant toward the completion of a new wastewater collection system in **Bisbee, Ariz.**

American Water's Contract Services Group received the 2012 Safety Award from the Missouri Water Environment Association. The award honored American Water for safety compliance in its operation of the City of St. Charles wastewater treatment facility.

Ramon Knutti, utilities superintendent for the town of Wingate, received the Wastewater System Operations Specialist of the Year award from Alliance of Indiana Rural Water.

Gresham, Smith and Partners, a design and consulting firm, won the Grand Award in the water/wastewater category in the American Council of Engineering Companies of Tennessee 2013 Engineering Excellence Awards competition. The winning project is the upgraded and expanded Bowling Green (Ky.) Municipal Utilities' Wastewater Treatment Plant.

The **Glycerol Facility** at the **26th Ward Wastewater Treatment Plant** in Jamaica Bay, N.Y., was named as an American Council of Engineering Companies National Recognition Award Winner for 2013.

TPO *welcomes your contribution 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.*

education

California

The California Water Environment Association has a Collection System Benchmarking Workshop on Aug. 21 (location to be determined). Visit www.cwea.org.

Georgia

The Georgia Association of Water Professionals will hold a Nutrient Removal Workshop on Aug. 28 in Marietta, Ga. Visit www.gawponline.org.

Kansas

The Kansas Water Environment Association is offering these courses in Dodge City:

- July 2 – Wastewater Reclamation and Reuse
- July 16 – Intro to Water and Wastewater Conveyance
- July 30 – Wastewater Stabilization Lagoons

Visit www.kwea.net.

Michigan

The Michigan Water Environment Association is offering these courses in East Lansing:

- Sept. 17 – Collections Seminar
- Oct. 30 – Health and Safety Seminar

Visit www.mi-wea.org.

New York

The New York Water Environment Association is offering these courses:

- Aug. 21 – Pump Stations and Pump Hydraulics, Rochester
- Oct. 23 – Portable Pumps – Uses, Sizing and Planning, Babylon

Visit www.nywea.org.

CALENDAR OF EVENTS

July 14-17
Georgia Association of Water Professionals Annual Conference and Expo, Savannah International Trade and Convention Center. Visit www.gawp.org.

July 28-31
Water Environment Federation/ International Water Association Nutrient Removal and Recovery 2013: Trends in Resource Recovery and Use, Vancouver Wall Centre Hotel, British Columbia. Visit www.wef.org.

July 30-Aug. 2
Kansas Water Environment Association Annual Water and Wastewater School, Lawrence. Visit www.kwea.net.

Aug. 6-8
2013 International Society of Automation Water/Wastewater and Automatic Controls Symposium, Crowne Plaza Orlando (Fla.) Universal Hotel. Visit www.wef.org.

Aug. 26-29
Kansas Water Environment Association Annual Conference, Hyatt Regency, Wichita. Visit www.kwea.net.

Sept. 8-11
Rocky Mountain Water Environment Association Annual Conference, Keystone, Colo. Visit www.rmwea.org.

Sept. 29-Oct. 1
Atlantic Canada Water & Wastewater Association Annual Conference, Crown Plaza, Fredericton Convention Center, Fredericton, New Brunswick. Visit www.acwwa.ca.

Oct. 5-9
2013 Water Environment Federation Technical Exhibition and Conference (WEFTEC), McCormick Place South, Chicago. Visit www.weftec.org.

Ohio

The Ohio Water Environment Association has an Operations/Laboratory Analysts Workshop on Sept. 25-26 in Grove City. Visit www.ohiowea.org.

Texas

The Water Environment Association of Texas has a Biosolids Odor and Corrosion Conference and Expo July 31-Aug. 1 in San Marcos. Visit www.weat.org.

Wisconsin

The Central States Water Environment Association-Wisconsin has a Collections Systems Seminar on July 25 in Marshfield. Visit www.cswea.org/Wisconsin.

The University of Wisconsin Department of Engineering-Professional Development has a Wastewater Treatment Processes and Technologies course on Sept. 24-26 in Madison. Visit http://epdweb.engr.wisc.edu. **tpo**

TPO *invites your national, state, or local association to post notices and news items in the Worth Noting column. Send contributions to editor@tpomag.com.*

(Continued from page 51)

14. HACH TOC ANALYZER

The BioTector B3500c TOC analyzer from Hach Co. was designed to meet the requirements of clean water applications, including condensate return, cooling water, potable water, pharmaceutical water and demineralized water. The analyzer offers process insights, process incident alerts, environmental monitoring, energy optimization, product and water low prevention, and boiler and plant protection. **800/227-4224; www.hach.com.**

15. HAYWARD FLOW CONTROL BASKET STRAINERS

The Platinum GF-PP (glass-filled polypropylene) SB Series of basket strainers from Hayward Flow Control are available in sizes from 1/2 to 4 inches with true union threaded or flanged end connections. The vessels have a non-shock maximum pressure rating of 150 psi at 70 degrees F with maximum service temperature of 240 degrees F. **888/429-4635; www.haywardflowcontrol.com.**

16. OPTO 22 SCALABLE OPERATOR INTERFACE

The groov scalable operator interface from Opto 22 monitors and controls systems and equipment using computers and mobile devices. The system enables end-users to build and deploy browser-based interfaces for automation, monitoring and control applications. The interfaces can be viewed on most computer and mobile devices, regardless of manufacturer or operating system. **800/321-6786; www.opto22.com.**

17. REZNOR STAINLESS STEEL HEATER

The VC series stainless steel heater from Reznor can withstand humid conditions in a wastewater treatment plant and is approved for installation outdoors. The single-stage and two-stage heater runs on propane or natural gas; model EWHB runs on electricity. The heater can be suspended from the ceiling or wall mounted. **800/695-1901; www.rezspec.com/en/home. tpo**

TREATMENT PLANT OPERATOR tpo JULY

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EDUCATION

RoyCEU.com: We provide continuing education courses for water, wastewater and water distribution system operators. Log onto www.royceu.com and see our approved states and courses. Call 386-574-4307 for details. (oBM)

MISCELLANEOUS

UV DISINFECTION EQUIPMENT: Attention: Small wastewater treatment plant owners and operators. Possible use with Fish Farms. Portable, or very easy installation. Brand new product. US patent pending. callagher@sbcglobal.net, www.thefecalfighter.com. (oBM)

Wachs Trav-L-Vac 80: A system for buffalo or valve box cleanout. Gas powered, skid mounted. Asking $5,000 Call 814-321-1450 (C07)

POSITIONS AVAILABLE

Enz USA, Inc., the largest pipe cleaning tool manufacturer is seeking a full-time sales representative to cover the South Eastern states. Applicants must be self motivated, strong in communications, and technically proficient. Experience in the sewer cleaning industry would be beneficial but not essential. This position requires travel Monday – Friday in a company provided vehicle. Enz USA offers a competitive salary with commissions, benefit package, expenses, and 401K. Send resumes to: dana@enzusainc.com (www.enzusainc.com) (C07)

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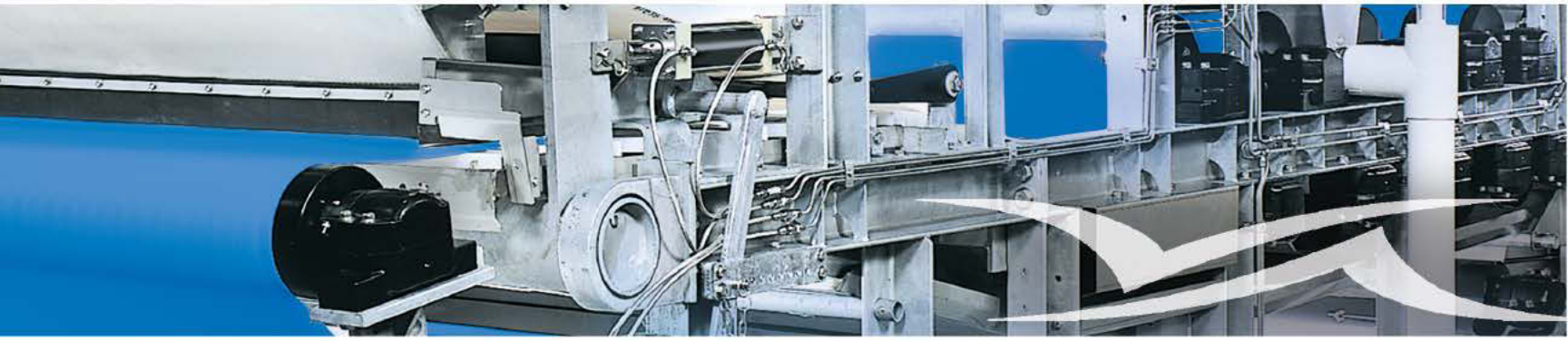

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Operators Everywhere Trust USABlueBook®

In the heart of Texas lies the Trophy Club Municipal Utility District 1's Wastewater Treatment Facility. That's where Karl Schlielig, Jeff Richey and the rest of the team are working hard to keep up with increased demands, while still delivering high-quality effluent.

Thanks to the expansion of USABlueBook's nationwide distribution network, the team in Trophy Club is getting exactly what they need, quicker than ever. "We thought you guys were fast before," shared Jeff, "but now we just pick our stuff up from Will Call over at your new warehouse. Last summer we were doing some work on our return pumps, and it was so easy to just run over there and get what we needed. It's great!"

"We thought you guys were fast before, but now we just pick our stuff up from Will Call over at your new warehouse."

"We like USABlueBook because you guys make things easy... your close warehouse, the way you work our account POs [billing process]... we even like the phone number of 1234," Jeff laughed.

Karl Schlielig
WW Superintendent
Trophy Club MUD 1
Trophy Club, TX

Jeff Richey
Crew Leader
Trophy Club MUD 1
Trophy Club, TX

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