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The Missouri River and Mississippi River wastewater treatment plants in St. Charles, Mo., are going through major upgrades to better serve the city and its 66,000 residents. The St. Charles team includes, front, from left, pretreatment coordinator Steve Schweitzer, facilities manager Kendall Coleman, and maintenance chief Mick Settles; back, operator Robert Lippincott, operations residual coordinator Warren Weber, and chief operator Todd Van Voorhis. (Photography by Tom Tussey)

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We Can't Afford What?

A REPORT SHOWS THAT UTILITY LEADERS WORRY ABOUT FUTURE FUNDING FOR WATER AND WASTEWATER SYSTEMS. ON THIS ISSUE, OUR SOCIETY NEEDS TO GROW UP AND GET WITH IT.

By Ted J. Rulseh, Editor

Reports on aging infrastructure come out every so often, a few of them each year, it seems, from different entities. A report earlier this year from the Black & Veatch consulting firm is notable for its perspective. It doesn't just report the (generally sorry) condition of the infrastructure. It explores the condition of water and wastewater systems and, more specifically, how utility leaders feel about it.

The *Strategic Directions in the U.S. Water Utility Industry Report* identifies top challenges facing the wastewater and drinking water sectors, and it cites capital costs and funding as the industry leaders' top concerns.

This statement from Cindy Wallis-Lage, president of the Black & Veatch global water business, speaks volumes: "Utility leaders are continuously challenged to make the most of limited budgets — a situation truer today than just five years ago. As a result, the vast majority of survey respondents doubt the sufficiency of their future funding to manage and maintain their systems."

FRIGHTENING THOUGHT

Think about what she said. The *vast majority* of people in leadership roles at wastewater and water utilities are not sure they can *afford* to run and keep up their systems of piping and treatment plants. If that doesn't terrify people in the water business, it certainly should.

The consequences of letting our water-related systems go to seed are too dire even to imagine. If we assume, correctly, that clean water is life, then these facilities are more important than any other public infrastructure. And yet it appears to the industry's leadership that the public is unwilling to pay what it costs to sustain them.

Look, this isn't a choice. If we're going to drink clean water and protect our lakes and streams from pollution, then we have to take care of the infrastructure, and whatever that costs, we have to pay.

Efficiency initiatives are fine — if we can get more done with the same or less money, that's a plus. But cost savings

Public servants of all stripes seem to labor under the assumption that their services have to be cheap. That isn't true. The services have to be efficient — not the same thing as cheap.

only go so far. Sooner or later we have to pony up, or face service issues, permit violations, pipe breaks, sinkholes in the streets, sewage overflows and worse.

BETWEEN THE LINES

Let's look at some of the basic findings listed in the Black & Veatch report.

For one, more than 75 percent of respondents said they had taken steps to cut energy usage. More than half said they were taking on asset management improvement programs. Fine — if tight budgets promote greater efficiency, that's not a bad thing.

But then: "85 percent of respondents said average water consumers have little or no understanding of the gap between rates paid and the cost of providing water and wastewater services." This in itself is an unsettling thought. And furthermore, why is there a gap in the first place? Shouldn't it be axiomatic that sewer and water rates cover the true costs of the services?

And then this: "Nearly half of utility leaders believe customers will probably be willing to pay the higher rates needed to fund capital improvements." Which on the flip side means *more than half doubt it!*

PAYING THE PIPER

It's time for that doubt to go away. One thing I have learned from being in business and observing business is that being bashful about pricing is a form of slow suicide. If you run a business, you need to charge what your product or service is worth, including enough to earn a fair profit. If you can't do that — if your customers literally won't pay it — then you shouldn't be in the business.

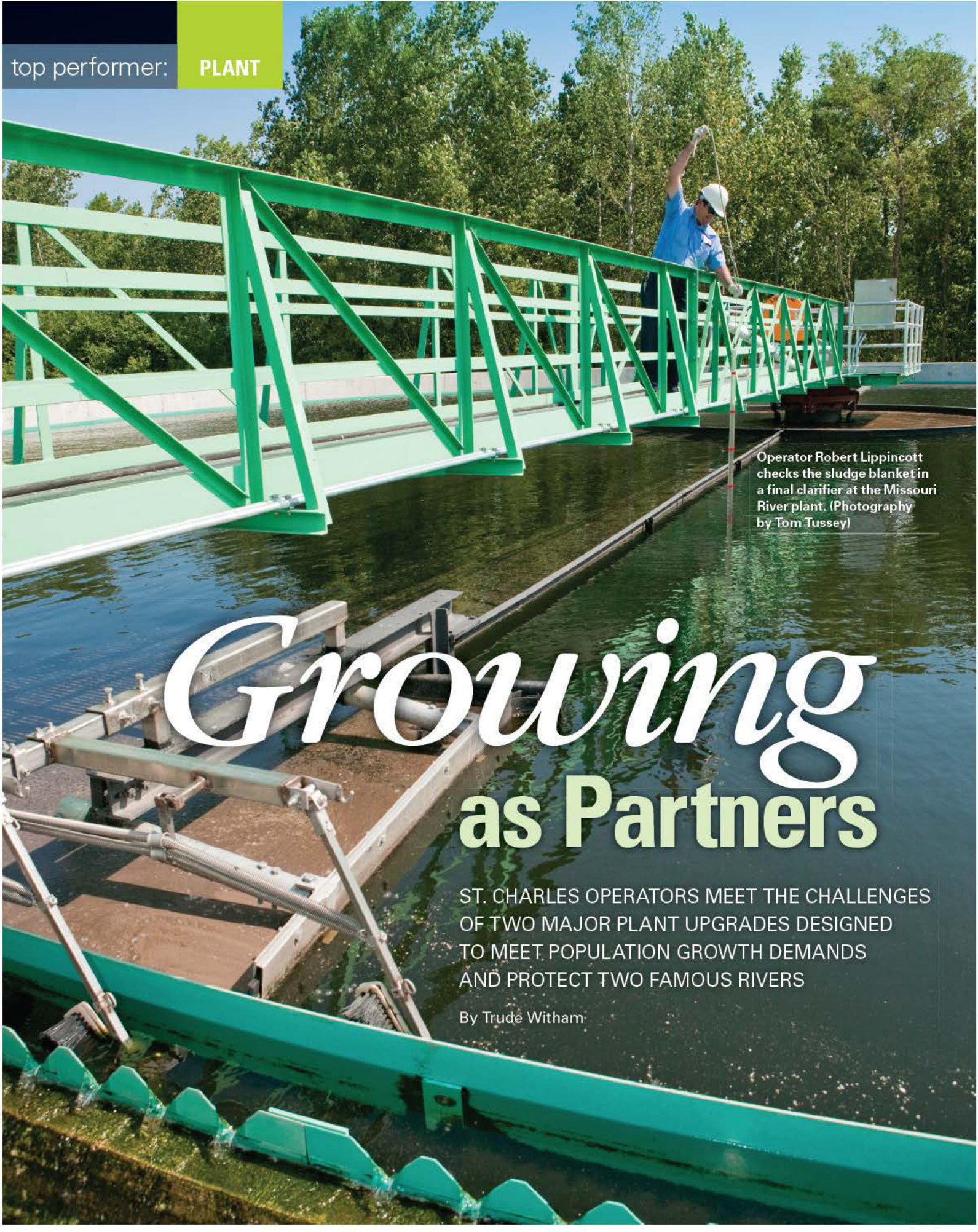
Things aren't much different for a wastewater or water utility. Public servants of all stripes seem to labor under the assumption that their services have to be cheap. That isn't true. The services have to be *efficient* — not the same thing as cheap. The price of the service has to reflect the true cost of providing it, and that includes enough for upkeep and future investment. There's just no getting around it.

As a society, we've persuaded ourselves that we "can't afford" the rising costs to support excellent services, whether that be schools, parks, transit or utilities. With allowance to people who genuinely are struggling in a time of recession, the reality is that most of us can well afford it — we simply prefer not to pay it. That isn't a responsible attitude, and it needs to change.

In the words of John Chevrette, president of the Black & Veatch management consulting division, "Overcoming today's challenges requires a significant change in how utilities develop and implement strategic and capital plans.

"At the same time, consumers must better understand that water and wastewater services are not free or low-cost. Rather, these are services that must be paid for in an equitable and responsible manner." May it be so.

You can read the full Black & Veatch report at www.bv.com/survey. **tpo**



Operator Robert Lippincott checks the sludge blanket in a final clarifier at the Missouri River plant. (Photography by Tom Tussey)

Growing as Partners

ST. CHARLES OPERATORS MEET THE CHALLENGES OF TWO MAJOR PLANT UPGRADES DESIGNED TO MEET POPULATION GROWTH DEMANDS AND PROTECT TWO FAMOUS RIVERS

By Trude Witham

THE MISSOURI RIVER AND MISSISSIPPI RIVER WASTEwater treatment plants in St. Charles, Mo., have been challenged to keep up with residential and commercial development in one of the nation's fastest growing areas. Both are going through major upgrades to better serve the city and its 66,000 residents for the next 20 years.

Begun in 2010, the improvements to the two activated sludge plants are making life interesting for the facilities' 14 team members. "Our biggest concerns are keeping enough equipment in operation, meeting effluent quality, and working with the multiple contractors and design engineers on site," says facilities manager Kendall Coleman.

Operations chief Todd Van Voorhis adds, "Since construction is ongoing, it is sometimes hard to find out which vendor to go to for help. For example, the SCADA vendor is in Texas, so we have to troubleshoot by phone and online."

The upgrades also spell changes to the process. Both plants are switching from chlorine to UV disinfection. Biosolids will be landfilled rather than land applied, changing some operators' duties. Even with these challenges, the staff has excelled, winning the Missouri Water Environment Association (MWEA) Biosolids Award for large facilities in 2010, and MWEA Safety Award for large facilities in 2011.

PUBLIC-PRIVATE PARTNERSHIP

The upgrade of the 26-year-old Missouri facility, started up in July 2012, increased the design capacity from 5 mgd to 7.5 mgd. The 50-year-old Mississippi plant's upgrade will increase capacity from 6.25 to 9.6 mgd and is to be completed in June 2013.

"Some of the old, deteriorated equipment was replaced in earlier upgrades," says Coleman. "For example, the secondary treatment process at the Missouri River plant never performed properly during the winter months, so in 1992 we did an upgrade to meet the required permit limits." The upgrade consisted of a new external final clarifier and a Fine Air aeration system (Sanitaire).

The City of St. Charles and Environmental Management Corporation (a part of the American Water Contract Services Group) have one of the nation's oldest public-private partnerships for wastewater treatment, dating back to 1984.

> "We're trying to use existing structures and processes as much as possible to reduce costs."
> **TODD VAN VOORHIS**

Environmental Management Corporation (EMC), a part of the American Water Contract Services Group, operates and maintains both plants through one of the nation's oldest public-private partnerships, started in 1984. EMC also operates and maintains the city's 19 lift stations and handles the industrial pretreatment program, the fats, oil and grease (FOG) reduction program, and the water treatment plant's lime residual.

Renewable every five years, the agreement guarantees effluent quality and regulatory compliance at both wastewater facilities, and on-call backup operations expertise around the clock. The partnership has saved the city significant money in operating and capital investment costs (EMC did not disclose the amount).

OPERATOR INPUT

The operations and maintenance staff sat in on meetings with the design engineers to offer input on equipment and vendors for the upgrades.

"The city hired EMC as the project manager early in the upgrade planning process," says Coleman. "In June 2007, project manager Jim Solari moved his office to the Mississippi River plant to ensure direct involvement between the city, operations, the design engineer and contract personnel."

One of Solari's responsibilities was to make sure the operators' equipment preferences were included during the project's design and construction phase. Van Voorhis is also heavily involved with various daily meetings and discussions about the Mississippi plant's construction. "We're trying to use existing structures and processes as much as possible to reduce costs," he says.

MORE EFFICIENT

The switch from chlorine to UV disinfection will allow the plants to comply with U.S. EPA and Missouri Department of Natural Resources require-

profile

Missouri River and Mississippi River Wastewater Treatment Plants, St. Charles, Mo.

BUILT:	1986 (Missouri River), 1962 (Mississippi River)
POPULATION SERVED:	66,000
EMPLOYEES:	14
FLOWS:	Missouri River: 5.0 mgd design, 3.58 mgd actual, 19.5 mgd peak; Mississippi River: 7.5 mgd design, 5.74 mgd actual, 17.7 mgd peak
TREATMENT LEVEL:	Secondary
TREATMENT PROCESS:	Activated sludge
RECEIVING WATERS:	Missouri River, Mississippi River
BIOSOLIDS:	Switching from land application to landfill
WEBSITE:	www.stcharlescitymo.gov
GPS COORDINATES:	Missouri River plant: Latitude: 38°48'17.28" N; Longitude: 90°28'05.72" W; Mississippi River plant: Latitude: 38°52'27.82" N; Longitude: 90°30'40.64" W

Operator Robert Lippincott, right, and facilities manager Kendall Coleman check a secondary treatment process via the SCADA system at the operations control center.

"We have guys going back and forth between plants, so they have to be versatile in performing different jobs on a day-to-day basis. That can be a challenge, especially with the ongoing construction at both facilities."

TODD VAN VOORHIS

Missouri River & Mississippi River Wastewater Treatment Plants PERMIT AND PERFORMANCE

	Missouri Plant		Mississippi Plant	
	PERMIT	EFFLUENT	PERMIT	EFFLUENT
$CBOD_5$	N/A	N/A	25 mg/L	4 mg/L
BOD	30 mg/L	3 mg/L	N/A	N/A
TSS	30 mg/L	6 mg/L	30 mg/L	6 mg/L
Fecal coliform	N/A	N/A	400 cfu/100 mL	4 cfu/100 mL

ments for more stringent bacteria removal. "The UV system [TrojanUV] will provide more efficient disinfection, will be safer for operations personnel, and will eliminate the risk of an accidental release of chlorine from the facility," says Coleman. "It will also eliminate the discharge of disinfection byproducts."

The Missouri River plant's $19 million upgrade also includes:

- New headworks with combined fine screening and grit removal (Andritz)
- Conversion of the secondary treatment process to disk aeration (Siemens Water Technologies) and removal of the in-line boat clarifiers
- New final clarifier and rebuilt existing final clarifier (Walker Process)
- Two new biosolids centrifuges (Andritz)

The Mississippi River plant's $25 million upgrade includes:

- New fine screening (Andritz) and improvements to existing grit removal facilities
- Installation of a diffused air system for aerating the influent/return activated sludge before discharge to secondary treatment process
- Increasing the volume of existing aeration basins
- Addition of a sixth aeration basin with Sanitaire aeration equipment
- New final clarifier (Walker Process)
- New ultraviolet disinfection (Trojan)
- New sludge-thickening facility with two gravity belt thickeners (Andritz)
- New SCADA monitoring and control system

Also under way is the Adams Street lift station, force main and sewer line rehabilitation project, to be completed in spring 2013.

NEW SKILLS

Some technologies used in the upgrades, such as the UV, centrifuges and SCADA, are new to the plants' operators, even those who have been in the business for a while. "The SCADA was the biggest challenge for the operators to learn, since those don't always work as expected in the early stages," says Coleman. "False alarms are common, and when you are dealing with new processes and equipment, it can be challenging to troubleshoot and correct things."

Adds Van Voorhis, "The design engineers say we have to set a pump at a certain hertz, but then we have to fine-tune where it should be set according to our actual flow. For example, if we have heavy rains or have to change the settings on our screening system to get rid of debris."

In addition, since the biosolids will now be hauled to a local landfill by operations staff, the operators must get commercial driver's licenses. "This presented a challenge for several of our staff, as some were hesitant to take this on," says Coleman. "Management and labor were able to work out an agreement to ensure that the task is handled efficiently and that only individuals interested in performing that job will be required to do it."

The operations residual coordinator, Warren Weber (Class C wastewater license, 20 years with EMC), previously spent 70 percent of his time working with the land application program. He will now focus on operating the new dewatering equipment and overseeing the shipment to the landfill.

VERSATILE TEAM

Three operators each are assigned to the Missouri and Mississippi plants, including operations chiefs Gary Heggemeyer (Class B, 37 years) and Van Voorhis (Class A, 16 years). All operators are cross-trained in laboratory and maintenance procedures.

The maintenance mechanics perform preventive maintenance and repairs at both facilities and the 19 lift stations. Laboratory technician Steve Botch (Class A, 13 years), based at the Mississippi plant, oversees quality control/quality assurance testing and operation monitoring reports. He also assists with developing standard operating procedures.

Pretreatment coordinator Steve Schweitzer (Class A, 35 years) is responsible for the industrial pretreatment program, which includes regulating significant industrial users' discharge to the sewer system. Those dischargers

Biosolids from the St. Charles Mississippi River plant are land-applied on farms.

PHOTO COURTESY OF KENDALL COLEMAN

Operations residual coordinator Warren Weber checks the Allen-Bradley control panel (Rockwell Automation) of the centrifuge operation.

include a uniform laundry service, a metal finishing plant, and a groundwater reclamation site.

Schweitzer also oversees the FOG program, implemented in 2003. Part of his job is to make sure grease traps are installed at all industrial and commercial sites. He also assists with environmental compliance obligations required by state and federal agencies. Other team members are:

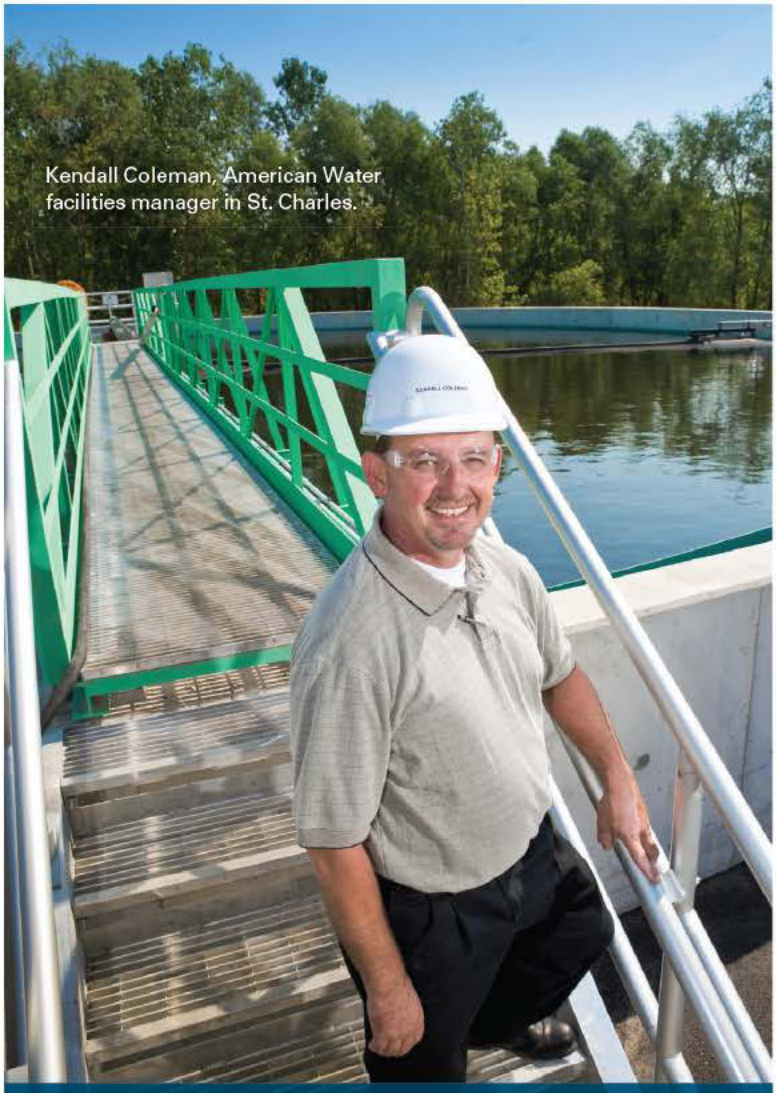
- Operator/safety coordinator Matthew Laugeman (Class A, 10 years)
- Class A operators Robert Lembeck (8 years), Robert Lippincott (11 years) and Larry Shy (11 years)
- Maintenance chief Mick Settles (Class A, 34 years), and maintenance mechanics John Leffeler (Class A, 41 years), Joe Hewitt (Class B, 12 years) and David Johnston (1 year)

"We have guys going back and forth between plants, so they have to be versatile in performing different jobs on a day-to-day basis," says Van Voorhis. "That can be a challenge, especially with the ongoing construction at both facilities."

HIGHLIGHTING THE POSITIVE

The plants and their operators have won various awards over the years. Settles, Heggemeyer and Leffeler have received Missouri Water & Wastewater Conference (MWWC) Operator of the Year awards.

The MWWC East Central section awarded Heggemeyer the 2011 Kramer Award after he was nominated by his coworkers. The award goes to those



Kendall Coleman, American Water facilities manager in St. Charles.

LIKE FAMILY

A team of 14 Environmental Management Corporation (EMC) employees keep the Missouri River and Mississippi River wastewater treatment facilities in St. Charles, Mo., running smoothly.

"EMC is fortunate to have a well-trained and seasoned staff for the wastewater facilities," says facilities manager Kendall Coleman, who has been with EMC for 22 years and holds a Missouri Class A wastewater license. "Everyone knows what needs to get done and most tasks are completed without the need for a lot of oversight from management. We all make mistakes at times, or come across something that may be difficult to solve, but when this happens, we call everyone together to discuss."

Staff members take their breaks and lunch together, allowing for tailgate sessions and discussion to solve the day's problems. "My management style is to treat them like family," says Coleman. "They don't work for me, but with me."

Coleman encourages employees to put family first: "Family is important. We have staff with a lot of vacation time, and if someone needs some time off, I try to be very flexible in letting this happen. I keep the guidelines a little wider than some to accommodate the employees and their family needs."

who exemplify high standards through technical self-improvement, loyalty, integrity and trustworthy service to the profession. The Missouri River plant won the MWEA Plant of the Year in 2007.

"We won these awards because we have a great staff with 350 years of collective experience," says Coleman. "The old plants didn't work all that well, and the staff had to stay extra focused on safety, effluent quality and the community. It's not an easy job or a pleasant job. I mean, most people in the community don't say, 'Let's take a trip to the wastewater treatment plant today.' "

PHOTO COURTESY OF KENDALL COLEMAN

The Mississippi River plant (7.5 mgd design) is operated by the American Water Contract Services Group, through Environmental Management Corp.

Warren Weber with the centrifuge (Andritz) at the Missouri plant.

"People can get into a mode of only discussing problems and issues, but it's just as important to highlight the positive, so I nominate my staff for awards."

KENDALL COLEMAN

Coleman sees awards as a way to keep employees motivated and to reward their efforts. "People can get into a mode of only discussing problems and issues, but it's just as important to highlight the positive, so I nominate my staff for awards," he says.

MANAGING CHANGE

Operators at both plants will continue to face challenges as the upgraded plants start up. "Things won't necessarily be easier with the new equipment," says Coleman. "Some old challenges will go away, but there will be new ones. I am confident that the staff will manage it and solve it their way."

Managing change is one of Coleman's strengths. "I went through change management training with EMC, so I'm pretty good at adapting to and managing this type of thing," he says. He also needs to find experienced operations staff to replace several team members who will retire in the next five years.

Coleman continually reminds his staff to focus on three main objectives: safety, effluent quality and the customer. "We want everyone to go home the same way they came to work, with no accidents or injuries," he says. "Our job is to ensure that everyone has clean water for consumption and recreation, and that we have to continuously provide the most cost-effective operation possible. If we do these things well, everything else will take care of itself." **tpo**

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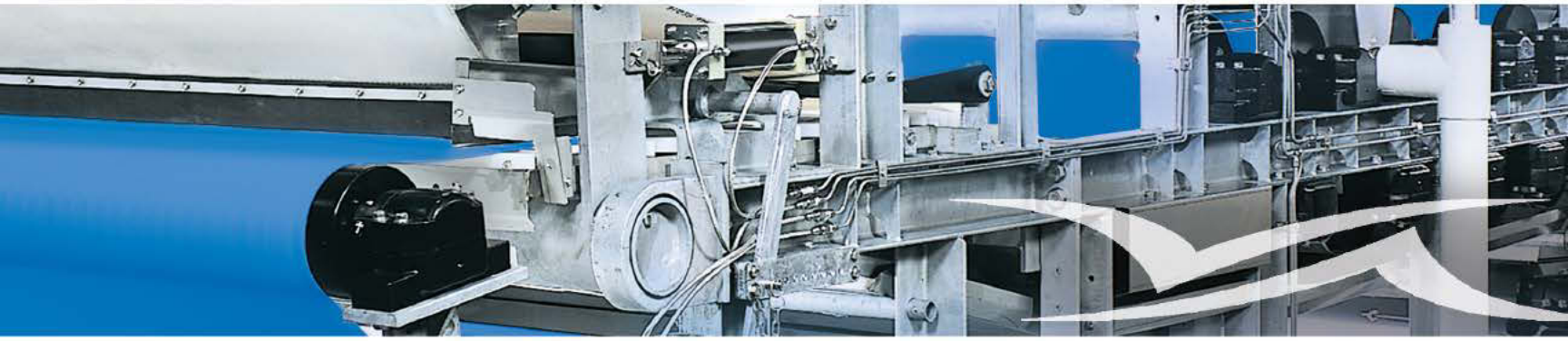

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Back From the Grave

PARIS UTILITY DISTRICT TRANSFORMS AN OLD TREATMENT PLANT THAT HAD CLOSED INTO A STATE-OF-THE-ART FACILITY WITH INNOVATIONS INCLUDING EFFLUENT HEAT RECOVERY

By Doug Day

YOU WOULDN'T KNOW IT BY LOOKING, BUT THE Paris Utility District in the Village of South Paris, Maine, has a brand new wastewater treatment plant.

From the outside, you see the same brick and mortar of an old industrial wastewater treatment plant that was shut down for nearly 20 years. Walk inside and you're in for a surprise. "The plant is now all state-of-the-art," says utilities manager Steve Arnold. "We even converted everything to all-new LED lighting."

What used to be a manually run mechanical plant now has full SCADA control. Grit that used to be shoveled by hand is automatically removed. Oil heat is a thing of the past — heating and cooling are provided by an innovative system that uses plant effluent (see sidebar).

IT'S NO MIRACLE

South Paris didn't find a wastewater treatment fairy. The district spent several years figuring out how to reuse what it had to build a treatment system for today's needs.

The old combined sewer and stormwater treatment plant was built in 1975 as two separate units: one for industrial wastewater and one for municipal sewage and stormwater. Then the industries left the community, and the industrial half of the plant was shut down in 1985.

What was left operating was quickly becoming outdated. "We had a metal grit channel in the headworks with a cantilever bucket elevator with scoop shovels that dumped debris on a belt that emptied into a container," recalls Arnold. Grit was shoveled into five-gallon buckets. "If we had a storm, what was usually one or two buckets would become 50, and we had to carry them up two flights of stairs," Arnold says.

In 2004, the district called on the engineering firm Woodard & Curran of Portland to design a new plant. The result is a project that won

From left, operator Wayne Kennedy, chief operator Paul Lowe and operator Barry Lambert check the programmable logic control panel (Allen-Bradley/ Rockwell Automation). (Photos by Stacey Damon)

profile

Paris Utility District Wastewater Treatment Plant, South Paris, Maine

BUILT:	1975 (rebuilt 2010)
POPULATION SERVED:	3,500
FLOWS:	0.65 mgd design, 0.35 mgd average
TREATMENT LEVEL:	Secondary
TREATMENT PROCESS:	Activated sludge with chemically enhanced secondary treatment
RECEIVING WATER:	Little Androscoggin River
BIOSOLIDS:	Dewatered, landfilled
EMPLOYEES:	6
ANNUAL BUDGET:	$850,000 (operations)
GPS COORDINATES:	Latitude: 44°12'45.97" N; Longitude: 70°31'02.30" W

an Engineering Excellence Award from the Maine chapter of the American Council of Engineering Companies. "They were only using one-sixth of the original secondary system," says Paul Rodriguez, senior project engineer with Woodard & Curran. "Over two years, we looked at what they had and evaluated several options."

RIGHT-SIZING

The original wastewater treatment plant had three influent lines, one from a tannery, one from a cannery, and one for municipal wastewater and stormwater. Flows averaged 1 to 2 mgd, versus a design flow of 3 mgd.

"Our drinking water plant had three wells running 24/7 pumping 1,200 to 1,400 gpm, so we always had water coming in," says Arnold. "As those industries closed, we used less and less of the plant."

The municipal wastewater and stormwater continued to be treated in aeration basins with mixers. There were six cells of 239,000 gallons each, but eventually the plant was only using one, and it was usually at half capacity. The plant was oversized, much of the equipment was nearing the end of its life, and regulations were getting stricter. "We had a great big dinosaur, and a duplication of everything," says Arnold.

After considering the options, the district and Woodard & Curran decided the best option was to use the industrial portion of the plant for a new activated sludge secondary treatment plant. Its design flow is sized at the current NPDES permitted flow of 0.65 mgd to meet today's needs of 1,000 service connections in a community of 3,500. Because it treats combined flow, its peak flow design is 1.5 mgd. Average flow is 0.35 mgd.

"The upgrades were separated into phases that focused on every aspect of the wastewater collection and treatment facilities, including the headworks, biological treatment, disinfection, sludge dewatering, pumping stations, and a new control system that also monitors all the pump stations in the collection system," says Rodriguez.

GETTING TO WORK

Work began with a new headworks in the existing building, installed from 2005 to 2007. A bypass channel was jackhammered into the floor so that the new equipment from Headworks could be installed without shutting down the plant.

> "Our TSS used to be in the range of 11 to 22 mg/L. We're down to around 2 to 5. We have reported a couple of months of 100 percent removal, and our inspector says we can't do that!"
>
> **STEVE ARNOLD**

The new secondary treatment system went online in September 2010. "Our TSS used to be in the range of 11 to 22 mg/L," says Arnold. "We're down to around 2 to 5. We have reported a couple of months of 100 percent removal, and our inspector says we can't do that! BODs are in single numbers and used to be 15 to 22 mg/L. The process is tremendously efficient, and the levels of treatment we're getting are fantastic."

Arnold, who during the 1990s was a compliance inspector for the Maine Department of Environmental Protection assigned to South Paris, observes,

The South Paris team includes, from left, operator Barry Lambert, plant superintendent Steve Arnold, chief operator Paul Lowe, office manager Penny Lowe, operator Wayne Kennedy, and lab manager Louise Grant. Not pictured: Operators Roja Hawkins and Barry Morse.

Lab manager Louise Grant at work.

"They were only using one-sixth of the original secondary system. Over two years, we looked at what they had and evaluated several options."

PAUL RODRIGUEZ

"They always met their permit limits and did a good job with what they had. But it's like night and day. We've acquired the tools we need to do the job easier and more efficiently by deploying the latest in technology."

Arnold calls the $10 million investment in the new plant not an upgrade or refurbishment but a "reinvention," with the idea of reusing as much as possible to reduce costs and construction work. Rodriguez adds, "They're doing a fantastic job running the plant. It's beyond what anyone could have expected going into this.

Arnold's team includes chief operator Paul Lowe (wastewater and drinking water), wastewater operators Wayne Kennedy (master electrician), Roja Hawkins and Barry Lambert, part-time operator Barry Morse, lab manager Louise Grant, and office manager Penny Lowe.

MAKING THE OLD NEW

Screening is now done with a Mahr Bar screen with a Vulcan wash press that automatically bags the waste material for incineration. Inclined screw conveyors (WSG & Solutions) automatically remove grit from an optimized grit tank that includes fiberglass baffles, new diffusers, and a pair of three-lobe positive-displacement blowers (Aerzen) for aeration.

"What used to be a carbonation/stabilization tank serves as our new chlorine contact chamber," says Arnold. Old equalization tanks became the new aeration tanks. The old primary clarifiers for the industrial wastewater system are the new secondary clarifiers, and the former upflow clarifiers became the new biosolids storage tanks. What used to be the pump building now houses the new treatment equipment.

The old influent pumps are now stormwater pumps. When the forward-flow pumps get overwhelmed with stormwater, the excess water flows over a channel wall and is pumped to one of the new storage tanks, made from reused parts of the old facility. Repurposing tanks around the plant saved millions in construction costs.

Two old aeration tanks and several secondary clarifiers were cleaned and stripped of all components and now provide 1.73 million gallons of stormwater storage capacity. After rain events, the contents of the storage tanks are reintroduced through the headworks for complete treatment.

While the old plant experienced two to four combined sewer overflows per year, there has been only one since the new plant went online. That was in June 2012, when 9 inches of rain fell in 40 hours on a weekend. "We had taken 3- or 4-inch rainfalls and weren't sure what it would take to fill the tanks and cause an overflow event," Rodriguez says.

To fund the project, the utility issued a 40-year bond for $5.4 million and used grants for the rest — just over $1 million from a Maine Department of Economic and Community Development block grant, and more than $3 million from a U.S. Department of Agriculture Rural Development block grant. All seven pump stations were also upgraded and hooked into the new SCADA system.

INNOVATIVE HEATING

The Paris Utility District Wastewater Treatment Plant is heated and cooled by an effluent thermal heat pump (Trane/Ingersoll Rand) that replaced an old oil-fired boiler. Geothermal heat pumps aren't new, and effluent thermal heat pumps have been around for more than 10 years.

Still, according to Paul Rodriguez of Woodard & Curran, people are just beginning to appreciate the concept. "It's gaining more acceptance with the high costs and extreme variability of fuel oil as compared to the slow and relatively stable rise in electricity costs," he says.

"It's pretty easy to install. Heat pump technology has also advanced, and you're able to produce heat very efficiently from fairly cold water. Our design was for down to 38-degree water. If you have near-freezing temperatures, say in a lagoon system, you would be on the borderline for a cost-effective effluent thermal system."

The effluent at Paris is a fairly constant 47 degrees F, perhaps into the mid-60s in prolonged hot weather. "We use it like you would use a geothermal heat pump — heat in the winter and cool in the summer," says utilities manager Steve Arnold. "Last year, we didn't purchase any heating oil. We normally went through 8,000 to 10,000 gallons at up to $4 a gallon." Annual savings of $36,000 are huge for a plant with an annual operating budget of $850,000.

Effluent is drawn from the chlorine contact chamber into the heat exchangers through a 2-inch pipe. The primary heat exchanger provides heating and cooling for the 12,000-square-foot control building, maintaining 70 degrees F. A heat exchanger in the pump building provides some supplemental heat there; the equipment itself usually keeps that building warm in winter.

A propane heating backup only kicks in if there are several days of extreme cold. "The first winter, it ran overnight once, but only because we fouled one of the sections of the new effluent heat exchanger system," says Arnold. "We were still learning how to use it. Last winter, the propane heat was never used."

After passing through the heat exchanger, the effluent goes back to the contact chamber for another dose of chlorination. Arnold expects payback on the $100,000 effluent heat exchanger in three or four years.

Operator Barry Lambert, chief operator Paul Lowe and operator Wayne Kennedy check the plant's serpentine belt press conveyor (Huber Technology).

Paris Utility District Wastewater Treatment Plant
PERMIT AND PERFORMANCE

	INFLUENT	PERMIT	EFFLUENT (Old Plant)	EFFLUENT (New Plant)
BOD	145-489 mg/L	30-50 mg/L	15-22 mg/L	2-8 mg/L
TSS	162-419 mg/L	30-50 mg/L	11-22 mg/L	2-8 mg/L
Ammonia	N/A	8-17 mg/L	0.2-2.0 mg/L	0.1-0.8 mg/L
pH	7.0-7.5	6.0-9.0	6.5-7.5	6.5-7.5

NEW TREATMENT PROCESS

"Operators had to be trained by every vendor on every piece of equipment," says Arnold. "We set time aside and did training for three weeks straight — 45 minutes here, a couple of hours there. I would say everyone had more than 80 hours of training. And we're still learning. We spent hours on the SCADA system, and we had to train on the new effluent thermal heating system SCADA as well."

The biological treatment is done with a plug flow reactor with an anoxic selector zone. "Anoxic swing zones control nitrification/denitrification for alkalinity recovery and reduce the nitrate loading to the secondary clarifiers," says Rodriguez. "The system de-couples mixing and aeration and includes state-of-the-art controls to minimize power consumption. Enhanced secondary treatment is done through chemical precipitation using metal salts, polymer and magnesium hydroxide."

High-efficiency equipment was used throughout, including Allen-Bradley soft-start variable frequency drives (Rockwell Automation) and pumps from Watson-Marlow and Flygt.

After screening and primary treatment, wastewater flows to aeration basins and clarification, then to ferric chloride treatment for phosphorus and chlorine disinfection (May through September) before discharge to the Little Androscoggin River.

"We have a lot more equipment online," notes Arnold. "We expect a 1 or 2 percent decline in electricity use." Even if the plant's $85,000 electricity budget remains the same, the new equipment provides better reliability.

ALARM RESPONSE

The old plant had standard alarm systems for functions like flow measurements and level indications, but it was all operated manually. Now it is all monitored and tracked by a FactoryTalk View SCADA system from Rockwell Automation with Allen-Bradley PLCs. All the data is available on laptop computers from remote locations. "From home, we can see exactly what's going on at the plant," says Arnold.

Before the rebuilding project, all alarms sounded at the sheriff's department. A dispatcher then paged the on-call operator, who had to make a phone call to confirm the alarm. "You had to drive to the plant and look at the alarm board," says Arnold. "If it was at a pump station, you would then have to drive out there. Many times, by the time you got there, the alarm had cleared, but you still had to check it." Then it was back to the plant to reset the alarm panel and call the sheriff's department.

"Now alarms automatically call an on-call cellphone, and an automated voice tells you exactly what and where the alarm is," says Arnold. "That in itself is worth its weight in gold." There are fewer high-water alarms because the new system can handle stormwater surges automatically.

> "We've acquired the tools we need to do the job easier and more efficiently by deploying the latest in technology."
>
> **STEVE ARNOLD**

"In the past, we had to come down to the plant and make sure everything was all right," says Arnold. Because of the automation and updated equipment, the number of alarms has dropped to one-tenth the previous level.

It took some time, and a lot of study and planning, but the Paris Utility District expects long years of reliable performance from its new treatment plant.

Editor's Note: Paul Rodriguez, the senior project engineer quoted in this story, is no longer with Woodard & Curran. His replacement on the Paris project is project engineer Rob Polys. **tpo**

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Unraveling the Mystery

HERE'S WHY IT'S IMPORTANT TO UNDERSTAND OXIDATION-REDUCTION POTENTIAL — AND WHY AN ORP METER CAN BE A POTENT ITEM IN AN OPERATOR'S TOOLKIT

By Mark Spencer

Everyone in the water and wastewater industry knows and measures pH. Conductivity is a concept we all readily grasp. Dissolved oxygen and free chlorine are actual chemicals, so we understand them.

But oxidation reduction potential (ORP or redox) is another matter. For most, it's a mystery, and that's a shame because ORP can be used in more applications than any other measurement. Furthermore, the analyzers that measure it are inexpensive and simple. The more you know, the more you will want to use them.

WHAT ORP MEANS

ORP is mysterious to most because it doesn't measure anything in particular. It is an aggregate measurement of all the chemicals in the water that either give up electrons (oxidize) or steal electrons (reduce). Chemistry is the study of what happens when molecules or atoms of one kind take electrons from molecules or atoms of another kind.

We say a chemical that is oxidized by another is a reducing agent, and a chemical that is reduced by another is an oxidizing agent (or oxidant). Sort out this nomenclature and you're halfway to understanding ORP.

The other convention we use when describing ORP is that chemicals that oxidize have positive ORP values while those that reduce have negative values. Knowing this, we can define what an ORP value is.

To make sure the processes are optimized, all we need to do is measure and control the ORP. That's why the ORP sensor is one of the most powerful tools in the water quality instrumentation toolbox.

To do so, we must understand the most fundamental law of oxidation-reduction reactions: It takes two to tango. You can't have one chemical that oxidizes unless there is another that reduces and can take up the liberated electrons. For instance, iron in a vacuum will stay iron. But add oxygen and the iron gives up electrons to oxygen, and the two them combine to form iron oxide (rust).

The chemicals that disinfect or break down matter, such as oxygen, ozone, chlorine, hypochlorite or potassium permanganate, are oxidants and grab electrons. But they can't do anything unless they find a partner to give them electrons. In water treatment, that partner is always organic matter: ammonia, bacteria, dead leaves and anything else that needs breaking down.

ORP is the sum of all the possible oxidation and reduction reactions that can take place in the water. But they don't take place until there is balance between oxidation and reduction. A hypochlorite solution has a positive ORP that stays positive until it comes across some organic matter.

Once we understand that oxidation-reduction reactions constitute an exchange of electrons between the oxidizing chemicals and the reducing chemicals, we can see that they work just like batteries. Just as batteries are characterized by a voltage, so are oxidation-reduction reactions. That's why ORP is measured millivolts (mV).

HOW AN ORP SENSOR WORKS

Now we can look at how an ORP probe works. If we examine the glass electrode of an ORP sensor, we see a platinum band that wraps around the glass and connects to the interior of the probe. Platinum is a great catalyst: It speeds up reactions. (The catalytic converter in a car contains a strip of platinum that accelerates the conversion of toxic carbon monoxide to carbon dioxide.)

On the platinum surface, redox reactions can proceed rapidly, but we need a partner to balance the flow of electrons. Every giver needs a taker. That's where the reference electrode comes in.

Decades ago, the reference electrode was a hydrogen electrode in which hydrogen gas broke down into positive hydrogen ions and electrons, or vice versa. That's why ORP reactions are generally referenced to the standard hydrogen electrode (SHE).

But carting hydrogen gas around is cumbersome, so we now use a silver wire in a potassium chloride (KCl) solution. Some of the silver dissolves in the KCl solution as positive silver ions. This is nothing more than an off-the-shelf pH electrode — that's why ORP probes and pH probes have identical reference electrodes. They differ only in the process electrode.

When the process electrode (the one with the platinum band that sticks in the water) is in a solution that has a positive ORP (likes to oxidize), the silver wire in the reference electrode balances out the chemistry by dissolving silver atoms to form silver ions and electrons. The electrons flow to the process electrode to satisfy the oxidizing agent's appetite for electrons, and we measure the voltage as a positive ORP value.

When the probe is in a reducing environment — say, a solution of hydrogen sulfide — the opposite happens. The positively charged silver ions in the KCl solution grab electrons from the process electrode, turn back into neutral silver atoms, and plate onto the silver wire. Because the current flow is now reversed, we measure a negative voltage.

A word of caution: While platinum makes reactions speed up, some redox reactions are slow no matter what. Put an ORP sensor in calibration solution and it will give a reading in 30 seconds. Put it in

tap water and it takes up to 20 minutes. This is because the reactions involving iron compounds in the calibration solution are fast, but the reactions of residual chlorine and other minor constituents in tap water are slow.

WHY ORP MATTERS

The ORP probe is a "bottom line" instrument: It doesn't care what's in the water. It simply measures the redox potential of everything in the water. Whether it's ozone, chlorine, sodium metabisulfite or dissolved oxygen, it doesn't care. We only care that whatever is in the water can do the job, whether breaking down contaminants, turning nitrates into nitrogen, or any other chemical reactions that occur in a treatment facility.

To make sure the processes are optimized, all we need to do is measure and control the ORP. That's why the ORP sensor is one of the most powerful tools in the water quality instrumentation toolbox.

Let's end by citing the most common uses of ORP analyzers. Oxidation reactions are behind two of the most common reactions in wastewater processing.

In wastewater, one variety of bacteria includes little chemical factories that oxidize (nitrify) ammonia to nitrite. Another variety further oxidizes the nitrite to nitrate. Then, in a reversal of bacterial philanthropy, another set of bacteria that is deprived of oxygen reduce (denitrify) the nitrate to nitrogen gas, which floats off into the atmosphere.

The usual course of action is to measure dissolved oxygen (DO) — keeping it high enough during the nitrification stages and low during the anoxic (denitrification) stage. This is the role of the aerator, which ensures that the water has enough DO — about 4 to 8 ppm, or at least 50 percent saturation. Normally a DO sensor does the job, but an ORP sensor can measure the actual aerobic chemistry and do it for less money.

In water treatment, disinfection in the form of chlorine or hypochlorite works by breaking down bacterial cell walls. Regardless of the form of chlorine going into the water, it is hypochlorous acid — HOCl — that kills the bacteria. We are all familiar with chlorine analyzers used to dose the right amount of chlorine and keep the free chlorine concentration in the right range. An ORP analyzer gives us the bottom line, which is the oxidation potential that does the work of disinfection.

THE OTHER SIDE

So far, we've discussed oxidation reactions in a wastewater plant, but reduction reactions also play a role. Denitrification reduces nitrate to nitrogen gas — bacteria do this work in low-oxygen conditions. The reducing environment is characterized by a negative ORP value. It is much easier to measure this value with an ORP analyzer than to measure very low oxygen with a dissolved oxygen analyzer.

The reduction of phosphate is similar to the reduction of ammonia by bacteria. One set of microbes do their work in a very low oxygen environment and another set do it an oxygen-rich one. ORP to the rescue.

I'm not suggesting that a water treatment plant throw out its chlorine analyzer, or that a wastewater plant dispose of its DO analyzer. But I am suggesting that, for a modest investment, arming these facilities with ORP analyzers can ensure that their chemical processes are doing exactly what they are supposed to.

If you would like to learn more about ORP measurements, you can download a more comprehensive paper at www.WaterAnalytics.net/Resources.

ABOUT THE AUTHOR

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A SPARKLING LEGACY

NEW YORK'S STEVE ASKEW TAKES PRIDE IN HIS PLANT, IN HIS TEAM'S PERFORMANCE, AND IN THE CHANGES WASTEWATER TREATMENT HAS HELPED BRING TO THE CITY'S WATERWAYS

By Ted J. Rulseh

STEVE ASKEW CONCISELY SUMS UP THE CHALLENGE of running New York City's North River Wastewater Treatment Plant: "We're a 28-acre, $2 billion piece of concrete, processing millions of gallons of wastewater every day, 500 feet away from tens of thousands of people on Manhattan's West Side."

Askew, the plant's superintendent and chief operator, meets that and more specific challenges daily with expert help from a staff of 125, all but about 20 under his supervision. For them, it's about making a difference — and it's easy to make the case that they have done so.

"In the simplest sense, water comes in dirty and goes out clean," says Askew, a veteran of 29 years with the city Department of Environmental Protection (DEP). "New York City has experienced continued improvement in water quality in the last generation, and I'm proud to be part of that.

"This is not the same city it was 25 years ago with respect to water quality and access to the water. The city is located in a marine environment. Between Manhattan Island, Staten Island, Brooklyn and Queens, we have nearly 600 miles of coastline. Twenty-five years ago, either people couldn't get access to the water or they were afraid to go near it.

"Now people want to go to the beach. Real estate values along the waterfront have skyrocketed, and public access to the waterfront has come to the forefront among the city's policies. That couldn't be done unless the waterways were clean. There are 8 million people in this city, and this would be quite literally a cesspool if we didn't do what we do, and do it well."

Plant superintendent Steve Askew checks the QuickPanel View engine pump control panel (GE Intelligent Platforms). (Photos by Sonny Maxon)

BIG GREEN ROOF

It's hard to imagine a more unique setting for a treatment plant than North River's — it actually has for its roof the 28-acre Riverbank State Park. Rising 69 feet above the Hudson River, it provides spectacular vistas. It includes an outdoor 25-yard lap pool; a wading pool; tennis, basketball and handball courts; a softball field; a 400-meter running track; and a football/soccer field.

Buildings house an Olympic-size pool, a covered skating rink, an 800-seat theater, a 2,500-seat athletic complex with fitness room, and a 150-seat restaurant. So, besides the challenge of keeping a 175 mgd (design) activated sludge plant in permit compliance, there's the need to be a good "downstairs" neighbor. In part, that means operating a vast odor-control system.

While the park itself is run by the New York State Office of Parks, Recreation and Historic Preservation, the North River plant maintains close ties with the park staff. "Wastewater treatment plants are generally not in the public access business, but we have a strong public outreach program at North River, and the park is a vital part of that," Askew says.

It's all in a day's work for Askew, a Grade 4A license holder and winner of the New York Water Environment Association William D. Hatfield Award (2007) and Uhl T. Mann Award for operations and maintenance excellence (1999). As the ranking employee on site, he is in charge of the entire facility, including operations, maintenance, public relations and contract administration.

ALWAYS LEARNING

It has been a rewarding journey for Askew, son of a city DEP employee. After high school, he attended City College of New York to pursue electrical engineering, but "life got in the way" and he was unable to finish. Instead, he joined the U.S. Navy, where he worked in the nuclear power program for six years, both on shipboard and at the shipyard in Newport News, Va.

Steve Askew, plant superintendent, North River, New York City

"I'm always looking to do things better. I'm kind of a mover and shaker. I don't accept the status quo."

STEVE ASKEW

profile

Steve Askew, New York City, Department of Environmental Protection

POSITION: North River Wastewater Treatment Plant superintendent

EXPERIENCE: 29 years in wastewater

DUTIES: Chief operator, in charge of all plant functions; leads staff of 105

EDUCATION: Electrical engineering studies at City College of New York; nuclear power training and experience in U.S. Navy

CERTIFICATION: New York Grade 4A wastewater license

GOALS: Continue successfully completing plant projects and upgrades

GPS COORDINATES: Latitude: 40°49'38.40" N; Longitude: 73°57'13.65" W

PHOTO COURTESY OF NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION

The entire North River plant is located underground with the Riverbank State Park on top.

The North River Wastewater Treatment Plant team includes, from left, plant superintendent Steve Askew, supervisor of machinists Bob Zaragoza, deputy of operations Sammy Andalib, and deputy of maintenance Charles Youhan.

"When I got out of the Navy in the early 1980s, the nuclear industry was in a state of turmoil because of the Three Mile Island incident," Askew recalls. "I needed a job and more or less followed my father's footsteps into the DEP."

He started as a mechanic, doing repairs and installation on major equipment like pumps and engine-generators. He earned his wastewater operator license, moved into an operator's role, and worked up the chain to shift operator, shift supervisor, assistant plant superintendent, and ultimately plant superintendent at North River in 1996.

His varied education served him well. "A wastewater treatment plant has electrical systems, mechanical systems, HVAC systems, so everything I learned in school with respect to engineering, chemistry and biology applied to my new career," Askew says. "My formal schooling and my nuclear work certainly transferred over."

Along the way, Askew took courses in facilities management at New York University and Manhattan College, along with training specific to the wastewater field. He also became certified in vibration analysis and as a value engineering facilitator. "I'm always looking to do things better," he says. "I'm kind of a mover and shaker. I don't accept the status quo."

ALL CHOREOGRAPHED

Askew's team includes assistant superintendents Sammy Andalib (operations) and Charles Youhan (maintenance), along with operators, general mechanics, skilled tradespeople such as machinists and electricians, process engineers, logistics support, and administrative staff.

The plant also operates three boats that haul biosolids from the mesophilic anaerobic digesters — some 70,000 to 100,000 cubic feet per day — to centrifuge dewatering facilities at Ward's Island on the other side of Manhattan.

"Everything is choreographed and everybody works in concert with one another," says Askew. "I'm sort of the conductor who keeps it all moving." The plant's average dry-weather flow of 125 mgd, down significantly over the past decade, is mainly thanks to the city's water conservation initiatives. Flow peaks can be high because the city operates a combined sewer system — maximum permitted wet-weather flow is 340 mgd.

Odor control is especially critical, and to that end, most plant process areas are enclosed. The headworks, for example, is inside a building, and the primary clarifiers are covered. "All of the air from within these spaces is drawn off and sent to odor control systems," says Askew. "We move about 750,000 cfm of air through odor control, in addition to moving 600,000 cfm for supply ventilation. Many of these spaces are occupied by operators, and we have to provide the necessary air changes per hour."

The odor-control system first passes air through wet scrubbers containing a solution of sodium hypochlorite and sodium hydroxide to oxidize the sulfurous compounds. The air then passes through activated carbon filtration to remove remaining odorous compounds and scrubber off-gasing before being exhausted. "We've got 25 scrubber towers and close to 60 carbon vessels, each holding 20,000 pounds of carbon," Askew says. "That's a lot of odor control."

COST-CONTROL CHALLENGE

Cost control is another challenge in a time of tightening budgets and fiscal constraints. "To increase efficiency, the DEP has embarked on an operational excellence program where we're looking to optimize our processes," says Askew. "Every year, new mandates come in that may tend to increase operations complexity and cost. On top of that, equipment gets older every year. Meanwhile, resources are becoming more and more scarce. That's a challenge, but we are certainly up to it."

For one thing, "We're very regimented with our maintenance practices. We're being creative with reliability-centered maintenance. It's not the old planned maintenance where you do an open inspection at a fixed interval. We don't go around greasing pumps that haven't run in six months. We don't waste time and resources over-maintaining equipment."

> "If you become a leader rather than a pusher, things will get done, and they'll be done better, because the people have more of a sense of pride, and quality goes up."
>
> **STEVE ASKEW**

The maintenance regimen includes vibration analysis to detect equipment anomalies that could signal impending failure, and infrared thermography to locate "hotspots" on equipment or in electrical connections, again to detect and head off trouble.

"We also do lube oil analysis," Askew adds. "For example, instead of changing oil every three months on an engine, we'll take an oil sample every month, and if we start seeing a trend, then we'll change the oil. We don't want to throw away good oil. That just wastes time and money."

Askew also seeks efficiency by doing work in-house: "It's not cost-effective in all instances, but we've been successful in picking and choosing which tasks to outsource and which tasks to insource, and we've developed a balance there."

LEADING THE TEAM

A major driver of efficiency is an effective team, and here Askew strives to motivate by involving team members in decision making. "I'll never ask someone to do something that I haven't done myself or am not willing to do myself," he says. "I try to foster a sense of ownership within the facility.

"I think it was General Dwight Eisenhower who put a string on the table in front of his generals and showed them that if he pushed the string, it didn't go anywhere, but if he pulled the string, it followed him. If you become a leader rather than a pusher, things will get done, and they'll be done better, because the people have more of a sense of pride, and quality goes up.

"In a municipal environment, it can be difficult to give positive motivators, so we try to instill trust in people. Any good management program will tell you that intangibles — a person's sense of self-worth and being part of a team — really goes a long way in motivating people. I certainly stand by that.

"Before I come up with an initiative I'll lay it out and get feedback from the team. When you do that, they can say, 'Hey, this program was a success not because somebody else constructed it and I filled in the blanks, but because I was part of its development.' That really helps out a lot."

Askew also believes in immediate feedback: When he observes people doing things right, he tells them on the spot. The reverse also holds true. For the longer term, Askew lets team members know that a good career path is available to them.

"I try to encourage them to keep their career paths open," he says. "Some people are very amenable to that, while others are content with where they are in the organization. If a person aspires to upward mobility, I'll mentor that person. I've been quite successful in that.

"There are probably more plant superintendents and assistant superintendents in the organization who have worked for me than any other chief operator, and I take great pride in that. It's their own motivations and abilities that got them there, but I like to think that under my tutelage I instilled that motivation in them."

UPGRADES ON THE WAY

Keeping Askew motivated are continuing facility improvements and upgrades, one of the largest being a new combined heat and power system. North River's anaerobic digesters produce about 1.6 million cubic feet of methane gas per day. At 650 Btu per cubic foot, that's roughly a billion Btu of energy.

The digester gas fuels 10 large reciprocating engines — five 1,700 hp units that directly drive the main sewage pumps, and five 1,000 hp units that drive the process air blowers. Heat is recovered from the engine jacket water, lube oil and exhaust for total thermal efficiency approaching 85 percent.

Those dual-fuel engines (gas with diesel pilot ignition) are near the end of their lives and will be replaced by a combined heat and power system using spark-ignited gas engine-generators producing electricity to drive the pumps, blowers and other equipment. The project is in the design stage, and construction is scheduled to start late this year.

"It's going to be a balancing act because we have to maintain full operational capability," says Askew. "It affects the most critical parts of the facility. As we take equipment out of service and put new equipment in, the construction and coordination will be quite complex.

"I've been involved in plant upgrades before — I probably have a billion dollars of construction under my belt — so I really look forward to it. Maybe that's one of the reasons I'm sticking around."

LEAVING A LEGACY

Indeed, Askew already has "stuck around" for more than a year beyond the time he could have retired: "It's fun, and as long as I keep having fun, I'm going to stay.

"I work for a good organization. I've been lucky to work for some really good people who support me and trust me. I've also been fortunate to have good people work with me. The success of any supervisor is really contingent on the quality of subordinates. I've been really lucky at both ends."

As for his legacy, he says: "We can all look at ourselves at the end of our career and ask: Did I make a difference? It would be self-serving to say I did. That will be determined not by me but by my peers."

For New Yorkers enjoying the city's rejuvenated waterways, the impacts of Askew and his peers are not in question. **tpo**

PHOTO BY KIEFFER PHOTOGRAPHY

Members of the North River plant WEF Operations Challenge team, the Harlem Pumptrotters, are, from left, Bill Sedutto, Mike Leone, Joe Riccardi and Justin Manfredi.

RECOGNITION MATTERS

When North River Wastewater Treatment Plant superintendent Steve Askew invited his people to take part in the Water Environment Federation Operations Challenge, they were skeptical. "Their attitude was, 'We're never going to win,' " he says. Nonetheless, the plant formed two four-member teams, and one of them won an initial round of competition among New York City treatment plants. That team went on to win first place in the New York Water Environment Association state contest and with it, the right to enter the national competition at WEFTEC in New Orleans last October.

The members of the team — called the Harlem Pumptrotters — are sewage treatment workers Mike Leone, Justin Manfredi, Joe Riccardi and Bill Sedutto. "We supported them all the way," says Askew. "We gave them the opportunity to practice. When those guys came back from Buffalo and the state competition, you could feel the pride in the whole plant. We walked in on Monday morning after the competition and there was a big banner up. I had emailed pictures back to the facility, and they had posters up. Everyone joined in the sense of pride about going to New Orleans to compete.

"When employees are able to showcase their skills, that's absolutely priceless. We can put them in a classroom and have the best trainer and the best training materials, but the proof is in the pudding when an employee can say, 'Wow, I participated, and I was successful in my endeavor,' " Askew says.

The plant has also been well recognized for its day-to-day performance, having won numerous Silver and Gold Peak Performance Awards from the National Association of Clean Water Agencies. "We're really proud of those," he says, "and they're posted in the lobby for everyone to see."

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Better Recipe

A NEW CHEMICAL TREATMENT PROCESS HELPS A FLORIDA PLANT PRODUCE CLASS A BIOSOLIDS AT SIGNIFICANTLY LOWER ENERGY AND OVERALL OPERATING COSTS

By Doug Day

The Haines City (Fla.) Wastewater Treatment Plant has found a way to recycle its biosolids more easily, make a product for beneficial reuse on agricultural fields, and meet new regulations while cutting operating costs and reducing odors.

The 3 mgd (design) activated sludge plant has an average flow of about 1.5 mgd; effluent is sent to the city's reclaimed water system. The plant needed an upgrade to meet new biosolids regulations from the Florida Department of Environmental Protection that take effect in January 2013. The new provisions substantially limit land application of Class B biosolids and make some land application of Class A biosolids less attractive.

After reviewing alternatives, Haines City selected the Neutralizer process from BCR Environmental. The system treats waste activated sludge with a two-stage chemical system to produce Class A/EQ (exceptional quality) biosolids suitable for commercial fertilizer.

"We are ahead of the curve as far as compliance issues," notes Nathan Silveira, licensed operator and interim pretreatment coordinator at the plant, which serves the city's 20,000 residents. The process allowed elimination of three digesters, each with a pair of 125 hp motors, cutting electrical costs substantially. "We had a lot of odors because of the digesters and that's something that's been eliminated," Silveira adds.

The chemical systems automatically inject a mixture of sulfuric acid, sodium chlorite, sodium hydroxide, ferric chloride and sodium nitrite in two processing steps.

BCR Environmental CEO Aaron Zahn and vice-mayor Roy Tyler at the polymer control pump system at the Haines City Wastewater Treatment Plant.

FAST PAYBACK

The Neutralizer system was installed in a new 5,000 square foot building on the site of the plant's unused drying beds. The plant expects to save $180,000 in operating costs per year and another $100,000 in energy costs; BCR Environmental says the system uses 5 percent of the energy used by a single digester.

"In the first three weeks, we saw a $6,000 savings in electricity," says Silveira. In the first full month of operation, the savings was documented at about $10,000 and has been as high as $12,000 per month.

The DEP provided a loan for the $4 million project at 2.6 percent interest. Payback is expected in five years. Along with the savings, the investment prevented the expenditure of $2.7 million to rehabilitate the digesters and sludge thickening equipment.

NEW TREATMENT

After less than a year of construction, the Neutralizer unit was put online in March 2012, and it was fully commissioned in late May. It replaced the old system, which used three aerobic digesters and two drum thickeners to create Class B biosolids.

The plant now processes about 14,400 pounds of biosolids per week in three batches. "When biosolids went to the drum thickeners, we really didn't know how much we were sending," says Silveira. "We were doing 40,000 gallons a day, but our return activated sludge was loose one day and thick another, so we didn't know how much solids we were removing. We had a general idea; now we know precisely."

The Neutralizer batch processing tanks at the Haines City facility.

Turbidity results with the Neutralizer show that substantial solids had been going back to the plant from the drum thickeners. "Over the summer, we usually run at 0.4 NTU turbidity, which is pretty low," says Silveira. "Now we do even better than that. We consistently stay at 0.2 NTU or lower. It has made a difference in how the plant runs, and we saw that difference relatively quickly."

After treatment, what is left is a neutralized biosolid with no odor. It is sent to a centrifuge that dewaters to 19 to 24 percent solids, versus 12 percent with the drum thickeners. The dewatered material is automatically transferred to a trailer with a built-in spreader. "We can fill the process tank in the morning, treat it, dewater it in the afternoon for pickup the next day, and it's off our site," Silveira says.

> "We can fill the process tank in the morning, treat it, dewater it in the afternoon for pickup the next day and it's off our site."
>
> **NATHAN SILVEIRA**

Previously it took a month to fill a digester, then 40 days for aerobic digestion, which created odors and used electricity the whole time.

BETTER FOR OPERATORS

While the new system is more technical because of automation, it is better and cleaner for operators. "We have many more parameters to watch on the monitors," says Silveira. "We have cameras so we can see all the different areas. If I see that the trailer is getting full or if something comes up that I have to do, I can pause the system."

There is no material splashing out of the digesters to clean up, and samples are taken from built-in ports. "I don't get messy anymore," Silveira says. "I'm not exposed to the raw sludge nearly as often, and I don't have to deal with the weather or odors."

The Class A biosolids trailer is picked up by a trucking company and land applied on nearby pastures. It can also be used on city properties, such as parks and boulevards. Land spreading of Class B material couldn't have continued under the new regulations. With better treatment, the biosolids can be sold as commercial fertilizer for $250 per 36,000-pound truckload, once the proper permits and licenses are obtained.

Better treatment has also reduced transportation. "We used to haul 45 to 55 loads a month," says Silveira. "With this new process, we're only hauling 12 to 15 times."

That means transportation that used to cost up to $15,000 a month now costs about $6,000. It also cuts carbon dioxide emissions by 180,000 metric tons annually, equivalent to taking 130 cars off the road.

For Silveira, that was just more reason to pursue a new technology that has helped save money and improve wastewater treatment for the community. **tpo**

CHOOSING TECHNOLOGY

With new biosolids regulations on the horizon, the staff at the Haines City Wastewater Treatment Plant evaluated several upgrade options. The Neutralizer from BCR Environmental scored best in all seven criteria: Exceeding regulatory requirements, initial cost, overall operating cost, energy conservation, beneficial reuse and market value, operational simplicity, and footprint.

BCR Environmental began developing the technology about 10 years ago. A research and development team talked to plant operators in Florida to get familiar with current practices. They found that biosolids handling was difficult and used energy and operationally intensive systems, according to Aaron Zahn, CEO. The Neutralizer system uses chemicals already common to the wastewater industry. The first commercial unit went online in 2006, and seven more locations have been installed since.

The process uses sulfuric acid, sodium chlorite, sodium hydroxide, ferric chloride and sodium nitrite in two steps. "We figured out how to mix them together at the perfect times and manners," says Zahn. A mixture of sulfuric acid and sodium chlorite is added to the biosolids to create a chlorine dioxide solution. "Step 1 achieves a Class B biosolid and oxidizes the sulfides, sulfates and mercaptans, which are the odor-forming compounds," Zahn says. Sulfuric acid is added again, creating chloric acid, reducing the pH to about 2.3, and increasing the oxidation-reduction potential (ORP). Sodium nitrite is then added to create nitric acid, which effectively kills spores. "What you have is disinfection of the material to non-detectable levels of all pathogens and viruses," says Zahn. "You also achieve extreme oxidation of the volatile solids."

Haines City plant operator Nathan Silveira says the resulting nutrient removal will help in the future as regulations become more stringent. "We don't have any limits on phosphorous right now, and it was one of the worries we had; adding more and more phosphorus to the plant. At some point, it becomes exponential. The Neutralizer adds six gallons of ferric chloride per tank, and that removes the phosphorus."

Sodium hydroxide brings the final pH back up to neutral; the specific level is adjustable to meet whatever is needed based on the intended use of the biosolids. At the Haines City facility, that pH is 5.5 to 8.5.

Zahn says economical biosolids treatment alternatives are difficult to find for smaller plants. "Of the 16,800 wastewater facilities out there, 95 percent of them are 15 mgd and below," he says. Because the Neutralizer is a chemical process, it can be scaled down to a facility with flows as low as 0.5 mgd.

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.

Floats on either side support the fusion aerator/mixers.

Drop-In Deliverance

A NEW MIXER AND REACTOR SAVE ON ENERGY AND CHEMICALS AT A WASTEWATER TREATMENT LAGOON IN INDIANA

By Scottie Dayton

Dense algae and high pH levels plagued the lagoon at the Wingate (Ind.) Wastewater Treatment Plant in summer. Since 2007, nitrogen averaged 18.9 mg/L to 30 mg/L every January through March, exceeding the 7.2 mg/L winter discharge limit.

"An engineer at the Indiana Department of Environmental Management (IDEM) recommended building a mechanical treatment plant, but our 260 residents can't afford a $2 million facility," says town superintendent and Class 1 operator Ramon Knutti. "Even covering the lagoon with a $750,000 blanket was out of the question."

Then Knutti met Jim Bradley from Bradley Environmental in Ladoga, Ind. Bradley was looking for an opportunity to test his fusion aerator and Bobber moving-bed biological reactor. He offered to provide the equipment for free if Knutti would participate in monitoring how it worked.

The IDEM approved the pilot project and waived enforcement. The Wingate plant is the only one in the world using the technology, which solved all the issues and operated as designed.

PHOTOS COURTESY OF BRADLEY ENVIRONMENTAL

Town superintendent and Class 1 operator Ramon Knutti inspects the fusion pump on one of six reactors.

GALLANT EFFORTS

Septic tanks service homes in Wingate; effluent flows by gravity through 4-inch sewers to two lift stations. The east station pumps to the center of town, then effluent gravity-feeds to the west station, which pumps it to the 35,000 gpd (design) wastewater treatment facility. Flows average 20,000 to 22,000 gpd.

The 14-foot-deep lagoon had two 5 hp surface aerators in the 492,000-gallon primary cell, and one 3 hp unit in the secondary and tertiary cells, each 233,000 gallons. Weekly, Knutti added one pound of enzymes to the lift stations and a pound each to the treatment cells to accelerate the process.

"Once temperatures fell below 39 degrees F, the enzymes didn't do anything, but I felt more comfortable adding them year-round to compensate for minimum sludge and low bacteria numbers," Knutti says. When algae turned the water deep green, Knutti applied a contact killer. "I used 10 gallons per cell at $95 per gallon and treated them twice a year," he says. "The effect was minimal."

During summer, he also increased chlorine from 0.8 ppm to 1.8 ppm to help kill algae in the contact tank. Then he added the chemical in winter to monitor its effect on ammonia. "I needed 300 ppm chlorine to remove 30 ppm ammonia, and that was too expensive," he says. "It also was dangerous to my discharge stream."

Searching for a better algae killer, Knutti found EarthTec algicide/bactericide, a biologically active form of copper ion from Supreme Turf Products. "It costs $29 per gallon and worked better," he says. "While it didn't kill all the algae, I now could see down into the water. That hadn't happened before."

THE EQUIPMENT

While waiting for the aeration system to arrive, Knutti installed an electric meter at the lagoon to monitor usage. "Other than that, we used the same electrical hookups that were in place for the surface aerators," he says.

Knutti, Bradley and Bill Blythe, lead biologist for Bradley Environmental, set six 1 hp fusion pumps three to a row and 15 feet apart in the first cell, and one in the third cell. The second cell received six

A bioreactor in the secondary cell has a 6-foot sphere beneath the fusion pump. Inside the ball is 50 cubic feet of media. With floats, the unit measures 144 inches long, 48 inches wide and 96 inches high.

1 hp reactors for nitrification. Dual stainless steel cables anchored to eyebolts screwed into the shore prevent the units from drifting.

"We experimented with the best position for the aerators," says Knutti. "At one point, the primary cell short-circuited due to heavy rains. Moving the two middle aerators closer together solved the problem."

The fusion pump mixer/aerator pulls 600 gpm into the 8-inch inlet pipe from any depth or direction. One enclosed propeller lifts the flow, and a second propeller at the air/water interface creates a vacuum, drawing in oxygen at 1.5 lb/hp/hr. After mixing, eight adjustable outlets disperse the oxygenated water to any depth or location in the lagoon. With floats, the pump measures 40 inches high, 80 inches long, and 48 inches wide.

"Lagoons are an extremely efficient, effective, inexpensive treatment process for small towns. I believe this technology can save them, as the capital and operating costs are one-tenth the cost of mechanical plants."

RAMON KNUTTI

"Our intake pipes are 7 feet deep so as not to disturb the sludge blanket," says Knutti. "We set the discharge outlets to release toward the surface and outward, ensuring complete mixing from top to bottom and side to side."

The reactor, a 6-foot sphere, sits beneath the fusion pump. Inside the ball is 50 cubic feet of Kaldnes media, plastic wheels 3/8-inch in diameter and 1/4-inch wide. One cubic foot of media equals 260 square feet of surface area; 65 percent of it is protected to prevent the biofilm from being scraped away when the media is agitated.

The pump fills the ball with water and creates the air/water interface. As oxygenated water cascades down through the floating wheels, it replenishes oxygen, transfers nutrients, and cleans the media. The water is dispersed back to the lagoon through the adjustable outlets. The reactor with floats measures 144 inches long, 48 inches wide, and 96 inches high.

PIONEERING STUDY

Knutti, Bradley and David Denman from the IDEM Operator Assistance Program monitored the system since it was activated in September 2011. "No one has done a study from lagoon system to

(continued on page 31)

Plant supervisor Killis Sinkhorn, right, observes as Kentucky State University research assistant Paul Auberry, feeds hybrid catfish.

PHOTOS BY JAMES MANN

In the Swim

A KENTUCKY COMMUNITY TURNS ITS OLD TREATMENT PLANT INTO AN AQUACULTURE FACILITY IN A PARTNERSHIP WITH A UNIVERSITY AND A PRIVATE COMPANY

By Jeff Smith

When the City of Winchester planned in 2004 to build a new 7.2 mgd activated sludge wastewater treatment plant on the site of the existing Strodes Creek plant, there was no money available to decommission and demolish the old facility.

But before the new plant went online in 2008, the Agriculture Department of Kentucky State University approached plant supervisor Killis Sinkhorn about using the old facility to continue its research on paddlefish, a high-value boneless fish for commercial production. "I was all for it," says Sinkhorn. "Using an old facility for a beneficial reuse is a win-win situation."

Today, paddlefish live in the old plant's 60-foot-diameter final clarifiers, which are fed by effluent from the new plant. Hybrid striped bass swim in the decommissioned sedimentation lagoons, and koi, catfish and largemouth bass in the old rotating biological contactor channels.

"I've been a big advocate and in favor of this program since the beginning. I think it is exciting to take an old and abandoned wastewater treatment plant and make use of it for a beneficial purpose."

KILLIS SINKHORN

A POSITIVE FOR ALL

The university's proposal to raise fish at the old plant drew an enthusiastic reception from Sinkhorn. His next step was to seek the approval of general manager Mike Flynn and the five-member Winchester Municipal Utilities Commission.

"I saw it as a good idea, especially considering the direct impact it had on ratepayers by avoiding the cost of demolition," says Flynn. Once safety, permitting and site access issues were settled, the commission had no problem supporting the project.

Today, a private aquaculture wholesale company, Aquila International of nearby Versailles, manages the paddlefish population and related transportation issues, such as delivering fingerlings to the facility and sending fully grown fish to market. Aquila owner Tim Parrott visits daily to feed the paddlefish.

"I look at it as a symbiotic relationship," says Sinkhorn. The commission saved hundreds of thousands of dollars in demolition costs. The university was able to continue its research without costs to build ponds to maintain the fish, and Aquila International has a place to raise the fish for eventual marketing.

One of the hybrid striped bass raised at the plant.

The boneless meat of the paddlefish is delectable, but caviar — paddlefish roe — is the prized product. Sinkhorn says that to ensure their desirability, the fish undergo frequent testing by university aquaculture researchers. Tissue samples confirm that the fish are safe to eat.

Researchers and graduate students feed the hybrid striped bass — a cross between a marine striped bass and a freshwater white bass — and other fish raised on the property. "When we have a daphnia bloom in our new 110-foot-diameter clarifiers in the spring, they feed it to the fingerlings and the fry," Sinkhorn says.

A PLACE TO LEARN

Aquila International pays the utility commission a nominal fee to cover electricity and other basic costs. Aquila is responsible for mowing the grass and maintaining a good appearance, but plant staff members help out on occasion. For example, operators recently pulled the gearbox on an aerator for repair because they had the required equipment on hand. "Our staff gives assistance when it's needed," says Sinkhorn.

Kentucky State University research assistant Paul Auberry (left) and graduate student Godardo Juanich prepare old RBC tanks to be stocked with paddlefish while plant supervisor Killis Sinkhorn observes. BELOW: Fish tanks under cover.

The project also has educational benefits: Area students have long been exposed to agricultural programs like raising cattle and growing cash crops, but now they can learn firsthand about a different kind of farming. "We conduct tours of the plant to teach about our treatment process, and now we also try to develop an interest in aquaculture," Flynn says.

Sinkhorn observes, "I've been a big advocate and in favor of this program since the beginning. I think it is exciting to take an old and abandoned wastewater treatment plant and make use of it for a beneficial purpose." tpo

Share Your Ideas

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

(continued from page 29)

lagoon system," says Knutti. "We're testing everything to see what processes happen where." Purdue University professor Ernest R. Blatchley, P.E., published the initial study, available at www.bradleyenvironmental.com.

One fact the team learned is that the sludge layer varies from 12 to 24 inches deep to almost none. They are still investigating why. The system also lowered alkalinity from exceeding the pH 9 limit in summer to averaging 8.2 to 8.5.

The reactors provided the needed nitrification. "This past winter (2011-12), the water temperature was 33 degrees F, as cold as it ever gets," says Knutti. "Even then, ammonia levels averaged 2.5 mg/L." They were 0.02 to 0.04 mg/L in the summer of 2012.

The new system is also energy efficient. The plant's electric bill went from $910 to $550 per month, an annual savings of $4,320. Knutti saved an additional $6,240 annually by discontinuing the algicide/bactericide and the enzymes. With most of the algae gone, he also stopped increasing chlorine in the contact tank in summer.

"Lagoons are an extremely efficient, effective, inexpensive treatment process for small towns," says Knutti. "I believe this technology can save them, as the capital and operating costs are one-tenth the cost of mechanical plants." tpo

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Gone, But Not Forgotten

A BOOK AND LOBBY EXHIBIT LETS EMPLOYEES AND THE PUBLIC EXPERIENCE THE HISTORY OF THE METRO WASTEWATER RECLAMATION DISTRICT IN DENVER

By Briana Jones

PHOTOS COURTESY OF MWRD

Visitors can listen to interviews with plant employees on telephone headsets and view their photos on the display panel below the touch screen.

What's Your Story?

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

Creating a 353-page history book may not seem like everyone's cup of tea, but for Steve Frank, public information officer at the Metro Wastewater Reclamation District (MWRD) in Denver, Colo., it was a necessity to get the information written down before plant staff began to retire in huge numbers.

Frank wrote the book, *A 45-Year History,* with help from many plant employees who wanted to make sure the district's history was not forgotten. "It's a lot like solving a mystery," says Frank. "I would find a photograph, scan it, attach it to an email, and send it to someone asking for identification. I would get a reply back in a day or so."

The book took five years to compile. Its completion was celebrated with a corresponding interactive exhibit in the district's administration building lobby. "The exhibit is ideal for people standing around the lobby," says Frank. "They can browse through and get a sense of who we are."

HISTORICAL INSPIRATION

Published in 2009, the book takes a look at the district's history from inception in 1961 to recent changes as of 2006. MWRD serves about 1.7 million people in a 715-square-mile service area that includes the cities of Denver, Arvada, Brighton, Lakewood, Thornton and Westminster.

Frank wanted to capitalize on the knowledge of the plant staff members who had been with the district since the beginning. "For a lot of people who worked here over the years, the district was a living thing," he says. "One guy had been here 42 years. To him, it was like growing something in your backyard. You plant it, water it, nurture it, and watch it grow."

Jose Padilla, recently retired, was a major collaborator in the development of the book. "Information was leaving the plant and it wasn't being captured," he says. "The book was a great way to get all the information back from Day One from the employees that are still around."

Padilla started at the plant as a laborer in 1968, then moved up to plant operator, supervisor and finally employment and retirement plan administrator in Human Resources. Padilla grew up in Brighton, near Barr Lake. In those days, Denver had just one treatment plant, which discharged primary effluent into the lake.

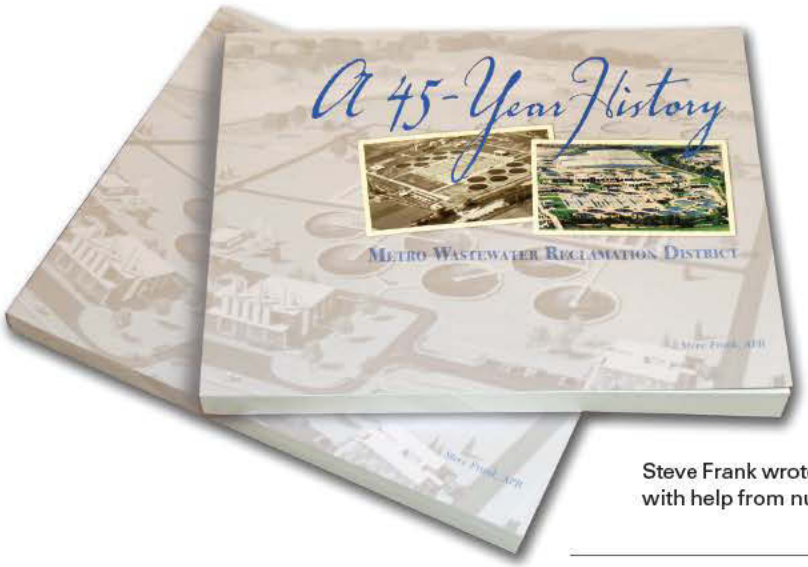
"During the summer as a kid, the stench was so bad, we couldn't play outside near the lake," he says. "Only after I got into the field, did I understand why."

Padilla's story was an inspiration for the book. "Jose grew up to become part of an industry that has managed to change that lake into a regional jewel," says Frank. "Now it's an amenity, not an eyesore, or a nose sore. That, to me, is the kind of story that brings it home. He's grown up to change that lake into an amenity. It's a nice backstory."

SHOW AND TELL

The exhibit in the administration office lobby includes videos, photos and even equipment used when the plant was built.

"There are six or eight videos you can play just by walking over and using the touch screen," says Frank. "Telephone handsets are



Steve Frank wrote the book, *A 45-Year History,* with help from numerous plant employees.

attached so people can watch the videos without disturbing everyone in the lobby. We've got a number of pieces from the beginning of the plant, like the shovels they used when they did the groundbreaking."

Frank and his assistant interviewed the first female plant operator, the third employee to start at the plant, and Padilla with 44 years with the district, to create an oral history. Visitors listen to the interviews and then can see the photos of the employees. "Below the screen, there is a display panel with the interviewees' photos," explains Frank. "We wanted people who were standing at the display after they watched the video to be able to, in essence, talk to our employees and find out a little bit about them."

LOST AND FOUND

A mockup of a sewer pipe in the exhibit shows "sewer treasures" that the sewer maintenance team has retrieved around town. "That's the very first thing people look at," says Frank. "Just from observing how they react, they're amazed to see fake teeth, coins, a high school class ring, all kinds of stuff, that has been rescued or retrieved from the sewers. These are things people can relate to."

Frank and other staff members start some plant tours in the lobby. "College groups tend to come in groups of twos and threes until they all get here," he explains. "I use the exhibit in the lobby not just as a holding tank, but as a way to engage and start the conversation while I'm waiting for the rest of them to get there. I want to make it worthwhile for the ones that are already there."

Making an impact on visitors of the exhibit and readers of the book was an unexpected result. "As we embark on new adventures and expansions at the plant, it's nice to have some sense of how we got to where we are," says Frank. **tpo**

LEFT: Facilities maintenance employees Doug Bockman, left, and Damon Garcia wrestle a manhole ring into position for the lobby display. BELOW: The exhibit in the administration office lobby includes videos, photos and even equipment used when the district's treatment plant was built.

VISITORS

Cleaning Water and Caring for Reptiles

By Briana Jones

Staff members at the Big Creek Wastewater Treatment Plant had seen snapping turtles on site before — but last spring they became primary caretakers.

"We've had nests in the past many times," says Brian La Bute, senior operations manager at the plant in Amherstburg, owned by the Ontario Clean Water Agency. "A lot of times you don't even know they're there until raccoons dig them up and scavenge the eggs."

Last May, plant staff saw a female snapper laying eggs. "Mom decided she wanted to lay them right in the middle of the gravel driveway," says La Bute.

Mother turtles do not watch over their eggs. "The operators saw the mother laying the eggs, so they took them under their wing and covered the nest with a big metal grate so the other animals couldn't get at them," says La Bute.

The first babies dug their way out on August 10, and a dozen emerged over a few days. Plant staff carried them about 200 yards to Big Creek, an environmentally sensitive wetland area, believing they wouldn't have survived the journey on their own.

"Snapping turtles are becoming an endangered species now," says La Bute. "So we try and help them out when we can." **tpo**

Show us your visitors

***TPO* invites you** to show us the wild creatures that visit your plant property. Mammals, birds, reptiles, amphibians — send a picture or two and a brief description of when and where the visitor appeared to editor@tpomag.com.

Headworks BIO wins lagoon nitrification project

Headworks BIO was awarded one of the largest lagoon nitrification projects in the United States at $3.69 million. The company will supply post-lagoon treatment for BOD polishing and nitrification using Moving Bed Biofilm Reactor (MBBR) technology for a wastewater treatment plant expansion in Batesville, Ark. The expansion will increase flow from 4 mgd to 9 mgd and decrease ammonia nitrogen to less than 8 mg/L. MBBR is a fixed-film treatment process that uses virgin polyethylene biofilm carriers to support the growth of biofilm. Oxygen is delivered to the carriers through coarse-bubble aeration.

Xylem earns contract in Brazil

Xylem won a contract to supply treatment technology and systems for a new wastewater treatment plant in Campo Grande, Brazil, that will serve 60,000 people. The company is providing its Sanitaire ICEAS biological technology. The contract for the Imbirussu Wastewater Treatment Plant is a $28 million plan to deploy new sewerage networks in the Campo Grande region to reach 70 percent of households by mid-2013.

WesTech supplying world's largest compressible media filter

WesTech Engineering, through subsidiary WWETCO, was selected by Black & Veatch and the City of Springfield, Ohio, to design and manufacture the largest compressible media filter in the world. Installation of 100 mgd WWETCO FlexFilter will begin at the Springfield Wastewater Treatment Plant in 2013. The filter will contain nearly 20,000 cubic feet of compressible media and will be used 20-30 times a year as part of a high-rate treatment (HRT) facility to treat CSO events.

Honeywell undertakes $35 million renewable energy project in Wilmington

Honeywell announced a $35 million renewable energy project for the City of Wilmington, Del., that includes a first-of-its-kind facility to convert two sources of biogas into power and heat for the city's wastewater treatment plant. The project is part of a citywide initiative to decrease energy costs and greenhouse gas emissions by 35 percent and meet nearly 50 percent of electricity needs with renewable energy. The centerpiece of the new project is a Renewable Energy Biosolids Facility to harness biogas to generate electricity for the Hay Road Wastewater Treatment Plant and provide thermal biosolids drying. The facility uses methane produced by plant digesters and from the nearby Cherry Island Landfill.

Blue Plains plant signs contract for upgrades

The M.C. Dean electrical design-build and systems integration firm teamed with PC Construction to win a contract for upgrades to the Final Dewatering Building at DC Water's Blue Plains Advanced Wastewater Treatment Plant, the world's largest treatment facility of its kind, serving 1.7 million people. The project will renovate and outfit electrical rooms with new medium-voltage switchgear and electrical systems.

Parkson Enhanced Nutrient Removal (ENR) system passes test

Parkson Corp. has successfully demonstrated a complete enhanced nutrient removal (ENR) system, proving its ability to cut costs and meet strict wastewater treatment requirements. The results from the 18-month trial of the DynaSand EcoWash filtration system combined with the Biolac extended aeration activated sludge show that the system performs effectively and at about half the capital cost of other designs. Tests were conducted at the town of Laurel in southwest Delaware.

Kruger wins ACTIFLO contract in Hillsboro, Ore.

Kruger, a Veolia Water Solutions & Technologies company, won a contract for the Rock Creek Advanced Wastewater Treatment Facility in Hillsboro, Ore., to furnish a 2 x 15 mgd ACTIFLO system for high-rate clarification for tertiary treatment. Clean Water Services is the plant owner and Carollo Engineers is the consulting engineer. The ACTIFLO system will be used for dry-weather tertiary treatment for solids and phosphorus removal at 30 mgd design flow during summer. It will also treat wet-weather peak flows up to 44 mgd during winter. The process is to be online by fall 2013.

Pittsburgh and Veolia Water sign water services management agreement

The Pittsburgh Water and Sewer Authority (PWSA) has hired Veolia Water North America to provide interim executive management services, leading 270 public employees in delivering water and wastewater services to more than 300,000 people. A team of water and wastewater experts from Veolia will help PWSA improve the utility's customer service and performance by conducting in-depth diagnostics of current operations, developing recommendations for improvement, and supporting PWSA employees in implementing initiatives aimed at reaching new performance metrics. **tpo**

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New Paradigms for Energy

A WERF RESEARCH PROJECT LOOKS BEYOND ENERGY EFFICIENCY, AIMING TO BEGIN IDENTIFYING PATHWAYS TO ENERGY SELF-SUFFICIENCY FOR CLEAN-WATER PLANTS

By Ted J. Rulseh

Energy is a big item on clean-water plant agendas: More and more plant teams are striving to make their facilities energy neutral or even net energy producers.

Now the Water Environment Research Foundation (WERF) has launched an 18-month research project to explore energy balance, reduction, recovery and production in treatment plants, with the vision of helping facilities achieve net zero energy.

The project goes by the long-winded name of "Energy Balance and Reduction Opportunities: Case Studies of Energy-Neutral Wastewater Facilities and Triple Bottom Line Research Planning Support." Its aim is to help transfer knowledge and experience among utilities and provide guidance for achieving energy self-sufficiency.

WERF contracted for the project with Black & Veatch, in partnership with AECOM, the North East Biosolids and Residuals Association, Hemenway Inc. and American Water. Co-sponsored by the New York State Energy Research and Development Authority, the study will involve 23 utility partners from the United States and Australia.

The research team, under co-principal investigators Lori Stone, biosolids global practice and technology leader for Black & Veatch, and Paul Kohl, energy program manager at the Philadelphia Water Department, will identify ways for utilities to reduce demand, increase energy efficiency, recover energy, and produce energy on site.

Stone and Lauren Fillmore, WERF senior program director, talked about the project in an interview with *Treatment Plant Operator*.

Lori Stone, biosolids global practice and technology leader for Black & Veatch

Lauren Fillmore, WERF senior program director

tpo: What actual forms of energy do we find in wastewater?

Fillmore: First of all, wastewater comes into the treatment plant at a warmer temperature than the ambient water would, because of the heat that goes into the water from activities like washing and showering. That heat can be extracted by various technologies. This is not lab-scale or pilot-scale research — it has been implemented.

Second, there is the energy of flowing or falling water. San Diego has been using this for years because their discharge is on a bluff. They have a drop of 90 feet, and they use turbines to capture that energy. There is also newer hydro power equipment that will take energy from low-head applications, or just flowing water.

The biggest energy component is chemical. A variety of microbial and biochemical processes have potential to produce energy or heat from wastewater, and a lot of work is being done toward improving production of biogas and other combustibles.

Another phase of work is developing processes that can operate with less energy input. The activated sludge process demands significant energy, primarily for oxygen transfer. As we look at innovative microbial processes and new ways to manage carbon and nitrogen in wastewater, we may find significant opportunities for efficiency.

> "Much of the focus in the past has been on energy efficiency — how to conserve energy based on the way the plant was operating. Now we need to start looking at demand reduction and then at the other side of the equation, which is how to produce power from biosolids or biogas to reach the energy neutral goal."
>
> **LORI STONE**

tpo: Why is WERF undertaking this research project?

Fillmore: Starting about five years ago, we began looking at the issue of optimizing wastewater systems, and energy efficiency was one way to do that. At the time we had some very modest goals: We wanted to achieve a 20 percent reduction in costs or improvement in energy demand.

After five years of research, we really started to embrace the idea that there is a lot of energy in wastewater in a number of forms. The goal we've set now is to look at what research needs to be done to help our subscribers, mostly from the wastewater sector, to become energy producers or at least meet the net zero energy goal. This is a goal that the industry is starting to embrace.

tpo: How does this effort differ from historic energy initiatives?

Stone: Much of the focus in the past has been on energy efficiency — how to conserve energy based on the way the plant was operating. Now we need to start looking at demand reduction and then at the other side of the equation, which is how to produce power from biosolids or biogas to reach

the energy neutral goal. You start with energy efficiency and add energy production to get to energy neutrality.

We've tried to enlist some utilities that already have lessons learned and have demonstrated progress toward becoming energy neutral. East Bay Municipal Utility District in California is one; the Gloversville-Johnstown Joint Wastewater Treatment Facility in New York is another.

tpo: What do you see as the key outcomes of this research?

Stone: This research program includes three basic tasks. The first is to look at some common configurations of wastewater treatment plants on the liquid and solids sides, try to model their processes, and demonstrate what energy neutrality could look like in those settings.

The second is to identify case studies that show the challenges and the successes utilities have had. Many utilities today are truly progressive — in particular they have seized opportunities for co-digestion and biogas production. We want to be able to document what they've done and how they did it.

Third is to develop a decision-making tool — a triple-bottom-line model focused on energy from a programmatic perspective, versus a project-by-project approach.

Fillmore: Because this is part of a research program that encompasses several years, we hope to use that triple-bottom-line analysis to inform where we could make the most environmentally sustainable investment of research dollars in the future. The elements we've pre-selected include improving biogas production, developing low-energy alternatives to the activated sludge process, and finding integrated ways to recover energy from either the solid or the liquid side of a facility.

tpo: Based on what we know today, is it easier for larger plants than for smaller plants to achieve energy neutrality?

Fillmore: We feel that in the next 10 or 20 years, the greatest potential lies in plants with flows of 5 mgd and larger. Admittedly, that is a somewhat arbitrary cutoff.

Stone: Because of the cost of biosolids processes, from having enough solids to produce a significant volume of biogas, to cleaning up the biogas for combustion, the ability to make those investments would be severely limited at smaller facilities. We've seen some facilities around the 5 mgd mark having successes, particularly in the area of co-digestion and biogas utilization.

tpo: In your experience, is the up-front investment required to make major energy improvements a substantial barrier to completing projects?

Fillmore: Our previous work has shown that one of the major barriers is financial. We found that different utilities would make very different decisions even with the exact same set of concrete financial numbers. One reason is that there are different kinds of financial analysis.

For energy efficiency projects, the one that's commonly used — but is probably not the best one — is simple payback. And even within simple payback we found wide diversity in what agencies would use as a threshold to go forward. Some would say projects had to pay back in two years; others didn't care how long the payback took as long as it was within the term of the bonds that would finance the project.

We found that if they looked at the more sophisticated forms of economic analysis, such as net present value and internal rate of return, they would be more inclined to go forward with projects. It is important to move these projects forward because the cash savings can be significant.

Stone: Utilities have many competing demands: dealing with the public, meeting regulations, being good stewards of funds, protecting the environment. Energy projects are often viewed as discretionary items as opposed to being part of the core mission. The tendency is to look at simple payback, which lacks the perspective of the full life-cycle benefit of the project. By using other approaches to evaluate energy projects, you can come up with a strong justification for proceeding.

tpo: As a practical matter, how do you see clean-water agencies benefiting directly from the products of this 18-month research program?

Stone: Besides synthesizing the core information and putting it into a final report, we'll provide some outreach and information pieces about energy balance and the models that work in representative wastewater treatment plant configurations. We envision being able to use social media for more dynamic delivery of the information in the case studies.

"The elements we've pre-selected include improving biogas production, developing low-energy alternatives to the activated sludge process, and finding integrated ways to recover energy from either the solid or the liquid side of a facility."

LAUREN FILLMORE

We would profile the various utilities not only in the report, but also in a video we could post on the WERF Web page or on Facebook. We could even tweet links to short videos that highlight the utilities and their progress toward energy neutrality.

Fillmore: WERF's sister organization, the Water Environment Federation, provides manuals of practice and other guidance to professionals in the industry. They're looking to develop a process utilities would go through in trying to reach a net zero energy goal. The information and the case studies that come out of this research will complement what WEF is doing. Often, people need to see something concrete in terms of what other utilities are doing. Just seeing something that's a little more than conceptual really helps people move to the next level. **tpo**

Process Chemistry and Laboratory Analysis

By Briana Jones

FERRATE REACTOR

Ferrator from Ferrate Treatment Technologies

The Ferrator from Ferrate Treatment Technologies is an onsite ferrate reactor for water and wastewater cleanup. Ferrate can be delivered continuously in commercially significant quantities to remove or inactivate toxic metals, pesticides, drugs, hormones and other toxins. The unit reduces the cost of producing ferrate by over 90 percent, can be scaled for any application, and easily retrofits into existing plants. It uses commodity feedstocks available at most treatment plants, is fully automated and provides remote operation and 24-hour off-site monitoring. **407/857-5721; www.ferratetreatment.com.**

Hydrex water treatment additives from Kruger USA

WATER TREATMENT ADDITIVES

Hydrex water treatment additives from Kruger USA (part of Veolia Water Solutions & Technologies) include chemicals formulated for multiple applications. Additives are categorized in application-specific product series (1000-9000). The treatment programs optimize chemical consumption and operating and maintenance costs. A global support team provides chemistry and equipment technology and offers complete carbon footprint assessments as well as ecoGreen alternatives. **919/677-8310; www.krugerusa.com.**

HACH PHOSPHORUS CONTROL MODULE

The RTC 101 phosphorus control system from Hach Co. provides real-time control of chemical dosing that helps maintain consistent phosphorus levels in effluent water. The system can be used for both open (feed forward) and closed loop (feed back) control of the chemical dose. The chemical feed pump is continuously controlled by a 4-20 mA signal or a dry contact relay. Both outputs can be utilized together. If the dose determined by the controller is below the pump minimum flow rate, the system automatically will switch from 4-20 mA control to relay control. **800/227-4224; www.hach.com.**

RTC 101 phosphorus control system from Hach Co.

LabLite Calibration, Maintenance and Training (CMT) program

SCHEDULING AND TRACKING PROGRAM

The LabLite Calibration, Maintenance and Training (CMT) program lets users schedule and track the calibration and maintenance on every device. Besides tracking routine or scheduled events, users can track emergency repairs, the time an item is down, and the costs of events. Users can add documents and images for each item of equipment, record service and warranty information, track the equipment location and the responsible party, and schedule and track training. **888/954-5483; www.lablite.com.**

SAMPLING BAG

Whirl-Pak Thio-Bag from Nasco

The Whirl-Pak Thio-Bag from Nasco is designed for sampling chlorinated water to test for fecal coliform and other bacteria. Each sterile bag contains a nontoxic, non-nutritive tablet containing 10 mg of active sodium thiosulfate to neutralize chlorine at the time of collection. The bag is EPA-approved and saves time, utility costs, storage space, disposal costs, and replacement of sample containers. The bag has 100 mL and 4-ounce fill lines. The bags come in boxes of 100. **800/558-9595; www.whirl-pak.com.**

Polypropylene hoods and casework from NuAire

HOODS AND CASEWORK

Polypropylene hoods and casework from NuAire are made with stress-relieved, fully seam-welded white polypropylene. The entire hood and vented acid storage base cabinet are made of 1/2-inch-thick polypropylene. The ergonomically designed units are available in 4-, 5-, 6- and 8-foot widths, with work surface depths of 24 or 30 inches. FumeGard NU162/164 fume hoods provide personnel protection, meeting SEFA and ASHRAE standards. **800/328-3352; www.nuaire.com.**

ODOR ELIMINATOR

Ecosorb from OMI Industries

Ecosorb from OMI Industries eliminates wastewater treatment odors. It treats odors generated throughout the treatment process, including those from pump stations, headworks, clarifiers, digesters, aeration basins, lagoons and sludge handling areas. Its formulation eliminates hydrogen sulfide, ammonia, sulfur dioxide, skatoles, mercaptans, amines and indoles odors. **800/662-6367; www.omi-industries.com.**

Crystal Green from Ostara Nutrient Recovery Technologies

NUTRIENT RECOVERY

Crystal Green from Ostara Nutrient Recovery Technologies is created from the company's Pearl nutrient recovery technology, which transforms nutrients recovered from waste-

water streams into fertilizer. The product is a high-quality nitrogen, phosphorus and magnesium fertilizer. Combined with slow release, it provides full-season nutrient availability. **604/408-6697; www.ostara.com.**

BIO ENERGIZER from Probiotic Solutions

BIOCHEMICAL OXIDATION

BIO ENERGIZER from Probiotic Solutions is a micro-carbon complex used to reduce sludge, odor, BOD/COD, FOG and costs in wastewater treatment plants and lagoons. The formula biochemically oxidizes sludge in lagoons while remaining online and continuing to work, and reduces the lagoon sludge blanket without draining, drying, dredging, handling or hauling. When used in activated sludge plants, the formula increases volatile solids destruction and improves decant volume and settleability. The formula uses micro-carbon technology as the base ingredient for maximum microbial stimulation to increase the production efficiency of treatment plants by reducing biosolids quickly, improving settleability and raising dissolved oxygen levels. **800/961-1220; www.probiotic.com.**

VACUUM SAMPLER

The vacuum sampler from QCEC is powered by a heavy-duty vacuum pump that needs little maintenance and has no pump tubing to replace. Pumps service 6- to 28-foot heads and up to 150-foot horizontal runs. Dual units can service two collection points with one sampler. The unit includes an easily removable refrigeration module. **515/266-2268; www.qcec.com.**

Vacuum sampler from QCEC

Real UV254 M series monitors from REAL TECH

UVT MONITORING

Real UV254 M series monitors from REAL TECH allow continuous, real-time testing of the UV transmission (UVT). The UVT is output via a 4-20 mA communication interface directly to the UV disinfection system or to a PLC. Models are available to meet site requirements. Real UV254 P portable meters provide on-site UVT testing of grab samples within minutes. They can be used for servicing UV disinfection systems or for determining system design requirements. **905/665-6888; www.realtech.ca.**

CHEMICAL ROOT CONTROL

RootX allows collection teams and treatment plant staff to work together to solve root control problems. It can be used on the sewer system without adverse effects on the treatment plant and can be integrated with regular inspection and repair schedules. The formulation puts users in control of root treatment programs with an on-demand process, working cost-effectively with existing sewer cleaning equipment. **800/844-4974; www.rootx.com.**

RootX chemical root control

Continuously Sequencing Reactor (CSR) from Schreiber

BNR SYSTEM

The Continuously Sequencing Reactor (CSR) from Schreiber is a biological nutrient removal (BNR) system that sequences through oxic, anoxic and anaerobic phases in one basin. The phases occur sequentially and repetitively. The unit allows the aeration to be turned off while the CSR applies low-energy mixing. The contents of the basin are mixed as a rotating bridge moves around the basin. Retrievable diffuser support components, and diffuser units suspended from the bridge drive complete mixing. Proximity of these components to the tank bottom provides localized scouring to maintain suspension of solids. Using FlexControls, the process can be advanced to meet stringent requirements. **205/655-7466; www.schreiberwater.com.**

DIGITAL HOT PLATES

Corrosion-resistant digital EchoTherm Model HS70 programmable stirring hot plates from Torrey Pines Scientific can be purged using an inert gas through a fitting on the rear of the chassis. Purging provides a positive pressure inside the unit to prevent corrosive gases from entering the chassis and attacking the electronics or stirring mechanism. The units have 10-program memory with 10 steps per program, temperature ramping, RS232 I/O port, membrane keyboard, and full-function liquid crystal display. Stirrer speeds can be set from 100 to 1,500 rpm. Temperature ramping can be set from 33.8 degrees F/hour to 842 degrees F/hour in 33.8 degree F increments. A built-in timer is settable to 99 hours and is readable to 1 second. An audible alarm with user settable auto-off allows users to turn off the heater and stirrer when the timer counts down to zero. A 6-inch Teflon immersion probe controls solution temperatures directly. **760/930-9400; www.torreypinesscientific.com.**

EchoTherm Model HS70 from Torrey Pines Scientific

Laboratory testing facilities from WesTech Engineering

LAB FACILITIES

Complete laboratory testing facilities from WesTech Engineering assist in project planning. Lab technicians are specialists in filtration, sedimentation and flotation. Testing and analysis of samples provides answers to process problems, establishing design parameters and equipment sizing based upon bench scale testing results. Comprehensive reports are sent to the customer and the information is used to select the most effective treatment options. Bench-scale units are available for rental or purchase. **801/265-1000; www.westech-inc.com.** tpo

By Scottie Dayton

Equipment reduces odors and energy costs

Problem

Strong odors emanated from the Martinsville (Va.) Wastewater Treatment Plant, affecting nearby tourist venues.

Solution

Operators installed two 1,200 mm **Hy-Pack filter presses from Beckart Environmental** to dewater and compact biosolids, and a single-stage Aqua3000 chlorine dioxide generator (also Beckart) at the headworks to mitigate odors.

RESULT

Biosolids costs went from $320,000 to $160,000 annually. By eliminating two 200 hp blowers, the plant saved $180,000 annually in electric bills. **262/656-7680; www.beckart.com.**

Surfactant reduces chemical oxygen demand

Problem

A chemical manufacturing plant in the northern Midwest had 4,000 to 10,000 mg/L of COD in its discharge water. The local wastewater treatment facility levied surcharges to treat the excess loading. Chemical plant management wanted to reduce the surcharges.

Solution

Management selected a bioaugmentation program, adding a 0.5 kg pouch of **BCP10 surfactant from Bionetix International** to the wastewater system every day for three days, then one pouch every week for the rest of a six-week treatment period.

RESULT

COD decreased to 2,600 mg/L and TSS also declined significantly. The chemical plant meets discharge levels and no longer pays surcharges. **514/457-2914; www.bionetix.ca.**

Chelating detergent cleans membranes

Problem

DTE Tonawanda Wastewater Treatment Plant in Buffalo, N.Y., used caustic soda followed by a citric acid wash to clean membranes in its ultrafiltration system. Results were less than acceptable even after three or four wash cycles.

Solution

The plant manager switched to **Micro-90 concentrated alkaline cleaning solution from International Products Corp.** A 1 percent solution of the nonhazardous, water-based detergent removed the organics and metals blinding the membranes and eliminated the two-step cleaning process.

RESULT

The plant achieves 100 percent recovery after every wash and has not replaced the membranes in nine years. **609/386-8770; www.ipcol.com.**

Nitrate method eliminates hazardous waste

Problem

The laboratory at Upper Blackstone Water Pollution Abatement District in Millbury, Mass., wanted to reduce hazardous waste from testing and perform nitrate analysis more efficiently.

Solution

The laboratory implemented the U.S. EPA-approved **one-reagent nitrate method from Systea Scientific.** The nonhazardous, non-enzymatic reducing agent minimized or eliminated poor recovery and matrix interference problems. Greater method sensitivity and linear range enabled high- and low-range samples to be performed together.

RESULT

The method protected personnel and the environment, while eliminating hazardous waste generation and enabling the laboratory to exceed new EPA-testing requirements. **630/645-0600; www.systeascientific.com. tpo**

NON-FOULING LEVEL TRANSMITTER

The LevelRat by Keller America is specifically designed for use in wastewater applications, with a unique Kynar diaphragm that provides a non-stick surface with superior strength to eliminate bulky protective cages.

Each LevelRat is built to order in the U.S. with custom ranges and cable lengths, all in 3 business days. Combined with guaranteed lightning protection on 4-20mA models, the Keller LevelRat provides the best value in wastewater level measurement.

For information on the best Keller submersible for your application, contact a Keller representative.

KELLERAMERICA

WWW.KELLERAMERICA.COM 877-253-5537 SALES@KELLERAMERICA.COM

UV Pure Technologies launches website

UV Pure Technologies launched a new website, www.uvpure.com. The site offers a company overview, product and technical information.

Hydrovolts names senior advisor

Hydrovolts, producer of hydrokinetic turbines to generate renewable energy from water treatment plants, appointed Anil Shrikhandle senior advisor. He will assist with strategic planning, raising growth capital, manufacturing and distribution partnerships and overseas expansions, particularly in India and Asia.

Wilo USA names director of engineering

Wilo USA appointed Joe Melton director of engineering. He has been with Wilo since 2005 and previously was southeastern regional sales manager and national sales manager for the company's water management segment.

Joe Melton

Yaskawa acquires Wermac Electric

The Drives & Motion Division of Yaskawa America acquired the business and operations of Wermac Electric Ltd. in Calgary, Alberta, Canada. Wermac has been a 25-year partner with Yaskawa, particularly in the oil and gas markets. The new division will be known as Yaskawa Wermac and will be located at the former Wermac Electric facility in Calgary.

seepex completes building expansion

Pump manufacturer seepex, an Enon company, completed construction of a 51,000-square-foot manufacturing addition to its Clark County (Enron, Ohio) headquarters. The company manufactures pumps for municipal water treatment facilities and the gas and oil industry.

Blue-White receives patent for safety switch

Blue-White Industries was awarded patent U.S. 8,215,931 for its Peristaltic Pump Safety Switch. The switch stops the pump when the front cover is removed, allowing the pump to only operate in the maintenance mode (a set rpm), protecting the operator while routine pump head maintenance is performed.

Hydro-Thermal participates in apprenticeship program

Hydro-Thermal Corp. is participating in the Wisconsin Department of Workforce Development apprenticeship program in cooperation with the Waukesha (Wis.) District High School. The Waukesha-based company hired two high school students through the Apprenticeship Manufacturing and Machining Program, which integrates school-based and work-based learning in occupational skills.

Drive Source expands Dynamatic website

Drive Source International expanded the company's Dynamatic brand website, www.dynamatic.com. The site features testimonials and technology videos on the company's adjustable speed drive pump controls and Eddy Current electromagnetic drives for the water and wastewater industry.

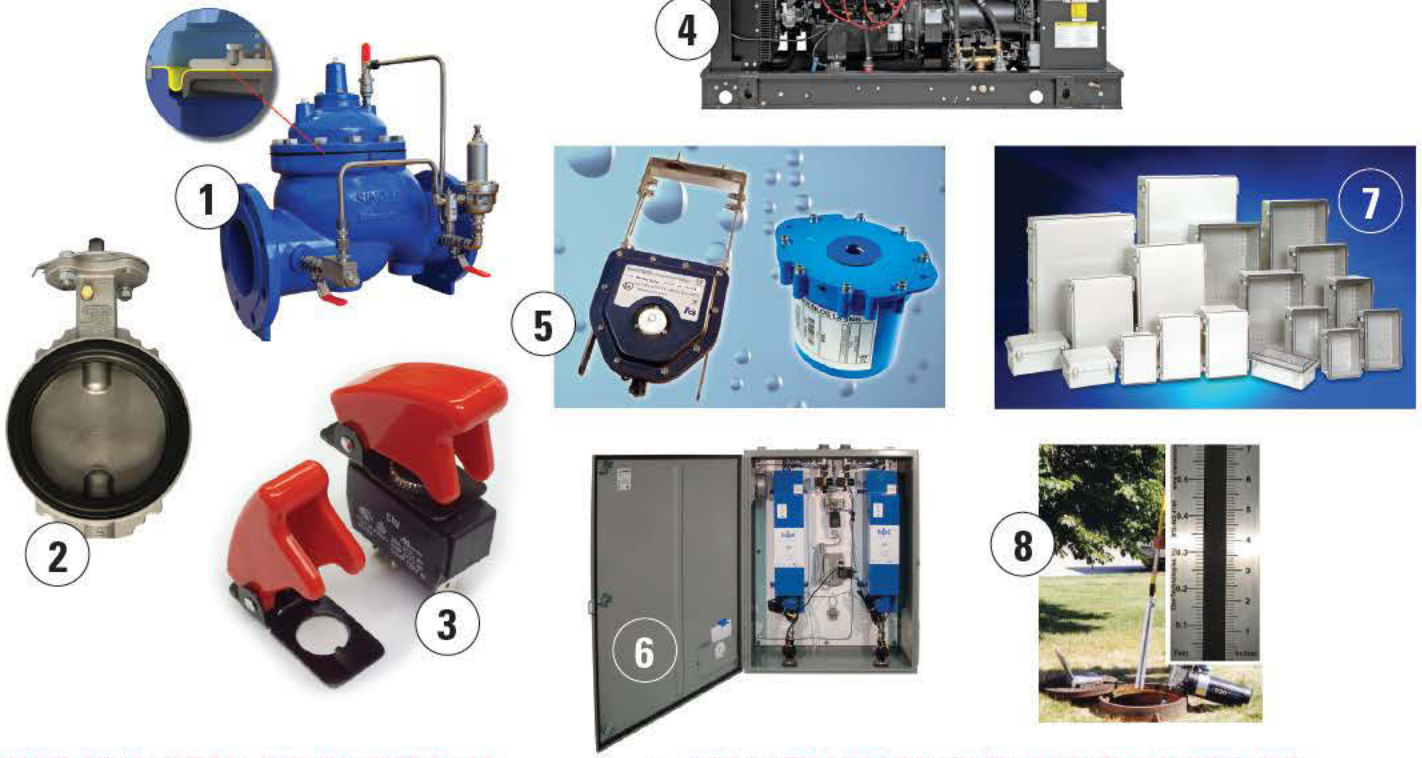
PSG Euro-Center staff

PSG opens California Euro-Center

Pump Solutions Group, a business unit within Dover Corp., opened its Almatec and Mouvex Euro-Center facility in Grand Torrance, Calif. The service center provides application engineering, market and after-sales support.

FCI's ST100 Series receives HART certification

The ST100 Series thermal mass air/gas flowmeter from Fluid Components International received full certification from the HART Foundation for its hardware and DD files, indicating full compliance with the HART Communication Protocol. tpo



1. SINGER VALVE SINGLE ROLLING DIAPHRAGM

The single rolling diaphragm (SRD) pressure reducing valve from Singer Valve is available in 6-inch and 8-inch sizes. The valves provide steady pressure control without the need for low-flow bypass. **888/764-7858; www.singervalve.com.**

2. SURE SEAL 345-SERIES BUTTERFLY VALVES

The 345-Series butterfly valve from Sure Seal is designed for use in rugged environments and with various types of loads. The lightweight valves feature improved flow through the use of a thin disc and large valve opening. The aluminum valves are available in six sizes from 2 to 6 inches and contain no hardware on the disc that can become loose and contaminate the product. **800/382-1604; www.suresealinc.com.**

3. CW INDUSTRIES TOGGLE SAFETY COVER

The CW GT-4X toggle safety cover from CW Industries features a spring-loaded design that provides protection against accidental actuation. Covers are available in white, black and red and are designed to mate with CW Industries' GTS Series toggle switches. The mounting base faceplate is glossy black steel and the safety cover is an ABS-blended plastic resin. The 0.481-inch mounting hole accepts all standard toggles with 15/32-inch mounting stems. **215/355-7080; www.cwind.com.**

4. GENERAC SPARK-IGNITED ENGINES

The 9.0 liter spark-ignited engine from Generac Industrial Power, used on Generac 80 kW and 100 kW generators, is made for use with gaseous fuel in industrial applications. Features include stainless steel intake and exhaust valves for durability and long life, Stellite (a cobalt-based alloy) corrosion-resistant valve seats and reduced valve angles to minimize friction that can result from using dry fuel. Other features include hypereutectic cast aluminum pistons for thermal expansion resistance and tighter clearances for quieter operation and longer piston ring life. A 12.9-liter engine is made for use on Generac 150 kW through 300 kW generators. **888/436-3722; www.generac.com.**

5. FCS ULTRASONIC LEVEL AND FLOW SENSOR

The SonicSens 2 ultrasonic level and flow sensor from Fluid Conservation Systems provides remote monitoring of open channels, combined sewer overflows, storm drains, storage tanks and flood warning systems. The battery-powered sensor is non-contact, non-contaminating and requires little maintenance. The sensor mounts above the level to be monitored and emits a high-frequency acoustic wave to the water surface that is reflected back to the emitting transducer. **800/531-5465; www.fluidconservation.com.**

6. UV PURE MULTIPLEX FOR HALLETT, UPSTREAM SYSTEMS

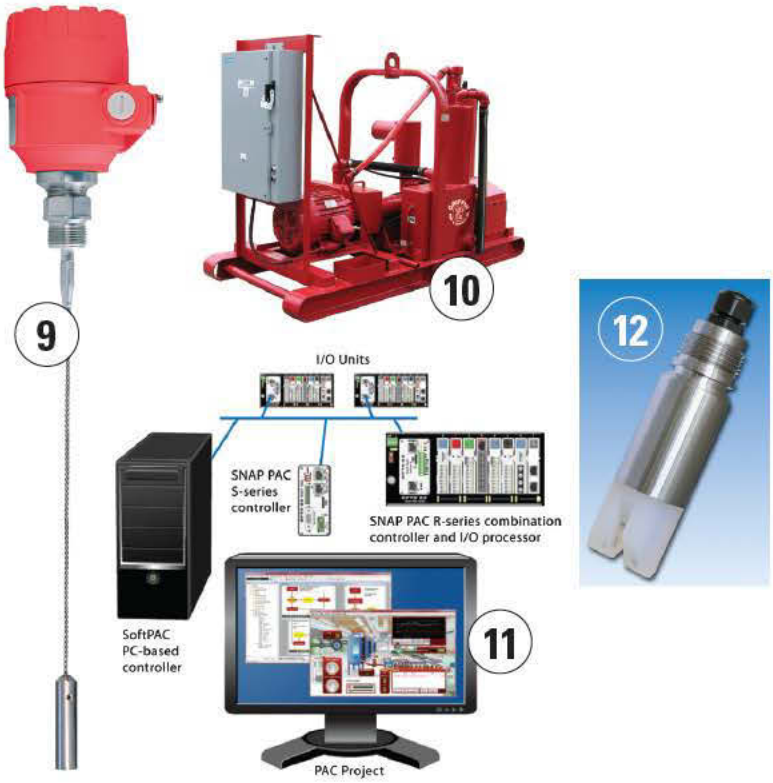
Designed for wastewater and potable water applications, the multiplex for Hallett and Upstream systems from UV Pure Technologies is housed in NEMA 4X cabinets and can treat up to 150 gpm. **888/407-9997; www.uvpure.com.**

7. PENTAIR HINGED-COVER POLYCARBONATE ENCLOSURES

Hoffman brand Type 4X hinged-cover polycarbonate enclosures with stainless steel latches from Pentair Technical Products are designed to withstand harsh environments. They are corrosion resistant and feature a drip shield at the top and bottom of the enclosure body to protect the gasket area from dust and water. **763/421-2240; www.hoffmanonline.com.**

8. ELAN TECHNOLOGIES LEVEL CALIBRATION TOOL

The QuickCal level calibration tool for water and wastewater use from ELAN Technologies has a 26-inch tapered aluminum ruler with 0.01-inch and 0.1-inch markings alongside an inset indicator strip. The ruler comes with an 8- to 16-foot extension, enabling the ruler to be lowered into the flow and removed. No confined space entry is required. The gray strip turns black when wet (it won't wick), providing an easy-to-read line for water level. Level increments correlate directly to primary device tables and flowmeters without a decimal conversion. **815/463-8105; www.elantechnologies.net.**



9. BINMASTER WAVE RADAR LEVEL SENSOR

The GWR-100 Guided Wave Radar level sensor from BinMaster Level Controls measures powders, bulk solids and liquids in vessels up to 78 feet tall. The level uses time domain reflectometry to continuously measure the distance, level and volume of material contained in bins, tanks and silos. It is immune to dust, humidity, temperature, pressure and bulk density changes, as well as noise that might be present when filling or emptying the vessel. The unit features two-wire TDR measurement technology with a low dead band (hysteresis) and accuracy of ±0.2 inches. **800/278-4241; www.binmaster.com.**

10. GRIFFIN ELECTRIC-DRIVEN WELLPOINT PUMP

The quiet operating Model 6WPRE electric wellpoint pump from Griffin Pump & Equipment is a fully automatic, dry priming and dry running, self-contained portable dewatering pump. The unit is capable of pumping 1,500 gpm with 140 feet of head capacity. Diesel engines, other capacities and custom pumps are available. **866/770-8100; www.griffinpump.com.**

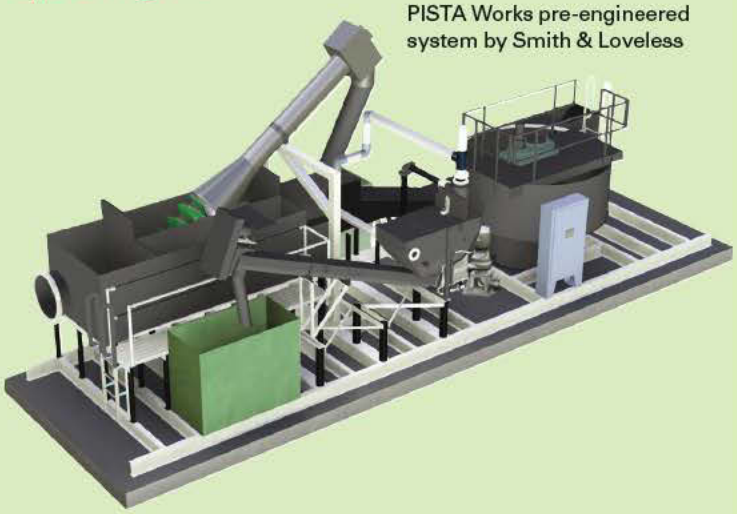
11. OPTO 22 SOFTPAC CONTROLLER

The SoftPAC software-based programmable automation controller from Opto 22 is designed for use with computationally intensive applications as well as applications that must log, manipulate and exchange large amounts of data. The controller runs under Microsoft Windows 7 or Windows XP operating systems and supports operation on multiple cores and processors. **800/321-6786; www.opto22.com.**

12. ENDRESS+HAUSER OPTICAL ABSORPTION SENSOR

The OUSAF11 sensor for measuring optical absorbance by a process fluid from Endress+Hauser uses visible and near-infrared wavelengths of light. Designed for product loss detection, interface detection, suspended solids and turbidity measurements, the sensor is available in an immersion model for use in open tanks and basins or in an insertion model with Tri-Clamp or Varivent connections that meet 3A Sanitary Standards. The sensor can be operated continuously up to 194 degrees F and up to 266 degrees F for up to two hours. **888/363-7377; www.us.endress.com.** tpo

product spotlight



PISTA Works pre-engineered system by Smith & Loveless

Headworks Package Provides Complete Screening and Grit Removal

By Ted J. Rulseh

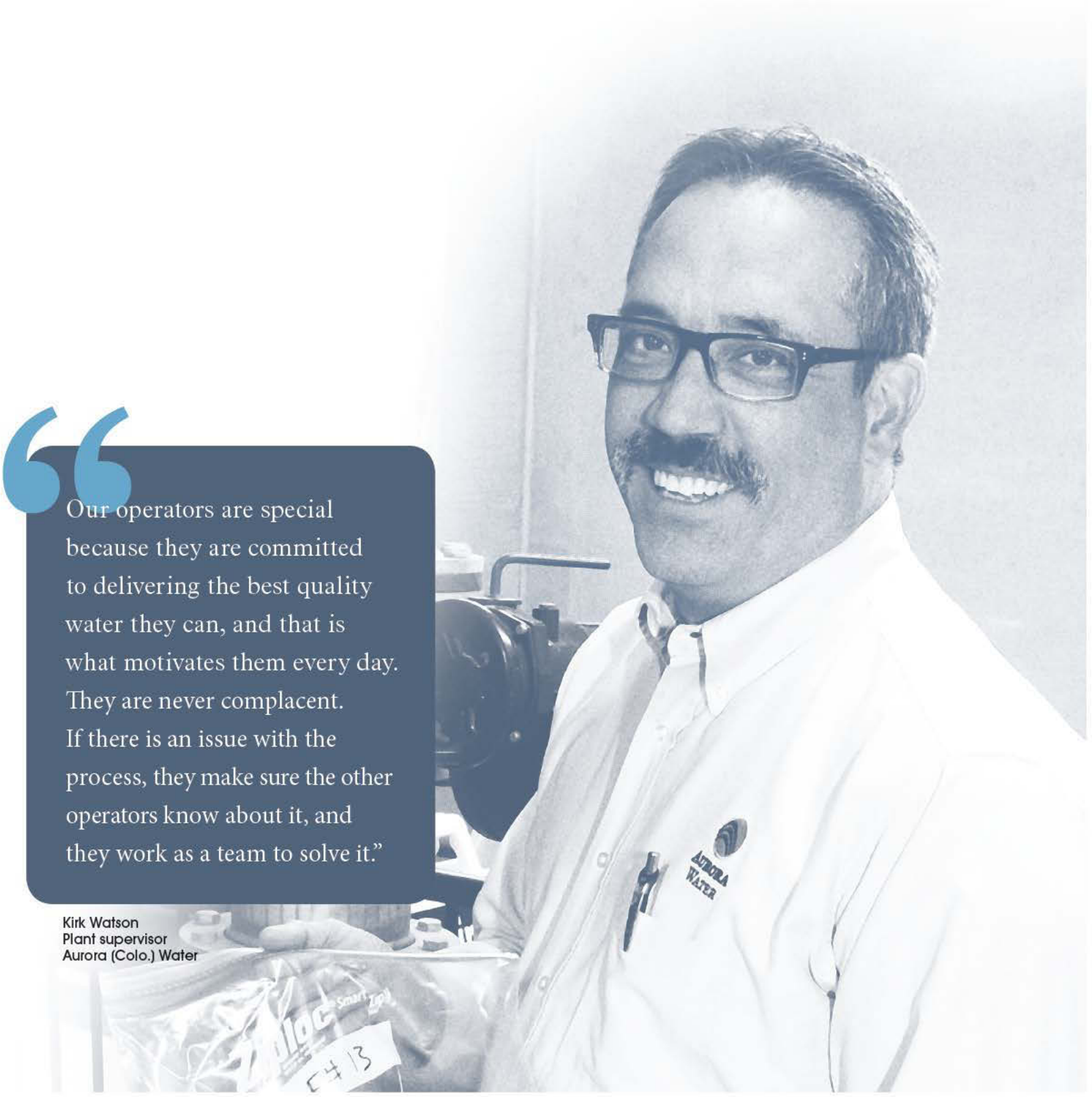
A package system introduced by **Smith & Loveless** offers four headworks processes on a single skid package. The **PISTA Works pre-engineered system** combines screening, grit removal and grit washing into an integrated system.

The complete system is pre-assembled and shipped direct to the job site on one truck. All equipment components are constructed of stainless steel. The system technologies include the company's V-FORCE baffle, S&L PISTA Turbo grit pump, and the PISTA Works grit washer with TRI-CLEANSE technology.

Package components also include ANSI flanged connections, a 6 mm OBEX spiral fine screen, manual bypass bar screen, two platforms for easy equipment access, and an epoxy-coated carbon steel skid support for the complete system, filled with grout.

"The typical headworks project consists of engineers designing a complete headworks structure with separate components," says William Flores, vice president, municipal systems. "We see cases where communities need a full headworks design but funds for engineering and construction are limited. This system enables the engineering firm to bring that community a headworks solution at a much more economical cost."

A pre-engineered and packaged system reduces construction and field installation costs while allowing for a compact footprint, says Flores. The system comes with a PLC-based control system with touch screen, color HMI, and NEMA 4X panel to operate the entire system. Five models are available to accommodate peak flow capacities from 0.5 mgd to 7.0 mgd. **800/898-9122; www.smithandloveless.com.**



"Our operators are special because they are committed to delivering the best quality water they can, and that is what motivates them every day. They are never complacent. If there is an issue with the process, they make sure the other operators know about it, and they work as a team to solve it."

Kirk Watson
Plant supervisor
Aurora (Colo.) Water

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TREATMENT PLANT OPERATOR

people/awards

The **City of Boulder (Colo.) 75th Street Wastewater Treatment Facility** received the Plant Performance Award from the Rocky Mountain Water Environment Association in recognition of the facility's outstanding maintenance, operations and public relations.

The **Kill Creek Wastewater Treatment Plant** won the Kansas Water Environment Association Plant Award and the KWEA Plant Safety Award.

The **Bonner Springs Utilities Department Wastewater Division** received the 2012 KWEA Collections System Award.

The **Olathe Wastewater Collection Program** received the 2012 Category II Collection System Award at the KWEA and Kansas Section of the American Water Works Association joint annual conference.

The **Montesano Wastewater Treatment Plant** received the Outstanding Performance Award from the Washington Department of Ecology.

The International Society of Automation announced these award winners at the 2012 ISA Water/Wastewater and Automatic Controls Symposium:

David Wilcoxson, MWH Americans and **Travis Crane** from the Jacksonville Energy Authority, honorable mention, Best Paper, "Optimization of Wastewater Lift Station for Reduction of Energy Usage and Greenhouse Gas Emissions."

Bob Dusza Jr., Manchester (Conn.) Water and Sewer Department, Best Presentation, "Using Cyber Security Evaluation Tool (CSET) for a Wastewater Treatment Plant."

Blair Sooley, Trihedral Engineering, honorable mention, Best Presentation, "Asset Tracking and Revision Control for Automated Water/Wastewater Control Systems."

Norman Anderson, CH2M HILL, Best Poster, "Planning and Designing SCADA Systems for Wastewater Collection Optimization."

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

Alaska

The Department of Environmental Conservation is offering these courses:

- Jan. 14-18 – Intermediate Wastewater Treatment Training, Fairbanks
- Feb. 4-8 – Intermediate Wastewater Treatment Training, Anchorage
- Feb. 21-22 – Electrical Troubleshooting and Preventive Maintenance, Anchorage
- May 22-23 – Pumps and Pump Systems: Specifications, Installation and Operation, Anchorage

Visit www.awwma.org.

California

The California Water Environment Association has an Introduction to Wastewater Collections Seminar Jan. 1-3 in Gilroy. Visit www.cwea.org.

Florida

The Florida Water Environment Association has a Utility Management Seminar on Feb. 21 in Gainesville. Visit www.fwea.org.

Kansas

The Kansas Water Environment Association is offering these courses:

- Jan. 3 – An Examination of Your Ethics, Dodge City
- Jan. 4 – An Examination of Your Safety, Dodge City
- Jan. 8 – Special Topics-Emerging Contaminants, Garden City
- Jan. 17 – Intro to Water and Wastewater Conveyance, Dodge City
- Jan. 22 – Special Topics-Ultrasound and Ultraviolet, Hays
- Jan. 24 – Special Topics-Corrosion, Garden City
- Jan. 24-25 – Wastewater Workshop, Ft. Scott
- Feb. 1 – Wastewater Preparation, Phillipsburg
- Feb. 8 – Small Wastewater Systems, Dodge City
- Feb. 13-14 – Utility Management Skills, Independence
- Feb. 14 – Wastewater Stabilization Lagoons, Liberal
- Feb. 20-21 – Wastewater Workshop, Parsons
- Feb. 26 – Special Topics-Emerging Contaminants, Dodge City
- Feb. 28 – Special Topics-Corrosion, Dodge City
- March 6 – Intro to Water and Wastewater Conveyance, Phillipsburg
- March 6-7 – Topics in Wastewater, Kansas City
- March 14 – Small Wastewater Systems

Visit www.kwea.net.

CALENDAR OF EVENTS

Jan. 27-30
New England Water Environment Technical Conference and Exhibition, Boston Marriott Copley Place Hotel. Visit www.newea.org.

Feb. 4-6
New York Water Environment Association Annual Meeting and Exposition, New York Marriott Marquis. Visit www.nywea.org.

Feb. 23-26
Water Environment Federation Disinfection and Public Health Conference 2013, Hyatt Regency Indianapolis, Indianapolis, Ind. Visit www.wef.org.

March 10-13
American Water Works Association and Water Environment Federation Utility Management Conference, Renaissance Phoenix Glendale Hotel & Spa, Phoenix, Ariz. Visit www.wef.org.

March 18-21
Illinois Water Environment Association and Illinois Section-AWWA Watercon 2013, Crowne Plaza Hotel, Springfield. Visit www.isawwa.org.

March 23-27
Missouri Water Environment Association/American Water Works Association Joint Annual Conference, Osage Beach. Visit www.mwea.org.

April 7-9
Water Environment Association of Ontario Technical Symposium, Toronto Congress Centre, Toronto. Visit www.weao.org.

April 7-10
Alabama Water Environment Association Annual Conference, Orange Beach. Visit www.awea-al.com.

April 14-18
Kentucky Water and Wastewater Operators Association Annual Conference, Galt House Hotel & Suites, Louisville. Visit www.kwwoa.org.

April 20-24
British Columbia Water and Waste Association Annual Conference and Trade Show, Kelowna. Visit www.bcwwa.org.

April 28-May 1
Arkansas Water Works and Water Environment Association Annual Conference, Hot Springs. Visit www.awwwea.org.

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JANUARY

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EDUCATION

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Michigan

The Michigan Water Environment Association has a Lagoon Seminar on Feb. 21 in Frankenmuth. Visit www.mi-wea.org.

Wisconsin

The Wisconsin Department of Natural Resources is offering these courses:

- Feb. 18-22 – General Wastewater Treatment Intro and Advanced, Chippewa Falls
- Feb. 26-27 – Primary Treatment Intro and Advanced, Madison
- March 5-6 – Anaerobic Digestion, Stevens Point
- March 7 – Anaerobic Digestion Advanced, Stevens Point
- March 12-13 – Phosphorus Removal Intro and Advanced, Green Bay
- March 14 – Paper Industry Wastewater Treatment, Green Bay
- March 19-20 – Trickling Filters and RBCs Intro and Advanced, Chippewa Falls

Visit dnr.wi.gov.

The University of Wisconsin Department of Engineering-Professional Development is offering these courses:

- March 20-22 – Wastewater Pumping Systems and Lift Stations, Madison
- April 23-25 – Nutrient Removal Engineering: Phosphorus and Nitrogen in Wastewater Treatment, Madison

Visit www.epdweb.engr.wisc.edu. tpo

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Mike captures a sludge sample at the Fort Atkinson Wastewater Treatment Facility.

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Like every facility, Fort Atkinson faces their own challenges. In particular, their close proximity to local food processing facilities makes the fight against grease a never-ending battle. Good thing USABlueBook has everything Mike needs to combat grease buildup, and destroy the foul odors that go with it.

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Mike Paul
Foreman
Fort Atkinson Wastewater Treatment Plant
Fort Atkinson, WI

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USABlueBook D-500C for Smaller Plants	45046	281.95

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