TREATMENT PLANT OPERATOR

tpo™

DEDICATED TO MUNICIPAL WASTEWATER PROFESSIONALS

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DECEMBER 2011

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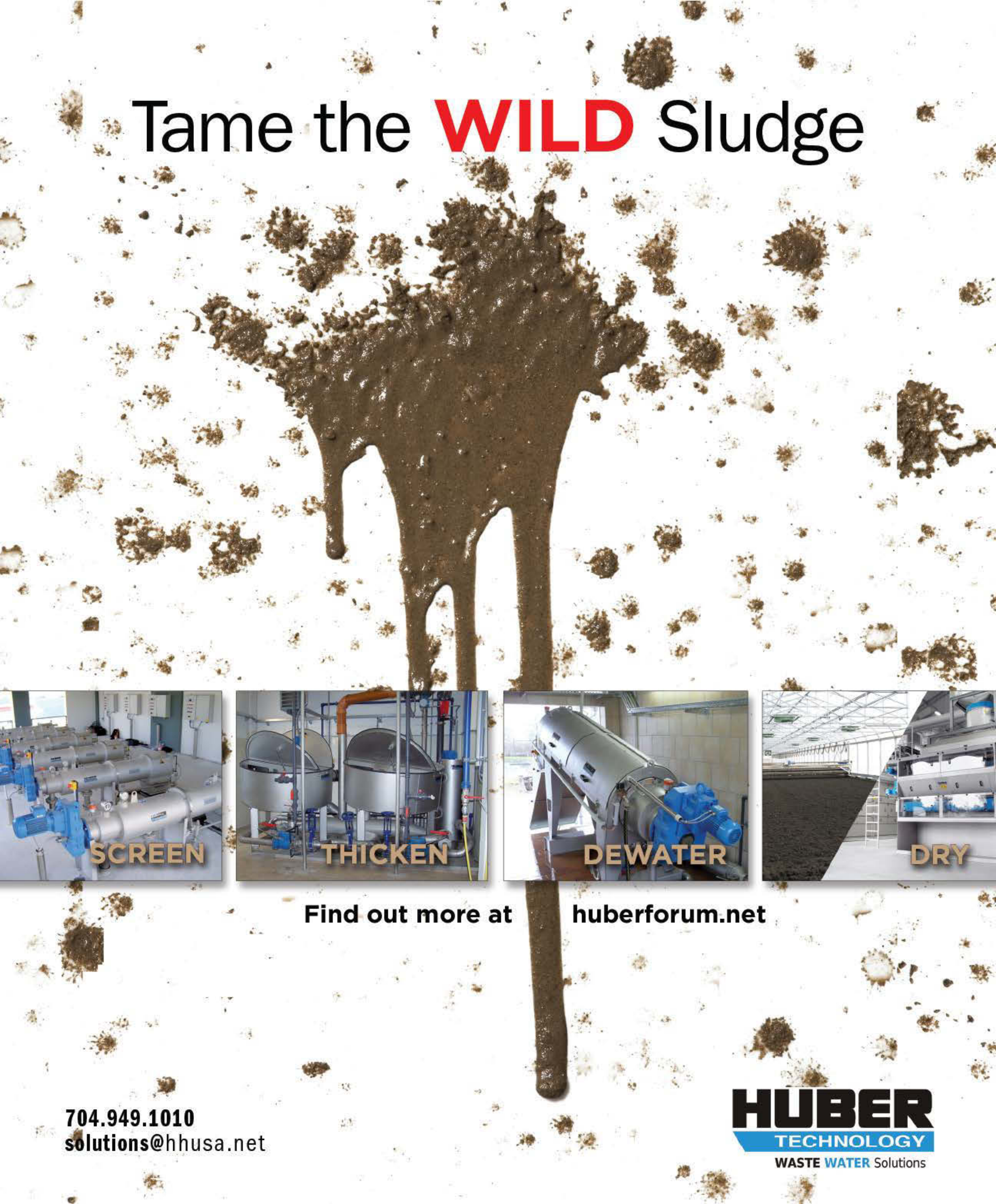
on the cover

Treating wastewater on Oahu is the job of the 300 employees with the City and County of Honolulu under Tim Steinberger, director of the Department of Environmental Services (ENV for short). The department's plants have a long record of winning awards from the National Association of Clean Water Agencies. (Photography by Marco Garcia)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let's be clear

Making the Most of It

MULTIPLE TECHNOLOGIES TODAY HELP CLEAN-WATER AGENCIES TURN WHAT WE USED TO CALL SEWAGE SLUDGE INTO "BLACK GOLD" FOR A WIDE RANGE OF SOCIALLY BENEFICIAL USES

By Ted J. Rulseh, Editor

My first job in community relations was helping a metropolitan clean-water agency win public acceptance for its biosolids (then called sewage sludge) land application program. This was in 1984, around the time the U.S. EPA first made it a policy to promote the beneficial use of biosolids.

At the time, clean-water agencies didn't necessarily grasp how important it was, in a land application program, to make sure the public understood the practice. So in the neck of the woods where I was working, rural townships, one after another, were passing ordinances to prohibit land application.

To make a long story short, the agency managed to turn things around, mainly by switching from surface spreading to subsoil injection of its liquid product. Since then, slowly (though not steadily, and with exceptions) beneficial reuse has become mainstream. Today we have a host of reuse technologies, many of which involve creating an innocuous Class A product.

IMPRESSIVE VEHICLE

One of these was the subject of an article in the November issue of *TPO:* The Natchez (Miss.) Wastewater Treatment Facility uses Thermo-System active solar drying technology from Parkson Corp.

I saw that system for the first time (well, not in actual operation) at the 2010 WEFTEC conference in New Orleans. I had someone use my smartphone to take my picture standing next to the computer-controlled "mole" vehicle that travels around the biosolids "greenhouse," methodically tilling and aerating the material. I sent the picture to my son with a message: "Our next car?" After all, the thing looks quite a bit like a miniaturized Volkswagen Beetle.

Who dreamed back in the 1980s that there would be all these innovative processes? Of course, biosolids were already working miracles back then — restoring strip-mined land in Illinois, boosting silviculture in Washington, and of course supporting incredible crops of corn and feed grain in many

Years of innovation have mostly resolved the technical challenge of creating consistent processes that yield consistent products. Odor concerns — the death knell for many reuse initiatives years ago — have been largely conquered. Concerns about long-term environmental issues, like heavy metals, seem to be fading, as well.

places. But in those days, with a few notable exceptions like Milwaukee's Milorganite, processes like pelletizing and composting were temperamental, and agencies approached them with caution.

MAKING PROGRESS

Today, composting processes have been pretty well perfected, and we have reported on a few of them on these pages. The agencies have little trouble marketing the resulting Class A products, whether to the general public or to commercial users and fertilizer formulators and distributors.

Much the same can be said for dried products. Operators like Synagro make a living on heat drying and pelletizing. And the Schwing Bioset process and others use lime stabilization to produce high-quality products.

Years of innovation have mostly resolved the technical challenge of creating consistent processes that yield consistent products. Odor concerns — the death knell for many reuse initiatives years ago — have been largely conquered. Concerns about long-term environmental issues, like heavy metals, seem to be fading, as well.

And now the biosolids process is going sustainable with solar drying. What could possibly make more sense? In Natchez and elsewhere, we have — a perfectly natural product being handled in a perfectly natural way.

GETTING WITH IT

Of course, much of this progress began with a change of attitude about the byproducts of wastewater treatment. The agency I worked for, like many others, began with an attitude that, "We've got this awful stuff. We need to get rid of it." And would farmers please do a solid favor and take it off their hands for free?

That "get rid of it" attitude was perhaps embodied in East Coast cities' (now outlawed) practice of ocean dumping: Let's get this stuff as far away and as far out of sight as possible.

The successful agencies back in the 1980s and before were those that realized they had a valuable product that users should be willing to pay for. And that's the direction in which things have been trending for a long time.

So, given my background, it hurts me a little inside when I see in one of our stories that a clean-water plant is sending biosolids to landfill, or when I hear someone in the industry speak about "disposal" of the material.

Of course I know that sometimes the alternatives are difficult. Land application is still socially unacceptable or cost-prohibitive in some heavily urban areas. And a process like pelletizing or composting may be difficult for an agency to undertake, for financial, technical or other reasons.

Still, I hope that landfilling is becoming the management tool of last resort. It is, after all, a waste. To contrast the old attitude I mentioned, "We have this wonderful product. Let's make the most of it." **tpo**

Say It With Video

A UTAH ENGINEER COMBINES HIS PROFESSION AND A HOBBY TO PRODUCE EDUCATION AND TRAINING VIDEOS AIMED AT CLEAN-WATER PLANT EMPLOYEES AND TOUR GROUPS

By Pete Litterski

When not studying for an environmental engineering degree at the University of Utah, Steve Myers spent much of his time working on videos, a hobby he picked up as a teenager.

Myers, now a biological systems product manager in the Salt Lake City office of the Ovivo water solutions company, got involved in filmmaking with his buddies and stayed with video production during college. It was then his father, Leland Myers, manager of the Central Davis Sewer District, based in Kaysville, Utah, recruited him to work on a series of training and education videos.

"I was just kind of dabbling in videos, and he found a use for them," Steve Myers says. "And he paid for them." That was in 2002, and Myers has made two or three videos a year for the district since then.

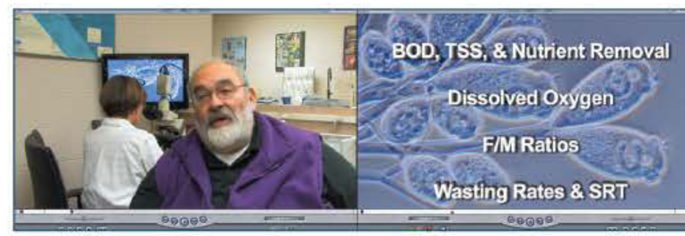
COVERING THE BASICS

Leland Myers, also an environmental engineer, had created one training video about grit filter operations for the district, north of Salt Lake City, but when Steve saw the short film, he said he could do better. Many of the early videos were designed to educate new employees and refresh existing employees on processes and tasks at the district. Topics covered everything from operating a mixer to changing a chlorine tank.

"The hardest part is to come up with a good script. Then it's just a matter of crunching through all of the visuals that you want to put with the words."

STEVE MYERS, P.E.

PHOTOS COURTESY OF LELAND MYERS



A screen shot from the computer of Steve Myers shows video of his father, Leland, as well as a graphic screen from an education video Steve created about wastewater microbiology.

Leland wanted to develop a library of videos: "We wanted to put all of our processes and maintenance operations on our intranet." As the collection grew, father and son discussed doing videos to explain the basic processes and purpose of wastewater treatment to employees and plant tour groups. The first of these covered the carbon cycle and explained a treatment plant's role in cycling carbon back into the environment in usable forms.

The Central Davis board supported the expense of creating the videos with intent to make them available in the public domain. Leland and Steve agree the carbon cycle video was "cheesy," and Steve no longer posts it at his website (www.heistmedia.com). But more recent efforts like Wastewater Microbiology and Nitrogen Removal Basics, and some training videos, are available there and at the YouTube channel, stevenmyers71.

KEEP IT INTERESTING

Steve is working on a new video on phosphorus and is considering redoing the carbon cycle video. Once father and son iron out the concept of a new video, "The hardest part is to come up with a

Leland Myers speaks about his son's Carbon Cycle educational video to a roomful of people preparing to become trainers for the U.S. EPA training program for small wastewater treatment systems.

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.

Steve Myers checks his viewfinder while shooting a training video for the Central Davis Sewer District in northern Utah.

good script," says Steve. "Then it's just a matter of crunching through all of the visuals that you want to put with the words." One big challenge is making sure the narration keeps viewers' attention. Although the subjects are serious, a little wry humor often creeps in.

Steve combines his videography with graphics and other visuals. In the carbon cycle video, he even used footage from the district's sewer inspection cameras. Assembling a finished product is easier now that Steve has invested much of his pay from the district in high-quality digital editing software and digital video equipment.

Although much of the work focuses on treatment plant operations, some videos go afield. In one case, Leland needed to address a problem in a neighborhood where baby wipes were clogging a lift station. Steve created a video showing how serious sewage backups can occur when lift stations are shut down. The problem declined after DVDs were mailed to residents.

While Central Davis employees are the primary targets of the videos, they also reach a broader audience. Up to 2,000 students per year tour the wastewater treatment plant. They may view videos at the plant or ahead of time in their classrooms. The microbiology video, which explains the functions of bacteria in treatment, is a good fit with sixth grade science.

SHARING WIDELY

The videos are also part of the package of digital material Leland shares with regulators. "We maintain our operations manual digitally, and we can update the index when we make changes or upgrades," he says. "Now when the state says they want to see our operations manual and documentation, we just give them a CD with our manual and a group of DVDs that show our training and maintenance procedures."

Steve has been invited to share his videos with college classes and has even had a graduate student seek permission to include his work as an addendum to a doctoral thesis. Steve still makes presentations to classes at the University of Utah each year.

Steve's supervisors support his sideline and have even asked him to produce several marketing and training videos for Ovivo's Carrousel activated sludge treatment systems. He sometimes shares videos with contractors and public officials he meets while making presentations for Ovivo. Educating potential customers about basic subjects makes it easier to explain his products' features.

Steve has also presented his videos at conferences hosted by the Water Environment Association of Utah and shares them with other wastewater treatment professionals, including his brother, the third environmental engineer in the Myers family. **tpo**

CATCHING THINGS EARLY

AWARD-WINNING OPERATOR BOB MOORE MAKES PREVENTIVE MAINTENANCE THE KEY TO KEEPING HIS TREATMENT PLANT RUNNING SMOOTHLY AND EFFECTIVELY

By Doug Day

WHEN BOB MOORE WAS HIRED IN 2006 AS LEAD OPERATOR AT THE South Coastal Regional Wastewater Facility in Delaware, the first thing he did was restructure the preventive maintenance program.

"Identifying problems early allows you to fix things before they become major," says Moore, now assistant manager for Sussex County's Bethany Beach Sewer District. He believes anything that prevents a crisis makes operators' lives easier, and ensures high-quality, permit-compliant effluent.

Moore has been instrumental in improving the operation of the county's largest wastewater treatment plant, according to a nomination form that led to his 2009 Operator of the Year Award from the Water Resources Division of the state Department of Natural Resources and Environmental Control. Heather Sheridan, director of Sussex County Environmental Services, and Loran George, district manager of the county Engineering Department, nominated Moore.

His focus on protecting water resources goes back to growing up on the water, and a conversation he had years ago when thinking about wastewater as a career. A friend happened to be an operator at a municipal treatment plant. "He made a comment that has stuck with me," says Moore. "The same amount of water has been on this planet for millions of years, and it's our job to clean it up and put it back the way we found it."

Bob Moore, Bethany Beach Sewer District assistant manager. (Photography by Todd Dudek)

ESCALATING ATTENTION

Before joining the South Coastal plant staff, Moore spent nine years in industrial wastewater. His goal on his new job was to give operators a schedule to prevent problems at the newly refurbished activated sludge facility with conventional aeration. Moore says treatment is achieved without chemical additives, except for chlorine disinfection of the effluent that is discharged through a deep ocean outfall.

"I was hired four months after a $21 million expansion," he says. The work increased design flow from 6 mgd to 9 mgd with a 14 mgd peak flow. "Using preventive maintenance, we were able to work a lot of little bugs out of the system within a year and had very few breakdowns." The plant has operated smoothly and effectively ever since and stays well within its permit requirements.

The district has a staff of 55 under district manager Loran George. Moore supervises five operators at South Coastal: Ann Hobbs, lab manager and Level 4 operator; Pat Rankin, lead operator and Level 4 operator; and Paul Hignutt, Fred Jester and Dave Drebing, Level 2 operators.

Preventive maintenance starts with getting to know the plant. "It's understanding the basic feel, sounds, and smells of each part of the plant," Moore says. That helps operators recognize if something has changed as they make their daily rounds.

"We have a daily preventive maintenance sheet," Moore says. "As operators go through the plant, they take their time and check off each item as they're inspecting the equipment. It's mainly visual inspection to make sure equipment isn't leaking and that nothing has shut down, along with cleaning equipment and picking up trash."

The weekly procedure gets a bit more detailed. "Certain equipment is taken out of service for inspection, and belts and oil levels are checked," says Moore. "A lot of it is exercising gates and valves, cleaning floats and transduc-

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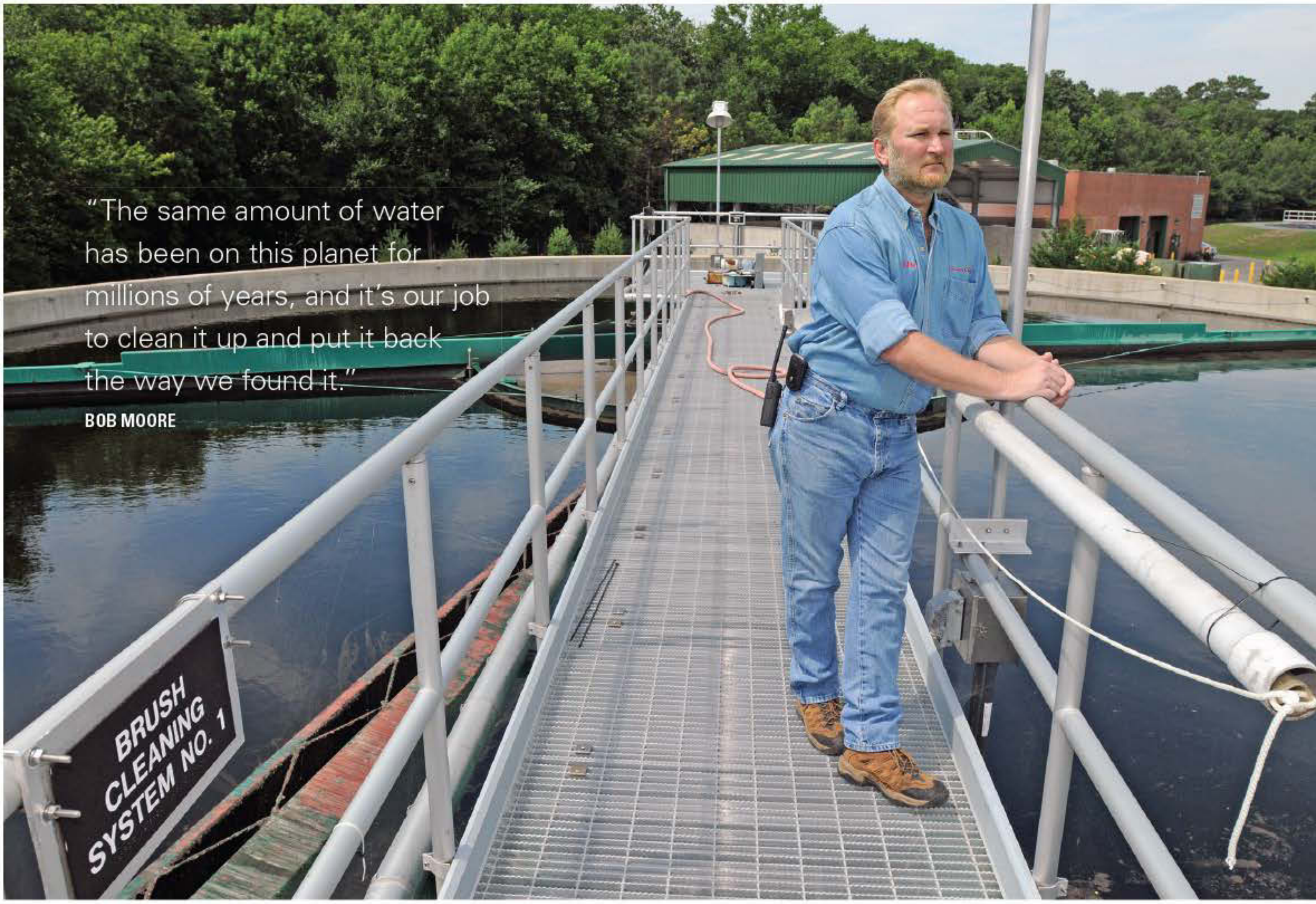

"The same amount of water has been on this planet for millions of years, and it's our job to clean it up and put it back the way we found it."

BOB MOORE

ABOVE: Bob Moore makes maintenance a top priority at the South Coastal treatment facility. LEFT: Moore and Level 2 operator Paul Hignutt take readings from the blower control panel from Schneider Electric inside the new blower room.

profile

Bob Moore,
South Coastal Regional Wastewater Facility, Sussex County, Del.

TITLE:	**Assistant district manager**
EXPERIENCE:	**9 years in industrial wastewater; 5 years at South Coastal**
RESPONSIBILITY:	**Supervise a staff of 5**
CERTIFICATIONS:	**Delaware Level 4 wastewater operator (highest); nutrient management license; water operator license**
GOAL:	**Continue treating wastewater and returning clean water to the environment**
GPS COORDINATES:	**Latitude: 38°42'3.08"N; Longitude: 75°5'32.27"W**

(continued)

"The number of alarms steadily declined, and is still declining, because we're able to spot potential problems before they actually happen."

BOB MOORE

RIGHT: The South Coastal facility team includes, from left, Level 2 operators Fred Jester and Dave Drebing, Level 4 operator and lab manager Ann Hobbs, Level 2 operator Paul Hignutt, district manager Loran George, and assistant district manager Bob Moore.

Paul Hignutt, Fred Jester and Bob Moore check out the Gardner Denver blower control panel.

ers, running backup generators, and cleaning things like lift stations and septage receiving equipment."

The monthly maintenance list involves tasks like greasing and lubricating, changing belts and filters, washing down areas, checking spillways, cleaning pits and vaults, and inspecting fire extinguishers.

Twice a year, before and after the peak summer season, detailed work is done to get the facility in top form. "We go completely through the plant and check everything from screws in doors and cracked glass in windows, to chipped paint on handrails and right on through all the major equipment," Moore says. "It also includes everything on the daily, weekly, and monthly lists."

DEVELOPING A SCHEDULE

The daily task list is the easiest place to start a comprehensive maintenance schedule, notes Moore, because it's just a matter of checking equipment while walking through the plant. Next is a close review of equipment manuals.

"Document manufacturers' recommendations for monthly and weekly maintenance and just build on it from there," he says. "If something is supposed to be done at 500 hours, I schedule it every 300 hours."

Operating experience can also help in developing a schedule. Some lift

HELPING THE STATE

Bethany Beach Sewer District assistant manager Bob Moore came to the rescue of the Delaware Department of Natural Resources and Environmental Control in updating an antiquated system for biosolids monitoring. A new reporting program had been on DNREC's wish list for many years, but budget constraints and staff shortage had prevented the work from being done.

According to a DNREC newsletter in December 2009, "This report is universally despised by the regulated community for its lack of user-friendliness, complexity, compatibility issues with many computers, and the hours of tedious data entry that are required to complete it."

Moore worked with DNREC inspector Brian Churchill to develop a spreadsheet to make it easier for operators. "The old system was very repetitious," says Moore. "It required an older version of Windows, so we had to keep an old computer around just to run it."

Moore designed the new spreadsheet-based reporting structure that holds all the data in a single file and does automatic calculations, which the old program could not do. "You plug in a certain amount of gallons at a certain percentage of solids, and it automatically calculates and enters data like dry tons and total tons," says Moore.

Wish granted.

stations and sumps may need cleaning more often than others, or a certain pump may require special attention. The schedule should be adjusted when unusual conditions are found to make sure the equipment gets proper attention before problems develop.

There are computerized maintenance management system (CMMS) programs available for purchase, but Moore uses a spreadsheet he developed. "There is a section on each PM sheet for notes," he says. "If an operator finds a problem, it is written down, dated and initialed so I can follow up with the right person." He then works with the maintenance group to create a work order for inspection, order parts, and schedule mechanics to complete the repair.

> "We meet every morning to discuss our plans for the day and to review project sheets and daily deliveries. Communication is a very important thing."
>
> **BOB MOORE**

GETTING RESULTS

The benefits of preventive maintenance showed up quickly. "The number of alarms steadily declined, and is still declining, because we're able to spot potential problems before they actually happen," says Moore. "We've had some equipment wear out, but we've had no major breakdowns."

Thanks in part to the quality of preventive maintenance, the U.S. EPA presented the plant with the Regional Environmental Excellence Award for overall excellence in operations and maintenance in 2009. The plant also won that award in 2000.

Preventive maintenance has identified issues such as clogged air relief valves and worn belts that would have shut down vital equipment if they had failed. When such issues are found, they are shared among the operators in various ways.

"The operators on shift know what is happening because they're all on the radio hearing about it," Moore says. Issues are also discussed at daily meetings. "We meet every morning to discuss our plans for the day and to review project sheets and daily deliveries. Communication is a very important thing."

Problems can also be used as learning experiences. When something happens, newer operators may go through the troubleshooting, diagnosis, and repair planning under the supervision of experienced operators. "That's the best way to teach somebody," Moore says.

Effective preventive maintenance not only protects the environment — it can have a positive economic impact on a plant. "I worked in a poultry plant for nine years in preventive maintenance, and we were probably the only department that saved money because we didn't have equipment breakdowns," Moore says.

"I even have a clipboard in my shed, and I track maintenance on all my cars and lawn mowers. I had a riding lawn mower that lasted 19 years."

No hassles with sudden breakdowns, better operation, regulatory compliance, confidence in the equipment, fewer emergency purchases: Moore makes sure that preventive maintenance brings a sense of calm to his treatment plant. tpo

more info:

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800/682-9868
www.gardnerdenverproducts.com

Schneider Electric
888/778-2733
www.schneider-electric.com

The West Jackson County Regional Land Treatment Facility in Ocean Springs, Miss., uses a three-cell lagoon treatment process on 75 acres with a 190-acre constructed wetland and 1 mgd spray irrigation system. Effluent from the wetland system discharges into Bayou Costapia.

Breath of Fresh Air

A NEW AERATION SYSTEM AT A MISSISSIPPI TREATMENT PLANT ENHANCES DISSOLVED OXYGEN LEVELS AND SIGNIFICANTLY REDUCES MAINTENANCE

By Scottie Dayton

Every month, operators at the West Jackson County Regional Land Treatment Facility in Ocean Springs, Miss., launched a boat into the 20-acre aeration cell in the treatment lagoon and spent up to six hours servicing eight splasher-type 25 hp surface aerators. In addition, the underwater power supply experienced frequent shorts, and the mooring cables holding the units to their concrete pads sometimes broke.

"About every three months, we'd find an aerator spinning wildly or flipped over and tangling itself in the cables," says section manager Kevin Elliott. "A local shop rewound the motor, but it still took two weeks to get it back. We had spells where BOD hit the permit limit of 10 mg/l. That made us nervous."

When Hurricane Katrina arrived in August 2005, it ripped the aerators from their moorings and threw them about. Two were ruined. In the aftermath, the utility received a $13 million grant to expand the plant from 5 to 7 mgd to handle future development. The authority hired William Rackley, P.E., project manager at Alan Plummer Associates in Fort Worth, Texas, to design the expansion.

"The project conception design called for upgrading the surface aerators, but we explained our problems to Bill and our preference for a technology that gave us fine- and coarse-bubble diffusion," says Elliott. The combination was needed to properly aerate the 14-foot-deep cell, which measured 415 by 1,545 feet.

Rackley located the MARS 3000 aeration system from Triplepoint Water Technologies. The units, with Double Bubble technology, produce 5 to 7 pounds of oxygen per horsepower hour (lb/hp-hr). Since their activation in May 2011, the plant has achieved reductions of 57 percent in BOD and 91 percent in TSS. The system produces a dissolved oxygen level of over 3.0 mg/l with only two of four blowers operating, versus 1.0 mg/l for the old system.

LEFT: A MARS aerator. BELOW: Decant from the second lagoon cell covered the aerators so that three blowers could run alternately for two weeks to test the system and super-oxygenate the water.

PHOTOS COURTESY OF TRIPLEPOINT WATER TECHNOLOGIES

Paul Surbey (left) and Gummi Jaeger from Triplepoint Water Technologies remove protective bags and prepare the membrane diffusers.

READYING THE SITE

The facility, next to the U.S. Fish and Wildlife's Mississippi Sandhill Crane Refuge, uses a three-cell lagoon treatment process on 75 acres with a 190-acre constructed wetland and 1 mgd spray irrigation system. Its 250-acre biosolids facility also handles material from three nearby treatment plants for land application. Effluent from the wetland system discharges into Bayou Costapia.

To prepare for the upgrade, operators bypassed

Share Your Idea

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

"Operators walk out on a pier now to maintain the blowers. It takes an hour, and that, along with no longer having to repair the motors, has reduced the lagoon's maintenance budget by 50 to 60 percent."

KEVIN ELLIOTT

Decant flows in from the second treatment cell in the lagoon. Four Continental Blower 125 hp multistage centrifugal blowers operating at 3,400 cfm/6 psi provide air to the 288 MARS aerators.

wastewater into the second treatment cell, then drained the aeration cell, transported the sludge to the head side with earth-moving equipment, and contained it behind a soil berm. Once the cell's clay base dried, they added fill where needed and shot elevations to ensure that the floor was level.

A crew from DRM Utilities in Tuscaloosa, Ala., built 3-foot-square, 2.5-foot-deep forms on the floor and poured concrete pads on 35-foot centers for the 288 aeration units. Simultaneously, the crew bored 30 feet into the clay and poured four 12-inch-square pilings. They left 16 feet above ground to support the 20- by 48-foot, 12-inch-thick concrete base and screened enclosure for four Continental Blower 125 hp multistage centrifugal blowers, operating at 3,400 cfm/6 psi.

When the aeration units arrived, DRM workers bolted them to the pads as insurance against natural disasters. The units are typically portable and can be installed from the surface. The crew built the 10-inch Type 304 stainless steel air header with custom-welded manifolds on the floor of the cell, then ran 4-inch flexible weighted tubing to each aerator. Motorized valves on the blower manifolds regulate airflow. The workers also excavated a lagoon levee to accept the new 24-inch force main.

SEA TRIALS

"Everyone was excited about opening the valves and allowing decanted liquid from the second cell to cover the aerators," says Elliott. "Wayne Dennis, operation and maintenance manager, ran three blowers alternately for two weeks to test the system and super-oxygenate the water. We had some compliance issues while bypassing and wanted to put them behind us as soon as possible."

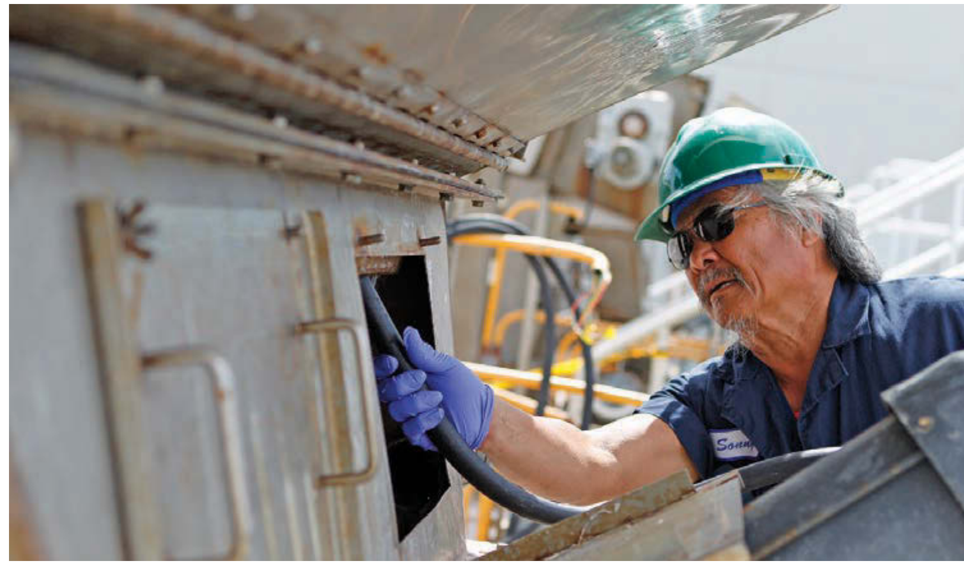
Each diffuser has a flow rate of 25 cfm (7,200 cfm total), transferring oxygen at 16 percent efficiency at 8 feet deep, and mixing 6,585 gpm (1.9 million gpd total). They have a central coarse-bubble tube surrounded by 10 1-meter fine membrane bubble tube diffusers positioned 6 inches above the floor. The 22-inch-high units have four weighted legs and clear the pad by 4 inches.

Air enters the diffuser's central static tube, creating a Venturi that circulates the water and liquefies sludge. Anticlogging technology prevents backflow. With coarse-bubble diffusion, 3- to 25-mm bubbles rise through the water column at 2 to 3 feet per second, causing turbulence and robust mixing.

While suspended in the water column, the liquid mixes with fine 1- to 2-mm bubbles rising at less than 1 foot per second from the self-cleaning membrane diffusers. The high surface-area-to-volume ratio of degraded debris and fine bubbles maximizes contact time and reduces BOD5.

When the plant resumed normal operation, flows of 3.5 to 5 mgd and high dissolved oxygen numbers enabled Dennis to turn off the third blower. "Operators walk out on a pier now to maintain the blowers," says Elliott. "It takes an hour, and that, along with no longer having to repair the motors, has reduced the lagoon's maintenance budget by 50 to 60 percent." **tpo**

As the aeration cell filled, operators turned on the blowers to test for even air distribution across the 288 aerators.



Assistant operator Sonny Awai Jr. washes down the influent bar screen at the Sand Island Wastewater Treatment Plant. (Photography by Marco Garcia)

Protecting Paradise

WASTEWATER TREATMENT PLANTS ON OAHU EARN RECOGNITION FOR EXCELLENCE IN SAFEGUARDING HAWAII'S PRECIOUS RESOURCES

By Doug Day

THE WEATHER ON OAHU TODAY IS PROBABLY IN the 80s with sunshine — because that's nearly always the way it is. It will probably rain somewhere, although areas of the island are quite dry despite being part of the most tropical state in the U.S.

Treating wastewater on Oahu is the job of the 300 employees who work for the City and County of Honolulu under the direction of Tim Steinberger, director of the Department of Environmental Services.

ENV, as it is called, is the municipal utility for the city and county, which encompass the entire 600-square-mile island of Oahu, 2,500 miles off the U.S. mainland and home to nearly a million people. The department is also responsible for collecting and managing solid waste on the island.

ENV collects 105 mgd of wastewater with 2,100 miles of pipeline and 70 pump stations and processes it all at nine wastewater treatment plants. Four of the plants use deep ocean outfalls, while others use underground injection wells.

Operators face the challenge of producing high-quality effluent and, increasingly, reclaimed water to support irrigation and reduce stress on groundwater resources. Technology in the form of an island-wide SCADA system helps the staff of 90 operators keep tabs on the entire system.

AWARD-WINNING PLANTS

ENV has a history of award-winning plants. "We have a lot of Gold and Silver awards from the National Association of Clean Water Agencies, and the Waianae plant has received Platinum awards for several years running," says Steinberger.

The NACWA Peak Performance awards are based on permit compliance. Silver awards are for five or fewer permit violations in a given year, Gold indicates 100 percent compliance for a year, and Platinum goes to plants that have received Gold awards for five years in a row.

In 2009, the Waianae plant received its eighth consecutive Platinum award, to go with eight Gold awards and six silvers since 1994. The Honouliuli and Kailua facilities received Gold awards in 2009, Sand Island received a Silver, and Kahuku has received a variety of national and state EPA awards in the past.

Keeping the plants running so well comes down to good operators. "Operators who are dedicated to their work and who take ownership of their facility — that's really the bottom line," says Steinberger. "We partner with the state Department of Health and the University of Hawaii to make sure our operators receive their training and keep up with their continuing education credits."

ENV meets most of its staffing needs from within the state, though the pool of employees is somewhat limited. "New operators work as assistants for the first year or two and make their way through the certification process and on-the-job training until they achieve an Operator 2 license and progress to an Operator 4," Steinberger says.

With a relatively small population to draw from, it's important for ENV to

"Operators who are dedicated to their work and who take ownership of their facility — that's really the bottom line."
TIM STEINBERGER

Sonny Awai Jr. cleans the weir in the gravity thickener tank.

The Sand Island Wastewater Treatment Plant maintenance team includes, from left, Melvin Ventura and Fredrico Pablo, mechanics; Thomas Souza, welder; Perry Takara, mechanic; Herbert Watanabe, machinist; and Rodney Endow, welder.

Division of Wastewater Treatment and Disposal, Department of Environmental Services, City and County of Honolulu, Hawaii

AREA SERVED:	Island of Oahu
POPULATION:	953,200
STAFF:	300
TREATMENT PLANTS:	9
OPERATORS:	90
TOTAL FLOW:	155.4 mgd (design)
TREATMENT LEVELS:	Primary, secondary and tertiary
BIOSOLIDS:	Processed into organic fertilizer by contractor (some landfilling)
WEBSITE:	www.envhonolulu.org
GPS COORDINATES:	Latitude: 21°18'23.13"N; Longitude: 157°52'56.46"W

develop its employees, though it does go to the mainland to recruit for some higher level management positions.

"There is a high demand on our aquifer, so any offset we can do by recycling water certainly is a help. Long term, I think we'll look at every plant to see if there is an opportunity for water reclamation and reuse."

TIM STEINBERGER

KEEP IT RUNNING

"Like all municipalities, we face an aging workforce," says Steinberger. "We have so much experience out there, people who have been working here 35 or 40 years. When you have that kind of wisdom that is about to retire, you kind of cringe; even though others have been working 20 or 25 years and are very capable, you like to have those seasoned veterans out there."

Good operators, while key, are not enough to operate an effective wastewater plant. Good maintenance is essential. "As long as you keep the facilities well maintained and give operators the tools they need, there is no reason why your plants should not be able to stay in compliance consistently," Steinberger says.

ENV has a central shop at its Sand Island plant, and all plants use a common database for reporting maintenance issues. "The database creates work orders for the maintenance crews," says Steinberger. "Some of the work can be done by the assistant operators on site, and some jobs may require that we send out a mechanic or electrician."

Preventive maintenance uses a three-tiered program of high, medium and low priorities. The idea is to keep the high-priority items to a minimum. That means focusing on the medium and low priorities so they never rise to the high-priority level.

PROTECTING WATER

The ocean environment works to the department's advantage. "Hawaii is a volcanic island, so it rises off the ocean floor very rapidly," says Steinberger. "We can discharge our effluent out a mile and a half and we're already 200 or 300 feet down. We do extensive monitoring, as well. Over the years, we've never shown any type of occurrence of contaminants coming to the shore."

There is no shortage of freshwater in Hawaii, but on a series of islands in the middle of a vast ocean, groundwater becomes a critical resource. "Fortunately, it rains quite a bit, and given the volcanic nature of the island, we're able to retain a lot of that water in the ground," says Steinberger.

But virtually all of Oahu's drinking water comes from groundwater, and demand continues to grow. "We are a thriving city, about the twelfth largest in the United States," says Steinberger. With growth comes increased attention to protecting groundwater, both to maintain the resource and to pre-

ABOVE: To run the facilities, plant operators get an assist from an island-wide SCADA system installed in the mid-1980s to monitor and control wastewater equipment from a central location at the Sand Island plant. James Barboza, Operator 4, is in charge of the SCADA database. RIGHT: The plant's upgraded odor control system from Azzuro Inc.

vent drawing it down so much that saltwater can intrude and spoil the entire supply.

Water reclamation helps limit pressure on groundwater supplies. About 12 mgd of secondary effluent from the Honouliuli plant goes on to the neighboring Honouliuli Water Recycling Facility, a tertiary plant that treats the water to R-1 quality, the highest level of treatment in Hawaii.

"That is distributed mostly to golf courses and parks," says Steinberger. "The area southwest of Pearl Harbor is very hot and dry. They only get about 15 inches of rain a year. So they're able to use that water to assist in irrigation, and there are a lot of golf courses on that side of the island."

LOTS OF FARMING

The Wahiawa plant's discharge is also recycled. It is the oldest plant on the island and the only ENV facility that discharges to freshwater — the Wahiawa Reservoir. The reservoir was created in 1906 to provide irrigation to Oahu's sugar cane industry. While sugar cane production in the state is down to about the same levels as it was in 1900, the area now contains diversified agriculture.

Rainfall varies greatly on Oahu because of its two mountain ranges. The eastern Koolau range can get 280 inches of rain a year. The smaller Waianae range gets 30 to 60 inches. The southern part of the island and the western coastal regions are semi-arid (like the dryer parts of Texas and New Mexico) and average less than 20 inches per year.

"There is a high demand on our aquifer, so any offset we can do by recycling water certainly is a help," says Steinberger. "Long term, I think we'll look at every plant to see if there is an opportunity for water reclamation and reuse. The Sand Island plant is right in the urban center of Honolulu, so finding areas for large-scale use of 70 to 80 mgd of reclaimed water is a bit of a challenge." ENV's other facilities are more likely candidates, since they are in the more rural areas.

NOT SO HARD TO SAY

Here are the basics about the Department of Environmental Services wastewater treatment plants on Oahu, which operate under the direction of regional managers Allen Perry, Nic Musico and Marc Armas.

Pronouncing these plant names is easier than it may appear. The five vowel pronunciations are A ("ah" as in bah), E ("ay" as in bay), I ("ee" as in see), O ("oh" as in go), and U ("oo" as in boo). Each vowel is pronounced, even when two vowels occur together. W is usually pronounced as V, except after U or O, when it is pronounced as W.

Honouliuli (built in 1980, design capacity 51 mgd). Serves southwest Oahu, primary and secondary treatment, deep ocean discharge. Plant management staff Gary Okamura, Gary Carolino, Robert Choate, Robert Souza, David Yamada.

Kahuku (1980, 400,000 gpd). Serves northern Oahu, activated sludge treatment with sand filters and chlorine disinfection. Discharge to injection wells for groundwater recharge. Plant manager Terry Onizuka.

Kailua (1965, 13 mgd). Serves the east shore of Oahu, regional secondary treatment plant serving two older primary treatment plants, deep ocean discharge. Plant management staff Jay Gonsalves, Ken Dao, Duane Carrick, Wesley Lim, Mark Nojiri.

Laie (1997, 430,000 gpd). Serves the northeastern shore of Oahu. Tertiary treatment with UV disinfection, water reclamation for irrigation and groundwater recharge. Being in an area of high rainfall, it uses a low-pressure collection system that helps minimize inflow and infiltration. Plant manager Christopher Moffett.

Paalaa Kai (1980, 144,000 gpd). Serves the northwest shore of Oahu, activated sludge secondary treatment, discharge to injection wells. Plant manager Alden Abe.

Sand Island (1976, 82 mgd). Serves metro Honolulu, which generates 85 percent of the island's wastewater. Advanced primary treatment with UV disinfection, deep ocean discharge. Plant management staff Jonathan Baker, Michael Dao, Roberto Pahed, Wayne Salas, Hermen Tomboc.

Wahiawa (1928, 2.5 mgd). Serves the central region, tertiary treatment with activated sludge (being upgraded to a membrane bioreactor) and UV disinfection. Discharge to freshwater reservoir. Plant manager Berwin Nyuha.

Waianae (1968, 5.2 mgd). Serves the western shore of Oahu, secondary treatment, deep ocean discharge. Plant manager Clyde Hudson.

Waimanalo (1972, 700,000 gpd). Serves southeast Oahu, secondary treatment with sodium hypochlorite disinfection, discharge to injection wells. Plant manager Michael Magee.

Nicole Fortin, sanitary chemist, runs a BOD test in the Sand Island lab.

EFFECTIVE CONTROL

To run the facilities, plant operators get an assist from an island-wide SCADA system installed in the mid-1980s to monitor and control wastewater equipment from a central location at the Sand Island plant. Staffed around the clock, it monitors all pump stations and treatment plants, two stormwater pump stations, and four preliminary wastewater treatment plants.

The department also has a biosolids facility near Sand Island operated by Synagro. It can process up to 10,000 dry tons annually from Sand Island into a Class A organic fertilizer through in-vessel bioconversion. Synagro markets most of the resulting pellets to golf courses, farms, and landscapers. The city and county use about two tons per month to fertilize public properties, such as parks.

"We have so much experience out there, people who have been working here 35 or 40 years. When you have that kind of wisdom that is about to retire, you kind of cringe."

TIM STEINBERGER

The biosolids from Honouliuli used to go to Naval property for composting, but the Navy closed that site in 2009. A new agreement with Hawaiian Earth Recycling will result in the composting of biosolids from most of the ENV plants except the Laie Reclamation Facility and Sand Island, beginning in 2012.

Another public-private partnership with Pacific Biodiesel converts 40,000 gallons of FOG into boiler fuel every month for use at businesses in the Campbell Industrial Park on the far southwest part of the island.

Hawaii is known for its warm and pristine waters. Keeping it that way takes a lot more work than most residents and the 8 million annual visitors will ever realize. tpo

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Quick Payback

A CALIFORNIA PLANT SAVES SUBSTANTIAL MONEY ON POWER, CHEMICALS AND HAULING COSTS WITH A NEW BIOSOLIDS PROCESS THAT REDUCES VOLUME

By Scottie Dayton

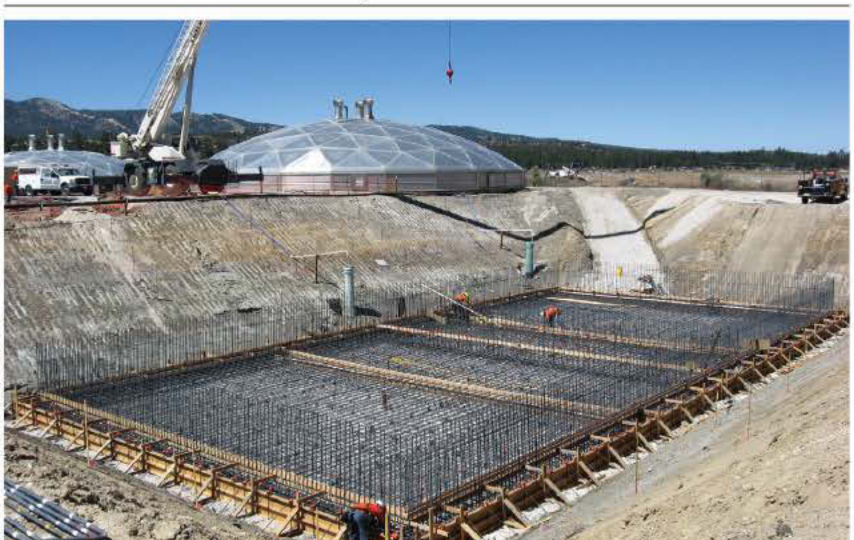
The Big Bear Area Regional Wastewater Agency in Big Bear City, Calif., generated 5,800 tons of Class B biosolids per year. The 300 trips to the landfill were on winding mountain roads that dropped 7,000 feet in elevation.

Treatment plant workers dewatered digested biosolids with a belt filter press, producing 14 percent solids cake, dried further in two drying beds. However, long winters and sometimes rainy summers affected results. From 2000 to 2010, landfill costs increased from $32 to $100 per ton.

"We were paying a lot to haul water," says plant superintendent Joe Hanford. "Reducing our biosolids volume became a major concern." Agency staff studied alternatives such as natural-gas-fired dryers to produce Class A biosolids, but they involved costly expansions.

Then they found the Cannibal solids reduction process from Siemens Water Technologies. In January 2008, Big Bear became the third plant in the state and the eighth nationwide to use the technology. In 2010, the agency produced 2,100 tons of biosolids and hauled 100 loads. In a little less than four years, the process has saved nearly $400,000.

Workers set rebar for the foundation of the bioreactor's interchange tanks, the second half of the Cannibal solids reduction process.



PHOTOS COURTESY OF W.M. LYLES CO.

Return activated sludge flows through the solids separation module in which ultra-fine mesh screens and hydrocyclones remove inert debris.

TWO-PART SYSTEM

The 4.9 mgd (design) activated sludge extended aeration treatment plant averages 2.4 mgd. After primary treatment, flows go to three oxidation ditches.

The Cannibal system has a solids separation module and bioreactor with two interchange tanks. Return activated sludge flows through the module, in which ultrafine mesh screens and hydrocyclones remove inert debris. A 7 hp motor drives the drum, and another powers the auger that compacts and dewaters the material. Screenings come out at about 30 percent solids and are landfilled.

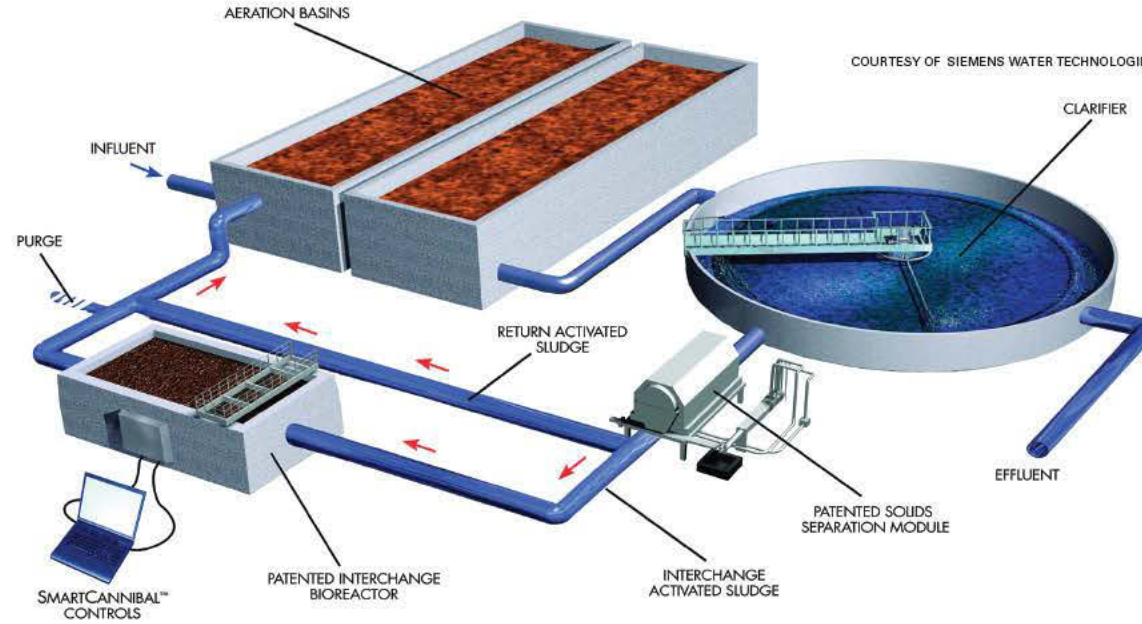
The screened sludge is pumped to either the bioreactor or to the oxidation ditches. The bioreactor, next to the building housing the separation module, creates a low oxidation reduction potential (ORP) environment. It promotes no new aerobic bacterial growth and actually destroys some microorganisms to feed the facultative bacteria, thereby reducing the solids that would normally be wasted.

Probes for ORP and pH monitor the environment. "ORP is a measurement of the liquid's ability to oxidize organic material," says Hanford. "It has a much stronger value than just measuring dissolved oxygen."

Share Your Idea

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

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



ABOVE: Steel framing goes up around the solids separation module of the Cannibal process. RIGHT: The sidestream solids reduction process reduces the cost of running the aeration blowers by lowering digested sludge yield.

THOROUGH MIXING

Each interchange tank has a floating mixer with a 30 hp motor that keeps the material in suspension. The mixers run six to eight hours per day as 4,000 pounds of screened sludge is added to the tanks. It takes 12 days for the biomass to break down. Suspended solids sensors and flow sensors monitor the mass flow rate and mixed liquor suspended solids concentrations throughout the process.

When the mixers shut off, effluent is decanted during the night and is routed by a 10 hp submersible pump to the oxidation ditches where the facultative bacteria die. From the oxidation ditches, mixed liquor returns to the separation module.

"Cycling the solids between aerobic and anaerobic bacteria destroys the material," says Hanford. "By lowering our digested sludge yield, we reduced the cost of running the aeration blowers by 10 percent and saved $4,000 per month."

The SmartCannibal system controls the plant and minimizes power usage. "The program isn't tricky to use, but it does take some thought to calculate how much to decant and how often to aerate the liquid," says Hanford. "The numbers are based on previous plant operations, so it isn't too difficult."

TRICKLE DOWN BENEFITS

The agency hired W.M. Lyles Co. to install the sidestream process. It took nine months. "We were down a couple of hours or sometimes overnight," says Hanford. "It really didn't affect the rest of our work that much."

The bioreactor will eventually need cleaning. At that time, workers will drain it to four feet and pump the sludge to the oxidation ditches. So far, the separation module has helped to reduce some maintenance tasks. "It removes the inert debris that used to plug our downstream pumps occasionally," says Hanford.

The biological process also substantially reduced the hours on the belt press and lowered polymer usage from seven 55-gallon drums per year to five. "Not using mechanical means to reduce our biosolids production is huge for us," says Hanford. "It saves a significant number of staff hours and reduces wear and tear on the equipment and vehicles." The agency calculated that the system would pay for itself in the first 10 years. tpo

"Not using mechanical means to reduce our biosolids production is huge for us. It saves a significant number of staff hours and reduces wear and tear on the equipment and vehicles."

JOE HANFORD

Water and wastewater foreman Don Lintner, left, and plant operator Kevin Nett check the secondary process at the New Holstein treatment plant. (Photography by Jim Kneiszel)

Better With Age

A STABLE PROCESS, SEQUENTIAL UPGRADES AND AN AWARD-WINNING LABORATORY PROCESS KEEP NEW HOLSTEIN'S TREATMENT PLANT ON TRACK

By Ted J. Rulseh

THE NEW HOLSTEIN (WIS.) WASTEWATER TREATMENT Plant sits humbly at the end of a gravel road on the east edge of town.

From the outside, it looks just like many 1970s-era small-community treatment plants, but what leaves the outfall daily is a source of pride to its operating team and should be to this eastern Wisconsin city of 3,300.

The plant, operated by New Holstein Utilities, has been in consistent permit compliance since 1988, and last year it received the 2011 Laboratory of the Year Award for small plants from the state Department of Natural Resources.

Camille Turcotte, DNR Environmental Science Services Section Chief, cited the plant's commitment to producing high-quality data, demonstrated by "the exceptional quality system that is in place, the organized and detailed maintenance, corrective action, and the chemical records that are maintained.

"This laboratory also analyzes more quality-control samples than required, and they use a verification system to ensure that their Discharge Monitoring Reports are always appropriately qualified," Turcotte stated.

The credit goes to water and wastewater foreman Don Lintner (named Lake Michigan District Operator of the Year by the Wisconsin Wastewater Operators Association in 2007) and plant operator Kevin Nett, who is responsible for the lab.

SIMPLE PROCESS

New Holstein lies between the 138,000-acre Lake Winnebago (a nationally known walleye fishery) and Lake Michigan. The treatment plant, 1.33 mgd design flow, 0.6 mgd average flow, discharges ultimately to Lake Michi-

"This laboratory also analyzes more quality-control samples than required, and they use a verification system to ensure that their Discharge Monitoring Reports are always appropriately qualified."

CAMILLE TURCOTTE
WISCONSIN DNR

profile New Holstein (Wis.) Wastewater Treatment Plant

BUILT:	1939 (upgrades 1953, 1973, 1989, 1997, 2001)
SERVICE AREA:	City of New Holstein
POPULATION SERVED:	3,300
FLOWS:	1.33 mgd design, 0.6 mgd average
TREATMENT LEVEL:	Secondary
TREATMENT PROCESS:	Activated sludge
RECEIVING WATER:	Jordan Creek
ANNUAL BUDGET:	$480,000
BIOSOLIDS:	Land application
WEBSITE:	www.ci.new-holstein.wi.us
GPS COORDINATES:	Latitude: 43°57'11.01"N; Longitude: 88°4'47.30"W

gan 20 miles east, via Jordan Creek (its receiving stream), Pine Creek, and the Manitowoc River.

The plant was built in 1939 with primary settling and seepage beds. An upgrade in 1953 added aeration, final clarification, and anaerobic biosolids digestion. The current facility was built in 1973. Its circular two-tank secondary treatment system has aeration basins on the periphery and final clarification in the center. There is no primary settling.

"We're like a large package plant," observes Lintner, who joined the New Holstein Utilities as an operator in 1988, became wastewater foreman in 2000, and added the water treatment plant to his responsibilities in 2010. At present, the plant operates only one semi-circular tank, leaving the other half of the circle in reserve for peak loads as needed.

Influent first passes through a Hycor fine screen (Parkson) and a Pista Grit degritter chamber (Smith & Loveless). Two raw sewage pumps (Crane Deming) with Allen-Bradley variable-frequency drives (Rockwell Automation) then lift the water to the aeration basins — there are no primary clarifiers. Ferrous chloride is added for phosphorus removal.

Rubber-membrane fine-bubble diffusers (ITT Water & Wastewater — Sanitaire) aerate the flow. Water from the final clarifiers passes directly to Jordan Creek — disinfection with chlorine gas was discontinued in 1988 when the DNR removed disinfection from the permit requirements. A SCADA system (Telemetry Process Controls) helps the plant team monitor both wastewater and water plant functions.

Biosolids undergo gravity thickening and aerobic digestion before being

Kevin Nett, left, and Don Lintner.

New Holstein Wastewater Treatment Plant
PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	200 mg/l	5 mg/l	30 mg/l weekly avg. 20 mg/l monthly avg.
TSS	150-200 mg/l	5 mg/l	30 mg/l weekly avg. 20 mg/l monthly avg.
Phosphorus	5-6 mg/l	0.5 mg/l	1.0 mg/l
pH	7.0	7.3	6-9
Dissolved oxygen	–	8-10 mg/l	4.0 mg/l

pumped to a storage lagoon to await land application on winter wheat and other farmland in autumn.

KEEPING UP

Since he came on board, Lintner has made it a point to keep improving the plant. "Our biggest challenge is age," he says. "The brick and block structures, the concrete and the tanks are beginning to show their age. We started a program a few years ago in which every couple of years we spray clear sealer on all exposed masonry and caulk the joints on the tanks."

Don Lintner pulls a final effluent sample. The New Holstein plant has won state recognition for the quality of its laboratory process.

This plaque from the Wisconsin Department of Natural Resources recognizes the New Holstein plant for having the state's Registered Laboratory of the Year for a small facility for 2011.

But Lintner and Nett — classified Grade 4 (highest) for activated sludge and laboratory among their numerous certifications — don't stop with mere maintenance. The plant has seen a series of substantial improvements, and more are being planned.

"In 1989, we installed the fine-bubble diffusers to replace surface aerators," says Lintner. "In 1997, we updated the lift station with the variable-frequency drives on the raw sewage pumps. In 2000, we built the new headworks building, remodeled the administration building, and put in the SCADA.

"In 2001, we added a new chemical room. That allowed us to move the chemical tanks and make room for a larger lab next to the office."

BEING ACCOUNTABLE

That lab helps the plant team monitor the treatment process and document performance to the DNR. Nett, who took charge of the lab in 2005, tests three times weekly for BOD, TSS, phosphorus and DO, and daily for pH. An outside laboratory handles monthly tests of biosolids and of effluent for chloride and ammonia.

"Once in a while, we run tests on septage loads if we have a suspicion that something is upsetting the process," Nett says. The plant receives about six to eight truckloads of septage or holding tank waste daily.

Lab procedures became more rigorous with 2008 changes to the state's NR 149 Laboratory Certification and Registration rules. "It's about accountability, traceability, and adherence to testing requirements," Nett says. "For example, for a given reagent, we need to record the lot number, when it was made, and when we received it. When we mix a reagent solution, we record the lot number the material came from and when it expires."

The regulation is also designed to ensure that plants follow accepted sampling methods and testing procedures. Lintner notes, "The DNR wants to make sure treatment plant lab data is defensible in case someone would raise

EYE OF THE STORM

The New Holstein Wastewater Treatment Plant faced its stiffest test in recent memory during a major rainstorm in June 2008. At the time, both aeration basins in the plant were active.

"It had been wet for quite a while before that," says plant operator Kevin Nett. "It had been raining a little bit every day. June 12-13 was the big one." Water and wastewater foreman Don Lintner scrolled back through SCADA history to reveal 4.5 inches of rain recorded on those days, following 2.7 inches on June 8.

"Our flow hit 2.3 mgd," Lintner recalls. "We shut down one of the basins to protect our solids. If it was going to rain again and flush us out, that way we would have one tank available, so that when the flow began to slow down, we would have some solids on hand and we could start treating again.

"Other than that, we didn't touch a thing. We didn't touch a pump. The influent pumps were running at 100 percent, and the wet well level was gradually rising, but it never got to the high-water alarm stage, and then the flow started to drop. Through it all, we didn't bypass, and we didn't violate our permit."

a question or file a legal action." NR 149 also requires plant lab manuals to spell out laboratory procedures in detail, so that any qualified professional could follow them to perform a plant's routine tests properly and accurately.

FLYING COLORS

In response to NR 149, Lintner and Nett took the plant's existing laboratory, forms and documentation and gave them a thorough upgrade. Lintner wrote a new draft of the manual to incorporate the new requirements and shared it with Nett for comment.

"We had taken some classes on the new regulation, and so we understood what had to be done," Lintner says.

"Kevin was really instrumental in the process and deserves credit for us receiving the award. After I wrote the draft, the two of us discussed it and he pointed out some items that were missing. I made some changes and asked Kevin to give it a final review. Then we sent it to our auditor at the DNR and got his feedback. We also got input from the Wisconsin Rural Water Association. We worked their recommendations into the final document."

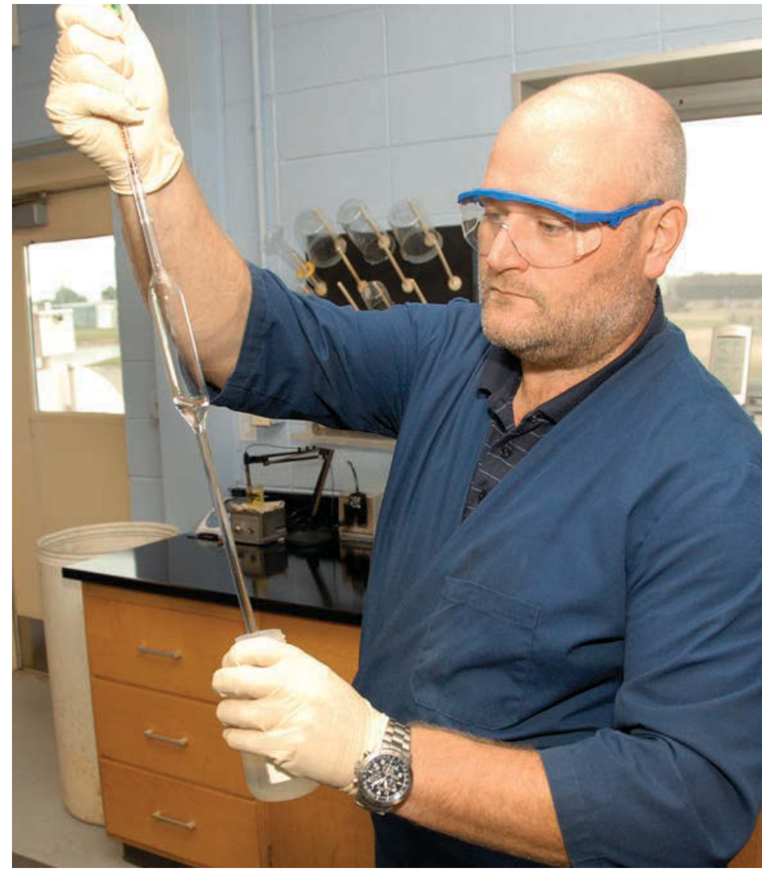
> "It's about accountability, traceability, and adherence to testing requirements. For example, for a given reagent, we need to record the lot number, when it was made, and when we received it."
>
> **KEVIN NETT**

In a lab audit by the DNR on Sept. 15, 2010, the auditor found no major deficiencies and suggested only minor changes in the manual and procedures. The manual will remain a work in progress, getting annual reviews and updates to keep its contents up to date.

LOOKING AHEAD

The entire New Holstein plant remains a work in progress. Lintner notes that a contract has already been let for a new facilities plan, and a new team member, part-time operator Nick Meurer, came on board last summer.

"We plan to redo the solids handling portion of the plant," says Lintner. "The process will remain essentially the same, but the structures and equipment are starting to show their age. We'd like to get away from the lagoon and add an aboveground storage tank." Replacement of the aeration basin blowers (1989 vintage) is also on the project list.



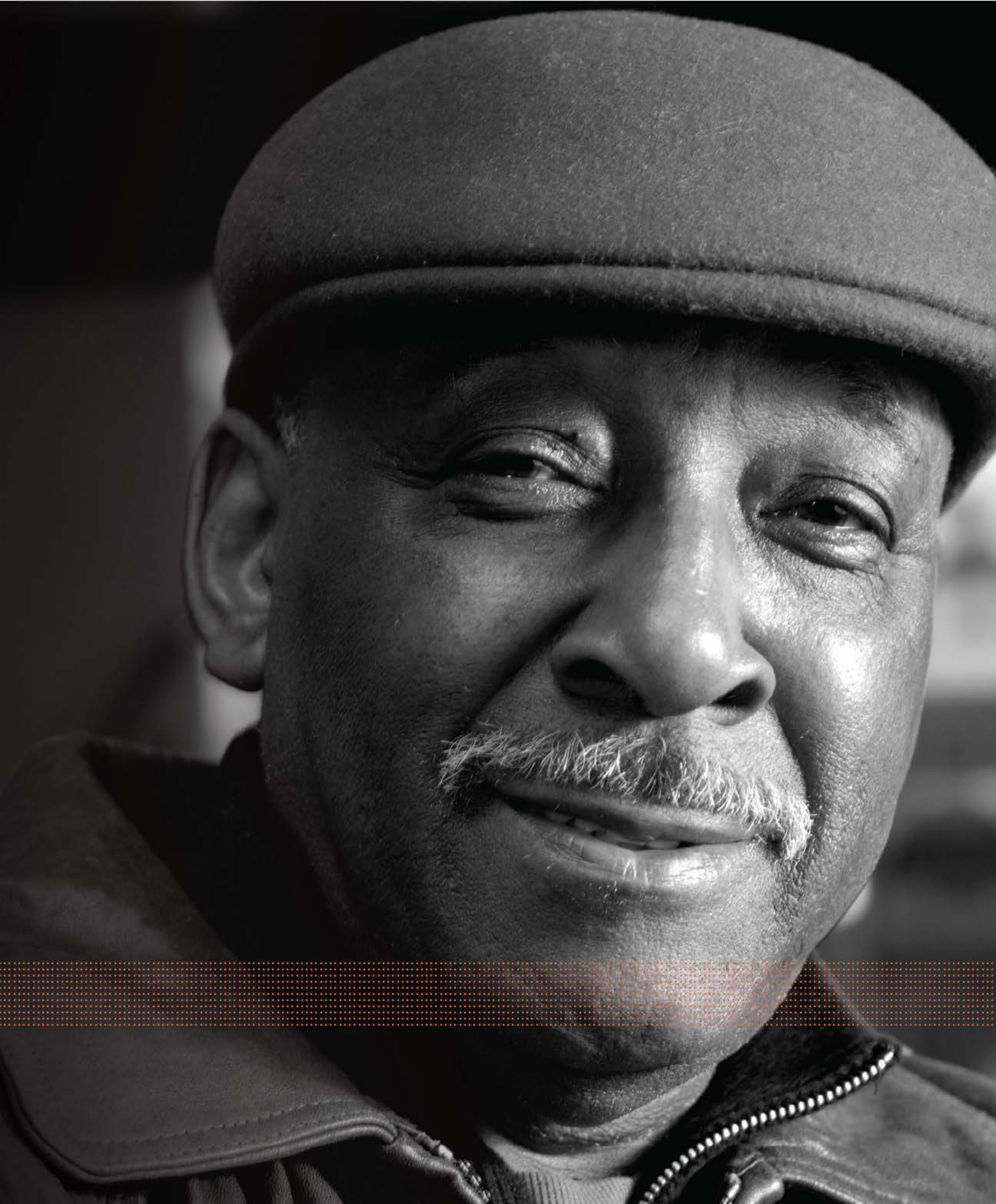
Kevin Nett prepares for a test on a water sample. Water and wastewater foreman Don Lintner credits Nett for the plant's recent award for laboratory excellence.

"Meeting the state's new phosphorus regulations down the road is a big item," Lintner says. "We are probably looking at a limit of 0.075 mg/l. I would expect to add some biological phosphorus removal in addition to our chemical removal, along with filtration of some sort.

"Under the state regulation, there are also adaptive things we can do toward meeting our requirement, such as taking a watershed approach and working with farmers downstream to increase cropland setbacks from the streams."

The plant's new permit will not take effect until 2015, so that allows time to devise workable solutions. At present, the team tests monthly samples to monitor phosphorus in Jordan Creek upstream from the plant at two points downstream: in Jordan Creek just before Pine Creek, and in Pine Creek just upstream from the Manitowoc River.

With a solid lab program in place and always with an eye toward updates and improvements, the New Holstein treatment plant team is well positioned to continue protecting water resources in its part of the Lake Michigan basin. tpo



GREENING THE PLANT

Grabbing Opportunity

BY BEING FLEXIBLE IN PROJECT PLANNING, A MASSACHUSETTS DISTRICT SAVES MORE THAN EXPECTED, FOR LESS MONEY, WITH AN AERATION UPGRADE AND SOLAR ENERGY

By Doug Day

The Charles River Pollution Control District (CRPCD) in Medway, Mass., identified a need for improved efficiency, then found a way to fill the gap and pay for a project that ended up costing $850,000.

The 30-year-old 5.7 mgd regional wastewater treatment facility had a major upgrade in 2000 when it added an anoxic selector, fine-bubble aeration, a SCADA system, and cloth disc filters. The latest improvements came after an energy audit funded by the Massachusetts Division of Energy Resources in 2008.

"They approached us to see if we were interested in participating in the Massachusetts Energy Management Pilot for Drinking Water and Wastewater Facilities," says executive director Cheri Cousens. The program has a goal of helping plants reduce energy use by 20 percent, and the Charles River project will meet or exceed that goal.

Two turbo blowers replaced three older centrifugal blowers to provide dissolved oxygen to the activated sludge process more efficiently. "We'll save on energy costs just by using a different piece of equipment," says Cousens.

"Our engineering company, CDM, recommended the smaller solar unit because we would save more power with the turbo blowers than would be produced by the larger solar project, while investing the same amount of money."

CHERI COUSENS

The Charles River Pollution Control District's regional wastewater treatment plant in Medway, Mass., was one of seven plants in the state that took part in an energy efficiency pilot project.

Two blowers replaced three less efficient centrifugal blowers, helping the plant cut its energy use by 22 percent.

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.

A 20 kW solar photovoltaic system was added to the roof of the building that houses the blowers. While it's a small solar project, it will help meet the plant's energy needs as it serves the treatment needs of Medway and three neighboring communities, while also handling septage from seven other towns.

A 20 kW solar photovoltaic installation helps meet the treament plant's electricity needs.

PHOTOS COURTESY OF THE CHARLES RIVER POLLUTION CONTROL DISTRICT

ASSESSING THE NEED

Charles River's plant was one of seven that took part in the state energy efficiency pilot program. The work started with an energy audit that found the plant spent about $454,000 a year for energy, using 2,000 Btu per gallon per day of wastewater treated. That was about 1,000 Btu below average, but still allowed for improvement.

CRPCD Energy Use by Process

PROCESS	PERCENT OF ENERGY USE
Biological Systems	61%
Raw Sewage Pumps	15%
Plant Water/Compressed Air	9%
Building Systems	6%
Secondary/RAS Pumps	5%
Primary Treatment	3%
Biosolids Thickening	1%

The study found that the plant site was also a good candidate for solar energy, but not for wind or inline hydroturbine in the outfall. The original study recommended a 120 kW photovoltaic system, but a later analysis found that the 20 kW installation would be less expensive and would free up money for the higher efficiency turbo blowers.

"Our engineering company, CDM, recommended the smaller solar unit because we would save more power with the turbo blowers than would be produced by the larger solar project, while investing the same amount of money," says Cousens. "It's better not to need the power in the first place."

In fact, the approach lowered the total cost of the equipment and installation from the estimated $1 million to the final cost of $850,000. The district used State Revolving Fund loans to pay for the work, then received 100 percent funding to repay the loans through the federal American Recovery and Reinvestment Act stimulus program.

RESULTS

The solar unit went into operation in February 2011, and the turbo blowers came online in August. In the long run, the project is expected to reduce the plant's energy bills by more than $100,000, a 22 percent savings. That exceeds the state program's goal. With the smaller solar project and the turbo blowers, it also exceeded the original estimate of a 16 percent energy savings. The efficiencies will also reduce carbon dioxide emissions by 558 tons per year.

Cousens says further savings will come with the future addition of variable-speed drives to the plant's water system. In addition, the district has already saved by bidding its electricity on the open market. Rather than paying 7.5 to 8 cents per kWh from the local utility, it is paying 6.74 cents from Hess Corporation, an east coast energy supplier.

Understanding and analyzing its energy needs helped the district improve its energy efficiency, minimize costs for customers, and reduce the treatment plant's impact on the environment. tpo

PILOT PROGRAM

The Massachusetts Department of Environmental Protection launched the Energy Management Pilot for Drinking Water and Wastewater Treatment Facilities in December 2007 along with the Executive Office of Energy & Environmental Affairs.

Seven wastewater treatment plants and seven drinking water facilities were audited for energy efficiency and renewable energy potential. The project was designed to reduce greenhouse gas emissions and energy use by 20 percent at each plant.

According to DEP, the pilot project identified $3.7 million in savings, averaging 33 percent per plant. Efficiency projects at those plants, when fully implemented, are expected to reduce energy use by more than 20 million kWh, resulting in CO_2 reductions of 17,000 tons a year. Renewable energy use will increase by 7 MW, including:

- 4.62 MW of new solar photovoltaic, a 70 percent increase in the state's solar capacity
- Up to 2.4 MW of new wind power at two wastewater treatment plants
- 140 kW of new hydroelectric power at two drinking water and one wastewater treatment plant
- 165 kW of combined heat and power that will recapture methane from wastewater sludge digestion

According to the U.S. EPA, the nation's water and wastewater plants would collectively save about $400 million a year by reducing energy use by just 10 percent.

Disinfection Dilemma

A SIMPLE LAB TEST HELPS A PLANT TEAM GET TO THE BOTTOM OF A CHLORINATION SYSTEM PROBLEM AND RESTORE ROUTINE PERMIT COMPLIANCE

By Ron Trygar, CET

Another set of bad effluent fecal coliform results. This makes four times since the new chlorine system was installed. The plant superintendent is not going to be happy about this, especially after the last council meeting where he had to explain to the commissioners the reasons for the pending consent order from the state regulators.

The treatment plant had recorded no violations in the last five years, and with the new five-stage Bardenpho system, meeting nutrient criteria was a breeze. The plant had undergone major upgrades to meet the nutrient removal standards, and part of the modification was a new chlorine disinfection system: a switch to sodium hypochlorite from 1-ton 100 percent gas/liquid containers.

WHAT IS WRONG?

The plant had used the gas from the 1-ton containers during its entire existence, going on 30 years, without a coliform violation or a chlorine-related accident or gas release. Joe, the chief operator, remembered when they used gas chlorine and life was less complicated. Now, they had all these pumps, tanks, a new open structure to house all this equipment — and coliform violations, as well. Why did they have to go with this new system, he wondered.

Joe brought up these issues at the monthly treatment plant staff meeting. His operations staff listened intently as he explained the situation between the treatment plant, the town council and the regulators.

Joe led a brainstorming session with his operators, gathering their thoughts and opinions on what might be a solution to the poor effluent disinfection. After all the more senior staff members voiced their thoughts, Joe noticed that his newest operator hadn't said a word. He asked Mary what she thought and was intrigued by her response.

A hydrometer floats in a bleach solution.

VALUABLE KNOWLEDGE

A few months ago, Mary attended a workshop provided by a state Rural Water Association to get continuing education units toward her license. The course was about using chlorine as a disinfectant and applying the alternative forms of chlorine, like calcium and sodium hypochlorite. Joe asked Mary for more details, as it seemed Mary had come away from the training with more than just some CEUs.

Figure 1: One demonstration was very simple — a hydrometer, a graduated cylinder and a reference chart.

PHOTOS COURTESY OF RON TRYGAR

Figure 2: In a second demonstration the trainer used a specially made bleach strength test kit.

During the workshop, the instructor explained how to measure the strength of the chlorine bleach solution and how bleach can lose its strength over time, especially weaker solutions in hot climates. He also noted that time played a big part in the solution losing its strength: The more it aged, the weaker it became.

The trainer performed a demonstration, describing how to measure the strength of the sodium hypochlorite solution. He had various samples of hypochlorite, and after donning eye protection and gloves, he showed the test methods. One demonstration was very simple — a graduated cylinder, a hydrometer and a reference chart (Figure 1).

The trainer poured sodium hypochlorite samples into several 1,000 ml graduated cylinders and used a special hydrometer to measure the specific gravity of each sample. He showed how to take the readings properly and to apply the readings to a small chart in an operator's handbook provided by a water and wastewater equipment supplier.

PUTTING IT TO WORK

Mary explained that it was very easy to do, but seemed like it might not be

What's Your Lab Story?

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

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

accurate enough to meet the plant's needs. In a second demonstration the trainer used a specially made bleach strength test kit (Figure 2). This method seemed much more accurate and measured the strength to the nearest tenth of a milligram.

Although close to the readings taken with the hydrometer method, the bleach strength test kit appeared more reliable. Through his lab supply vendors, Joe researched the different test methods, weighed the costs and availability, ordered a bleach strength test kit, and anxiously awaited its arrival.

A few days later, the bleach test kit had been delivered, and Joe and Mary went about testing their chlorine bleach supply. Mary had been trained in laboratory technique and was comfortable using the associated reagents and titration equipment. She set up a testing schedule and measured the bleach strength a few times per week for the next month. After that, she had some interesting results to share with the plant staff.

When a new bleach shipment arrived at the plant, its strength was exactly as advertised, 12.5 percent. However during the following few weeks, the strength dropped off dramatically, down to 8 percent in 14 days. After one month it was less than 5 percent strength as available chlorine.

MAKING CHANGES

When the plant was modified, a flow-paced chlorine feed system had been installed to control the speed of the hypochlorite pumps, but it had to be overridden often to maintain an adequate chlorine residual. The longer the hypochlorite remained in the tank, the more the feed system had to be manually adjusted. This didn't seem to be a problem during winter, but it became steadily worse as the heat of summer progressed.

Joe asked Mary to share the findings with the rest of the operations staff, and they offered ideas to prevent the sodium hypochlorite from losing strength. The team made several changes that made a major difference in the bleach feed system. They included:

- Ordering smaller quantities of bleach from the supplier, but more often
- Making a temporary shade to block the translucent hypochlorite tanks from the direct summer sun
- Installing a ventilation system to provide air movement through the hypochlorite tank and equipment structure, reducing heat

Once these modifications were made, the plant was once again in routine compliance with its operating permit. The course Mary attended was well worth the information she obtained, as well as the CEUs!

ABOUT THE AUTHOR

Ron Trygar is senior training specialist in water and wastewater at the University of Florida TREEO Center and a certified environmental trainer (CET). He can be reached at rtrygar@treeo.ufl.edu. **tpo**

Saving One Saves the Other

WATER ENVIRONMENT FEDERATION SEEKS TO BUILD INTEREST AND MOMENTUM IN THE WATER INDUSTRY FOR INNOVATION AROUND THE WATER-ENERGY NEXUS

By Ted J. Rulseh

There's a lot of talk in the water/wastewater industry about conserving energy and conserving water. But in the bigger picture, the two are intimately connected in what has come to be called the water-energy nexus.

How are they connected? Well, for example, it takes a great deal of energy to draw water from its source, treat it for drinking, distribute it to the population, then collect it as wastewater and treat it again for discharge back to the environment. And on the flip side, it takes enormous amounts of water to produce energy: Big electric power plants use water for process cooling.

Leaders of the Water Environment Federation see the water-energy nexus as a place for the industry to engage and achieve major progress toward optimizing the use of both resources. WEF held a conference on the topic in August in Chicago that drew a diverse audience of 371 professionals.

Jeff Eger, WEF executive director, and Matt Ries, WEF managing director of technical and educational programs, talked about the water-energy nexus and its implications in an interview with *Treatment Plant Operator*.

tpo: What is driving the federation's interest in the water-energy nexus?

Eger: The bulk of our membership consists of utilities and professionals involved in utility management. For utilities, energy is one of the largest costs, usually second only to labor. The extraction, pumping, conveyance, and treatment of water and wastewater consume a great deal of energy.

We don't often look at the other side — water is integral to the production of energy. They are linked together. There is one example in New York where the discharge from a wastewater treatment plant is being pumped under the Hudson River to a power plant for cooling, so as not to be using water from the river for that purpose.

"It's clear that partnerships will be key to education, training and advocacy on this issue."

MATT RIES

And of course there is potential for energy production from wastewater itself — biogas, combined heat and power, pelletized biosolids for incineration, micro-hydro power. And then there is another byproduct — fats, oils and grease. Can we find an effective way to create biodiesel from that material? There is a plethora of opportunities on both sides for the energy and water industries to be smarter, more efficient and more effective.

tpo: WEF has stated that there is potential for wastewater treatment plants to be net energy producers. Is that actually feasible?

Jeff Eger

Matt Ries

Ries: At our conference in Chicago, it was exciting to see the paradigm shift toward the concept of wastewater not being a waste but a resource. Maybe mainstream is too strong a word, but this concept is definitely becoming more accepted by utilities, consultants and engineers.

We had some case studies presented at the conference. The Strauss Wastewater Treatment Plant in Austria has been a net energy producer for several years. Here in the U.S., the East Bay Municipal Utility District in the San Francisco Bay area has stated plans to be a net zero energy facility next year.

We also had a case study of the Johnstown-Gloversville plant in upstate New York, which produces about 95 percent of its own energy. It's actually a regulatory hurdle that is keeping them from producing 100 percent. There are actually people out there doing this, and others have pledged to do it. It's an exciting trend we're seeing.

tpo: How does a plant become a net energy producer or achieve net zero energy? Is it through biogas utilization or through other measures like on-site wind and solar power?

Ries: Generally speaking, it's done by first looking at energy efficiency to conserve, and then looking at generation through optimizing the capture of digester gas and using that gas to offset electric power needs. In the case of East Bay, they are bringing in materials from the industry and adding them to their digesters to maximize gas production.

Digester gas is the first place treatment plants are looking, but renewables such as solar and wind are becoming more common. You combine high efficiency with the production of energy, and that's how you can approach net zero. It's still a long way off for most plants today, but we now have some real-world case studies to show that it can work.

tpo: How has the Strauss plant become a net energy producer?

"Digester gas is the first place treatment plants are looking, but renewables such as solar and wind are becoming more common. You also have to look at energy efficiency."

MATT RIES

Ries: The Water Environment Research Foundation is doing a benchmarking study on that plant now. They are producing up to 120 percent of their electricity needs on site from biogas.

It's not just technology. It's also a philosophy among the plant operators and management to focus on efficient operation and energy capture and production. They have a vision of sustainability and what it means to them.

Significantly, they have a highly educated and well-paid workforce. The operators have been trained in how to identify energy savings and efficient operating practices. You need the right kind of operators to do what they are doing. They are empowered to take risks, and that has helped them to get where they are.

tpo: How did the Chicago conference on water and energy come about?

Ries: It goes back to a 2008 conference we held, Green Practices for the Water Environment. It had parallel tracks on energy and climate change, stormwater and green infrastructure, and sustainable watersheds. As these topics grew in stature and as more people became interested, we decided to break these topics out. For 2011, we focused on energy. It seems we got the timing right — there was a real buzz among the participants.

tpo: How would you describe the makeup of the audience?

Ries: We were pleased to see that it was quite diverse. We had quite a few utilities represented and a number of consultants. We had a good number of academics who were doing research on the topic, as well as students and a few regulators, including representatives from the U.S. EPA.

There were also several presenters from outside North America and a couple of people I would call thought leaders, people thinking outside the fenceline of a treatment plant, looking at how we could integrate a city's energy and water resources and what role a water and wastewater utility would play.

Eger: When our staff came back, one comment was that people were there whom we hadn't seen before. That says a lot — that this is of interest to a lot of people, including new people who are trying to figure out how to get engaged on the topic.

tpo: What will WEF do going forward on the water-energy nexus?

Eger: We'll look at other annual activities. We had a varied energy program track at WEFTEC last October. At our Residuals and Biosolids Specialty Conference, we'll make sure that we include some components on energy. We want to continue to drive innovation, and we see this as a very ripe area for connecting the entrepreneurs and innovators with end users.

tpo: Will WEF be looking to form partnerships around this issue?

Ries: Yes. We are working with the Consortium for Energy Efficiency on energy conservation audit tools. They are an organization that works with some state energy authorities, and they have a group that deals specifically with water and wastewater utilities. The American Council for an Energy Efficient Economy has developed a blueprint for energy and water legislation, and we have worked with them also. It's clear that partnerships will be key to education, training and advocacy on this issue. We will be part of broad coalition of organizations and companies working on this.

Eger: On the advocacy side, sometimes regulatory hurdles are in the way of progress. We want to be a voice with Congress and the EPA to address those issues and remedy them as much as possible. Money is also a key issue. In my previous position with Sanitary District No. 1 in Kentucky, we had studies showing that we could become a net producer of energy, but because of aging infrastructure and Clean Water Act requirements, there wasn't enough capital to get us there.

tpo: Will WEF promote any specific technologies, innovations, or behaviors as part of this effort?

Ries: We just started a partnership with a group called Imagine H2O, which sponsors a Water-Energy Nexus Prize. Two of their prizewinners presented at our Chicago conference. One thing we are doing to encourage innovation is looking at how to get wastewater and biosolids defined as renewable resources and so make them eligible for tax credits and other incentives. We think that will help to encourage the use of those resources and encourage innovation in that area.

tpo: Do you see WEF Member Associations as partners in this endeavor?

Ries: We are encouraging closer ties between all the WEF committees and the Member Association committees. A number of committees, subcommittees and task forces have formed around energy topics. We have an energy task force that investigates a broad variety of initiatives. Through our Sustainability Community in Practice, we are working to coordinate all these efforts. As part of that we want to reach out to our Member Associations. The communication goes both ways. We want to let them know what we're doing at WEF, but we also want to learn from them.

"Operators are the frontline professionals. They are the source of ideas on how we really gain efficiency and productivity. They are very key to our efforts to be more efficient and be more mindful of how we can do better as we move into the future."

JEFF EGER

tpo: We've talked a lot about energy. What about avenues for more efficiency on the water side?

Ries: The answer from the wastewater side is to expand the concept of water reuse — treating water for its ultimate purpose. For flushing toilets, watering lawns and washing cars, we don't need potable water. There's an energy impact to that. If you're only treating to the point necessary for usage, you're not using as much energy. If your utility has a fairly comprehensive reuse program, you are offsetting potable water that otherwise needs to be treated and extracted.

tpo: What is the role of plant operators and operating management with respect to the water-energy nexus?

Eger: They are the frontline professionals. They are the source of ideas on how we really gain efficiency and productivity. They have the working knowledge and the experience in the operation of our plants. They are very key to our efforts to be more efficient and be more mindful on how we can do better as we move into the future. **tpo**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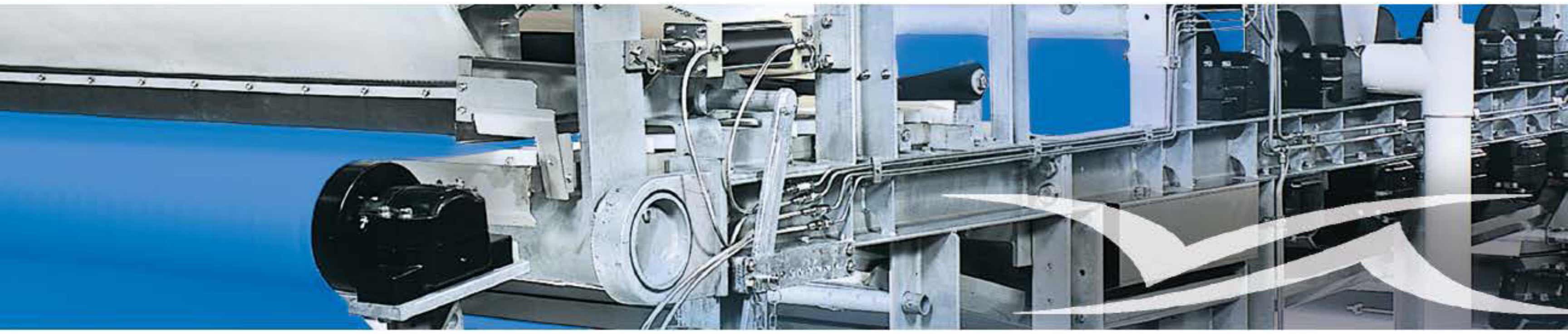

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Energy Management and Sustainability

By Briana Jones

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Endura Series high-efficiency motors from Aqua-Aerobic Systems provide lower maintenance costs and a longer production life for Aqua-Jet surface aerators and AquaDDM direct-drive mixers. Each unit is vibration tested and hydraulically designed. The NEMA 841 certified motors require no greasing and limited maintenance and draw few kilowatts on electrical systems. **800/940-5008; www.aqua-aerobic.com.**

DISC DIFFUSERS


Fine-bubble disc diffusers from Atlantic Blowers

Fine-bubble disc diffusers with integrated check valve from Atlantic Blowers are made of ABS plastic and EPDM (ethylene propylene diene monomer). The membrane has perforated "I" slits in a dispersion pattern. The chemical- and age-resistant materials protect the diffusers from harsh environments. The check valve design prevents backflow, while the unit offers extended lifespan and high oxygen transfer rate. **214/233-0280; www.atlanticblowers.com.**

OIL-FREE BLOWER


ZB 5-120 blower from Atlas Copco

The ZB 5-120 oil-free blower with variable-speed drive from Atlas Copco uses airfoil bearing technology for high-energy efficiency. The blower delivers 100 percent oil-free air according to ISO standard 8573-1 and eliminates oil contamination. The airfoil bearings allow friction-free flotation of the high-speed rotor. **866/472-1013; www.efficiencyblowers.com.**

HARMONIC FILTERS


Low Pass Harmonic Filters from Arteche Power Quality

Low Pass Harmonic Filters from Arteche Power Quality provide harmonic reduction for single or multiple variable-frequency drives, reducing motor temperature and improving power system efficiency. The filters offer low THD-I and THD-V for any operating condition (0-100 percent load). Standard filters (type KS) maintain 5 percent THD-I across the entire operating range from 0 to 100 percent load. The units are available from 200 to 690 volts and up to 60 Hz. Equipment is available in various NEMA-rated enclosures or as an open-type. A wide range of horsepower/ampere ratings is available. **262/754-3883; www.artechepq.com.**

VALVELESS PUMPS


Rotary lobe pumps from Boerger

Rotary lobe pumps from Boerger are valveless, self-priming, positive displacement pumps that use a timing gear and steel, stainless steel, or Teflon rotors with no preferred direction. The maintenance-in-place design allows quick and convenient replacement of all fluid-wetted parts without removing the pipe or drive unit components. The DPL-size double-acting mechanical seal is designed for pumping hazardous and viscous materials. **612/435-7300; www.boerger.com.**

ADJUSTABLE-SPEED DRIVES


Adjustable-speed drives from DSI Dynamatic

DSI Dynamatic adjustable-speed drives are built to outlast variable-speed drives by 6:1 in pumps, blowers and centrifuges, according to the manufacturer. The drives deliver low ownership cost with 50 to 60 percent lower capital cost than medium-voltage VFDs. The drives feature digital controls for new installations compatible with all brands of eddy-current drives and eddy-current drive upgrades. The controls are 70 percent smaller than comparable medium-voltage VFDs, saving space and reducing installation costs. The drives have an electromagnetic clutch design that is unaffected by fluctuations in power quality, and use less than 1 percent of the power to the motor to achieve greater efficiency. **800/548-2169; www.drivesourceusa.com.**

MAGNETIC BLOWER


Revolution blower from Hoffman & Lamson

The Revolution blower from Hoffman & Lamson is capable of flows from 2,500 to 8,500 cfm and pressures from 3 to 15 psig. The blower uses active magnetic smart bearing technology, surge control technology, high-efficiency permanent magnet motor, integrated human machine interface and programmable logic controller, and current source inverter variable-frequency drive. The entire system is factory prewired and tested in a sound enclosure. The unit offers increased reliability with no maintenance, no contaminating or flammable lubricants, and sound reduction. **800/682-9868; www.hoffmanandlamson.com.**

HIGH AMMONIA MBBR


ANITA Mox reactor from Kruger USA

The ANITA Mox from Kruger USA is a moving bed biofilm reactor (MBBR) solution for high ammonia concentrations (500-1,000 mg/l). The unit removes nitrogen from sidestreams with 40 percent of the aeration demand of conventional nitrification and without supplemental carbon addition, saving costs and reducing ammonia load and load swings. A continuous control method creates the necessary conditions for ammonia oxidizing bacteria and anammox bacteria to operate simultaneously in the biofilm of a single-stage reactor. **919/677-8310; www.krugerusa.com.**

DRY PIT MOTORS


Dry pit motors from KSB

High-efficiency dry pit submersible motors from KSB range from 6.5 to 10 hp and meet IE2 requirements. Made for dry pit installations, the motors can also be used in wet well installations when the pumps need to run at low liquid levels for extended periods. With 25 percent more copper per kW drive rating, heat loss in the stator windings and squirrel cage of the rotors is reduced. Loss of friction and magnetic reversal losses are also reduced. Available with 4 and 6 poles, the motors comply with NEMA MG1 part 31 requirements. **804/222-1818; www.ksbusa.com.**

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Flygt N Pump from ITT Water and Wastewater

ITT Water and Wastewater offers the Flygt N Pump with a self-cleaning impeller design that provides a flow path through the pump, greatly reducing clogging from solid objects such as stringy, fibrous material and trash. **704/409-9700; www.ittwww.com.**

POWDER COAT PUMPS

mRoy series pumps from Milton Roy

Milton Roy's mRoy series pumps have an advanced powder coat system for extreme durability in harsh conditions. The pumps offer a compact design with a 30-year design life drive, 96,000-hour diaphragm design life and capacities between 0.4 and 17 gph with turndown flexibility. **877/786-7298; www.miltonroy-americas.com.**

SELF-PRIMING VALVELESS PUMPS


NETZSCH Tornado rotary lobe pumps

NETZSCH Tornado rotary lobe pumps are positive displacement, self-priming, valveless units offering high performance, reliability, and maintenance in place. They are designed for intermittent or continuous operation, provide gentle pumping, and are suited to transfer, process and dosing applications.

The pumps offer high reliability through NETZSCH Gearbox Security System Technology, which provides a positive separation between the pump head/product seals and the pump gearbox to eliminate gearbox contamination in case of seal failure. Compact construction permits a small installation and maintenance envelope. Pump capabilities include high suction lift, flows up to 4,400 gpm, differential pressures up to 85 psi, dry running, and reverse flow. **610/363-8010; www.netzschusa.com.**

LED LIGHT


SAFR11 LED light from Rig-A-Lite

The SAFR11 LED light from Rig-A-Lite is designed to save energy in hazardous and corrosive environments. Ratings and approvals include: Class 1, Division 2 Groups A, B, C & D; CUL; wet locations; UL 1598A marine outside type; UL 844 hazardous locations; UL8750 LED safety; NEMA 3R, 4X; and IP66. Designed to operate for a minimum of five years with no maintenance, the LED offers 60,000 hours of rated lamp life at 78.1 lumens per watt. At 100 watts, it can replace up to a 250-watt metal halide or high-pressure sodium fixture. The unit is available in different globes that eliminate glare. **713/943-0340; www.rigalite.com.**

INTERTIE PROTECTION RELAY


SEL-700GT relay from Schweitzer Engineering Laboratories

The SEL-700GT intertie protection relay from Schweitzer Engineering Laboratories provides complete intertie protection for distributed generation for peak-demand shaving. Optional synchronous generator protection and synchronization automatically adjust generator voltage, speed, and phase angle to match line voltage. Suited for temperatures from -40 to 185 degrees F, the device closes the breaker when synchronized. **509/332-1890; www.selinc.com.**

HIGH-EFFICIENCY BLOWERS


Power Mixer blowers from Spencer Turbine

Power Mixer multistage cast centrifugal blowers from Spencer Turbine provide high-efficiency air delivery. The aerodynamic cast components provide smoother airflow from blower inlet to discharge. The blowers offer pressures to 28 psig, volumes to 35,000 icfm and power to 3,700 bhp. A complete dissolved oxygen (DO) control including programmed master control panel is combined with direct airflow PLC programmed control logic. The system includes variable-frequency drive blowers with automated speed adjustment in response to DO changes plus DO probe, gauges and instruments. **800/232-4321; www.spencerturbine.com.**

SMART CONTROL PANEL


ECO SMART STATION control panel from SJE-Rhombus

The ECO SMART STATION control panel from SJE-Rhombus offers energy-efficient pump control in municipal lift station applications. The unit, housed in the ARC ARMOR enclosure, features a microprocessor-based controller with color touchscreen HMI, data storage and communication technology. I-Link provides cellular-based remote monitoring and

(continued)

reporting. The pre-engineered control panel is available in 29 models, from 10 to 100 hp. **888/342-5753; www.ecosmartpanel.com.**


Conventional generators from Subaru

EX GENERATORS

Conventional generators from Subaru feature the latest models of EX series overhead cam engines. Available models include the RGX5100, RGX7100 and RGX7800. The RGX5100 is powered by the 10 hp EX30, delivers 5,000 watts and offers 8.3 hours of operation. Powered by the 12 horsepower EX35, the RGX7100 delivers a maximum output of 7,100 watts and provides 8.3 hours of operation. The RGX7800 is powered by the EX40, delivers 7,800 watts and provides 7.5 hours of operation.

All models are available with a recoil or electric starting system. A high surge capacity allows the generators to take on up to 150 percent of the rated power for as long as 20 seconds. Each unit houses a large zinc-plated steel fuel tank and durable electric components that feature copper windings with high temperature insulation. Standard features include automatic idle control, hour meter, low oil level sensor and shut-off, and low-tone muffler. **800/277-6246; www.robinamerica.com.**

ROTOR TECHNOLOGY


Smart Conveying Technology (SCT) from seepex

Smart Conveying Technology (SCT) from seepex includes separable rotor and stator segments. Rotor geometry can be changed over using a plug-in connection with no need to dismantle the suction casing, suction pipe or rotor-sided joint. The smart rotor can only be used in conjunction with the smart stator (SST); it is available for new pumps and as a retrofit for all SST ranges.

The technology includes a two-part pluggable rotor comprising rotor and rotor head. For clockwise pumps, the rotor is axially secured in the rotor head using a locking plate. Torque is transferred using the pin and fork principle. The torque transfer area is protected from penetration by an O-ring. Rotor geometry corresponds to 6LS geometry, and the size of the entire SRT unit (rotor plus rotor head) corresponds to the standard SST rotor. **937/864-7150; www.seepex.com.**


iQpump controller from Yaskawa America

PUMP CONTROLLER

The iQpump controller from Yaskawa America automatically adjusts pump operating conditions as the process variables change while maintaining optimum pump performance and protection. It can replace existing mechanical pump systems using throttling valves, bypass valves or other means of flow control to improve regulation and save energy. It is available from 5 to 500 hp.

The unit is configurable for simplex, duplex or triplex applications and was designed to control typical pumping applications that require systems to regulate constant pressure, constant flow or variable flow/pressure. **800/927-5292; www.yaskawa.com.** tpo

By Scottie Dayton

Rotary lobe compressor cuts costs

Problem

Personnel at the Town of Huntington (N.Y.) Wastewater Treatment Plant were troubled by the energy requirements of three 125 hp blowers powering aerators with variable-frequency drives in the two 1.5-million-gallon sequencing batch reactors. Supervisor John Pavlik looked at various blower manufacturer proposals.

Solution

G.A. Fleet Associates in Harrison, N.Y., suggested a side-by-side test with one of the older blowers and a **Delta Hybrid rotary lobe compressor made in Germany by Aerzener Maschinenfabrik GmbH and distributed by Aerzen USA.** The belt-driven unit combines the packaging principles of Aerzen rotary lobe blowers with screw compressor technologies for volume flows of 400 to 2,000 cfm. Low-pressure (3 to 5 psi) units use a 3+3 twisted rotor (supercharger) profile, while a 3+4 compressor rotor profile is used for higher pressures (up to 22 psi). The compressor is matched to the required pressure range for optimum efficiency.

RESULT

Four times per day, staff took readings and checked blower temperatures and pressures. "For the first few days, we questioned if we were monitoring the meters correctly because the numbers shocked us," says Pavlik. "They showed a 28 to 29 percent kW reduction, a 30 percent peak demand reduction, and a 45-degree temperature difference between the two units. Replacing the three original blowers will save us $56,000 to $58,000 in electricity per year, not including labor and materials." **610/517-0758; www.aerzenusa.com.**

Combined heat and power saves money

Problem

In 2007, the City of Oceanside, Calif., looked for a partner to build, own, and operate a biogas-fired cogeneration plant at the San Luis Rey Water Reclamation Facility.

Solution

CHP Clean Energy won the bid with the BioSpark system that conditions biogas before it enters the prime mover. A 30- by 55-foot building replaced the methane flares and houses the combined heat and power system. Engineers chose a modified Guascor reciprocating engine. The electrical interconnect is in the CHP structure. The gas treatment system's scalable technology focused on removing moisture, hydrogen sulfide, and siloxanes.

RESULT

The system enabled operators to maintain the reciprocating engine on a schedule consistent with a natural gas cogeneration facility. The city, participating in a power purchase agreement for the delivery of discounted electricity and heat, expects savings of $350,000 to $500,000 annually. **978/621-0421; www.chpcleanenergy.com.**

Dissolved oxygen probe improves control

Problem

Operators at the Bristol-Myers Squibb plant in East Syracuse, N.Y., manually measured dissolved oxygen in the aeration tanks because the treatment process operates at 112 degrees F, and the maximum operating temperature for online DO monitors is 105 degrees F. Without a way to constantly measure DO, the aeration blowers ran more than was necessary.

Solution

Hach Company engineers recommended the LDO sensors to provide continuous DO readings. When combined with automated variable-frequency drives, the sensors can control aeration blowers on a closed control loop in direct response to DO measurements. The units use 99 percent accurate luminescent technology and operate in water at 122 degrees F. They require no calibration for a year and almost no maintenance.

RESULT

The upgrade enabled the plant to use almost 75 percent less power and recoup the cost of sensors in less than a year. **800/227-4224; www.hach.com.**

Heat exchangers stop clogging and baking

Problem

Holes in three tube-in-tube heat exchangers at the Stanely Street Wastewater Treatment Plant in Niagara City, Ont., affected the heating of sludge with hot water. Heat exchanger replacements would have to fit through a 5-foot-square hatch in the roof, then be rolled down a long, winding corridor.

Solution

The facility bought rectangular-channeled **heat exchangers from DDI Heat Exchangers** to handle viscous material. The nonblock design has 3-inch gaps to prevent sludge blockage and no spacers for both liquids. The 3-feet-per-second flow prevents baking, while creating more turbulence for better heat transfer.

Although the units have a small footprint, their larger circumference reduces the need for macerators. A full door makes it easy to clean them every few years. DDI added a hoist bar to the exchangers for lowering them down the hatch with a crane, and rollers for maneuvering them into position.

RESULT

The heat exchangers are operating as specified. **514/696-7961; www.ddi-heatexchangers.com.**

Air bearing turbo blowers use less power

Problem

The 3 mgd Festus/Crystal City Sewage Treatment Plant in Festus, Mo., spent $42,000 in five years to fix three 100 hp positive displacement blowers.

Solution

Engineers from **HSI Blowers recommended replacing the existing blowers with two HSI 75 hp high-speed turbo units** producing 1,300 cfm/7.5 psi. The pre-engineered systems include compressor, motor, variable-speed motor starter, pressure relief valve, expansion joint, and control cabinet.

Impellers at both ends of a common shaft counterbalance and eliminate axial thrust load, stress, and twisting. Individually layered air bearings support the shaft. As the shaft rotates, the bearings float friction free on a film of air. The compact, lightweight unit requires no special foundation support or overhead cranes to access.

RESULT

The units use 40 percent less power than the original blowers, enabling the plant to receive an energy rebate from its electric provider and realize a payback in two to three years. **713/947-1623; www.hsiblowers.com.**

Peristaltic pumps increase energy efficiency

Problem

To comply with a U.S. EPA consent order, the City of Nashua, N.H., built a 60 mgd wet-weather treatment facility to receive overflows from its 50 mgd wastewater treatment plant. The new facility needed hose pumps to dose sodium hypochlorite tube pumps to meter sodium bisulfate.

Solution

The engineering consultant selected **two LPP-D peristaltic hose pumps and four LPP-M peristaltic tube pumps from Flowrox.** A single bearing-mounted roller in the hose pumps presses the hose once per 360-degree cycle, producing the maximum flow per revolution. The roller, mounted on a crankshaft, creates eccentric rotation to eliminate friction and lower energy consumption.

The flow rate of the tube pumps is unaffected by discharge pressure variations. Positive displacement of the tube bore with zero slip provides the same output volume on every cycle. The compression point of the tube acts as a self-cleaning check valve, providing a clear flow path with no possibility for vapor lock.

RESULT

After two years of constant operation, the pumps continue to run with no downtime. **410/636-2250; www.flowrox.com.**

(continued)

Rotary lobe pump cuts rebuilds

Problem

Three operators at the Wyoming Valley Sanitary Authority in Wilkes-Barre, Pa., spent three days per quarter rebuilding three progressive cavity sludge pumps. Annual maintenance for each pump cost $24,000 to $32,000. The authority needed a way to save money and reduce labor.

Solution

The authority installed an **SL133 500 rpm rotary lobe pump from LobePro** on a trial basis. Handling 665 gpm/125 psi, the compact, positive displacement unit pumped sludge with greater than 3 percent solids. As fluid enters the suction side of the pump, it fills the cavities between the lobes, then travels around the casing and is forced out the discharge port. Because of the operation design, the pump rarely ragged and could be run dry for a time without damage.

RESULT

Operators inspected the pump monthly. After four months, they reported no change in performance or wear and installed the pump permanently. It ran continuously for 15 months before the first rebuild, costing less than $4,000. "We're getting four to five times the service life over the screw pump," says superintendent Mike Jacobs. "And our lead mechanic can rebuild the pump in three hours because he can replace the four-wing lobes, seals, and wear plates without removing the piping or pump." **888/997-7867; www.lobepro.com.**

Biological activity enhancer aids digestion

Problem

The 5.5 mgd Landis Sewerage Authority in Vineland, N.J., struggled to increase methane gas production in the anaerobic digesters to maximize performance and energy savings. The combined heat and power unit ran at 32 percent electrical efficiency and 53 percent thermal efficiency.

Solution

By adding **BAE, a natural digestion-enhancing peat extract from Prodex, a JSH company,** the authority increased its average daily methane production by more than 28 percent from the previous year. The liquid biostimulant enhances BOD and TSS removal, improves sludge settling, eliminates FOG, and reduces solids handling.

RESULT

The authority increased methane gas production by 28 percent and boosted the generator's performance from 85 percent capacity to maximum design capacity of 95 to 98 percent, realizing a yearly savings of $78,739 with a reduced loan payback period of 5.4 months. The U.S. EPA honored the authority with its Energy Star CHP Award. **856/234-4540; www.prodexproducts.com.**

Speed reducers boost reliability

Problem

Outdated speed reducers on settling tank collector drives at the City of Los Angeles (Calif.) Department of Public Works Bureau of Sanitation experienced high-speed pinion failures and other related problems.

Solution

The utility replaced six of the drives with **Cyclo Bevel Buddybox speed reducers from Sumitomo.** The shaft-mounted, right-angle units have cycloidal speed reduction input and spiral bevel gearbox output. The compact, modular design provides high-torque density with multiple-output speed and torque combinations. The Taper-Grip bushing, a keyless device integrated into the reducer, provides self-aligning, backlash-free torque transmission to the driven shaft. The utility also purchased a self-aligning NEMA C-face adapter to replace the existing motor scoop arrangement.

RESULT

The utility will replace the remaining drives with speed reducers in the next phase of their retrofit. **800/762-9256; www.smcyclo.com.**

Light fixture retrofit saves dollars

Problem

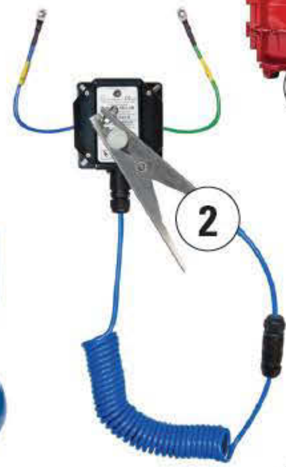
The Henkel industrial wastewater treatment plant in Puerto Rico used sixteen 250-watt high-pressure sodium bulbs to light the tank and walkways. The lighting system was inefficient. Maintenance manager Edgar Agront wanted better illumination and a lower electric bill.

Solution

In a pilot project, **Dialight Corp. installed a dozen 100-watt SafeSite LED fixtures.** They lit up the area while reducing energy consumption by 75 percent, resulting in an annual savings of almost $3,500.

RESULT

"The LED lighting looks brighter and more natural — a lot less yellow," says Agront. "People thought we had added more light when we actually reduced the fixtures by one quarter. We'll also save on maintenance costs because the fixtures should last 10 years." **732/919-3119; www.dialight.com.** tpo



1. WASTEQUIP INTRODUCES COMPACTOR

The Super Energy Efficient, 4-yard, self-contained compactor from Wastequip holds up to 24 bags of trash. Powered by the Super E Series cool running motor, the compactor features a real-time monitor that enables operators to see what is in the charge box or chute. The control system offers additional safety features, including dual Watch Dog timers that prevent unintended continuous operation along with an automatic maintenance scheduler (AMS) to alert operators when routine maintenance is due. **877/468-9278; www.wastequip.com.**

2. NEWSON GALE OFFERS AREA GROUNDING SYSTEM

The Earth-Rite TELLUS II hazardous area static grounding system from Newson Gales Inc. provides constantly verified static ground monitoring for drums, IBCs and other mobile or portable equipment during hazardous area operations. The system is suitable for use in the handling, transporting or mixing of combustible products, liquid or dry. A green flashing LED confirms a positive connection to ground and provides a pair of output contacts for interlock with pumps, valves or other control or alarm devices. **732/961-7610; www.newson-gale.com.**

3. KSB INTRODUCES AMAREX SUBMERSIBLE PUMP

The Amarex N submersible pump from KSB is available in eight models to fit a variety of wastewater and sludge treatment applications, including fluids containing long fibers and solid substances, fluids containing gas/air, raw, activated or digested sludge, drainage or water extraction. Grinder pumps with a 2-inch discharge feature an S-type impeller to macerate and grind solids, while Vortex pumps feature an F-type impeller with discharge sizes ranging from 2 to 4 inches. **804/222-1818; www.ksbusa.com.**

4. HAYWARD INTRODUCES ELECTRIC ACTUATORS

EPZ series industrial electric actuators from Hayward Flow Control are available in two sizes. The EPZ-6 has a torque output of 55 in-lb/6 Nm and the EPZ-15 has an output of 135 in-lb/15 Nm. Both sizes are non-spring return with NEMA 4/4X enclosures and ISO5211 F03/F05 mounting patterns. Other features include on/off jog control, aluminum dry powder coated housing, therma Class F motor protection, manual override and additional power supply flexibility (24 VAC, 120 VAC or 230 VA). **888/429-4635; www.haywardflowcontrol.com.**

5. ROTEX INTRODUCES BLINDING CONTROL SYSTEM

The ULTRASONEX blinding control system from ROTEX Global minimizes mesh blinding and bridging when screening difficult or sticky materials. Using ultrasonic frequency, the system enables powders to pass through screens, providing higher throughput, finer screen separation and longer mesh life. Available in 110 or 220 volts with touch-panel controls, the system is ATEX approved for use within potentially explosive gaseous or industry environments. **513/541-1236; www.rotex.com.**

6. DETCON OFFERS WIRELESS TRANSCEIVER

The Model RXT-300 SmartWireless transceiver from Detcon offers network stability, security and reliability. Using direct sequence spread spectrum, every device in the network is capable of functioning as a router and repeater for all other devices in the network. Subscribers can "hop" through neighboring devices and route around congestion and RF line-of-sight obstacles to communicate. The RXT-300 operates at 2.4 GHz and is able to transmit signal data from 4-20 mA DC or serial Modbus inputs. **888/367-4286; www.detcon.com.**

7. DUST CONTROL INTRODUCES LONG-THROW EVAPORATOR

The DBE-1000 long-throw evaporator from Dust Control Technology

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is designed to dissipate excess water in large areas. The unit features Teflon spiral nozzles for efficient droplet dispersal, minimal fouling and clogging. It can launch mist up to 200 feet and achieve evaporation rates up to 75 percent, with averages of 25 to 65 percent. Standard configuration includes a 25 hp motor wired for three-phase, 480-volt, 60-cycle service or three-phase, 400-volt, 50-cycle power. The stainless steel manifold is designed for a flow rate of 66 gpm and water pressure of 100 psi. **800/707-2204; www.driboss.com.**

8. McCROMETER INTRODUCES MC PROPELLER FLOWMETER

Mc Propeller flowmeters from McCrometer feature UltraShield technology bearing assemblies for added protection against sand, grit and debris. The meters include a lid spring and optional canopy boot or digital register designed to protect against water intrusion and harsh operating conditions. **800/220-2279; www.mccrometer.com.**

9. ITW OFFERS WEARING COMPOUND

DFense Blok Quick Patch bead-filled wear and abrasion epoxy from ITW Devcon is formulated for emergency repairs to processing equipment, even in severe conditions. With a working time of four minutes and 30-minute cure time, the patch can repair holes, leaks and cracks, as well as protect against wear, abrasion and corrosion. The nonsagging alumina ceramic bead-filled epoxy can be used at thicknesses up to 1 inch on vertical surfaces and 3/4 inch on overhead surfaces. Available in a 1-pound container, it can be used for repairing, rebuilding and protecting slurry pumps, pipe elbows, scrubbers, pulverizers, cyclones, fan blades, screw conveyors, chutes and hoppers. **800/933-8266; www.devcon.com.**

10. GORE INTRODUCES HIGH-RESILIENCE TUBING

STA-PURE Style 400 pump tubing from W.L. Gore & Associates features a VITON fluoroelastomer composite with reinforcement technology, enabling the tube to last more than 50 times longer than standard peristaltic pump tubing. Designed for use in high-pressure and solvent-based dosing applications, the tubing can operate at burst pressures in excess of 300 psi, continuous pressures up to 60 psi and intermittent pressures up to 100 psi. **410/392-4100; www.gore.com/industrialtubing.**

11. ENVIRONETICS OFFERS CUSTOM TANK COVERS

Defender tank covers from Environetics Inc. are custom manufactured from industrial grade materials to fit the profile of new or existing wastewater treatment or potable water tanks. The odor-control covers contain volatile organic compounds, while the low-profile, structurally supported covers minimize emission treatment volume to reduce the cost of air filtration equipment. **815/838-8331; www.environeticsinc.com.**

12. PATTERSON OFFERS PUMP LEVELING DEVICE

The laser large coordinate measuring device from Patterson Pump Co. is designed for the installation and final alignment of heavy-duty centrifugal pumps, pump basins, discharge heads, motor stands and gear stands. The laser tracking device enables technicians to lock in coordinate positions on the baseplate with the centerline of the piping to ensure level positioning. **706/886-2101; www.pattersonpumps.com.**

product spotlight

Auger Conveyor Adds Disposal Flexibility

By Ed Wodalski

Auger conveyor from Duperon

The auger conveyor from Duperon offers increased site flexibility with the ability to navigate up to 90-degree turns within 90 inches over distances of up to 40 feet. The system accepts screenings from multiple inputs and can move them from hard-to-reach locations at rates up to 18 cubic feet per hour.

"One of the key features of the equipment is its flexibility," says Beth Bauer, marketing technician. "What we found in a lot of treatment plants is that they had really small spaces, and that provided some constraints when they wanted to do some discharge." The modular conveyors are site specific and less than five feet long. They can be installed through a standard door opening. The unit's legs are adjustable from 26 to 48 inches.

The system's 8-inch-diameter auger is constructed of abrasion- and wear-resistant ultrahigh modular weight (UHMW) plastic that is flexible to prevent jamming and bridging. It can convey grit and debris up to 5.5 inches in diameter, around corners and into an otherwise inaccessible roll-off container, eliminating traditional and maintenance-heavy transport methods such as barrels, buckets and tubs.

"Depending on the configuration of the plant, the unit can accept multiple screens," says Bauer. "So instead of having to buy two or three separate pieces of equipment, you can have one fluid system."

The 220-volt system (188 watts) powers a 1/4 hp motor that is sealed for long life. The integral motor and gearbox require little maintenance, although a quarterly inspection is recommended to ensure nothing has passed through that might have bent a component. "Our main goal for the operator is to try to reduce maintenance time and worry about small things in the plant," says Bauer. "It's all about making life easier." **800/383-8479; www.duperon.com.**

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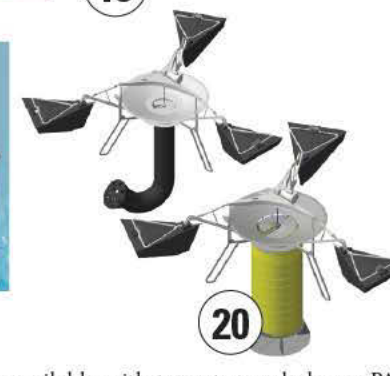

13. SEL INTRODUCES FLEXIBLE PLC SYSTEM

The SEL-2240 Axion control system from Schweitzer Engineering Laboratories Inc. provides a high-density, highly configurable modular RTU and programmable logic controller (PLC) system. Users can build a system with up to six units, or nodes, connected in a network using EtherCAT protocol. Each node can accommodate 10 modules, including a processor module, one or two power supplies and a user-determined mix of input/output modules. **509/332-1890; www.selinc.com.**

14. ENDRESS+HAUSER INTRODUCES TWO-WIRE FLOWMETER

The Promass E 200 Coriolis flowmeter from Endress+Hauser features two-wire 4-20 mA HART technology with full 16 mA of measurement span without the need for excess adapters, power supplies or barriers. The meter can be used with DCS, PAS, PLC and other remotely operated control system. It simultaneously measures mass flow, fluid density and temperature. **888/363-7377; www.us.endress.com.**

15. LARSON INTRODUCES LED WITH MAGNET MOUNT

The Magnalight LED 10W-6R-HT light from Larson Electronics LLC features a combined handle and magnetic mounting system. The light produces 5,400 lumens and is capable of throwing a light beam over 600 feet in length, yet uses half the electrical power of a comparable incandescent lamp. Designed for rugged usage, the light can run on any voltage from 9 to 50 VDC. **800/369-6671; www.magnalight.com.**

16. AIRMASTER INTRODUCES ENERGY-SAVING AERATOR

The Turbo X-Treme aerator from Airmaster Aerator is designed to provide maximum aeration while using minimal energy. Powered by a 25 hp motor, the aerator features a turbo blower for high-capacity water movement with maximum aeration and mixing in the discharge manifold. Made of stainless steel, the aerator is built for long-term operation. **888/813-3680; www.airmasteraerator.com.**

17. RIG-A-LITE INTRODUCES EMERGENCY LIGHTING FIXTURES

The HLEL series of emergency lighting fixtures from Rig-A-Lite feature a fiberglass-reinforced gray polyester housing for use in hazardous indoor environments, including oil and gas production and wastewater treatment plants. The lights are available with tungsten or halogen PAR 36 lamp heads in multiple wattages with an optional shatter-resistant shield. **713/943-0340; www.rigalite.com.**

18. PHOENIX CONTACT OFFERS INDUSTRIAL PC

The VL BPC MINI embedded box PC from Phoenix Contact has an operating range of -40 to 149 degrees F. The Valueline Mini BPC family features a fanless design in a compact, DIN rail-mountable package. The line is based on specially selected Intel Atom CPUs that consume less energy and produce less heat. The wide temperature model uses the Intel Atom Z510PT processor (1.1 GHz). Interfaces include six USB 2.0 ports, one VGA port and one RS232/422/485 port. **800/888-7388; www.phoenixcontact.com/perfectfit.**

19. KOCH INTRODUCES MBR FILTRATION MODULE

The PURON PSH1800 membrane bioreactor filtration module from Koch Membrane Systems Inc. features central aeration and a single header design that deliver 1,800 square meters in a 1.75-meter by 2.42-meter footprint. **888/677-5624; www.kochmembrane.com.**

20. SOLARBEE INTRODUCES GRID-POWERED MIXERS

Grid-powered wastewater mixers from SolarBee Inc. provide thorough mixing in partial- and total-mix systems and activated sludge basins with available utility power. Four GF models are available, providing a choice of single- or three-phase power and a choice of intake designs and mixing capacity. GF 5000 models provide mixing capacity up to 5,000 gpm with a j-hook intake design for maximum adjustment in fluctuating water levels. GF 10000 models are designed for applications with mixing requirements up to 10,000 gpm and have a straight intake design. Multiple units can be placed to meet capacity needs. **866/437-8076; www.solarbee.com.**

NEPTUNE INTRODUCES SERIES F MIXERS

Series F Mixers from Neptune Mixer Co., a division of Neptune Chemical Pump Co., can be inserted into the 2-inch bung of a standard 55-gallon steel drum and clamped to the drum lip for mixing water-like solutions. Features include a folding propeller that can be inserted into the bung and opens to a diameter of 3 3/4 inches with a mixing speed of 1,750 rpms. Mixers are available in four models with 1/4 to 1/2 hp ratings. **215/699-8700; www.neptune1.com.** tpo

Assmann Tanks Receive NSF Certification

Assmann Corp.'s high-density crosslink resin tanks received NSF 61 certification for chemical storage. The tanks are available in 40- to 12,000-gallon capacities.

Peerless Raises $60,000 for Riley Hospital's Camp

Employees, suppliers, customers, family and friends of Peerless Pump Co. raised more than $60,000 for Riley Hospital's camp for children at the 12th Annual Camp Riley Golf Outing.

Opto 22, eSight Energy Form Partnership

Opto 22 and eSight Energy have integrated their respective offerings, enabling Opto 22 to expand its portfolio of energy management software platforms that can communicate with and present energy data gathered by the OptoEMU sensor. eSight is a Web-based energy management and analysis suite that interfaces with the OptoEMU sensor, enabling customers to connect to metering devices, electrical panels, machines and equipment.

Pump Solutions Opens Singapore Office

Pump Solutions Group opened a regional office in Singapore. The office will primarily operate as a competency center to assist in marketing all PSG brands in Asia, as well as distributor training.

Thompson Pump Names Regional Representatives

Thompson Pump and Manufacturing Co. Inc. named Gajeske Inc., Best Line Equipment and Power Equipment Co. as regional sales, rental and service representatives. Gajeske has locations across Texas. Best Line is headquartered in State College, Pa., and Power Equipment has locations in Colorado, Wyoming and New Mexico.

RedZone Receives $25 Million ABS Investment

RedZone Robotics Inc., designer and manufacturer of wastewater inspection technologies and related analytical solutions for municipalities, received a $25 million investment from ABS Capital Partners Inc. RedZone will use the funds to expand its product set and geographic reach. As a result of the financing, ABS Capital general partners Bobby Goswami and Laura Witt will join RedZone's board of directors.

Itron, Tantalus Form Partnership

Itron Inc. and Tantalus Systems Corp. have partnered to deliver smart metering and smart grid benefits to electric and multiservice public utilities. The collaboration combines Itron's SENTINEL and CENTRON electricity meters as well as its gas and water ERT modules with Tantalus' communications network, TUNet.

Danfoss Breaks Ground on Logistics Facility

Danfoss broke ground in August on its new logistics facility in Loves Park, Ill. The 100,000-square-foot building, home to the company's drive division, adds manufacturing capacity and provides room for receiving, shipping and warehouse operations.

Godwin Opens Branches in Indiana, Ohio

Godwin Pumps opened locations in Cincinnati, Ohio, and Indianapolis and Evansville, Ind., to better serve the Midwest market. The new branches will be equipped with Godwin's range of Dri-Prime pumps as well as Flygt's electric submersible pumps.

Larox Flowsys Changes Name to Flowrox

Larox Flowsys Inc., headquartered in Lappeenranta, Finland, changed its name and branding to Flowrox, following the acquisition of parent company Larox by Outotec. The pump and valve supplier was not included in the transaction and continues to operate as an independent company. tpo

tpo CLASSIFIED ADVERTISING

DECEMBER

CONSULTING/ENGINEERING

Meuth Systems Precision water leak detection services for utility districts across Texas. Residential testing within 75 miles of Austin. Phone: 512-450-4992. (o-01)

DEWATERING

BUY - SELL - LEASE - TRADE: Clarifiers, Filter Presses, Belt Presses, Vacuum Filters, Filter Cloth, Dewatering Bags, Tanks, Mixers and more! Call Waste Treatment Equipment Specialties at 440-808-8844. **www.wescoequip.com.** (P12)

2007 Lely Maximizer & 2002 Hydrotower trash screening units. Both in great shape and used little. Lely: $25,000. Hydrotower: $8,000. $30,000 for both! 802-524-7013, ask for Paul or Justin. VT. (P01)

16 yd. dewatering box, works fine, has had some modifications, can be unloaded from back by bobcat. Has $1,500 lid that works great. Paid over 20 k for it. $8,000 OBO. 520-744-9282. (P12)

DEWATERING

6-YD. DEWATERING BOX: Stainless steel interior in excellent condition. Comes with or without 8-ton hydraulic dump trailer. $7,000 dewatering box only; $5,000 trailer only, or both for $10,000. Save $2,000. Call 910-738-5311, NC. (P12C01)

EDUCATION

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

WASTEWATER TRANSFER

FOR SALE: 75,000 gpd wastewater treatment plant. Fully functioning & in excellent condition. Aeration treatment method. Includes all nec. parts (3 tanks, 2 aeration zones, 1 digester, 1 chlorine tank). Complete blueprints. Available for inspection. Contact Andy Freyre at 786-295-8613 or email andy@commodorerealty.com. (o-12) worth noting

people/awards

ITT Corp.'s Water and Wastewater Group received the 2011 Innovative Technology Award from the Water Environment Federation.

The **City of South Lyon (Mich.) Clean Water Plant** received the 2011 Wastewater Utility of the Year Award from the Michigan Rural Water Association.

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

Georgia

The Georgia Association of Water Professionals has a Backflow Prevention Specialty Workshop in Marietta on Dec. 13. Visit www.gawponline.org.

Michigan

The Michigan Water Environment Association has a Wastewater Administrators seminar in Frankenmuth Jan. 19-20. Visit www.mi-wea.org.

North Carolina

The North Carolina American Water Works Association & Water Environment Association has these courses:

- Dec. 1 – Customer Relations, Statesville
- Dec. 13 – Safety, Wrightsville Beach

Visit www.ncsafewater.org.

CALENDAR OF EVENTS

Jan. 22-25
New England Water Environment Association Annual Conference and Exhibition, Boston Marriott Copley Place Hotel, Boston. Visit www.newea.org.

Jan. 30-Feb. 2
Water Environment Federation Utility Management Conference 2012, Hyatt Regency Miami. Call 703/684-2441 or visit www.wef.org.

Feb. 5-8
New York Water Environment Association Annual Conference and Exhibition, New York Marriott Marquis. Visit www.nywea.org.

Feb. 27-March 1
Pumper & Cleaner Environmental Expo International, Indiana Convention Center, Indianapolis. Call 866/933-2653 or visit www.pumpershow.com.

Ohio

The Ohio Water Environment Association has a Biosolids Workshop on Dec. 8. Visit www.ohiowea.org.

Texas

The Texas Water Utilities Association has a Distribution course in Waco on Dec. 13. Visit www.twua.org.

The Water Environment Association of Texas has a course on Renewable Energy, Energy Efficiency and Best Practices in Austin on Dec. 1. Visit www.weat.org.

Wisconsin

The Wisconsin Department of Natural Resources is offering these courses:

- Dec. 8 – Wastewater Treatment Systems Overview, Valders
- Feb. 1-2 – Ponds and Lagoons: Introduction and Advanced, Fennimore
- Feb. 6-10 – General Wastewater Treatment: Introduction and Advanced, Madison
- Feb. 21-22 – Anaerobic Digestion: Introduction, Burlington
- Feb. 23 – Anaerobic Digestion: Advanced, Burlington
- Feb. 27-29 – General Wastewater Treatment: Introduction and Advanced, Green Bay

Visit www.dnr.state.wi.us.

The University of Wisconsin Department of Engineering-Professional Development has a Sanitary Sewer and Collection System Engineering seminar in Madison Dec. 6-8. Visit www.epdweb.engr.wisc.edu. **tpo**

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


KRÜGER
Bottling Energy