**TREATMENT PLANT OPERATOR** 

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#### CLARIFICATION

An article in the March 2012 issue of Treatment Plant Operator about UV disinfection of water from combined sewer overflows (CSOs) was similar to an article that had appeared in the October 2011 issue of Water Environment & Technology magazine, published by the Water Environment Federation. The same article was submitted by an equipment manufacturer to both magazines. Although it was edited differently in each case, the basic subject matter and illustrations were the same. We regret that this occurred, as it is the policy of TPO to publish only articles that have not previously appeared in other magazines in the wastewater field.

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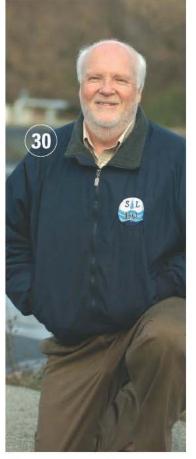
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#### on the cover

On more than one occasion, sewer users in Allenstown and Pembroke, N.H., have been able to keep money in their pockets because wastewater treatment plant superintendent Dana Clement helped develop a cost-effective solution to a problem Clement heads the team at the Allenstown Wastewater Treatment Facility. (Photography by Jeff Dachowski)



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### It's Important!

A NATIONAL MAGAZINE RANKED WATER AND WASTEWATER OPERATIONS AMONG THE NATION'S TEN MOST ESSENTIAL JOBS. THE QUESTION IS: WHY SHOULD THAT SURPRISE ANYONE?

By Ted J. Rulseh, Editor



few months ago none other than *Reader's Digest* magazine listed water and wastewater operators among "10 Top Jobs Americans Can't Live Without."

And not only did they place the profession in the top 10 — they ranked it Number 2. It's rare, maybe even unprecedented, for those who work in the field to get such highprofile recognition in a consumer magazine. The ranking appeared in January (www.rd.com/slideshows/ 10-jobs-americans-cant-live-without) in the Money section of the magazine's online edition.

Now consider the context in which the water professions appeared. Ours was perhaps the least predict-

able career to be mentioned. As one might expect, the list included police, firefighters, power plant operators, electric line workers, air traffic controllers, and telecommunications workers. Registered nurses ranked Number 1.

#### WHY THE SURPRISE?

And then right there at Number 2 were water and wastewater professionals. To those of us in and around the industry, such a ranking just seems intuitive. But if you asked everyday citizens to list the top 10 most essential jobs, how many do you think would have named water-related occupations?

Probably not many. And so the logical follow-on question is: Why? Clearly part of the answer is that people in the water professions don't "blow their own horns." That humble attitude is perhaps most characteristic of the wastewater side.

This low-profile approach is no one's "fault" — the professions tend to attract people who are simply intent on doing a great job and who don't necessarily care about recognition. But recognition becomes important in these times of fiscal austerity — the public has a say over where money gets spent, and they will support spending it in the areas they consider the most essential.

So perhaps it's time to be more "in your face" with the public about why clean water and the water professions are so indispensable.

#### **RAISING THE PROFILE**

What can your organization do to give your customers the message: We are important and you cannot - quite literally - live without us? One place to start would be for every single clean-water agency to post a link to that Reader's Digest article on its website or Web page. Or in case the article is taken down, as it will be in time, to post a summary of it for permanent display.

Next, perhaps it's time to get beyond a "just the facts, ma'am" approach to describing the treatment plant and sewer system. A typical Web page or brochure goes something like this:

"The Any City Wastewater Treatment Plant began operations in 1980 and cost \$17 million. It has seven departments with 43 employees ... it is monitored 24 hours per day and treats 23.5 million gallons of wastewater per day ... wastewater from homes and industry enters the plant through a 54-inch pipe nearly 23 feet below the ground ... the plant uses a combination of processes to achieve the required degree of treatment ..."

All good information, yes, but does it convey the essential fact about what the plant is for, what the people who work there do, and why the average person should care?

#### ANOTHER APPROACH?

Suppose that instead we started with an affirmative statement about why the plant matters: "The Any City Clean Water Plant is essential to protecting public health in our community and to sustaining water quality in the Pine River for recreation and fish and wildlife habitat ..."

And suppose that treatment agencies seized every opportunity to tell the community about their plants' and their team members' achievements? How about press releases, website items and social media postings like these:

"On June 30, the Any City Clean Water Plant marked five years of uninterrupted compliance with its permit from the state Department of Natural Resources, consistently producing treated water cleaner than the water in the Pine River ...."

"Susan Smith, plant superintendent at the Any City Clean Water Plant, attended the 2011 WEFTEC conference hosted by the Water Environment Federation. There she networked with 12,000 other clean-water professionals, learning new ways to treat water and improve water quality in the Pine River ..."

Perhaps it's less about the number of messages than about the attitude. It's time to kiss the low profile goodbye and speak affirmatively about what the clean water profession does - in terms that connect with things the public cares about.

"Alex Davis, operator at the Any City Clean Water Plant, has earned his Class 4 operator's license from the state Department of Natural Resources. Class 4 is the highest available level of licensing and encompasses four years of work experience and a combined 240 hours of study on established and new techniques for producing clean water to protect public health and the environment."

#### GETTING THE MESSAGE

Perhaps it's less about the number of messages than about the attitude. It's time to kiss the low profile goodbye and speak affirmatively about what the clean water profession does - in terms that connect with things the public cares about.

Do it often enough and with sufficient conviction and perhaps there will come a day when a magazine lists water professionals as among the most essential, and the general public reaction is, "I knew that." the

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# **Educational Entertainment**

THE CENTRAL MARIN (CALIF.) SANITATION AGENCY JOINS EFFORTS WITH FIVE OTHER LOCAL AGENCIES TO CREATE CROWD-PLEASING EDUCATION PROGRAMS

#### By Briana Jones

orking together is nothing new for the Wastewater Treatment Agencies of Marin County, Calif.

Central Marin Sanitation Agency coordinates education programs for itself and five other agencies, including Las Gallinas Valley Sanitary District, Novato Sanitary District, Sausalito-Marin City Sanitary District, Tiburon-Belvedere Sanitary District and Sewerage Agency of Southern Marin.

Six wastewater treatment plants serve all of Marin County, home to about 250,000 people. "We have a memorandum of understanding between the six wastewater agencies," says Robert Cole, environmental services manager for Central Marin Sanitation Agency. "It forms the Wastewater Treatment Agencies of Marin County Public Education Program. Our agency administers the program, so we schedule all the events, handle all the performers, handle all the reporting requirements, and schedule all the meetings."

The six agencies are members of Sav-R-Bay, an award-winning public awareness and environmental education program dedicated to protecting San Francisco Bay.



In the Captain Polluto puppet show, "The Scientist" explains how pipes connect homes to the wastewater treatment plant and that rain goes untreated down storm drains.

#### WHAT IS EDUTAINMENT?

Central Marin offers a variety of education outlets to teach kids about wastewater treatment. "Edutain-

ment is educational entertainment," says Cole. "We wanted to come up with a program for educating school-age children in grades K-5. We also have a high school program. And we wanted to be entertaining, something that the students would want to see."

Edutainment has something for everyone. It includes puppet shows, magicians, juggling, and much more. "In 1998, we produced a script, hired a magician and produced Abracadabra It's Water," says Cole. "That was in the 1999-2000 school year.

"Abracadabra It's Water is all about water. It rains in the clouds, produces stormwater, goes into reservoirs, and becomes drinking water. Then people use that water in their homes and it goes through the sewers and becomes wastewater. Finally it gets treated and goes back into the bay, and through evaporation it goes back to the clouds and becomes rain. It's the whole water cycle."

The magic show was the first education program created by the agencies to bring interactive learning to public schools in the area. "Magic happens in the wastewater treatment plant where they clean the water," says Cole. "Poof! Out would come a glass of water from his hat and it's clear again."

Next in the edutainment lineup was Where Does It Go? (now called Go With the Flow), for grades 3-5.

Doug Nolan juggles a toilet seat and what should not go down the toilet in the Go With The Flow show.

#### 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@tpo mag.com or call 877/953-3301.





This juggling show includes performer Doug Nolan of Rock Steady Juggling who teaches the importance of keeping water clean by juggling objects that can or should not go down the drain. "His show in incredible. Incredibly expensive, but incredibly effective," says Cole. "All the classes wanted it. It was always sold out."

Strictly about wastewater, Captain Polluto is for grades K-2. Joe and Ronna Leon, owners of Caterpillar Puppets, created this show specifically for the Wastewater Treatment Agencies of Marin County.

Puppets tell the story of how Captain Polluto arrives on Earth, but refuses to drink the water because on his planet water is so polluted it is poison. The story explains how the agencies handle water to keep it clean.

"It starts in the schools because that's where children learn things, and they take it home to their parents. They say, 'Mom and dad, you can't put that down the drain.'"

#### MANAGING FUNDS

The Wastewater Treatment Agencies of Marin County receive \$75,000 annually for the education programs. "We're lucky because we have the funding, and in order to have the funding you have six wastewater treatment plants coming together, sharing the costs," says Cole.

"It's nice having a joint program because you have the availability of staffing, funding and more ideas coming together for new programs. It's very successful."

The entertainment is free for the schools. "We produce a list of all the schools in Marin County from the state Office of Education," Cole says. "We were doing all the advertising, but it got to be too much. So we turned that over to the performers. And they don't get paid unless they book a show. Let me tell you, they book shows. They book as many shows as Doug Nolan and The Sippy Cups perform to several thousand people at the Marin County Fair main stage in a show about wastewater treatment and pollution prevention.

they possibly can. They'll be much more aggressive doing it themselves rather than us doing it."

Marin County has found a way to incorporate entertainment into the classroom to teach a topic that is increasingly important. Cole says: "It starts in the schools because that's where children learn things, and they take it home to their parents. They say, 'Mom and dad, you can't put that down the drain.'" **tpu** 

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# Get 'Em Early, *Train Em Right*

A HIGHLY STRUCTURED INTERNSHIP PROGRAM CREATES A READY PIPELINE OF QUALIFIED OPERATORS FOR A CONNECTICUT WASTEWATER TREATMENT PLANT

By Doug Day

#### BRYNE EWAN WAS JUST 16 YEARS OLD. KEITH BROWNE

says it saved his life. For Francisco Franco Villa, English was a second language. Ben North was a college student looking for a challenge. All four now have good careers in the wastewater treatment field because of an internship program at the Thomas E. Piacenti Regional Water Pollution Control Facility in New London, Conn.

When the New London Pollution Control Authority signed a 10-year, \$59 million contract with Veolia Water North America to operate and manage its

wastewater and water systems in March 2008, the agreement required an intern program that would provide a source of staffing, along with educational and employment opportunities for people in the community.

Working with the city, Veolia Water has focused on mentoring and training, during which some candidates have discovered a passion for the environmental services field. The program also benefits team members at the plant, who see it as an opportunity to pass their knowledge on to the younger generation. "We looked at the workforce and could predict a regular turnover over the next five years. We use the internship program as a feeder to replace operators who leave." **PETE VETTER**  The team at the Thomas E. Piacenti Regional Water Pollution Control Facility includes, from left, project manager Pete Vetter, assistant project manager Ben North, operator Bryne Ewan, field service technician Brian Nixon, interns Kevin Tryon and Drew Cannon, operator Francisco Franco Villa, collection and distribution technician Alex Poulicakos, operator Jon Beers, maintenance technician Keith Browne, and operator Cory Law. (Photography by Vincent Scarano)

# profile

#### Thomas E. Piacenti Regional Water Pollution Control Facility, New London, Conn.

BUILT:	1950s (with several expansions and upgrades since construction)
AREA SERVED:	New London, Waterford, parts of East Lime
CUSTOMERS SERVED:	40,000 (wastewater)
FLOWS:	10 mgd design, 8.5 mgd average
TREATMENT LEVEL:	Advanced secondary
TREATMENT PROCESS:	Modified Ludzack-Ettinger (MLE)
RECEIVING WATER:	Thames River
BIOSOLIDS:	Incineration off-site
GPS COORDINATES:	Latitude: 41°20'34.89"N; longitude: 72°5'48.35"W

"The contract requires us to have two interns for 180 days every year," explains Pete Vetter, project manager in New London for Veolia. "We looked at the workforce and could predict a regular turnover over the next five years. We use the internship program as a feeder to replace operators who leave."

THE DE

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Veolia has 35 employees in New London handling everything from plant operations, water distribution and wastewater collection to meter reading, maintenance and customer service. Openings are filled from within, and the wastewater plant is the starting point for all new hires. "If we have a retire-

Interns Kevin Tryon, left, and Drew Cannon.



#### **MEET THE INTERNS**

"We have such a diverse contract with New London that there are a lot of opportunities," says Pete Vetter, project manager in New London for Veolia Water North America.

While all the interns start in the wastewater treatment plant, they have gone on to a variety of positions with Veolia. "We have one guy on a road crew installing water mains and sewers and servicing fire hydrants," says Vetter.

"Another manages the metering program. We have several who are operators, one who is a junior manager, one working at a helicopter factory. It's nice to see them find something that fits their personalities and their talents."

### New London Interns Still Working for Veolia

VIERIV YEAK	CORRENT POSITION
2008	Assistant project manager, Redding, Conn.
2009	Maintenance technician II, New London
2009	Operator I, New London
s 2009	Utility worker I, New London
2009	Operator I, Veolia Sikorsky Helicopter project, Stratford, Conn.
la 2010	Operator I, New London
2010	Operator I, New London
2010	Operator I, New London
2011	Field technician II, New London
2011	In internship program
2011	In internship program
	2008 2009 2009 2009 2009 2009 2009 2010 2010



Project manager Pete Vetter, left, and operator Bryne Ewan inspect the chlorine contact basin.



The Thomas E. Piacenti Regional Water Pollution Control Facility is designed for 10 mgd.

ment or anyone moving up anywhere in the organization, it creates an opening at the wastewater plant," says Vetter. "The logic of the intern program is to have qualified, trained people ready to fill those openings."

#### IT'S WORKING

The original New London wastewater treatment facility was built in the 1950s as a primary treatment plant. It was upgraded to secondary treatment in 1977. The plant has undergone further upgrades in the 1990s, including the addition of a third secondary clarifier and an odor-control system. The secondary process is designed to provide biological nutrient removal (BNR).

Secondary treatment is provided by a Modified Ludzack-Ettinger (MLE) process, consisting of two parallel trains of an anoxic zone and aeration zone, with internal recycle capable of four times forward flow in each train. Three secondary clarifiers are followed by disinfection with sodium hypochlorite before release to the Thames River.

The intern program plays a significant role in keeping the plant running and in compliance. Besides the two current interns, 13 people have been

"I have a 15-month-old son now, and without this I don't know where I'd be. Besides gaining a bunch of friends, family and a good career, I've gained a lot of knowledge about the industry and I've learned how important our job is. It saved my life."

#### **KEITH BROWNE**

selected for the program since 2008, and Veolia ultimately hired nine of them. The other four left early in the process when it was clear that it was not an appropriate career choice for them. "Wastewater is something you like to do or you don't," says Vetter. "It's not a match for some people and we generally find that out within a few weeks."

Interns are required to enroll in some sort of schooling. "We've had some going to a local trade school, some pursuing master's degrees, and some enrolled in a local community college," says Vetter. "We make their work schedule flexible to accommodate their school schedule."

The normal shift is 7:30 a.m. to 3:30 p.m. Monday through Friday. Interns who have classes during the day will work before and after class — whatever it takes to gain experience — while still completing their education.

Bryne Ewan's situation required even more flexibility, since he had just finished his junior year at a local technical high school when he joined the program. "He would come here about two days a week for two or three hours and would be in high school the rest of the time," says Vetter. "He worked full time in the summer to complete the internship."

Ewan was planning to go to college to study environmental science, but financial circumstances caused him to defer his education. "So we hired him," says Vetter. "He's the youngest employee in Veolia. He's 17 years old now, running his own shift, and he's one of our real successes. Right out of high school, he has a solid job, and as a full-time employee, he can receive Veolia's tuition reimbursement benefits.

Ewan says his science teacher knew Vetter at the plant and recommended he check out the intern program. "We had learned about wastewater treatment in class," he says, "so I already had a bit of a background in it."

#### GETTING EXPERIENCE

Ben North was the program's first intern in July 2008. There were no openings in New London when he completed the program, but Veolia hired him for projects in other locations, including one with some management responsibilities, until a position opened.

"He ran our second shift for a year while going to college during the day," says Vetter. Veolia then selected him for a position in Redding, Conn. "He has accelerated his career extremely quickly, and he became an assistant project manager after only twoand-a-half years in the industry," says Vetter.

When he became an intern, North was in college for environmental engineering. "I was interested in the environment, making a difference and cleaning it up, but I didn't really know how to do it," recalls North, who is still pursuing his degree. "The intern program opened a door to a career path I knew nothing about."

It provided knowledge and skills and something else employers are looking for — experience. "If you

can't be hired due to lack of experience, how are you ever going to get that experience?" North says. "It takes somebody to take you under their wing and show you the way."

#### MAKING A COMEBACK

Keith Browne, now in a maintenance position, says his job has given him valuable experience on the business side of the industry. "I'd like to keep moving up, and ideally I would like to be a project manager or a trouble-



#### **CONSERVING CHLORINE**

All interns at the Thomas E. Piacenti Regional Water Pollution Control Facility are assigned a special project to go along with their daily duties. "I encourage them to find a problem in the plant that they'd like to help solve," says Veolia Water North America project manager Pete Vetter, who oversees the company's operations in New London.

Intern Bryne Ewan, a 16-year-old senior in high school, noticed that the plant used more chlorine in summer than in winter. So Vetter asked him to find out why. "I did tests to see how sunshine effected chlorine use," says Ewan.

Using 5-gallon buckets of water, one covered and one uncovered, he found that the uncovered bucket had depleted levels of chlorine. "The uncovered water had a big decrease in chlorine levels versus the covered bucket," he says. "It varied a little depending on the weather, but the average difference was 16 percent."

That result got Vetter's interest. "So we did a full-size evaluation by stretching a tarp across the chlorine contact basin," he recalls. "We found that chlorine use went down." The idea will be evaluated further this summer, when a permanent cover is installed over half the chlorine contact area. Vetter expects to see some savings on chemicals, and the \$5,000 cost of the cover, which will later be extended across the entire area, can be further justified because it will prevent algae buildup in the contact basin.

While the main goal of such projects is to see how the interns can think on their own and develop an idea, Vetter hopes to get some benefit from their work. "Ben North's project improved the plant's denitrification system," he says. "And here was a 16-year-old presenting a strategy to people who have been in the business for 30 years — and we're accepting his ideas." shooter for the company, traveling to different plants and helping with their problems," he says.

Vetter says all the interns have similar success stories, though Browne's had a different beginning. He came to the plant with a troubled background, but Veolia took a chance. "We interviewed him and he seemed like a great kid, so we offered him an internship," recalls Vetter.

Browne says, "I have a 15-monthold son now, and without this I don't know where I'd be. Besides gaining a bunch of friends, family and a good career, I've gained a lot of knowledge about the industry and I've learned how important our job is. It saved my life."

Vetter says Browne lived up to the trust the plant placed in him and excelled. He was eventually hired as an operator, all the while studying on his own to qualify for his current position as a maintenance technician.

Browne couldn't afford tuition to



meet the education requirement, but lead operator David Cavanaugh, also president of Local 1303-395 of Council #4 American Federation of State, County and Municipal Employees at the plant, solved that by providing Browne a personal loan. "Part of my motivation on the job is knowing that the project management took a chance on somebody with my background," says Browne. "And without David, I wouldn't be in this position."

#### NEW TO THE COUNTRY

It was persistence that earned an internship for Francisco Franco Villa, who came to the United States from the Dominican Republic. "English was his second language - and he was working hard to improve it when he came here," says Vetter. "He sat outside my door two days a week for about a month looking for a job." That convinced Vetter to offer him the next internship.

Villa, who was already going to wastewater classes one night a week at the local community college, had signed up for English classes two nights a week and math courses the other two nights.

He is now a day-shift operator and "doing extremely well," according to Vetter. "He has a family and a couple of kids. He was working several jobs around the area before coming here. This is really his first break since coming to the United States."

#### "I encourage [the interns] to find a problem in the plant that they'd like to help solve." PETE VETTER

To date, all of the interns have come to New London through word of mouth. North, the first intern, later recommended a friend who had just graduated from college with a degree in political science and who was looking for a job in a tough market. That friend, Steve Zimney, had skills the plant liked and is now running a shift at Veolia's Sikorsky Helicopter site in Stratford, Conn.

#### NO DOWNSIDE

It used to take about two months to get someone ready to take over an open position at the plant, but with the intern program in place, it now gets done in two or three weeks. The plant saves money by not having to advertise job openings, there is less staff overtime for backfilling work and training replacements, and staff gets the opportunity to mentor and train young people interested in the environmental field.

Requiring an intern program as part of an operating contract is unusual, but Vetter says everyone likes it, and the concept may spread within Veolia. He recently spoke about the program at a national company meeting.

"He deserves a lot of credit for the success of this program," says Browne. "Instead of using interns as day laborers, he really teaches us the technical aspects of the field and encourages our input from day one."

Vetter, in turn, says the program could not succeed without the support of Local 1303 and Cavanaugh, who serves as a mentor to every intern.

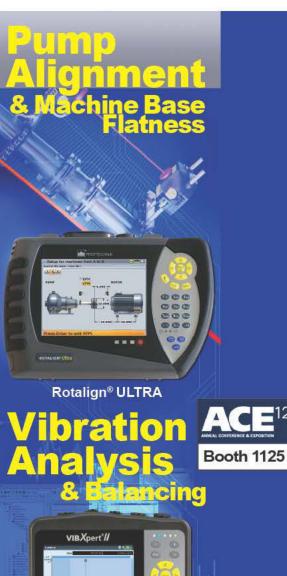
"Interns spend the first couple of months with David, learning the laboratory, sampling, and the basics of the wastewater treatment plant," says Vetter. "He and the rank-and-file have really embraced the program as a way of getting new talent, not only into the wastewater plant but into the union. It can only be successful if the union supports it."

What started as a contract requirement has become part of the facility's culture and has been readily embraced by all employees. Vetter says it has been a "fantastic experience for everyone, seeing these young people coming in and watching them develop a passion for the business." tpo

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# Worth the Effort

WITH PATIENCE AND A LITTLE INVESTMENT, A WYOMING WASTEWATER TREATMENT PLANT SAVES ENERGY, EARNS REBATES AND IMPROVES PERFORMANCE

More efficient 50 hp and 25 hp Aire-02 Triton models from Aeration Industries replaced several 75 hp and 40 hp aerator/mixers for surface aeration.

By Doug Day

orking through grant and energy rebate programs can get complicated and a bit frustrating. But it's worth the effort, says Larry Pardee, director of Public Works in the Town of Jackson, Wyo.

"It was tough, but in the end we're better for it," he says. "It's not just hard work. It's staying committed to doing the right thing and having a long-term perspective."

Pardee is pleased with 33 percent savings on the treatment plant's electric bill. New energy-efficient equipment will cut the plant's annual demand of 5.9 million kWh by about 1.95 million kWh and save about \$85,000 a year.

The plant team's tenacity led to funding most of the work with proceeds of various grants and rebates, giving the township a payback of about 15 months. Planning began in 2007, and most of the installations took place in spring and summer of 2011.

"Energy efficiency and conservation are the wise way to go. As a municipality, it is our obligation to learn how to spend taxpayer dollars much more efficiently." MARK BARRON

#### **AERATION UPGRADES**

Jackson lies in the Jackson Hole valley in western Wyoming, just south of Yellowstone National Park. The town received a state grant of \$45,000 in 2007 for an energy audit to identify efficiency opportunities at the 5 mgd treatment plant, which serves the town's 9,300 people and nearby subdivisions. The open-lagoon plant has 10 ponds and is the largest user of electricity in Teton County.

Five of the 10 lagoons use surface aeration, while the others have a fairly complex system of underwater pipes. "Oxygen is a friend of the microbiology going on in the lagoons," says Pardee.

Effluent is UV-disinfected before release to the sensitive wetlands

and ponds of the 960-acre Wyoming Game & Fish South Park feedgrounds elk refuge.

#### BETTER AERATION

As part of the efficiency project, several 75 and 40 hp aerator/mixers for surface aeration were replaced

with 50 hp and 25 hp Aire-02 Triton models from Aeration Industries. "Not only are they far more energy efficient, they have greater mixing capacity and inject higher volumes of oxygen," Pardee says.

With the improved performance, the plant achieves the same results with 22 units rather than the 28 it used before. "We are wired to add four more," adds Pardee. "If we do add them, the plant capacity would increase by 1 mgd." He also looks forward to lower maintenance with the new aerators: "We were always out in boats on the lagoons working on the old ones."

A new high-efficiency 150 hp variable-speed blower from HSI was also added for the underwater aeration system. That replaced two 250 hp fixed-speed blowers, still in good condition and used during times of higher flow. The new blower was much less expensive than adding variable-speed drives to the old blowers and will save the plant about \$28,000 a year in electrical costs."

An old SCADA system was also replaced with a new system from Rockwell Automation. "The old one was outdated, and there were some functions we couldn't even use, so we were running some systems manually," says Pardee. Next up is replacing the raw-water pumps – that will be done in about two years and should lead to even more energy rebates.

#### VARIED FUNDING

Cooperative efforts between the township, the county, the Lower Valley Energy cooperative, the Bonneville Power Administration, and

#### 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. the state resulted in \$1.3 million in state grants to cover most of the \$1.8 million cost of the efficiency projects. The town paid the balance but recouped most of that through energy rebates.

Lower Valley Energy issued an initial rebate of \$457,700 in 2011, and another rebate of up to \$85,000 is possible in 2012. Pardee estimates the town's ultimate investment at \$100,000, which would mean a payback of just one year and three months.

The plant also got \$570,000 in federal stimulus funds from the American Recovery and Reinvestment Act to install a 165 kW fixedarray photovoltaic system at the treatment plant. The town's share of that project was \$280,000. "As long as the sun shines, that's electricity I'm not buying at 5.5 cents a kilowatt-hour," Pardee says.

#### THE MOTIVATION

Jackson's efficiency program was inspired by a large environmental conference hosted by a local ski resort in fall

2006. While the focus was the impact of global warming on the ski industry, the program left a big impression on those attending from Jackson, includ-

THE "10x10" PLAN

With a "10x10" plan aimed at reducing total fossil fuel energy use by 10 percent by 2010, Jackson Township achieved a 17 percent reduction while still adding facilities and buildings. "The reality was getting 365 town and county employees and enabling them to become part of the solution," says mayor Mark Barron. "There was a positive energy and a great sense of pride, and they found themselves being very entrepreneurial."

He credits Public Works director Larry Pardee for his leadership. "Larry was way out in front, setting the example and encouraging employees to find their own motivations," says Barron. He was surprised by the achievements, including a 29 percent reduction in energy use in existing buildings, vehicles, and facilities.

His tips: "Declare what you want to do, measure your starting point, measure your ending point, communicate, communicate, and educate." Among the results of the efficiency initiative:

- Electricity use was reduced by 33 percent at the wastewater treatment plant, 39 percent in the town hall, and 12 percent in the Public Works shop.
- Gasoline use was reduced by 32 percent in the Street Department,
   52 percent in the Police Department,
   68 percent in the Recreational Trails
   Program, and 20 percent in the total town and county vehicle fleet.

ing Pardee and mayor Mark Barron.

"Energy efficiency and conservation are the wise way to go," says Barron. "As a municipality, it is our obligation to learn how to spend taxpayer dollars much more efficiently." In November 2006, Barron signed the U.S. Mayors Climate Protection Agreement. He is still the only Wyoming mayor to do so.

He then got the Teton County commissioners on board, and they worked with Lower Valley Energy to develop an energy strategy for the entire community. "By February 2007, we created a board, formed a committee, created work groups, and put together an action plan," explains Pardee.

#### ORGANIZED APPROACH

Called the "10x10" plan, it was a framework for cutting total fossil fuel energy consumption by 10 percent by the end of 2010, using

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A 165 kW photovoltaic system from Sharp Electronics went live in September 2010 and had generated 16.0 MWh as of March 21, 2012.

"It took painfully longer than expected, but it turned out better than any of us anticipated." LARRY PARDEE

2006 as the baseline. "We had to absorb new energy users like new buses and buildings, so we really needed to cut energy use by about 18 percent," says Pardee.

At the time, the Bonneville Power Administration was just beginning an effort to reduce total demand on

its system, which was reaching its limits. BPA is the wholesaler of about 30 percent of the electricity in the northwest region of the U.S. To cut demand, it began providing funding to its retail providers, such as Lower Valley Energy, to encourage efficiency.

The state was also getting involved in energy planning. Barron was the only person outside the governor's staff to sit on a panel that created a state energy performance contracting program to help communities get help to cut their energy use.

#### NEED TO REINVEST

Meanwhile, the treatment plant needed upgrades. "We knew that a lot of our systems were at or beyond their life cycle," says Pardee. "Beyond energy efficiency or saving the planet, we knew we had to reinvest in our plant. When the '10x10' plan came about, we decided to take a deep breath and get ourselves aligned with the plan." Waiting up to two years for the various agencies to finalize their work caused some frustration, and even more came when the consulting firm Jackson selected refused to sign a performance contract and eventually pulled out of the state program.

Dearémon

While the town was a few months late on meeting the goal, Pardee and his staff were able to work through the complications. "It took painfully longer than expected, but it turned out better than any of us anticipated," he says.

In his view, the "10x10" plan made the difference: "It educated us a lot on energy efficiency and really sharpened our focus to go deeper in ways we would not have thought of. It was very strategic, purposeful, and well thought out." **tpo** 



Effluent from the Jackson treatment plant feeds wetlands and ponds in an elk refuge just south of the township.



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DANA CLEMENT'S CONTRIBUTIONS TO TWO NEW HAMPSHIRE COMMUNITIES GO WELL BEYOND DEALING WITH THE TECHNICAL CHALLENGES OF RUNNING A TREATMENT PLANT

By L.K. Williams

ON MORE THAN ONE OCCASION. THE TAXPAYERS AND SEWER USERS in Allenstown and Pembroke, N.H., have been able to keep money in their pockets because wastewater treatment plant superintendent Dana Clement helped develop a cost-effective solution to a problem.

In 2003, state authorities placed a moratorium on new connections to the Allenstown Wastewater Treatment Facility (formerly known as Suncook), which was at 100 percent of capacity. In addition, the plant, then 26 years old, had never operated as intended: The extended aeration plant was built with clarifiers that were too small for the design flow of 1.05 mgd.

"The biggest problem we had was in the springtime with inflow and infiltration," Clement says. "We tried our best to take measures to assist the small clarifiers. It just wasn't enough." With upgrades needed, yet with no new connections to expand revenue

and no desire from the community for increased sewer rates or taxes, the plant had to be entrepreneurial.

"In 2005, we took a chance and started taking in septage," Clement says. His team found ways to make it profitable to treat 100,000 gpd of septic tank waste, and the resulting revenue gave the community a stronger base for moving forward.

That's just one example of how Clement has made a difference for his plant and community during 20 years on the job.

#### **INDUSTRY WITH PROMISE**

Wastewater treatment is not just about removing wastes from water — as with any good business, it's about solving problems, generating revenue and

AGNETIC DRUM

Plant superintendent Dana Clement, Allenstown Wastewater Treatment Facility. (Photography by Jeff Dachowski)

maintaining assets. Clement likes the problemsolving aspect best.

A New Hampshire native, he began work life in a factory but found that position left little room for personal development. When cities began building treatment plants, he took notice: "I said, 'Wow, here's basically a new industry that I think would pose a lot of opportunity.' So I went back to school and got a business degree and got into the field. Wastewater in this country was in its infancy. Even the technology had a long way to go at that point."

Clement got his start in 1977 at the Hooksett (N.H.) Wastewater Treatment Plant. In 1981, he started his own construction business, which he managed until 1990, when the housing market took a nosedive. He then worked as an operator at the 32 mgd Lowell (Mass.) Regional Wastewater Utility until the superintendent position opened in Allenstown in 1992. "I've been here ever since," says Clement.

When he took the job at Allenstown, it was a Grade II plant, and he had a New Hampshire Grade IV (highest) certification. The hiring authorities were looking beyond certification, seeking someone with business training or experience.

#### HAVING CONTROL

Clement definitely had the experience and wanted to be a manager. "It's always been my ambition," he says. "I really enjoy challenges. The biggest satisfaction I get is seeing results from solving problems, and the most effective way you can do that, in my mind, is if you have some control over how it is done. A manager has that ability."

At Allenstown, Clement works with seven team members: chief operator

24 TREATMENT PLANT OPERATOR

"I said, 'Wow, here's basically a new industry that I think would pose a lot of opportunity.' So I went back to school and got a business degree and got into the field. Wastewater in this country was in its infancy." DANA CLEMENT

# profile

#### Dana Clement, Allenstown (N.H.) Wastewater Treatment Facility

POSITION:	Plant superintendent
EXPERIENCE:	20+ years
DUTIES:	Team supervision, budgeting, regulatory liaison
EDUCATION:	Business degree, accounting minor, Hesser College, Manchester, N.H.
CERTIFICATIONS:	Grade IV wastewater treatment, Grade II collections system
GOAL:	Leave successors a state-of-the-art facility with secure funding
GPS COORDINATES:	Latitude: 43°7′36.84″N; longitude: 71°27′42.97″W

Dana Clement (with Hach DR/820 colorimeter) gave up life in a factory for wastewater treatment, a career in which he saw challenges and opportunities to grow.

T-II

Dana Clement and his team have overseen major improvements at the treatment plant, including the installation of the BioMag process, designed to enhance activated sludge treatment.



#### **THE BIOMAG PROCESS**

Cambridge Water Technology's BioMag process is designed to enhance existing activated sludge systems, expanding capacity and achieving total nitrogen removal to less than 3 mg/L and total phosphorus to less than 0.2 mg/L at lower costs than alternative technologies.

In the process, powdered magnetite, a readily available iron ore, is mixed in with the return activated sludge. This ballast is five times the weight of water, so that once it impregnates the biological floc, solids settle quickly in the secondary clarifiers. Magnets separate the magnetite from the floc, enabling the recovery of most of the magnetite from the waste biosolids. The recovered magnetite is available for reuse.

The primary equipment in the process consists of a 2 mm rotary drum screen with wash press, high-speed shear mill, magnetic recovery drum, and magnetite injection system. Treatment plant superintendent Dana Clement claims 90 to 95 percent magnetite recovery.

By augmenting sludge settleability, he says, the process increases clarifier capacity and eliminates the need to build large, costly concrete tanks. "The biggest bottleneck we had in this treatment plant was undersized clarifiers," he says.

Allenstown is the first full-scale municipal installation of the BioMag technology. Previously, CWT had applied it at Long Trail Brewing Co. in Bridgewater Corners, Vt. That facility treats 5,000 gpd of process water. The technology is based on the work of Massachusetts Institute of Technology researchers. Their goal is to provide high-performance, low-cost solutions for process water and wastewater treatment.

Jeff Backman, operators Russell Smock and Richard Slager, mechanic Ernest Beauchesne, laborer David Herron, administrative assistant Andrea Martel, and office assistant Rebecca Marquis.

"I think the mindset of working a problem until a solution is found is everyone's attitude here," he says. "The operators are constantly coming to me with 'I've found this problem,' or 'I've found that problem and I think I have an answer.' They're problem-solvers, and I think that's the key — paying attention to detail and being determined to find a solution to a problem."

The problems Clement has helped solve go well beyond equipment and



Clement promotes a mindset in which the team works a problem until a solution is found. (SCADA system by Rockwell Automation, compressors by Kaeser Compressors).

process issues at the plant — they include issues fundamental to the business of running a wastewater operation.

The Allenstown Sewer Commission, an elected board, appealed to voters in 2007 and 2008 for funds to upgrade the treatment plant and end the moratorium on new connections. The commission invested in a full plant design, but the price tag on the facility was too high for the voters, at \$16 million. The populations of Allenstown and Pembroke are about 5,000 and 7,300; median incomes are around \$57,000, and 12 percent of family incomes in Pembroke fall below the poverty level.

#### THREE TIMES A CHARM

"We went back to the drawing board and came up with a Plan B at onetenth the cost of a full plant upgrade," Clement says. The commission tapped the American Recovery and Reinvestment Act (federal stimulus funds) and septage revenue, each providing half the money needed (\$1.62 million in 2009 and \$360,000 in 2011) for new technology that would effectively increase capacity.

That technology, the BioMag process developed by Cambridge Water Technology (CWT [now Siemens]), uses a ballasted floc system that was untested in a full-scale municipal wastewater treatment application (see sidebar). By 2009, the commission and the voters seemed to have reached an understanding. Even without a facility design in hand, the authority won voters' approval for the new plan.

The commission met the federal deadline of February 2010 for a signed construction contract, and the project started taking shape in April. About 10 months later, the BioMag equipment was installed in a new building.

However, Clement and his team had to manage conduit, piping and process tank work to create and expand an anoxic zone, an anaerobic zone, and the associated nitrate return pumps and mixers. They also changed the aeration system to gain control of each tank individually.

They removed all the old piping and coarse-bubble diffusers, and then installed new main air headers with fine-bubble tube diffusers (Environmental Dynamics International) and modulating valves (Asahi), controlled by the plant SCADA system based on inline dissolved oxygen monitors (InsiteIG) as well as ORP monitors in the selector zones.

#### ON A LIMB

Municipal bodies typically do not embrace unproven technologies, but Allenstown did in this case, in part because its leaders saw little choice. "We did go out on a limb," Clement says. "However, the presentation from Cambridge was convincing, and they had been successfully conducting pilot projects at various locations. They had operating data that we could look at and evaluate. At this point, the process is up and running successfully."

Since the BioMag installation, the plant has seen several spring rains large enough to have caused I&I problems in the past. "But we sailed right through them this time," Clement says. "I can sleep at night not worrying about putting something into the river."

The BioMag process completed its first year in February 2012. As of late 2011, CWT was estimating that the plant had gained 300,000 gpd in capacity — about 30 percent — with the technology. Clement says that should accommodate the two communities for a number of years.

Clement credits the commission for taking the risk. "The community needs to be thankful to them," he says. "It's been a lot of hard work on the part of plant employees, because we've had to do a lot of these side projects ourselves."

The upgraded Allenstown facility replaced the extended aeration process with the Modified Ludzack-Ettinger (MLE) process and chlorine disinfection. At the headworks, a Jones + Attwood (Ovivo) 6 mm fine screen removes large solids and is followed by Milltronics (Siemens) OCM III ultrasonic flow measurement and Dorr Oliver (Ovivo) cyclone degritters.

ABS submersible and Aqua-Aerobic floating mixers are used in the selector tanks. Three 125 hp Tuthill positive displacement blowers provide aeration. Gorman-Rupp T3 self-priming centrifugal pumps move the return activated sludge. The plant discharges treated wastewater to the Merrimack River.

"We went back to the drawing board and came up with a Plan B at one-tenth the cost of a full plant upgrade."

#### DANA CLEMENT

While the MLE process can remove phosphorus, the plant is not yet required to do so. Its new NPDES permit may include limits of 7.2 mg/L phosphorus, 0.0625 mg/L copper, and 24 mg/L ammonia. "We also expect a reduction in BOD and TSS from our existing 30/30 permit," Clement says.

#### DEALING WITH SEPTAGE

Meanwhile, septage and the resultant revenue continued to roll in, but complaints about odors escalated when the septage business began. Clement and his team covered sludge and septage holding tanks and the dewatering area, where 90 percent of the odor originated, and installed odor-control systems. "We reduced the complaints from a high of probably 70 a year down to three," Clement says.

"Quite a few people in this town were getting pretty fed up with the odors. And they may have

tried to stop us from taking septage. Faced with losing our only source of profitable revenue, we had to do something." The facility purchased aluminum covers at a cost of \$300,000 for the sludge and septage holding tanks, using revenue from septage treatment. The team designed and built all the components for odor-neutralizing misting systems for the holding tank and dewatering areas. Other measures included installing underground drains for waste pumping, automating septage waste measurement, and purchasing an automatic sampler for deliveries.

With a hint of pride in his voice, Clement says the Allenstown facility takes in more septage — 19 million gallons last year — than any other facility in New Hampshire. Operators decant and dewater the septage and send the solids and process biosolids to landfill.

Facility leaders may look at solids reuse as they consider a power-generating program. A Tennessee Gas Pipeline Company line goes through the 4-acre plant property. "We're looking at generating our own power needs

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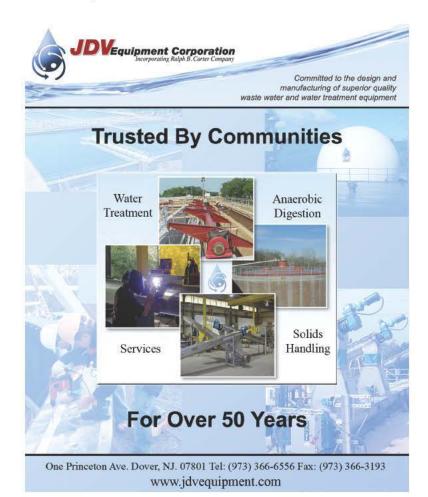
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The Allenstown team includes, from left, grade IV operator Russell Smock, chief operator Jeff Backman, grade II operator and administrative assistant Andrea Martel, plant superintendent Dana Clement, and grade II operator Richard Slager.

from natural gas and using the waste heat energy to dehydrate our solids to a Class A biosolid," Clement says.

"Yeah, I'm pretty excited about it. We should be able to generate our own power for half the cost of what we're buying from the grid and dehydrate our biosolids from our current 30 to 35 percent solids to 99 percent solids. We could actually sell it."



"We should be able to generate our own power for half the cost of what we're buying from the grid and dehydrate our sludge from our current 30 to 35 percent solids to 99 percent solids. We could actually sell it."

#### DANA CLEMENT

#### TACKLING AN UPSET

Generally, the plant runs smoothly and is in compliance with its permit. But in January 2008, a local business drained ammonia from a holding tank to a floor drain, ultimately disrupting operations at the treatment plant. The ammonia killed much of the biomass and led to discharge of untreated or under-treated wastewater. Clement

and his team returned the process to normal in three days.

"As soon as we assessed the severity of the problem, we took measures to isolate the ammonia and contain the biomass," he says. "Next, we nurtured a viable biomass for availability once we were able to go back online. After the bulk of the ammonia had passed through, we air-stripped as much ammonia as possible from the process tanks. Then we slowly brought the process back online."

When not dealing with plant or business issues, Clement is active in the New England Water Environment Association and New Hampshire Water Pollution Control Association. In 2010, his NEWEA peers honored him with the William D. Hatfield award, citing his achievements in improving treatment and reducing operating costs.

In 2005, he designed a new SCADA system. "Everything has been done from scratch," he says. "First, we identified and prioritized areas needing improved control. Next, we inventoried instrumentation and control equipment, wiring, and modifications of existing equipment and construction components.

"Once the equipment was installed, I wrote the code for the PLCs and created the graphic screens for the operator interface. The last part has been an evolving project, as we are constantly changing processes, adding and removing equipment, and improving our control loops."

As in any business, Clement likes to see what other plants are doing. He also enjoys traveling and will mix the two when he can — but only when traveling alone. "I just can't convince my wife," he says. "It's not one of her highlights." **tpn** 

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THE SOUTH LYON (MICH.) CLEAN WATER PLANT'S EXEMPLARY PERFORMANCE DEPENDS ON EXCELLENT OPERATORS, PROGRESSIVE CITY LEADERSHIP, AND A SUPPORTIVE COMMUNITY

By Ted J. Rulseh



THE SOUTH LYON CLEAN WATER PLANT IS AN important line of defense in what the Michigan Department of Environmental Quality (DEQ) classifies as an environmentally sensitive area.

The plant discharges to a tiny creek known as Yerkes Drain, which ultimately feeds the Huron River, a popular stream for wildlife viewing, fishing, canoeing, kayaking, and other recreation along its course to Ann Arbor, 20 miles south.

The plant, upgraded in 2005, consistently puts out what Water and Wastewater Department superintendent Bob Martin calls "spectacular" effluent. For that, he spreads the credit far and wide, beyond his team of operators and support staff.

"Anytime you have an effective plant, it's not just the function of the superintendent or the workers," Martin says. "It's a community-based proj-

Foreman Dave Miller, left, and operator Dan Gehringer clean debris from a cascade leading to Yerkes Drain, which feeds into the Huron River. (Photography by John Stormzand)



ect. The residents of this city pay for the plant through their water bills. The city council needs to know how to deal with the engineering company to get the best design and the best bang for the dollar. The plant personnel depend on good relationships with their vendors. What we have going here across the board is a team effort. It's a matter of community pride."

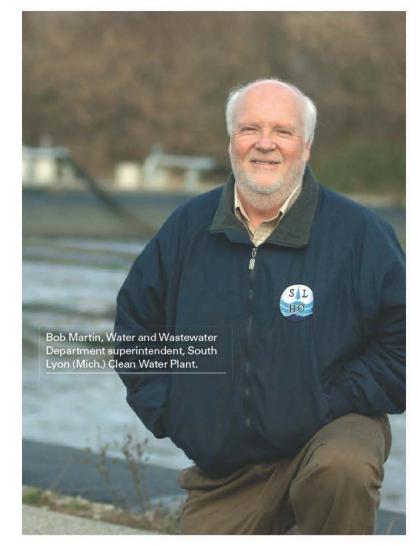
All the effort and pride were recognized when the Michigan Rural Water Association named South Lyon as Wastewater Utility of the Year for 2011.

#### ALL ABOUT CLEAN

Martin touts the "clean water" in the treatment plant's name. "For years, the idea of 'sewage plant' or 'wastewater treatment plant' has created an adverse image for our industry," he says. "What we do is take dirty water and make it clean. That's what our daily task is."

The South Lyon plant was built in 1979 with a Parshall flume, comminutor, aerated grit removal system, primary settling tanks, three banks of four rotating biological contactors (RBCs), final clarifiers, a traveling bridge sand filter, chlorine disinfection, anaerobic biosolids digestion, and eight biosolids drying beds.

The city completed a major plant upgrade in 2005 to meet tightening permit limits on ammonia nitrogen and phosphorus. The upgrade increased design flow from 1.5 mgd to 2.5 mgd; average daily flow from the community of 11,200 is 1.2 mgd.



Influent passes through an Aqua Guard mechanical bar screen and compactor (Parkson) to a wet well, where five raw sewage pumps raise the flow to a new aerated grit removal system (Walker Process).

Effluent from the grit tank flows by gravity to two aeration basins with the BioLac extended activated sludge process (Parkson). After aeration, alum and polymer are added to the mixed liquor from the aeration basins, which flows by gravity to two secondary clarifiers (Hi-Tech).

"Anytime you have an effective plant, it's not just the function of the superintendent or the workers. It's a community-based project."

#### **BOB MARTIN**

Settled solids are pumped from the clarifiers and either returned or wasted to the waste activated sludge storage tank. Secondary effluent is delivered by three Flygt (Xylem) dry-pit submersible pumps to three Actiflo ballasted flocculation tanks (Kruger), then flows by gravity through a WEDECO (Xylem) UV disinfection channel. From there, water flows by gravity to a post-aeration tank and a cascade aerator before discharge. Waste activated sludge is pumped to Hycor rotary drum thickeners (Parkson) before being delivered to the aerobic digesters. Biosolids are land-applied through contracted services.

#### AMPLE EXPERIENCE

The plant benefits from a highly experienced team, led by Martin, who

The stay The starte starte starts when

"We treat our workers well, and they don't leave us. That gives us a lot of high-level expertise in treatment. We're family." BOB MARTIN

# profile

#### South Lyon (Mich.) Clean Water Plant

A CONTRACTOR OF	
BUILT:	1979, upgraded 2005
POPULATION SERVED:	11,200
EMPLOYEES:	9
FLOWS:	2.5 mgd design, 1.2 mgd average
TREATMENT LEVEL:	Tertiary
TREATMENT PROCESS:	Activated sludge, Actiflo high-rate clarification
RECEIVING WATER:	Yerkes Drain (feeds Huron River)
BIOSOLIDS:	Land-applied by contractor
WEBSITE:	www.southlyonmi.org
GPS COORDINATES:	Latitude: 42°27'17.20"N; Longitude: 83°39'50.52"W

came to South Lyon 33 years ago as an operator and lab chemist and assumed his present job in 2002. A Detroit native, he earned a two-year liberal arts degree from Oakland Community College and then a four-year degree in Water and Wastewater Technology from Lake Superior State University in Sault Ste. Marie, Mich. The South Lyon team includes, from left, back row, foreman Dave Miller, lab technicians James Ciarmataro and Andre Randall, operator Dan Gehringer and custodian Mike Kelly; front row, operator Dennis Bridson, superintendent Bob Martin, operator Ron Beason, and administrative assistant Judy Archey.

"I initially enrolled in wildlife conservation and forestry, but I realized early in the game that I would probably need a master's or a doctorate degree to get into my chosen area of that field, which was being a forest ranger," Martin says. Along the way, he took water and wastewater classes and came to realize that was his true calling.

Today he holds Class B wastewater and Class D1 water licenses and leads a fully cross-trained team that operates the city's water and wastewater plants. The most senior team member is foreman David Miller (35 years), who before joining the city worked at Michigan's Kincheloe Air Force Base (now closed) making deionized water for jets.

The staff also includes plant operators Dennis Bridson (31 years), Ronald Beason (18 years), Andre Randall (15 years), James Ciarmataro (12 years), and Dan Gehringer (3 years); plant custodian Michael Kelly (18 years); and administrative assistant Judy Archey (14 years). Randall and Ciarmataro run the lab, though all operators are qualified to perform the everyday tests.

"We treat our workers well, and they don't leave us," says Martin. "That gives us a lot of high-level expertise in treatment. We're family. Even though technology has entered the field of water and wastewater, this is still predominantly a blue-collar industry. The folks we get requesting work here are

#### **TWO-WAY STREAM**

Clean-water technology should work in two directions, says Bob Martin, Water and Wastewater Department superintendent in South Lyon. Plant operators use technology, and equipment vendors can (or should) use operators' knowledge to make technology better.

"Operators take pride in their plants, and they become so good at what they do that the companies that build these pieces of equipment should turn to them more often," Martin says. "These folks operate the equipment on a daily basis. They know the ins and outs of how to get things to work perfectly. There's a large amount of untapped knowledge among the operators in this country that could be shared with the engineers who design the equipment.

"People like Parkson Corp. have reached out to us for that kind of input, and they have taken some of it back to their company and incorporated it. They actually sent some of their people here and had them run my plant for two or three days so they could get a better feel for how their equipment works on site."



Operator Dan Gehringer lubricates bearings on an Aqua Guard mechanical bar screen (Parkson).

people looking for a trade they can learn. We have sold our workers on the fact that they are a major part of the operation. We listen to them and use a lot of their suggestions."

#### ALWAYS IDEAS

Never was that more true than during design of the 2005 plant upgrade. "At that time, there were work sessions involving the engineering company and some of our operators," Martin recalls. "We were constantly tweaking what was done on paper, if we felt that was warranted.

"For example, the engineers took direction from us on the type of bar screen we wanted. We visited different plants and tried to identify the perfect bar screen that would do a good job of removal and also have a very good track record for low maintenance."

Information sharing is also part of life for the South Lyon team. "On a daily basis during lunch, we discuss what's going on in the plant, and we all share ideas," Martin says. "Over the past few years, with the economy the way it is, we have tried to work on lowering our costs.

"One thing we've done is micromanage our alum feed to the Actiflo system. I challenged the team to see how low we could go to save on purchasing of alum, but still get the quality treatment we know we can get from this plant.

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#### **TERTIARY INNOVATION**

The use of Actiflo technology South Lyon uses for tertiary treatment is among the innovations in the new treatment plant's design. The Actiflo process, which uses microsand to speed settling of solids, is more common in high-volume applications such as combined sewer overflow (CSO) treatment, where rapid settling is important.

"We sat down with the city's engineering firm, Hubbell, Roth & Clark, and looked at our options for tertiary treatment," says Bob Martin, Water and Wastewater Department superintendent. "It just so happened the building where we used to have our traveling bridge sand filters would hold three Actiflo tanks, each able to treat up to 1.3 mgd. So we went with that process."

At any given time, two of the Actiflo units operate at about 700,000 gpd while the third is rested and cleaned. "We got a contract guarantee from Kruger to remove 75 to 80 percent of whatever we sent to the Actiflo system," says Martin. "We're sending it secondary effluent that is pretty clean already.

"We add a small amount of aluminum sulfate and polymer, and then we introduce microsand ballast to those tanks. The sand attaches to the floc and speeds up the settling process. The solids settle out in the maturation tank, and the clean water passes up through lamella tubes.

"The result is that we have effluent at or below 0.1 mg/L total P. Our ammonia N permit level is 0.5 mg/L, but we are always at or below 0.1 mg/L. The water we are putting out of the plant is spectacular. I like to tell people we used to have an Impala as a plant, and now we have a Maserati."



Lab technicians James Ciarmataro (left) and Andre Randall perform an analysis.

"Not all scientists walk around with a microscope and a lab coat. We're scientists every day here, and we don't necessarily do things with graduated cylinders and burettes. We literally started watching our total P lab analysis and tweaking the alum feed down to see how low it could get before the total P kicked up a little bit.

"We've adjusted it to where we now receive four fewer alum shipments a year than we did three years ago. That's about a 20 percent reduction. Each shipment of alum we eliminate saves about \$5,500."

#### LOOKING AT ENERGY

Next on the agenda is a close look at the plant's energy consumption. Recently, the plant received an energy audit from students at Lawrence Technological University in Southfield, Mich. The city has also entered a contract with the Suburban Michigan Regional Energy Office, a partnership of nonprofit organizations that offers tools to help cities become more energy efficient.

That contract involves a \$36,000 grant, from funds provided by the Michigan Public Service Commission, for a project to use the treatment plant's SCADA system (from UIS SCADA of Ypsilanti, Mich.) to monitor energy usage, create baselines, and identify process changes that can lower consumption and costs.

"Our SCADA reads the amps drawn at our blowers and pumps and ties into the DO probes in the aeration basins," says Martin. "In this way, we are gathering information to help us make logical decisions based on actual numbers and facts.

	INFLUENT	EFFLUENT	PERMIT
CBOD	210 mg/L	2.09 mg/L	4.0 mg/L
TSS	212 mg/L	5.2 mg/L	20 mg/L
Ammonia N	25.3 mg/L	0.095 mg/L	0.5 mg/L
Total P	5.2 mg/L	0.133 mg/L	0.3 mg/L
Total Hg	N/A	<1.0 µg/L	2.0 µg/L*
DO	N/A	8.49 mg/L	7.0 mg/L
pН	N/A	7.48	6.5-9.0

\* 12-month rolling average

"With the data we accumulate through historical trending, we will be able, for example, to put in timers to shut the blowers off at certain times of day, so we can maintain the DO level we need without overkill. The same with the wasting pumps and the aeration for our aerobic digesters.

"It will take six to eight months of baseline studies to collect the data we need, but we are conservatively hoping to reduce energy costs by somewhere between 15 and 18 percent through this Energy Alliance grant."

#### STEPPING UP TOGETHER

Team members also step up to deal with emergencies. "It's easy to run your plant on a sunny day when everything is fine," says Martin. "The measure of your team is what happens when things don't go the way they're supposed to. Does your team step up?

"We're here every day from seven in the morning to five at night. When we leave, we put the plant on a dialer system, and if something goes haywire after hours, it calls whoever is on call for the week. You try to train your people to deal with problems.

"Last summer a lightning strike took out our 750 kVA transformer at about 10 o'clock at night. All our guys showed up. We ran the plant on standby

"It's easy to run your plant on a sunny day when everything is fine. The measure of your team is what happens when things don't go the way they're supposed to. Does your team step up?" BOB MARTIN

power, and within 22 hours we got a new transformer on site and wired into the system so that we could go back on utility power. It's a measure of how tough and how good your team is when they band together in tough situations."

The team concept extends to cooperation between city departments. For example, the Public Works crew lends its Vactor combination truck to the treatment plant for tank cleaning when needed. The plant in turn lends its front-end loader for tasks like fall leaf pickup, and plant workers sometimes help Public Works with snow plowing.

In Martin's view, it all goes back to community pride. "Water and wastewater plants are the most expensive assets a city owns," he says. "The DEQ has put a lot of pressure on cities in this area because they refer to it as environmentally sensitive. They have mandated sizable upgrades to our wastewater treatment, and the community of South Lyon has never balked at that challenge.

"We have built a state-of-the-art facility that not only cleans the water but makes the entire city very proud of what we discharge." **tpo** 

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# **Keeping SCADA Secure**

WASTEWATER UTILITIES CAN USE VARIOUS SIMPLE, LOW-COST MEASURES TO MAKE A GOOD START TOWARD PROTECTING AGAINST CYBER-ATTACKS

By Blake Visin

he general public knows the danger of identity theft or fraud - banking, medical or other personal records falling into the wrong hands. Recently, SCADA systems have fallen victim to increased threats.

Fortunately, wastewater agencies can take a number of basic and cost-effective measures to make their SCADA systems more secure. They start with simple awareness of the issues and extend to technology policies and procedures and technology risk analysis. Security measures can be scaled to suit collection and treatment systems of almost any size, age and complexity.

#### THREE-LEGGED STOOL

Information security is based on three tenets: confidentiality, integrity, and availability (CIA). In their book Fundamentals of Information Systems Security, David Kim and Michael G. Solomon define confidentiality as guarding information from everyone except those with rights to it. Integrity deals with data validity and accuracy.



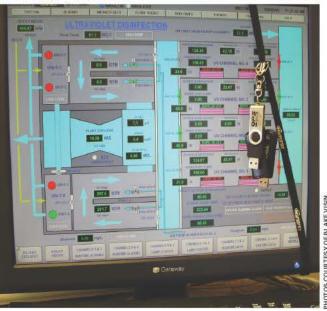
The convenience of portable thumb drives made it easy to transfer information to and from SCADA systems - opening a gateway to malicious attacks.

Availability means authorized users can access data whenever they request it.

The challenge is to balance these tenets like a "three-legged stool." For example, if data is too freely available, confidentiality and data integrity may be compromised. On the other hand, if confidentiality is too tight, it will hinder availability and make operators less effective and productive.

SCADA systems evolved with a focus on availability and data integrity. Confidentiality was not an issue, mostly because earlier controls were closed systems, dedicated to running a plant or process from one central control room.

Later, the convenience of portable thumb drives made it easy to transfer information to and from these systems - but little thought was given to what might be innocently introduced or maliciously modified. As the Internet developed and corporate networks emerged, the next step was remote access and the sharing of process information across a wide area network (WAN).



Many SCADA systems use a human-machine interface (HMI) to view and control processes. Most run on some form of the Windows operating system, making them viable targets for hackers.

Suddenly, SCADA systems were no longer isolated and were subject to the same threats that face operating systems like Microsoft Windows, Unix, or Linux. Meanwhile, programmable logic controller (PLC) manufacturers, while making their products more network- and user-friendly with easier access, often neglected confidentiality. Thus the three-legged stool of security was unbalanced on multiple fronts.

#### THREATS ARE REAL

Worldwide, there are multiple accounts of successful SCADA attacks. In January 2003, the Slammer worm infected the safety monitoring systems at the David-Besse nuclear plant in Ohio. In 2003, two hackers gained access to control technology for the U.S. government's Amundsen-Scott Pole Station in Antarctica, which ran life-support technology for scientists. A SCADA system attack at the Maroochy water system in Australia disrupted wastewater treatment for two months.

Much more recently, in November of 2011, a hacker connected to a South Houston water facility to demonstrate the simplicity of an

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#### One exceptional resource on SCADA security is US-CERT — the operational arm of the National Cyber Security Division at the Department of Homeland Security.

attack. Although the culprit claimed he did not vandalize any equipment or systems, the fact he could demonstrate connectivity, and possibly control, brings this type of security flaw to the foreground.

These are only a few examples. What can a wastewater utility do to use SCADA technology effectively while maintaining or increasing security? Unfortunately, no single standardized solution will cover all agencies. Depending on the organization's size, the availability of trained support staff or financial resources may be limiting factors.

However, there are a number of low-cost and relatively simple solutions that any agency can implement to start minimizing risk from outside attacks. Most novice computer users are already familiar with a number of security methods that can be applied to more complex systems.

#### GENERAL TO SPECIFIC

The first step is to address a series of fundamental questions, starting at a macro level and then narrowing down. The first focus should be on personnel and policies and may include these questions:

- · What is the staff's level of security awareness?
- What is the staff's technical level?
- Are technology-based security policies and procedures in place?
- Are these procedures and policies routinely reviewed and exercised?
- Is the agency staff properly trained on a regular basis?

Focus can then shift to the actual assets and specific processes to assist in analyzing security at the component level. These questions may include:

- What assets or processes require protection?
- What level of protection is needed?
- · How might an asset or process be compromised?
- What is the impact if protection fails?

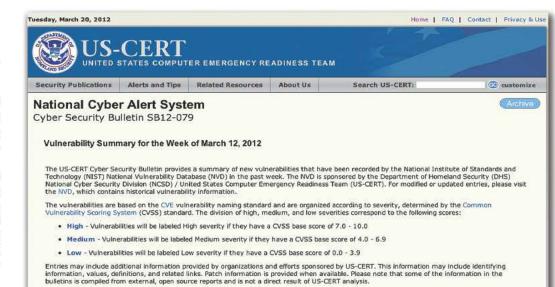
Once these are answered, more specific questions can be asked. Is the SCADA system accessible from outside by phone or Internet, or is it part of a larger corporate network? If yes, the next question is whether it needs to be connected or integrated.

If there is no real benefit to having phone, Internet, or corporate network access, the SCADA can be made into a closed system although this may be impractical, as it inhibits sharing of process data. If there is a need for corporate network access, the technical security effort increases and becomes more holistic.

Is there a proper and secure firewall (hardware and software) in place on the network that is routinely managed? Are strong passwords in place for the SCADA system? And the entire corporate network? Are strong information security procedures and policies in place for the entire corporate network that cover a full range of issues, including the use of thumb drives by employees or vendors? Is there a policy or procedure to handle vendor or employee PC connections to the corporate network?

#### **RAISING AWARENESS**

A first step for improving SCADA security is simply to increase awareness of the latest threats and security issues. Subscribing to a



#### A SCADA SECURITY CHECKLIST

Here is a summary of basic measures water and wastewater utilities can take to make SCADA systems more secure:

#### **Increase awareness**

- · Subscribe to a free online technology publication
- Subscribe to US-CERT to monitor nationally important risks and threats
- Investigate user groups and develop relationships with sister agencies

#### Technology policies and procedures

Develop effective, dynamic policies and procedures. Then exercise, review and modify them and communicate them through training. These include:

- Vendor and employee (personal) computer access, including use of thumb drives and Internet connectivity (VPNs)
- Automated/manual updates for operating systems, applications, and hardware, where applicable
- Registration of PLCs with vendors or manufacturers for updates and news

#### Technology risk analysis

This should complement or add detail to a business continuity or disaster recovery plan and should be reviewed at least annually. A team should include various departments (or perspectives) and use a template-based approach to identify, assess, and prioritize:

- Critical assets (networking devices, computers, PLCs, and applications) and processes
- Deficiencies in assets or processes
- Areas that can be hardened or added redundancy that is cost-effective

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technology-based newsletter delivered via email is effective. One exceptional resource is US-CERT, the operational arm of the National Cyber Security Division at the Department of Homeland Security.

This agency coordinates information sharing, proactively manages cyber-risks and offers free, timely, actionable information to help users secure computer systems. It also provides a way for organizations to communicate and coordinate directly with the U.S. government about cyber-security.

Joining user groups or sharing information with utilities of similar function and size is another way to increase awareness and share knowledge and lessons learned. In addition, security-minded professionals should pay heed to regular operating system and application updates provided by Microsoft.

Many SCADA systems use a human-machine interface (HMI) to view and control processes. Most run on some form of the Windows operating system, making them viable targets for hackers. SCADA computers must be religiously updated on 'Patch Tuesday' — a oncea-month Microsoft update delivery day.

#### ADDRESSING THE COMPONENTS

After the network infrastructure is addressed, the focus can shift to the system components, specifically PLCs. Most manufacturers request registration of their products. This may seem like a menial task, but most manufacturers reward it by providing automated notifications when new firmware or software updates are available.

#### **Additional Online Resources:**

www.dhs.gov/files/programs/sharing-information.shtm www.dhs.gov/files/programs/critical-infrastructure.shtm www.asisonline.org www.asisonline.org/toolkit/toolkit.xml www.us-cert.gov www.csrc.nist.gov

ologies are available to guide an analysis team. They vary in detail and capabilities, but they all provide practical guidance or industry best practices. Four popular choices include:

- Risk Management Guide for Information Technology Systems (NIST SP 800-30 and SP 800-66), available at www.csrc.nist.gov
- CCTA Risk Analysis and Management Method or CRAMM, available at www.cramm.com
- Operationally Critical Threat, Asset, and Vulnerability Evaluation or OCTAVE, available at www.cert.org/octave/osig.html
- ISO/IEC 27005; "Information Security Risk Management," available at www.iso.org

As one example, the OCTAVE methodology offers flexibility based on the size and type of an operation. It is a qualitative method-

There are a number of low-cost and relatively simple solutions that any agency can implement to start minimizing risk from outside attacks. Most novice computer users are already familiar with a number of security methods that can be applied to more complex systems.

These manufacturers' technical support areas and online forums can offer suggestions or air concerns and issues that a non-registered user may miss. PLC software and firmware also need to be updated regularly. Beyond new equipment, utilities should make efforts to keep all SCADA system components updated.

#### WHAT TO PROTECT?

This leads to the critical questions of what assets require protection. Are all of the organization's assets accurately inventoried? Do you know what equipment is actually running and controlling your processes? Have you identified critical processes and the interdependencies of processes?

The most thorough and accurate way to answer these questions and account for devices used throughout a SCADA system is to do a risk analysis. The mere thought of this can be overwhelming, but in well-run organizations, much of the work may already be done.

Effective organizations will have a business continuity plan (BCP) and a disaster recovery plan (DRP), identifying critical plant infrastructure and what it takes to continue operations or recover after a disaster, including a cyber-attack. An additional SCADA-specific risk analysis can add more details to existing plans, making them even more effective during disasters and helping with risk mitigation.

There are many ways to accomplish a qualitative or quantitative risk analysis. Hiring an expert integrator is effective but can be costly. An alternative is to have internal maintenance staff or plant personnel record pertinent information. A thorough analysis of a SCADA system from a holistic risk perspective takes a joint team involving plant operators, support personnel, and IT staff. The differing viewpoints allow one group to recognize issues others may overlook.

#### EXPLORING METHODOLOGIES

A number of industry-standard and no-cost or low-cost method-

ology that is easy to understand and can be modified to the unique attributes of different treatment plants and systems.

For the first risk analysis at a plant site, or for an organization not familiar with the process, staff should consider the OCTAVE Allegro method, the simplest variation of this methodology. This scaledback, template-based approach may work best until a team develops familiarity with the analysis process.

Deficiencies found (like out-of-date PLC firmware) or areas that need improvement (like weak passwords) can be addressed immediately. Other benefits of this method include ease of understanding, customization, ease of duplication, and scalability. Once the first plant analysis is complete, the process can be efficiently replicated at other plants.

#### **BEING BETTER PREPARED**

When addressing cyber-security issues related to SCADA, the three tenets of data must be balanced: confidentiality, integrity, and availability. By addressing these issues, an organization will become better prepared to respond to all types of disasters, including human error, cyber-terrorism, and natural disasters. The holistic approach, specifically with risk analysis, can make any organization more resilient, sustainable, and efficient.

#### ABOUT THE AUTHOR

Blake Visin is information systems director at Renewable Water Resources (ReWa), a special-purpose district that provides wastewater treatment to five counties in South Carolina. **tpo** 



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# **Bar None**

SCREENING EQUIPMENT WITH LINKS CAST FROM STAINLESS STEEL ALLOYS INCREASES EFFICIENCY AT A MICHIGAN TREATMENT PLANT

By Scottie Dayton

A aintenance of the 33-year-old bar screens at the Kalamazoo (Mich.) Water Reclamation Plant was stressing the operators. Shear pin failures occurred often, and almost always on weekends.

The worn and corroded frames allowed chain guides to wobble, requiring tension adjustments. When some 1-inch screen rack bars broke, they weren't replaced because of their difficult location and the unit's age. Operators worried that rags slipping through the larger gaps would clog pumps and flood lift stations. With one screen worn out and the other two not likely to continue working, they feared a catastrophe.

To research replacement options, a team that included design engineer Dail Hollopeter, P.E., of Jones & Henry (Toledo, Ohio), operator/maintainer I Gary Ossino, operator/maintainer II Phillip Minich, and operations supervisor Dan Bogema gathered information from trade shows and sales representatives and visited five



The screening system efficiently removes rags and other solid objects.



ABOVE: Operator/maintainer II Phillip Minich shows operator/maintainer apprentice Ed Marnon how to access the chain links on the screening system. RIGHT: The chain inspection port is behind a cover that is easily removed for service.



municipalities with different screening equipment to gain firsthand knowledge from operators.

Their research concluded that the bar screens should be simple and straightforward, fit in the channels, and be made of stainless steel to resist corrosion. AMWELL – A Division of McNish Corporation won the bid with its DuraMax bar screen. Installation of two units by local contractor L.D. Docsa Associates took less than two months and did not disrupt plant functions.

#### **DIFFICULT CONDITIONS**

The 54 mgd (design) activated sludge plant handles 25 mgd on average from more than 180,000 residents within the county. The sewers, with 60 lift stations, cover 350 square miles and include 72-inch interceptors delivering 300 gallons per second to the headworks.

"Channels 1 and 2 are on the first wet well, and Channels 3 and 4 are on the second wet well," says plant engineer Larry Fischer. "The screen in Number 1 doesn't function. We replaced the screens in Channels 2 and 3. Channel 4 is still functional and can be used for backup."

The original cast iron chain-and-rake screens were 6 feet wide and 31 feet tall from the bottom of the 10-foot-deep channel to the upper operating floor. The bars were in the bottom 8 feet. Although the area was not classified as a confined space, workers carried gas detectors and followed protocol for entry that included activating exhaust fans. Changing a shear pin took one to two hours.

Although AMWELL was not the lowest bidder, plant operators saw the cast, hardened stainless steel chain design as the best product for the purpose. Another consideration was that the chain and sprockets, made by Environmental Resources, have a 10-year war-



ranty. "That's extensive for a piece of mechanical equipment used in a corrosive atmosphere," says Fischer.

#### VAST IMPROVEMENT

The screens, built of 1/4-inch stainless steel frames, have jamresistant chain guides and bar racks with 1-inch openings. Curved sidebars on the links reduce wear on the headshaft sprockets and increase load-carrying capacity. Tee-shaped full-length lateral ribs reinforce the chain sidebars. Rotating chain pins (inserted by hand from either side of the link) and pin bosses evenly distribute the load and wear throughout the joint contact surfaces.

#### "The screens are wonderful and have worked out even better than anticipated." LARRY FISCHER

Once the screens were installed, a level transducer initiated operation, cycling for two minutes every 25 minutes. "The screens and conveyor run five minutes an hour versus 60 minutes an hour for the old equipment," says Fischer. "We haven't run the new system long enough to quantify our energy savings, but it has to be significant."

If the screen binds, an electronic shaft power monitor stops the motor before pins can shear, and the operator receives a screen fault alarm. From the upper operating floor, the worker turns a switch, reversing the screen for a short distance to dislodge debris, and then turns the switch back to forward to engage the tines and continue cleaning. The operator rarely needs to enter the channel area.

Another worker-friendly feature is that the gearbox and motor



The screens have jam-resistant chain guides and bar racks with 1-inch openings.

are positioned 6 feet off the main operating floor. "The old drive equipment was 12 feet overhead," says

Fischer. "We needed a ladder to reach it and

a crane to lift the motors. Now we can unbolt

them or check the oil from the floor. The

screens are wonderful and have worked out

even better than anticipated." tpo

#### **Share Your Idea**

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

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Jim Pynn, superintendent at the Newtown Creek Wastewater Treatment Plant, promised visitors a Hershey's Kisses chocolate and a spectacular view of Manhattan's east side with plant tours on Valentine's Day.

# **Known the World Over**

VALENTINE'S DAY TOURS AT BROOKLYN'S NEWTOWN CREEK TREATMENT PLANT BRING A RECORD CROWD AND INTERNATIONAL PUBLICITY

#### By Ted J. Rulseh

im Pynn never dreamed a single email about a tour of his treatment plant would lead to publicity across the nation and as far away as New Zealand.

• But that's what happened when word got out that he was leading tours of the Newtown Creek Wastewater Treatment Plant on Valentine's Day. Pynn, superintendent at the plant in Brooklyn, N.Y., promised visitors a Hershey's Kisses chocolate and a spectacular view of Manhattan's east side.

"There were lovers holding hands. People were dressed up a little bit fancy. A lot of folks wore red for the occasion. They got up on top of the eggs and looked at the view. They were holding hands. People were smooching and kissing."

#### JIM PYNN

On the Friday before Valentine's Day, Pynn did 14 interviews with local and national media. Comedians Jay Leno and Jimmy Fallon mentioned the event in the monologues on their programs. Best of all, the day's tours drew 250 visitors — about five times as many as usual.

"It was really a very fun time," says Pynn. "People enjoyed being interviewed by the media that were there. All the reactions were positive. You would expect some sly comments or silly off-color jokes about wastewater treatment, but that didn't happen."

#### A HAPPY ACCIDENT

It all happened mostly by luck. The treatment plant runs public tours on the second Tuesday of each month, and in February it happened to be the 14th. A woman signing up for the tour asked what would be done differently in honor of Valentine's Day. "I answered that we were going to give out Hershey's Kisses," Pynn recalls.

He suspects the woman shared that information with *The Brooklyn Paper*, a local weekly. On Feb. 9, the *New York Daily News* carried the story with a picture of Pynn before a large window overlooking the plant. From there the story hit the news wire services and was picked up almost everywhere imaginable — on local radio and TV, on the *Today* show and other network programs, in *USA Today* and newspapers all over the country and overseas.

The highlight of the tours was a walk to the top of the plant's eggshaped digesters. "The eggs stand 130 feet above grade, above all the other buildings in the area, and we have a clear shot of a beautiful view of Manhattan," Pynn says.

#### GREAT OPPORTUNITY

Pynn didn't waste the chance to preach the importance of wastewater treatment. "I think a lot of people are generally interested in our facility, and I think more people are becoming environmentally aware," he says.

"When people come and we're able to explain how the water is delivered, treated and taken away, they leave in a sort of amazement. Once we had them as a captive audience, I did my normal routine. We have a PowerPoint presentation, and I went over the history of the city infrastructure, dating back to the late 1600s when the first Dutch and English settled.

"I told how we progressed from wells and privies in the backyards, to sewer systems emanating out to the shoreline, to collecting the sewage and conveying it to our 14 treatment plants. We have diagrams explaining the processes. They were very interested groups of people. I think everyone would say they had a great time.

"There were lovers holding hands. People were dressed up a little bit fancy. A lot of folks wore red for the occasion. They got up on top of the eggs and looked at the view. They were holding hands. People were smooching and kissing. The Hershey Company donated 4,000 of its chocolates, and people were taking one, two and handfuls of them.

"Speaking of Valentine's Day, a sewage treatment plant in Brooklyn is offering a special Valentine's Day tour for couples. Personally I like to take my wife there other times of the year, when it's not all couples."

#### JIMMY FALLON LATE NIGHT WITH JIMMY FALLON FEB. 13

"Some of the visitors were senior citizens who remembered the neighborhood and the old plant and how it stunk. They were very pleased to see the new facility. They praised the architecture, they praised the technology, and I got a little bit of praise, too. They were impressed that we have a well-run organization and that we were able to portray the department in such a positive way. I think the people were surprised to be treated so nicely and informed so well."

#### LESSONS LEARNED

Pynn believes there's a lesson in his experience for clean-water operators anywhere. "We provide a hidden service, and the more the public knows about what we do, the better," he says. "If there's any kind of enticement to get the public in — whether it's an environmental fair, an event where you open the plant to future young scientists, or any kind of gimmick — that's a good thing.

"Once you have them there, you need a good, structured program to inform them about what you do. I think the public will really appreciate coming through and seeing what their tax dollars or the money from their water meter bills has allowed your city to do for them." **tpo** 

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Students from the University of Arkansas take a tour of the Woolsey Wet Prairie Sanctuary.

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# Wet and Wild

A PRAIRIE SANCTUARY NEXT TO THE FAYETTEVILLE TREATMENT PLANT IS AN ATTRACTION FOR BIRDS AND WILDLIFE, AND FOR PEOPLE WHO APPRECIATE THEM

#### By Jeff Smith

hen City of Fayetteville officials decided about 10 years ago to build a new wastewater treatment plant to keep up with population growth in surrounding communities, they chose a building site that included a 9.88-acre tall-grass prairie wetland.

To offset the loss of that prairie to plant construction, they created a 43.65-acre wetlands next to the new 10 mgd (average) West Side Wastewater Treatment Plant. Known as the Woolsey Wet Prairie Sanctuary, it has become a major attraction for wildlife and for bird lovers and nature lovers in and around Fayetteville, Ark. (population 74,000). "We get hundreds of people each year who visit and enjoy the sanctuary," says plant operations manager Tim Luther.

"It was like peeling back the layers and giving the native plants a chance to come back, which is exactly what they did." BRUCE SHACKLEFORD

The water level in each of the seven wetland cells can be individually controlled by adjusting stoplogs in the water-control structures. Hydrological modifications were made by building earthen berms using excess soil from plant construction to create a mix of habitats, such as wet meadow, marsh, open water and forested wetlands. Maintenance of the berms primarily involves mowing, done by operations staff members Graydon Carruth and James Rachel.

Another maintenance item is controlled burning, needed to get rid of undesirable vegetation. "Otherwise, invasive grasses like fescue will take over and choke off the emergence of native seeds that have been dormant for many years," Luther says. Other reasons for controlled burning include control of plant disease, reduction of wildfire hazards, improved wildlife habitat, and improved seedling production.

According to environmental consultant/ecologist Bruce Shackleford, who helped design the wetlands,

the goal of the Woolsey Wet Prairie Sanctuary is to restore the native prairie ecosystem. When work on the sanctuary began, there were 47 native plant

species present. At last count, there were 380, and seven of them were classified as species of concern.

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interesting features of your facility's

Shackleford says the original intent was to plant seeds of different species, but soon after construction it became clear that the site, formerly a hayfield and cattle pasture, was full of native seeds that had lain dormant for decades. "It was like peeling back the layers and

giving the native plants a chance to come back, which is exactly what they did," he says.

Controlling the water level in each cell is critical to emerging new growth. Instead of making the cells symmetrical with scraped-off flat bottoms, the designers enhanced the hydrology by following the natural contour of the rolling prairie mounds to create the meandering berms. Instead of having everything at a uniform depth, there are areas with two to six inches of water at certain times of the year. This provides uplands, as well as areas where the soils are saturated but do not have standing water.

"If you have that variation in hydrology, then you are going to have a



greater variation in plant species," Shackleford says. That in turn increases the variety of birds and wildlife that call the property home or use it as a stopover during migration.

Named after the Samuel Gilbert Woolsey family who settled the property in 1830, the site is a source of pride for Fayetteville. In March 2011, the sanctuary won recognition from the National Wildlife Federation as a certified National Wildlife Habitat.

One offshoot of the Woolsey Sanctuary project has been the creation of a species index where staff members can enter species they see on site: birds, insects, mammals, amphibians, and reptiles. "We'll use that over the years to track species diversity," says Bruce Richart, laboratory director and sustainability champion.

Luther observes, "The most important reason why the Woolsey Wet Prairie Sanctuary is so successful is because of the support it gets from the City of Fayetteville and its residents." **tpn**  LEFT: Maintenance of the wetlands primarily involves mowing and controlled burning, done by operations staff members. BELOW: The water level in the seven wetland cells can be individually controlled by adjusting stoplogs in the water-control structures. Hydrological modifications were made by building earthen berms to create a mix of habitats.



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# **Power Down, Revenue Up**

DEMAND RESPONSE PROGRAMS CAN HELP TREATMENT PLANTS CREATE A NEW INCOME STREAM BY CUTTING BACK ON ELECTRIC POWER FOR SHORT PERIODS WHEN REQUESTED

#### By Ted J. Rulseh

hy would an electric utility or an independent system operator (ISO) pay a wastewater treatment plant to use less electricity? Well, because selling less power at certain times on certain days may offer various advantages.

If that seems confusing, then it's worthwhile to listen to Randy Palombi, vice president, load response, with Constellation NewEnergy, a subsidiary of Constellation Energy Group, an energy company based in Baltimore, Md., that through its subsidiaries provides electricity, natural gas, and energy and sustainability solutions to residential and business customers around the country.

The concept behind demand response is that an electric power customer receives a payment from a utility, an ISO, or a third-party service provider like Constellation, in return for agreeing to reduce its power demand by a specified amount, for a specified time, upon request. The customer can then use the dollars received to offset operating costs or to invest in facility improvements.

"Wastewater treatment plants are large users of energy, and anything they can do to reduce their energy costs is appealing. These are 24/7 operations that are also very energy-intensive."

#### RANDY PALOMBI

Wastewater treatment plants, as large energy users, can be good candidates for demand response programs. Palombi talked about the concept and its applications in the clean-water industry in an interview with *Treatment Plant Operator*.

#### **tpo**: In the simplest terms, what is demand response?

**Palombi:** Demand response is really the temporary reduction of energy demand. It's taking action to reduce electric usage — your demand for electricity — upon request. You are adjusting your demand in response to a request, typically from the utility or ISO.

**CPD**: What motivates utilities to offer demand response programs? **Palombi:** It's usually done for one of three reasons. First is for grid stability. The electric grid is a complex network, and power usage and supply have to be in balance at all times, or they risk brownouts or blackouts.

If a demand response program is in place, then when the grid becomes strained, meaning there is more demand for electricity than the available supply, the utility can ask end users who have signed up for the program to reduce their consumption. This is often done through a third party like Constellation Energy who can aggregate numerous end-use customers and provide a much higher level of demand reduction than a utility or ISO could arrange on its own.

Second, demand response is done for economic reasons — it's typically referred to as price-responsive demand response. When the utility or ISO needs more power to meet the demand, they



Randy Palombi

can hypothetically pay certain customers to reduce their usage, for less than it would cost to buy additional power supply.

Third, demand response is done as part of utilities' integrated resource planning, where they look into the future at their demand for electricity and how they are going to deliver the supply. In many cases it's far more economical for the utility to implement a demand response program to deal with peak demands instead of committing dollars to building and maintaining new peak-time power plants. This is especially true in areas where peak-time power plants are only needed a handful of hours per year.

#### **LPD**: What role does your company play in demand response programs?

**Palombi:** We provide demand response services throughout North America including several regulated and all the deregulated electric power markets, which includes primarily California, Texas, New York, and the Middle Atlantic and New England states.

#### **tpo**: Why is demand response appealing to wastewater treatment plants?

**Palombi:** They are large users of energy, and anything they can do to reduce their energy costs is appealing. Some plants we have dealt with have greater than 10 megawatts of demand, and there are plants with loads much bigger than that. These are 24/7 operations that are also very energy-intensive.

#### **LPD**: How much can a wastewater treatment plant expect in incentives for enrolling in a demand response program?

**Palombi:** The economic benefit varies significantly across markets. There are programs in California that pay customers up to \$100 per kilowatt per year — or \$100,000 per megawatt per year — to curtail. In other markets it's as low as \$40,000 per megawatt per year. An average ballpark number is perhaps \$60,000 per megawatt per year.

That's what they receive as a capacity payment, which is simply

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the right to call them to reduce usage. Depending on the program, when we actually call and they do reduce usage, they may also get compensated for the energy they didn't consume. And on top of that there is the avoided cost on the electric bill for that energy. So there can be three benefit streams.

**CPO**: By how much can a wastewater treatment plant reduce its usage for a demand response program?

**Palombi:** The plants we see participating, fall into two categories: those that simply reduce their usage, and those that have backup generation they can run during the time they are asked to curtail demand — they are shifting load from the utility grid to their on-site generators.

For those reducing their usage, on average we see them curtailing their load by about 15 to 30 percent. However, if a plant has backup generators, and they're gas-fired, and gas prices are cheap, the cost to operate those generators can be less than they would earn in demand response payments. So they may elect to participate in a program where they shift more of their load, for a longer period of time, and as a consequence they're going to be compensated more.

**tpo**: Can any wastewater treatment plant take advantage of demand response incentives?

**Palombi:** Demand response is not applicable to every facility under every type of operation. Some installations just can't do it because they don't have the operational flexibility or they don't have the ability to reliably control their loads. The real key is for the user to be able to reduce demand, but not to the point where it's going to affect their process. At the end of the day they need to treat the wastewater — they can't just shut down.



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**Epo**: How are demand response contracts typically structured? **Palombi:** Demand response programs vary greatly from utility to utility and ISO to ISO, but the key parameters participants need to understand are:

- How much notification will you get before you have to curtail? It could be 10 minutes, an hour, three hours, or even a day.
- What is the maximum length of time you can be curtailed per event?

"The real key is for the user to be able to reduce demand, but not to the point where it's going to affect their process. At the end of the day they need to treat the wastewater — they can't just shut down."

#### RANDY PALOMBI

- During what hours of the day, days of the week or months of the year can you be called?
- What are the maximum hours per month and per year that you can be asked to curtail?

Every one of those is defined up front and capped in a contract. For capacity programs, the customers get paid whether they ever get called to curtail load or not. It's an insurance policy for the utility or ISO, giving them the right to be able to call. In markets where brownouts are highly unlikely and capacity prices are low, the frequency of being called is typically very low — but when you do get called, the requirement is that you will be able to comply and drop the agreed-upon load.

**tpo**: Is there a size below which a plant is too small for demand response?

**Palombi:** It isn't so much a matter of size. A big consideration is what type of control they have — how much of their system is automated versus manual. If it's a smaller load but they can adjust that in an automated fashion and it's reliable, then it's less of a barrier that it's a smaller load. On the other hand, if it's a larger load but they have to do it manually or it's less reliable, demand response may be less feasible. That said, we typically look for a minimum of about 200 to

#### "What a lot of entities do is take that money from demand response to help fund other energy initiatives." RANDY PALOMBI

300 kilowatts of curtailment load. If you use the average of 15 to 30 percent of peak, that's about a megawatt of peak demand for the customer.

**tpu**: What are some examples of things treatment plants do to curtail load?

**Palombi:** First and foremost would be their pumps and aeration blowers. Those are large users of energy, and often they have operational flexibility there. They can sometimes divert wastewater to storage ponds during curtailment periods. One of our customers actually shifts wastewater treatment to another facility.

They can also shut off digester mixing and heating systems, depending on their operations. And apart from treatment itself, these facilities have office and storage spaces, where they can do everyday things like turning off unnecessary lighting, adjusting ventilation and air-handling fans, and changing temperature set points.

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**CPO**: Have you seen plants make investments in order to enable them to take part in demand response programs?

**Palombi:** Absolutely. In fact, in a lot of markets there are incentive dollars available to offset some of these costs. In California, for instance, if a treatment plant were to put in automation that would better enable them to participate in demand response, the utilities would pay up to \$300 per kilowatt of load shed for that equipment. This is referred to as AutoDR. It can make a very big difference in the economics of those projects.

Even without the rebate or incentive dollars from utilities and other sources, there are companies using their own capital to make improvements to be able to take part in these programs. I don't know if many would do a project solely for that reason, but there are usually additional benefits associated with it.

Putting in variable-speed drives, for instance, gives you more controllability for demand response while also improving your cost structure for energy usage. One thing that does make a lot of economic sense is putting in controls that allow you to better automate some of your load shedding and load shifting capability.

We see a lot of that today, and a lot of the rebate dollars are going to enhancing SCADA systems and putting in more automation and controls.

**LPD**: How do users take advantage of the incentives from demand response?

**Palombi:** One benefit of demand response relative to energy efficiency or time-of-use rates is that you actually get a payment — a revenue stream coming in to you, as opposed to just a reduction in your bill. What a lot of entities do is take that money from demand response to help fund other energy initiatives. One of our participating water districts in California is using demand response funds to help pay for new pumps and other equipment for an improvement project.

#### **LDO**: Does demand response have any other benefits?

**Palombi:** Yes. There are really three potential benefits to an end user. First there's the financial benefit. Second, there can be an environmental benefit — reducing energy usage, reducing the carbon footprint, reducing NOx emissions, and so forth. A lot of entities are publicizing the heck out of taking part in these programs to get the environmental benefit, and if we move to mandatory cap-and-trade markets for carbon I think that will be a much greater benefit.

And finally there's a societal benefit. We see this for a lot of municipalities. They're being good societal partners; they're shedding load to reduce the likelihood of a blackout or brownout that would affect critical facilities like hospitals.

#### **tpo**: How can a treatment plant go about investigating demand response?

**Palombi:** The first thing I would have them do is reach out to a curtailment service provider like Constellation or to their local utility. What we do is sit down with a prospective customer and talk about their operations, what kind of flexibility they have, what types of loads they have, what strategies they could implement, whether they need any enabling technology. It's basically an energy audit, specific to their site.

We then develop a pro forma to show them how much money they could make by doing demand response, and we create an actual tactical plan of how they would go about curtailing load if they were called upon.

Of course, not all utilities offer demand response programs, so they would have to look at their local utility or ISO and see if they have a program or not. **tpn** 



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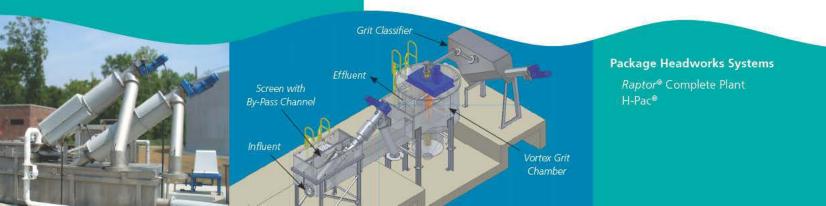
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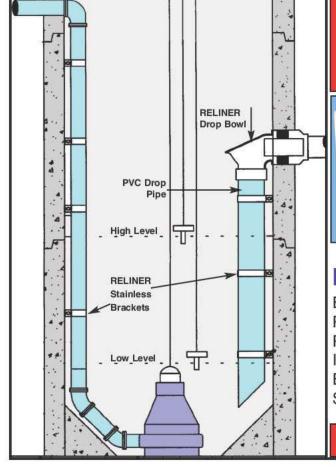
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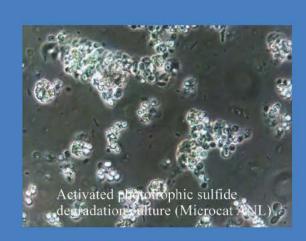
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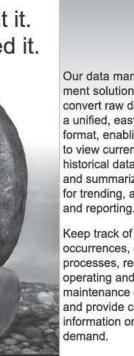
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Nutri-Ject Systems, Inc. P0 Box 398 Hudson, IA 50643 800-798-4205 • 319-988-4205 • Fax: 319-988-3506 scott@nutriject.com www.nutriject.com

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Olympus Technologies, Inc. P0 Box 2326 Eugene, OR 97402 541-689-5851 • Fax: 541-689-5818 info@ti.cc www.oti.cc



ProSonix PO Box 26676 Milwaukee, WI 53226 800-849-1130 • 414-409-7304 info@pro-sonix.com www.pro-sonix.com

#### Sludge - Mixers/Thickeners

**DEL Tank & Filtration Systems** 436 Hwy 83 N Scott, LA 70583 800-468-2657 • 337-237-8400 • Fax: 337-266-7800 sales@deltank.com www.deltank.com Ad on page 65

FKC Co., Ltd. 2708 W 18th St. Port Angeles, WA 98363 360-452-9472 • Fax: 360-452-6880 mail@fkcscrewpress.com www.fkcscrewpress.com

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SPX Flow Technology 135 Mt. Read Blvd. Rochester, NY 14611 888-649-2378 • 585-436-5550 • Fax: 585-436-5589 ft.amer.info@spx.com www.spxft.com

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WesTech Engineering, Inc. 3625 S West Temple Salt Lake City, UT 84115 801-265-1000 • Fax: 801-265-1080 info@westech-inc.com www.westech-inc.com Ad on page 18

#### Sludge Reduction/Treatment



Agriment Services Inc. PO Box 1096 Beulaville, NC 28518 800-641-6981 • 252-568-2648 • Fax: 262-568-2750 agrimentservices@yahoo.com www.agrimentservices.com

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H20 Innovation Inc. 330 Saint-Valiler St. East, Ste. 340 Quebec City, QC G1K 9C5 Canada 888-688-0170 • 418-688-0170 • Fax: 418-688-9259 info@h2oinnovation.com www.h2oinnovation.com

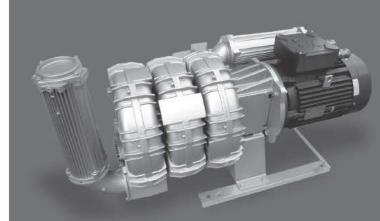
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9735 NorthCross Center Ct., Ste. A Huntersville, NC 28078 704-949-1010 • Fax: 704-949-1020 marketing@hhusa.net www.huber-technology.com Ad on page 7

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Prime Solution, Inc. 610 S Platt St. Otsego, MI 49078 269-694-6666 • Fax: 269-694-1298 info@psirotary.com www.psirotary.com Ad on page 73

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FlowWorks.com 606 Maynard Ave. S, Ste. 201 Seattle, WA 98104 206-859-6999 · Fax: 206-320-9939 sales@flowworks.com www.flowworks.com Ad on page 102

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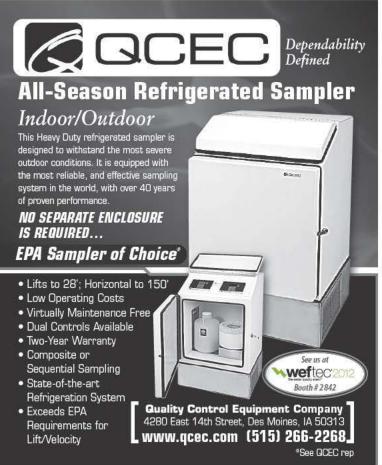
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Inspector Training & Certification: April 27-28, 2012 - Helena, MT Montana DEQ & NAWT Contact: Solid Waste Section at (406) 444-5300 May 30-31, 2012 - Sonoma, CA Instructors: Jacque Sommers and Kit Rosefield Go to www.COWA.org June 14-15, 2012 - Waco, TX Instructors: Jim Anderson and Dave Gustafson Go to www.NAWT.org August 27-28 - (TBA) Arizona Univ. Of AZ - NAWT Contact: Kitt Farrell-Poe at (520) 621-7221

#### Installer Workshops

June 27, 2012 - San Diego, CA Re-Certification Installation of OWTS - NEHA 2012 AEC Instructors: Jim Anderson and Dave Gustafson

October 8, 2102 - Dover, DE DOWRA Conference Contact Hollis Warren at (302) 284-9070 or Htwarren430@aol.com

WWW.NAWT.ORG

Installer Workshops Continued... October 25-26, 2012 - Lakewood, CO CHURCH Onsite Wastewater Consultants Contact Kim Seipp at (303) 622-4126

Operation & Maintenance Training Certification: September 12-13, 2012 - Mill Valley, California

Operation & Maintenance, Level 1 Instructors: Mike Treinen or Kit Rosefield Go to www.COWA.org

November, 2012 - (TBA) California Operation & Maintenance, Level 2 - Instructors: Nick Weigel or Kit Rosefield - Go to www.COWA.org

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#### industry news

#### Layfield acquires Canwest Protective Coatings

Layfield Environmental Systems Ltd., Edmonton, Alberta, a division of the Layfield Group, acquired Canwest Protective Coatings Ltd. of Red Deer, Alberta. The transaction adds in-house, spray-applied liner application to Layfield's portfolio of services.



#### Xylem breaks ground on manufacturing plant

Xylem Inc. broke ground on a 10,000-square-foot addition to its Godwin pump manufacturing facility in Bridgeport, N.J. The expansion will enable the company to better support continuing growth in the dewatering segment.

#### Calgon's UV system receives conditional acceptance

Calgon Carbon Corp.'s Ultraviolet Technologies Division received conditional acceptance of its C3500D wastewater disinfection system from the California Department of Health. The UV system meets the coliform and virus disinfection criteria found in Title 22 of the California Code of regulations for recycled waters that have received treatment through a tertiary filtration process. Recycled waters meeting the microbiological standards can be used for the irrigation of crops and golf courses, recreational waters and other non-potable applications.

#### Ludman Industries moves into new plant

Ludman Industries, producer of compactors, briquetters, granulators flaking and shredding mills, moved into its new 100,000-square-foot testing, manufacturing and assembly plant at 4810 N. 124th St., Milwaukee, Wis. The facility incorporates energy-efficient heating, cooling, light and other "green" initiatives.



#### Ruhrpumpen opens Virginia service center

The Ruhrpumpen pump technology company opened a service center in Hampton, Va. The facility features machine tool and balancing capabilities to repair and rerate API and ANSI centrifugal pumps and related equipment.

# Mazzei names executive team

Mazzei Injector Co. named Paul Overbeck vice president of sales and marketing and appointed Geoffrey Whynot chief operating and financial officer.



#### Kee Safety joins Pacific Industrial Contractor Screening

Kee Safety Inc. joined Pacific Industrial Contractor Screening (PICS) to ensure that its procedures conform to stringent safety standards for the installation of its system and equipment. The company is a supplier of OSHAcompliant fall protection systems and safety railing components. PICS prequalifies contractors by gathering data about the company, verifying its completeness and accuracy, and evaluating its compliance with safety standards.

#### Siemens acquires Cambridge Water Technology

Siemens Industry Automation Division acquired Cambridge Water Technology. Cambridge will become part of Siemens municipal wastewater business and continue to operate out of Cambridge, Mass. Senior managers Charles Hamlin, Steve Woodard and Andy Bishop will join the Siemens management team.

#### ETS begins production at new plant

Engineered Treatment Systems LLC has begun UV systems production at its new Beaver Dam, Wis., plant. The manufacturing facility includes a product assembly area and conference/training room that can accommodate up to 60 people. The new plant, which officially opened in March, is approximately 400 percent larger than the old factory.

#### Sioux Corp. redesigns website

Sioux Corp., manufacturer of pressure washers, steam cleaners and steam generators, redesigned its website, www.sioux. com, adding videos, slide shows and related content.



#### Underground Pipe attends SJE-Rhombus training

Three members of Underground Pipe and Valve Inc. received water and wastewater product training at the SJE-Rhombus facility in Detroit Lakes, Minn. Training included standard and engineered control panel design, operation and troubleshooting and a tour of the facility.

#### Revere opens two offices

Revere Control Systems, Birmingham, Ala., opened offices in Chattanooga, Tenn., and St. Petersburg, Fla. The Tennessee location will contain control panel production and administrative offices. The Florida location will add sales support for existing engineering and service operations.

#### Accela offers mobile inspector app

The Accela Mobile Inspector app provides permitting, licensing and code-enforcement professionals using Accela Automation enterprise software the ability to perform complete site inspections from job assignment to submittal via their iPhones or iPads. **tpo** 

# LARGE-SCALE DISINFECTION

Here's the TrojanUVSigna<sup>™</sup>. It's ideal for those municipalities wanting to upgrade their wastewater disinfection system or convert from chlorine. The system provides high UV output, high electrical efficiency and the lowest lamp count (thanks to TrojanUV Solo Lamp<sup>™</sup> Technology). It's also easy to operate and maintain. Quartz sleeves are automatically cleaned with ActiClean<sup>™</sup>. Lamp replacements are simple. And if you need to lift a bank from the channel, just activate the Automatic Raising Mechanism.

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#### 1. SIMPLE SOLUTIONS AIR RELIEF VALVE

Wolverine air relief valve filters from Simple Solutions Distributing LLC are designed to mount to air relief valves in tight locations. Available in two sizes (ARV-1.2, ARV-5), the valves have a 2-inch FPT inlet for quick mounting. Custom inlets are available. **973/846-7817; www.industrial odorcontrol.com.** 

#### 2. UNIVERSAL FLOW MONITORS VORTEX SHEDDING FLOWMETERS

CoolPoint vortex shedding flowmeters from Universal Flow Monitors Inc. have no moving parts, eliminating the potential for clogging and feature Intrinsic Safety on 1/4-, 3/8-, 1/2-, 3/4-, 1-, 1 1/2- and 2-inch meters. The 4-20 mA three-wire transmitter has a brass body with Viton seals and PVDF sensors. Available in pipe sizes from 1/4 to 4 inches, the meters have a 10:1 turndown ratio and three-digit LED readout, selectable alarm state (N.O. or N.C.) set point or pulse output and choice of gpm or Lpm. **248/542-9635; www.flowmeters.com.** 

#### 3. T&D CO<sub>2</sub> DATA LOGGER

The TR-76Ui CO<sub>2</sub> three-channel data logger from T&D Corp. simultaneously measures and records CO<sub>2</sub> concentration, temperature and humidity. The unit has a CO<sub>2</sub> range up to 5,000 ppm and can store up to 8,000 data sets. Supplied software enables the user to download data to a PC via USB connection, where information from all three channels can be simultaneously viewed in graph or table form. The optional handheld data collector with graphical display enables data to be collected via infrared communication and immediately checked. **518/669-9227**; www.tandd.com.

#### 4. REGAL GAS CHLORINATORS

The Regal gas chlorinator from Chlorinators Inc. disinfects and purifies municipal drinking water and wastewater. The all-vacuum system provides a consistent chlorine residual, is directly mounted and is made of corrosion-resistant materials. 772/288-4854; www.regal chlorinators.com.

#### 5. WATSON-MARLOW CHEMICAL METERING PUMP

The 520RE high-pressure chemical metering pump from Watson-Marlow is designed for applications that require accurate metering, dosing and transferring of harsh chemicals. The pump delivers flows to 55 gph and pressures to 100 psi. The 520 series eliminates ancillary equipment, including dampeners, de-gassing valves, strainers and check valves. **800/282-8823; www.wmpg.com.** 

#### 6. BDP INDUSTRIES DSP SCREW PRESS

The 3012 DSP screw press from BDP Industries, designed for smaller size wastewater treatment plants, handles 75 gpm of septage (400 pounds of dry solids per hour) and produces a cake at least 25 percent solids. The unit measures 8 feet by 16 feet, weighs 4,000 pounds and can be operated unattended. It is fully self-contained with no chance of spills in the operator area. **518/695-6851; www.bdpindustries.com**.

#### 7. BLUE-WHITE A2 METERING PUMP

The A2 peristaltic metering pump from Blue-White Industries is designed for smaller capacity municipal water and wastewater treatment applications. An alternative to solenoid pumps, features include selfpriming, maximum feed of 11 gph, maximum pressure of 125 psi, auto



secondary trim), pulse inputs and remote start/stop. Other features include variable speed motor, tube failure detection and NEMA 4X/IP66 washdown. **714/893-8529; www.blue-white.com**.

#### 8. ENECON LIQUID COATING

ENESEAL CR single-component, water-based liquid coating from ENECON Corp. dries to a durable, corrosion-resistant, elastomeric skin that provides environmental protection to metal and concrete/masonry surfaces. It also can be applied as a top coat over most zinc primers. The coating does not require abrasive blasting and adheres to all types of ferrous metal and galvanized surfaces. It can be applied by brush, roller or spray and cleans up with soap and water. **888/436-3266; www. enecon.com.** 

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# product spotlight

#### **Control Monitor Protects Against Blower Failure**

By Ed Wodalski

Com-paK Plus rotary-lobe blower packages from Kaeser Compressors convey powder or granular bulk solids with pressure or vacuum and provide wastewater tank aeration.

The units are available with integrated safeties and controls. Features include the Omega Control Basic monitor and self-protection system. The controller monitors onboard sensors and switches (mounted, piped and wired at the factory), indicates when maintenance is needed, and automatically shuts down the blower to prevent failure.

The differential pressure sensor on the inlet filter/silencer notes when the filter needs service and shuts down the blower if inlet losses are too high. Pressure and temperature transducers on the inlet and outlet of the blower directly measure critical parameters. PTC thermistors embedded in the motor windings monitor temperature.

Factory-installed options include a speed sensor on the blower that indicates if there is a problem with the belt drive and oil level sensors to ensure lubrication. The CE-marked and UL-tested blower packages are ready to operate, suitable for remote installation and carry the EMV safety certification for electromagnetic compatibility (emissions and immunity) and EMC Directive 89/336/EEC compliance.

A six-sided enclosure allows for side-by-side installation and full service access. All routine maintenance points are accessible from the front, and service and utility connections are in the rear. Dry contacts are included for SCADA output.

Integrated packages with variable-frequency drive have pushbutton speed control and PID loop 4-20 mA control. The series is available in 7.5 to 100 hp with capacities up to 1,400 cfm and pressures to 15 psi.

"Blowers are very simple machines," says Calvin Wallace, sales manager-Omega. "You have two rotors that spin in a housing. It takes air from one side of the casing and puts it into the pipe. What makes our blowers unique is their self-protecting design. If someone closes the wrong valve or doesn't put oil in, or if they don't clean the filter or the cabinet gets too hot, the blower simply shuts itself off and sends the operator a message."

The standard design includes a sound-attenuated enclosure. Anti-vibration pads absorb vibration before it reaches the floor or enclosure. Kaeser Omega Plus tri-lobe blowers have pressure-equalization channels that reduce pulsations and stress to sensitive equipment. "Internal pulsation dampening in the blower removes 95 percent of the pulsation in the blower housing," Wallace says. "Our blowers are in the neighborhood of 72 decibels. In almost every case we can produce blowers with noise levels below 85, which is the OSHA limit," he says.

Options include the Omega Frequency Control (OFC) for continuous blower speed adjustment and Kaeser Start Control (STC) for reduced-current starting and enhanced instrumentation. A Sigma Air Manager (SAM) that can control up to 16 units and air-cooled aftercoolers for temperature-sensitive applications are available. **877/596-7138; www.kaeser.com/omega**.



# 

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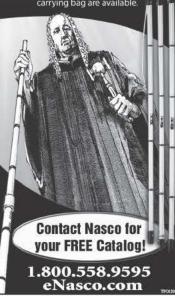
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# people/awards

The Hill Canyon (Calif.) Wastewater Treatment Plant was recognized by California OSHA for exemplary safety practices and was awarded Safety and Health Achievement Recognition Program (SHARP) status. The SHARP award goes to employers who develop and maintain advanced health and safety programs that meet or exceed state and federal OSHA requirements and who demonstrate commitment to employee health and wellness.

The Fort Myers Beach (Fla.) Wastewater Treatment Plant received a Domestic Wastewater Treatment Plant Excellence Award from the Florida Department of Environmental Protection.

The U.S. EPA Region 1 (New England) Office announced these awards:

- · Vermont wastewater treatment plants and operators, for their efforts in response to Hurricane Irene
- · Claremont (N.H.) Wastewater Treatment Plant, exceptional work in operations and maintenance
- Fields Point (R.I.) Wastewater Treatment Plant, outstanding work
- · Greenfield (Mass.) Wastewater Treatment Plant, exceptional work in operations and maintenance
- · Kevin Cini, chief plant operator for the City of Groton (Conn.) Wastewater Treatment Plant, operator excellence
- · Donald Schagen, superintendent of the Lebanon (N.H.) Wastewater Treatment Plant, operator excellence
- · Maine Wastewater Control Association, outstanding work
- Manchester (N.H.) Wastewater Treatment Plant, Regional Pretreatment Program Excellence Award

# It's your magazine. Tell your story.

TPO welcomes news about your municipal wastewater operation for future articles:

#### Hearts and Minds:

Your public education and community outreach efforts.

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Interesting features of your facility's grounds, signage or buildings.

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Improvements at your facility

that help the environment.

Greening the Plant:

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

• Janine Burke, executive director of the Warwick (R.I.) Sewer Authority Treatment Plant, operator excellence

The Northwest District of the Arkansas Water Works & Water Environment Federation announced these awards:

- Tim Copeland, Holiday Island, Wastewater Operator population less than 5,000
- Pat Sharp, Rogers Water Utilities, Wastewater Operator population more than 5,000
- Mike Roberts, City of Bentonville Wastewater Treatment Plant, Manager of the Year - Wastewater
- Holiday Island, Small System Award Wastewater
- · Roman Rios, City of Bentonville Wastewater Treatment Plant, Laboratory Professional - Wastewater
- Nancy Busen, City of Bentonville Wastewater Treatment Plant, Recognition Award

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

# education

#### Alaska

- The Alaska Water Wastewater Management Association has these courses: • May 21-22 - Operator Shortschool, Sitka
- May 24-25 Operator Spring Shortschool, Anchorage Visit www.awwma.org.

#### Mississippi

The Mississippi Water Environment Association has a Biosolids course on June 5. Visit www.mswea.org.

#### New York

- The New York Water Environment Association has these courses:
- May 8-June 5 Activated Sludge, Stone Ridge
- May 16 Asset Management for Wastewater, Bergen Point
- June 20 Confined Space Awareness, Fishkill
- June 26 Operation and Maintenance Training, Wallkill Visit www.nywea.org.

#### North Carolina

The North Carolina AWWA-WEA has a Physical/Chemical Wastewater Operators School seminar May 1-4 in Raleigh, N.C. Visit www.ncsafewater.org.

#### Ohio

The Ohio Water Environment Association has a Collection Systems Workshop on May 10 in Lewis Center. Visit www.ohiowea.org.

#### Texas

The Water Environment Association of Texas has a Laboratory Topics Seminar June 6-7 in Austin. Visit www.weat.org.

#### Wisconsin

The Wisconsin Department of Natural Resources is offering these courses:

- May 3 SSO, CMOM and Security, Eagle River
- June 6 Customer Service, Richfield
  - June 7 Classic Collection Systems, Watertown
  - June 7 Wastewater Treatment Processes, BNR and Troubleshooting Wastewater Problems, Tomah

Visit www.dnr.state.wi.us. tpo

#### **CALENDAR OF EVENTS**

#### April 29-May 2

Arkansas Water Works & Water Environment Association Annual Conference, Hot Springs. Visit www.awwwea.org.

#### April 30-May 2

Oklahoma Water Environment Association and American Public Works Association Joint Technical Conference, Renaissance Hotel and Convention Center, Tulsa. Visit www.owea.org.

#### May 1-3

Montana Water Environment Association and Montana Section of the American Water Works Association Joint Conference, Holiday Inn Grand, Billings. Call 406/546-5496 or visit www. montana-awwa.org.

#### May 7-11

Alaska Water Wastewater Management Association Annual Conference, Westmark Hotel & Convention Center, Fairbanks. Call 800/544-0970 or visit www.awwma.org.

#### May 13-18

New Jersey Water Environment Association Annual Conference, Bally's Atlantic City. Call 201/296-0021 or visit www.njwea.org.

#### May 14-17

Central States Water Environment Association Annual Conference, Pheasant Run Resort, St. Charles, III. Visit www.cswea.org.

#### May 20-23

West Virginia Water Environment Association Annual Conference, Grand Pointe Conference and Reception Center, Parkersburg. Visit www.wv-wea.org.

#### May 21-22

Louisiana Water Environment Association Spring Conference, Lindys Bogs Conference Center, New Orleans. Visit www.lweaonline.org.

#### June 3-6

Water Environment Federation Collection Systems 2012: Show Me The Green – Confluence of Planning, Implementation and Regulations, St. Louis Convention Center. Call 703/684-2441 or visit www.wef.org.

#### June 3-6

New England Water Environment Association Spring Conference, Newport (R.I.) Marriott. Visit www. newea.org.

#### June 3-6

Pennsylvania Water Environment Association Annual Technical Conference and Exhibition, Penn Stater Conference Center and Hotel, State College. Call 570/549-2204 or visit www.pwea.org.

#### June 4-6

New York Water Environment Association Spring Conference and Exhibition, Hyatt Downtown, Buffalo. Call 315/422-7811 or visit www.nywea.org.

#### June 5-8

Mississippi Water Environment Association Annual Conference, Hollywood Casino Meeting Center, Bay St. Louis. Visit www.mswea. org.

#### June 19-21

Ohio Water Environment Association Annual Conference, Bertram Inn and Conference Center, Aurora. Call 440/829-8405 or visit www. ohiowea.org.

#### June 24-27

Michigan Water Environment Association Annual Conference, Boyne Mountain Resort, Boyne Falls. Call 517/641-7377 or visit www.mi-wea.org.

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