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MAY 2014

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Jason DeMichele  
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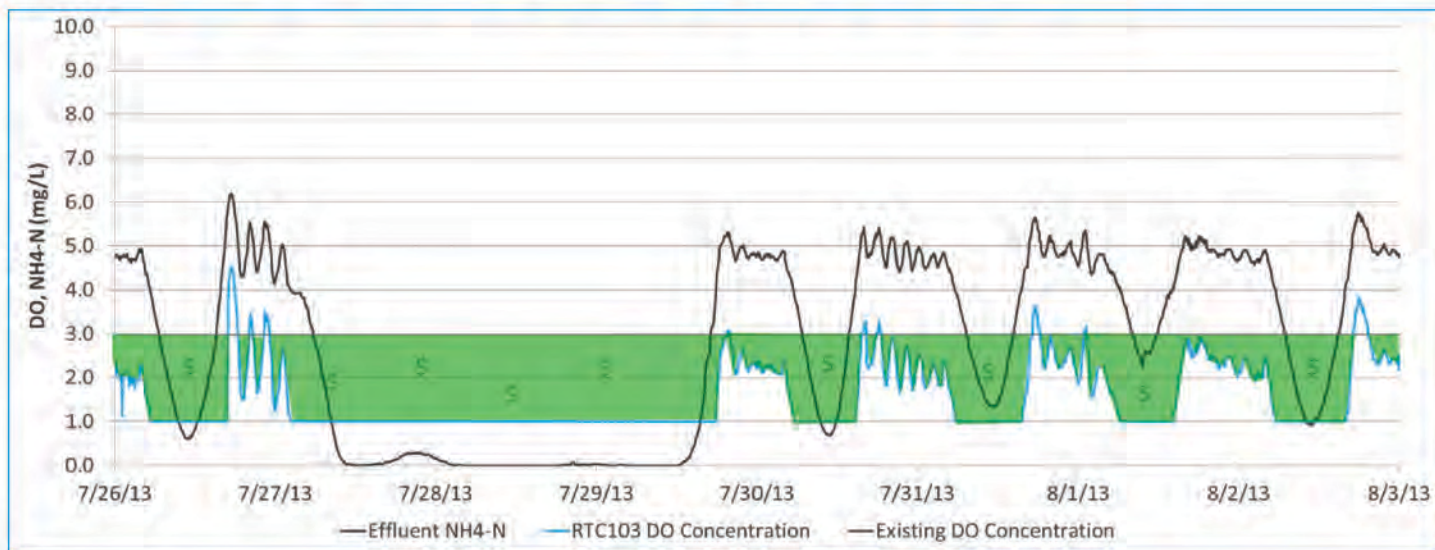
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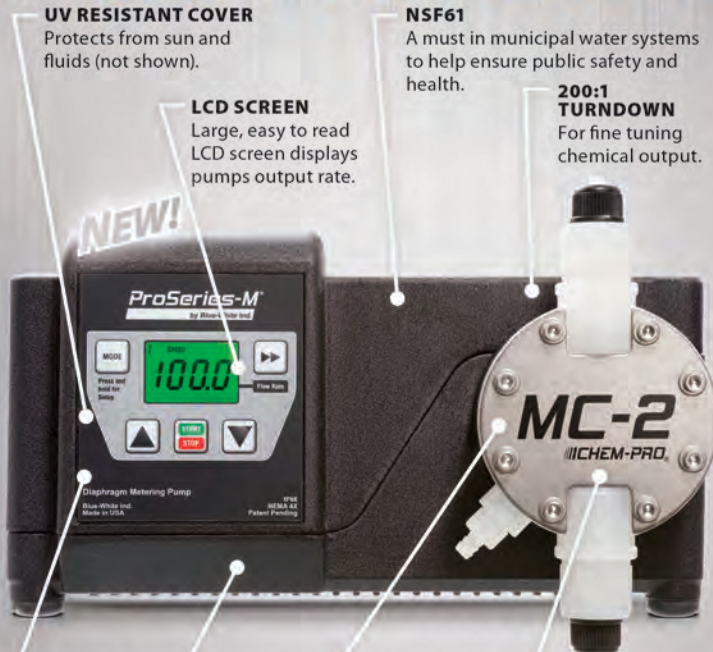
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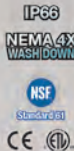
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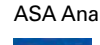
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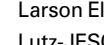
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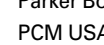


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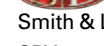


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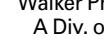
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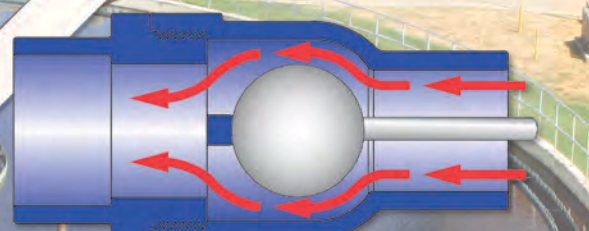


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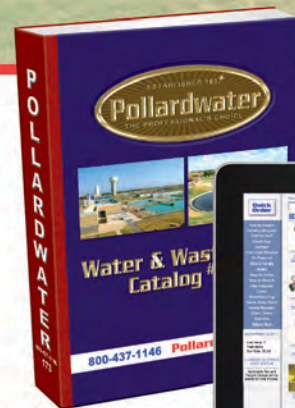
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let's be clear

## Power Marriage

FROM REMOVING TEDIOUS, UNPLEASANT CHORES TO HELPING DELIVER HIGHER-QUALITY END PRODUCT, AUTOMATION ELEVATES PEOPLE AND ADVANCES THE CLEAN-WATER PROFESSION

By Ted J. Rulseh, Editor



When I talk to longtime clean-water plant managers about staffing, it usually turns out they had more people on their teams 15 to 20 years ago than today.

Some of that no doubt has to do with belt-tightening — budgets now are about as stressed as they've ever been. But a bigger reason most likely is automation: Better technology means fewer people can accomplish as much or more.

So, does automation cost jobs? No one really likes to talk about that side of things — but the simple fact is, yes, machines do replace people. But, more to the point, what they largely replace are jobs that people

hate doing or that force people to work at things far below their creative and productive potential.

### NATURAL PROGRESSION

Automation is inevitable if only because of human nature: We want to avoid unpleasant work and wasted time. That's why to heat our homes we prefer thermostat-controlled gas furnaces to chopping wood and hand-feeding stoves. And it's why we enjoy little conveniences like speed-dial phones and automatic coffee makers.

You see things of similar nature around clean-water plants. There are self-cleaning bar screens in headworks because operators don't like hand-raking debris (and managers don't like paying for the labor to do it). The same basic thing is true of grit-handling systems like the one described in this issue's "How We Do It" feature.

Many older plants today are making transitions from manual operations to SCADA process control. Now instead of having to walk all over the facility to read instruments and record data, operators can monitor, control, document and report nearly everything from a single computer terminal.

Does all this automation make the people less valuable? No, it makes them more so. Because now, instead of spending a large slice of their days using their muscles to travel around the plant, they can use their brains (aided by intelligence from the computers) to refine processes and make better effluent more consistently and efficiently.



## CORE BENEFITS

So it's worthwhile now and then to reflect on the benefits of all this automation, and to be thankful for it. Here are a few of the basic advantages:

**Safety.** Machines ensure that people no longer have to lift and carry heavy objects. Instruments detect hazardous gases. SCADA monitoring means people don't have to climb ladders to read meters in remote places.

**Job satisfaction.** In the old days, wastewater treatment could be a dirty, smelly job. Today's equipment makes it much less so. Freedom from nasty jobs helps operator morale. And clean, low-odor facilities are more likely to interest potential future operators who come through facilities on tours.

Now, instead of spending a large slice of their days using their muscles to travel around the plant, operators can use their brains to refine processes and make better effluent more consistently and efficiently.

**Accuracy.** Think how easy it is to make mistakes when measuring things, or taking instrument readings, recording results by hand, and then transcribing data into required report forms. Computerization helps ensure that measurements are correct in the first place and only need to be entered one time.

**Efficiency.** In the kids' book, *Mike Mulligan and His Steam Shovel*, Mike bragged that he and his iron partner Mary Anne could "dig as much in a day as a hundred men could dig in a week." You get the idea.

**Insight.** Computerized processes make it possible to collect and analyze data in ways that would be difficult or impossible by manual means. Good data can deliver valuable insights that inform operating improvements — the opposite of "garbage in, garbage out."

**Cost savings.** Yes, technology takes an initial investment, but generally with an expectation of fast economic payback through saving on labor, materials and energy.

## STRONG MARRIAGE

There's a saying attributed (probably in error) to Albert Einstein: "Computers are incredibly fast, accurate and stupid. Human beings are incredibly slow, inaccurate and brilliant. Together they are powerful beyond imagination."

That really sums up the benefits of automation. The marriage of human and machine is powerful indeed. You are welcome to share your perspectives on this topic. Send me a note to [editor@tpomag.com](mailto:editor@tpomag.com). I promise to respond, and we'll include a sampling of comments in a future issue. **tpo**

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Mike Hecker with one of the displays he used in the Brown Bag session.

## IDEA OF THE MONTH:

# Brown-Bagging It

By Ted J. Rulseh

When the Colorado city of Fort Morgan launched a series of Brown Bag Lunches to help residents learn about city departments, Mike Hecker was glad to make his department first in line.

Hecker, superintendent of the 2.25 mgd (design) City of Fort Morgan Wastewater Treatment Plant, addressed people at a Feb. 11 lunch at the local library and museum. According to a news story in the *Fort Morgan Times* newspaper, his audience was bigger than the typical turnout for previous series of monthly Brown Bag sessions. "The little room we used was pretty full," Hecker says.

Such presentations are one way in which clean-water operators can work toward achieving the status of the fire chief.



## IT'S THE BUGS

To set the tone, Hecker passed out the plant's brochure, which shows a young boy looking into a toilet and a headline, "Ever wonder where it goes?" Twenty-three years in the industry make him well qualified to answer. He walked the group through a slide presentation showing the plant's treatment stages, from primary settling, to secondary aeration and biological nutrient removal, to UV disinfection before discharge to the South Platte River.

"I went through the whole process, and I focused on the microorganisms that do all the hard work out here," Hecker says. As a prop, he used a paper model of the plant.

The newspaper said the audience seemed impressed. "You're actually putting better stuff into the river than is already in it — wow!" one attendee told the paper. Another observed, "He's so descriptive, and he does it on a scale that doesn't require you to have a lot of education to understand."

## CAREER POSSIBILITIES

Hecker didn't waste the opportunity to make a pitch for his business as a source of career opportunities. "You don't have to have a four-year degree to become a wastewater operator," the newspaper quoted him as saying. "I wish more kids would become involved. There's going to be a big need. A lot of people have a bad idea about this industry. They think we're rolling around in the muck 24/7. As you can see, we're not."

Andrew Dunehoo, instigator of the Brown Bag Lunches, told the paper, "Mike is the epitome of that phrase, 'If you never want to work a day in your life, love what you do.' People need to know these things so they don't take it for granted and understand how it works."

Dunehoo invited Hecker to speak after sitting in on his presentation at a meeting of city department heads. Since the Brown Bag lunch, Hecker has accepted speaking invitations for the local Rotary and Optimist clubs. Earlier this year, about 40 children in a local home-schooling network toured the plant.

"We encourage the public to get to know us," says Hecker. "I wish we would get more response." He's not at all shy about taking his message in front of the public. In fact, he says, "I like doing it." **tpo**



## Leave the names alone

I do not support the movement to change the titles of wastewater treatment plant operators. The idea behind the movement seems to be that operators would gain respect by giving themselves a title that sounds more appealing. The opposite is true.

For example, I am thinking of looking for a new apartment. When I do, the landlords will ask me what kind of job I have. If I tell them I am a water resource recovery specialist, or a clean-water operator, they will ask what that means. When I tell them that means I operate part of a sewage treatment plant, they will realize that I am trying to sanitize my job title, and think less of me, not more.

The title of your article ("Let's Be Clear," January 2014) asked, "What's in a name? Or a title?" The answer is honesty. If I tell people I am a wastewater treatment plant operator, they sometimes react with disgust. They should, because being an operator is occasionally a disgusting job. I can fix being disgusting by taking a shower, and putting on clean clothes. It is harder to repair the damage to my reputation caused by a dishonest job title.

When people look down on me because I am an operator, I don't mind. I like to be underestimated by people, because that makes it easier to impress them, and thus gain their respect.

Sincerely,

**Jonathan Field**  
**Operator In Training**  
**Fairfax County, Va.**

## Prefers the term 'recycling'

Concerning plant names and job titles, I would prefer that plants be called "raw water recycling plants" and that operators be called "water recycling specialists."

I work with Gulf Coast Authority at the 40-acre industrial wastewater treatment facility in Texas City, Texas. GCA has provided regional wastewater treatment services since 1974. We serve two chemical plants and a marine terminal operation. Wastewater is transported by pipeline to our facility, where it is treated with oxygenated sludge.

The treated stream is then polished in a series of retention ponds before discharge to the Texas City ship turning basin. We have a treatment capacity of 15.7 mgd (5-6 mgd average). I have a B license in wastewater and am lead operator on my shift.

**Clifford Pabón**

## Respect follows knowledge

I am of two minds regarding this subject. Does the industry need a more positive reputation among the non-wastewater general public? Sure it does.

Does changing the name from "sewage treatment plant operator" to "water reclamation facility specialist" help in this effort? I don't think so, but I don't really know. One thing I do know is that if you put a tutu and lipstick on a pig, it's still a pig.

The thing that needs to be done is to educate the public in what it is we really do, and what it is we have to know to be able to do what we do. Then the respect will come. When I married my wife, her 13-year-old daughter wouldn't tell her friends what it was I did for a living. Now, some 21 years later, she has no such qualms. She's proud of the work I do. It's not what we call ourselves, it's what people know about what we do that will make the most difference.

And speaking of specialists, if you're a clean-water plant specialist, what is your specialty? Process control testing? Troubleshooting? Maintenance?

Instrumentation? Laboratory analysis? It would make more sense to call yourself a generalist, as you have to do so many things well that you're really not a specialist, are you?

And, by the way, if we need to change our titles, shouldn't this periodical change its name from *TPO* to *WRS* (Water Reclamation Specialist)?

**David E. Boyer**  
**Compliance Coordinator**  
**Public Utilities Department**  
**Unified Government of Athens-Clarke County, Ga.**

## Proud to serve

I grew up on a dairy farm in Wisconsin. Upon graduating from high school in 1976, I enlisted into the U.S. Air Force. My job was to operate, maintain and repair water and wastewater treatment plants; my title was environmental support specialist.

After completing one year of on-the-job training and a Level 5 correspondence course, the title changed to environmental support technician. In essence, I was the operator, mechanic, electrician, lab technician, and administrator. I am proud to be in the water and wastewater industry — 35 years and still going strong.

**Dave Humpal**  
**Assistant Superintendent**  
**Town of Brownsburg, Ind.**

## Better names needed

The whole root of the issue as I understand it is that our titles do not accurately reflect what we do. Mine, for instance, is "co-superintendent, wastewater treatment facility." Our staff members are called "utility operators." Neither name is bad by any means, but they surely could be better. We have gotten away from calling our facilities "sewage treatment plants" or "sewage disposal plants" and have upgraded to "wastewater treatment facilities" for the same reason. We must have expanded our vocabulary in the past 25 years. Also, we no longer use the word "sludge." We now use the word "biosolids."

**Operators** are by first perception someone who turns on a machine, pushes buttons, and when the job is done, turns it off. This sounds too mundane, boring, requiring a minimal skill set. Anyone can flip a switch or push a button.

A **specialist** is an expert operator, troubleshooter and repair technician. A problem solver. An authority on the subject. Isn't that what we really do at our facilities? I think so. It's what our staff does at our facility. These are not Webster's definitions, but I think most people perceive these titles as described.

When you go to the doctor for a serious problem, do you wish to see just a doctor, or a specialist? When you have a whole community depending on outstanding water resources, would you wish to have an operator in charge, or a specialist? We are specialists. There is no false glorification of our positions by renaming them.

I am all for changing the titles and names of our facilities for the following reasons:

- We need to eliminate any negative wording in order to attract our young people into this profession.
- We need to promote the importance of what we do. We serve mankind by protecting the public health, the environment and arguably our most valuable resource: clean water.

When I enrolled at Vermilion Community College in Ely, Minn., the program was called Water Resources with a Hydrology option or a Pollution Control option.



I like the titles of “water resource protection specialist” and “public water supply specialist,” or some variation of these. We should change the titles not so much for us, but for those who come after us. We have to do a better job of selling the profession than we are currently doing.

I would like our facility name to change to “water resource preservation facility” or “water resource protection facility.” To me, these names depict what our purpose is in a more positive way than “wastewater treatment facility.” Plus, it really doesn’t cost anything to change a name, compared to other things that we could do. Let’s waste the waste!

**Al Gorick**  
**City of Bemidji, Minn.**  
**Co-Superintendent**  
**Wastewater Treatment Facility**

## Call them specialists

I enjoy reading *TPO* and *WSO* magazines — they provide me with current news. I truly believe the title “specialist” would give a professional image. I’ve worked in wastewater collections for 10 years, first conducting internal pipe inspections on wastewater mains 6 to 120 inches. My current position is in the Operations Support section.

We play a vital role in the collection and transport of untreated liquid waste through a network of pipes, lift stations and manholes, getting it to the wastewater treatment plant quickly as possible to avoid septic conditions, which would make the operators’ job of treating the waste harder. Our work involves knowing about the components, construction, maintenance and operation, industrial waste monitoring (pretreatment) and, most important, the safety of the collection system.

I take pride in and enjoy my work, but I never see any articles in *TPO* on the wastewater collections operator. Your material helps me be a better employee.

Thank you,  
**Gregory E. Banks**  
**Wastewater Collection Division**  
**Dallas Water Utilities**

*Editor’s note:* Much more about collection systems can be found in a sister publication of *TPO*, *Municipal Sewer & Water*.

## What *TPO* needs

This magazine is missing information operators need. We want to read about solutions to plant problems with pictures of equipment. For example, a pipe delivering sodium bisulfate to a chemical controller was frozen and solved by ...

Another example is a tool someone made that makes us be more successful in everyday duties. Maybe someone came up with a creative, cheap way to remove thick sludge from an aeration basin?

It is very frustrating not learning about examples of work schedules that operators like to work. Many plants have horrible work schedules and the boss will not make changes because the employees do not have a solid solution and cannot show examples on paper. Or talk with a boss who got positive results from employees.

This is what operators in California want to read about, and we like to look at pictures of plant equipment, process flow diagrams, before and after projects, and so on, not people. But my favorite part of the whole magazine is reading Ted J. Rulshch and Sam Wade articles. Thank you for reading my thoughts.

**Abraham Perry**  
**Calistoga, Calif.**



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# Making 'Lemonade'

A BOOTH AT THE ANNUAL CALIFORNIA LEMON FESTIVAL HELPS THE GOLETA SANITARY DISTRICT REACH THE PUBLIC AND BUILD SUPPORT FOR ITS INITIATIVES

By Craig Mandli

**W**hen presented with a bushel of lemons, the crew at the Goleta Sanitary District knows just what to do. The district, a longtime participant in the annual California Lemon Festival, hosts a fun and interactive booth that invites attendees inside the world of wastewater treatment. In essence, they're making educational lemonade.

The district has operated a booth at the festival since 2001 and, according to Teresa Kistner, industrial waste control officer and de facto marketing director, it's all part of an effort to shed a bright light on the importance of wastewater treatment.

"Why should wastewater treatment only be in the news when there's an issue with water quality, or when citizens are upset by their sewer rates increasing?" says Kistner. "Our thought is that if the pub-

"If people in the community can see what we do, they are more likely to be in our favor when we have to make a decision that affects sewer use fees. It's more than that, though. We want people to know that if they have a problem, there is someone who cares waiting to help."

**TERESA KISTNER**

lic knows what we do and who we are, they'll be on board with the decisions we make and support our role in protecting public health and the environment."

## PITCH AND TOSS

For the first eight Lemon Festivals, the district displayed models and diagrams of treatment plant machinery and showed sterilized samples of wastewater, from influent to final effluent. Attendees asked many questions, which staff members were happy to answer.



PHOTOS COURTESY OF GOLETA SANITARY DISTRICT

They also led a Down the Drain game with pipes for wastewater, treated water and reclaimed water. Visitors tossed lemons into the pipes to win prizes, such as key chains, bottle openers and magnets, printed with the district's contact information. The staff also invited people to visit the wastewater treatment plant open house, usually held within a couple weeks of the festival.

While the game was fun, Kistner questioned whether a message was getting through. "People had a blast playing the game, but they really weren't learning anything about wastewater treatment," she says. "So we went back to the drawing board and came up with the spinning wheel game."



A Lemon Festival attendee plays the Goleta Sanitary District's "Down The Drain" game, a highlight of the district's festival exhibit from 2001-08.



## RECYCLED CONTENT

The spinning wheel, which made its debut in 2009, is made from recycled treatment plant parts. The wheel is a stainless side of a screening/mixing drum from an old belt press. The pole is an old metal fence post, secured into a pulley from an old grit pump. For stability, this heavy wheel is anchored to a base made from a large round drip pan. Surplus bearings and gasket material provide smooth spinning and a means for the wheel to slow and stop on a number.

"It's really a work of love and ingenuity from our great crew and Jeff Salt, our operations supervisor," says Kistner.

The face of the wheel is divided into 16 pie pieces, each with questions that quiz attendees on such topics as sustainable practices, wastewater treatment, environmental protection and future wastewater innovations. Visitors spin the wheel, answer the matching question (all answers appear on the displays in the booth), and write their name on a card. A raffle is held every 15 minutes, and the winners receive a KleanKanteen reusable stainless steel water bottle printed with the district's logo, phone number and Web address.

The game exceeded expectations the first year: In two days, 619 people played, and 62 received water bottles. The booth has remained busy each year and, more important, citizens take home knowledge about the district and why its role in the community is important. "I think the spinning wheel game is much more effective engaging people at the Lemon Festival," says Kistner. "Many of the people ask follow-up questions or want us to clarify something on one of our displays. That shows us they take interest in what we we're putting out there."

While locals are used to the district's involvement in the festival, tourists and out-of-towners are often surprised to see the wastewater treatment display in among crafts, art and the smorgasbord of foods. "We've gotten some puzzled looks over the years, which is to be expected," says Kistner. "Often those people are extremely interested in what we do once we start talking to them. Many are from other areas of California and are very interested in ways to

conserve potable water. We're all environmentalists at heart, so we love talking about that."

## OUT AND ABOUT

The Lemon Festival is just one part of the district's outreach. Besides the annual open house, the district regularly invites school groups, service organizations, youth groups and "basically anyone who's interested" to tour the treatment plant, says Kistner. She and other district employees also make presentations on the treatment process at schools.

"For four years we geared our open house toward kids and decorated our facility for an Environmental Safari adventure to teach about the treatment works," says Kistner. "We've done programs for kids anywhere from kindergarten through college age and have given numerous presentations to commercial and industrial businesses. (continued)

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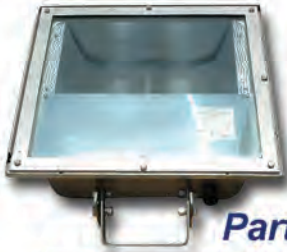
The festival display included a lemon tree irrigated with reclaimed water.





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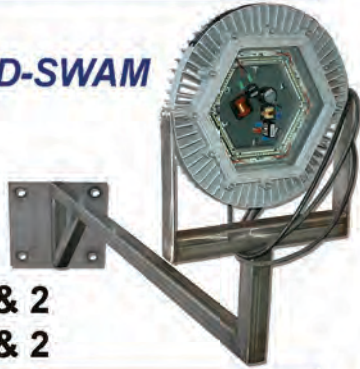


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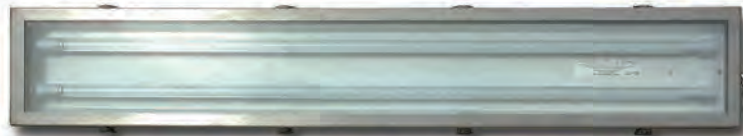
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The district's California Lemon Festival team includes, from left, Juan Ramirez, collection system Grade II; Teresa Kistner, industrial waste control officer and de facto marketing director; and Justin Graves, collection system Grade I.

When someone asks us to do something educational, we make a concerted effort to accommodate."

Community members aren't the only ones interested. Kistner has long been involved in the California Water Environment Association, giving presentations on the importance of public outreach. The district has also shared tips with other municipalities, such as the City of Napa Conservation Program, which introduced its own spinning wheel game at the 2011 Napa Earth Day event.

"We enjoy bouncing ideas off others in the industry," says Kistner. "Any time we can talk to someone from a different municipality about our public outreach and what they're doing or want to do, I consider it a great opportunity."

### TRUE BELIEVERS

District staff members are proud of their work and aren't afraid to let others know. According to Kistner, while no one on staff has formal public relations training, their enthusiasm is easy to see when they interact with the community. "Mine is really a behind-the-scenes job, to implement the pre-treatment program, not necessarily community outreach," she says. "Our staff is full of people who are fun and easy to work with, and they genuinely like talking about what they do. We do it because it creates respect for the industry."

The benefits for the citizens are twofold. "If people in the community can see what we do, they are more likely to be in our favor when we have to make a decision that affects sewer use fees," she says. "It's more than that, though. We want people to know that if they have a problem, there is someone who cares waiting to help."

Kistner has seen the benefits of the public outreach. The Goleta Sanitary District Governing Board of Directors, along with Salt and Kamil Azoury, general manager/district engineer, have thrown their support behind the initiative, allowing staff members the time and resources they need to educate the public. "This is one of those industries where it is truly out of sight, out of mind," says Kistner. "The sewers are all underground, so people take them for granted. We want to bring them to the forefront." **tpo**

### What's Your Story?

**TPO welcomes news** about your public education and community outreach efforts for future articles in the Hearts and Minds column. Send your ideas to [editor@tpomag.com](mailto:editor@tpomag.com) or call 715/277-4094.





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## PROBLEM PATROL

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## PLANT AWARDS

### Effluent Beauty Contest

The judges held the water up to the light, swirled it around and then inhaled sharply. This was not your typical water contest. The prize at stake was not “best-tasting water” or “best tap water.” This was the first-ever Rhode Island “Excellence in Effluent” contest, designed to recognize the state’s wastewater treatment plants. Learn more about the judging criteria and how you can start a similar competition in your state.

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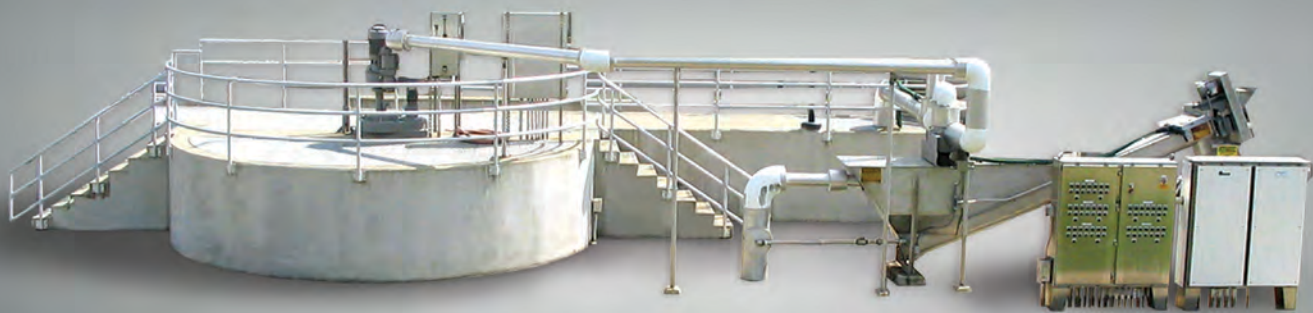
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The Lee Wastewater Treatment Plant is located in the picturesque Berkshire Mountains of western Massachusetts. (Photography by Ed Collier)

# Designing for *Excellence*

A PROGRESSIVE MASSACHUSETTS TOWN REPLACED A 40-YEAR-OLD PLANT WITH NEW TECHNOLOGY TO TREAT HIGH FLOWS AND MEET STRINGENT PHOSPHORUS LIMITS

By Trude Witham

THE TOWN OF LEE, MASS., IS KNOWN AS THE GATEWAY to the Berkshires, and for its New England charm. This progressive town of 5,200 is also home to an award-winning wastewater treatment plant.

The new facility was long overdue. The original 1 mgd extended aeration activated sludge plant was 40 years old, and most equipment was approaching or exceeding its design life. “In 2005, the town received a consent decree from the state Department of Environmental Protection to upgrade or build a new plant to treat high flows, which sometimes reached 4.88 mgd from heavy rain and snow melt,” recalls Alan Zerbato, plant supervisor and chief operator.

Planning for the new plant began in January 2005, construction started in July 2006, and the plant was commissioned in March 2008. It cost \$22.2 million, paid for with a 20-year loan at 2 percent interest.

Plant operators were challenged to learn the new equipment and tweak it to get the best results. Later, they had to contend with a stringent new permit limit on total phosphorus. They succeeded on both counts, and the plant won the 2012 regional U.S. EPA Wastewater Treatment Excellence Award for efficient operation and performance.

## CHOOSING TECHNOLOGY

After receiving the consent decree, town leaders formed an oversight committee charged with choosing an engineering firm to look at new treat-

ment technologies. The committee evaluated the technologies, while considering energy efficiency.

“I was a member of the committee, as were other volunteers from the town,” says Zerbato. “We all had different areas of expertise. We put in a lot of time and really did our homework. Our Public Works superintendent, Chris Pompei, who oversaw the building of the new plant, put a lot of time into the project and was very supportive during the transition.”

The consensus was to go with sequencing batch reactor (SBR) technology. The plant also includes \$83,000 worth of energy efficient equipment: motors, variable-frequency drives, automated lighting and instrumentation that controls on-off times for the blowers and mixers. The Metcalf & Eddy engineering firm designed the plant, and C.H. Nickerson was the general contractor.

## FROM OLD TO NEW

Key features of the new plant include:

- Influent screening, grit removal and rotary drum thickener for sludge processing (Huber Technology)
- Influent pumping system (Fairbanks Nijhuis)
- Four SBRs, post flow equalization tank and effluent disk filters (Aqua-Aerobic Systems)
- UV disinfection system (TrojanUV)



"[Our operators] are very conscientious and reliable. Whether it's raining, sleeting or snowing, when an issue arises, they don't stop doing their repairs."

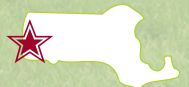
**ALAN ZERBATO**



The team at the Lee Wastewater Treatment Plant includes, from left, Myron Ford, laborer; Craig Rand, operator; Chris Pompei, public works superintendent; Alan Zerbato, plant supervisor/chief operator; and Todd Tyer, operator.

## profile Lee (Mass.) Wastewater Treatment Plant

<b>BUILT:</b>	<b>2008</b>
<b>POPULATION SERVED:</b>	<b>5,200</b>
<b>EMPLOYEES:</b>	<b>4</b>
<b>FLOW:</b>	<b>1.25 mgd design</b>
<b>TREATMENT LEVEL:</b>	<b>Tertiary</b>
<b>TREATMENT PROCESS:</b>	<b>Activated sludge (SBR), cloth media filtration</b>
<b>RECEIVING WATER:</b>	<b>Housatonic River</b>
<b>BIOSOLIDS:</b>	<b>Dewatered, incinerated</b>
<b>ANNUAL BUDGET:</b>	<b>\$434,000 (operations)</b>
<b>WEBSITE:</b>	<b><a href="http://www.lee.ma.us">www.lee.ma.us</a></b>
<b>GPS COORDINATES:</b>	<b>Latitude: 42°17'13.10" N; Longitude: 73°14'30.98" W</b>





Operator Craig Rand monitors one of the plant's SBR tanks (transmitter from Endress+Hauser).



## SWEET REWARDS

Operators at the Lee Wastewater Treatment Plant are proud of the awards they have won. After their new plant was built in 2008, they faced challenges in learning the new sequencing batch reactor (SBR), disk filter, UV disinfection and SCADA technologies, and in meeting stringent new phosphorus limits.

Besides winning a 2012 regional EPA Wastewater Treatment Plant Excellence Award, the plant was recognized by Aqua-Aerobic Systems for exceptional operation of the SBR and disk filter equipment in 2010-2012.

"The plant was nominated by the Massachusetts Department of Environmental Protection to acknowledge the outstanding operations and maintenance work performed by plant staff," says Alan Zerbato, plant supervisor and chief operator. The Lee plant was among five facilities in New England recognized for exemplary performance in 2012.

- SCADA iFIX software (GE)
- Operations, administration and laboratory facilities

Influent enters the headworks and flows to the screening and grit removal system, then enters one of two wet wells. From there, it is pumped to the SBRs. After treatment, the wastewater goes to settling and sludge wasting. Sludge is dewatered to 6 percent solids and transported offsite for incineration.

During the final (decanting) phase, the clear effluent flows to the post-equalization tank, which maintains a constant flow to two disk filters in series. The filtered effluent passes through the UV system and is used for makeup water for polymer system flushing and plant washdown before discharge to the Housatonic River.

Although the town's oversight committee and engineering firm tried to anticipate what the U.S. EPA might require in future discharge permits, they

### Lee Wastewater Treatment Plant PERMIT AND PERFORMANCE (monthly averages)

	PERMIT	EFFLUENT
<b>BOD</b>	20 mg/L	4 mg/L
<b>TSS</b>	20 mg/L	2 mg/L
<b>Total phosphorus</b>	Apr. 1-Oct. 31: 0.2 mg/L Nov. 1- Mar. 31: 1.0 mg/L	0.13 mg/L 0.08 mg/L
<b>Total nitrogen</b>	Report	3.0 mg/L
<b>pH</b>	6.5-8.3	Compliant
<b>E. coli</b>	126/100 ml	7/100 ml

Note: BOD and TSS samples are taken twice a week, phosphorus and nitrogen weekly, and *E. coli* weekly, depending on the season. pH is tested daily.

were taken by surprise with the new permit issued in December 2008, nine months after the plant was built. "The new permit included a monthly total phosphorus limit of 0.2 mg/L from April 1 through October 31," says Zerbato. "Because it was much more stringent than our old 1.0 mg/L limit, the new limit was appended and a consent order was administered by the EPA."

The consent order called for an interim seasonal total phosphorus limit of 0.55 mg/L effective immediately, and the 0.2 mg/L seasonal limit by April 1, 2012.

### REDUCING PHOSPHORUS

To meet the new phosphorus limit, the staff had to change how the plant operated. "We immediately started a phosphorus reduction program," recalls Zerbato. "We brought in vendors to try various chemicals to enhance phosphorus removal. I added chemicals at different locations in the process, changed the SBR phase times, talked with other SBR facility operators, and took courses to learn how to reduce phosphorus."



Once the plant's in-house testing looked promising, the town sent a letter to the EPA asking permission to continue pilot testing. "We wanted to continue with our own testing, rather than hire a consultant, to save our rate-payers money," Zerbato says. "The EPA allowed us to continue as long as results remained encouraging. Aqua-Aerobic Systems has been a great partner in this project, and they wanted to do their own pilot study. They did all their own testing, on their dime, and came up with the same results that we did."

These results are described in a technical paper co-authored by Zerbato and Terence K. Reid (director of research and development) and his team at Aqua-Aerobic Systems. They presented the paper at the 2012 WEFTEC conference in New Orleans.

"The goal of the study was to determine if manipulating system key operating variables would yield the desired phosphorus removal without having to install additional equipment — for example, a separate polymer system that could dose the effluent before it entered the disk filter," explains Zerbato.

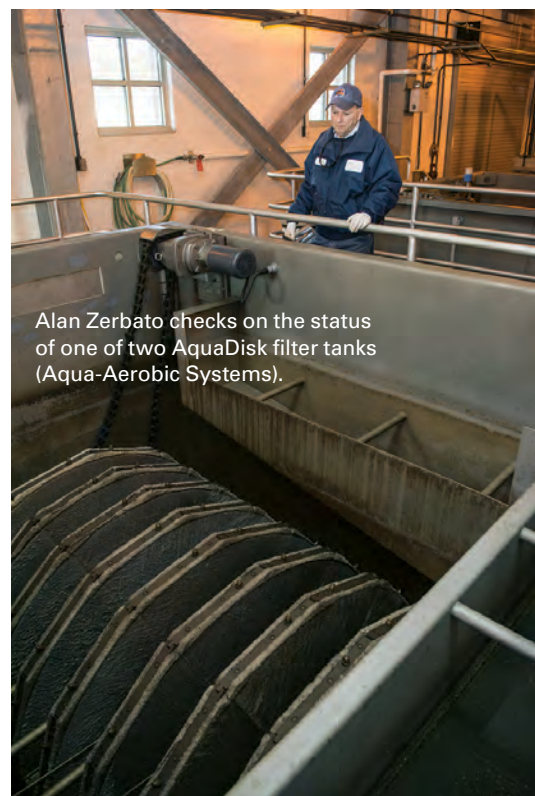
During the study, the plant achieved an effluent total phosphorus level of 0.1 mg/L and an effluent total nitrogen level of 3 mg/L by:

- Changing the phase times of the SBR process — for example, increasing the anoxic time during the fill phase, and changing the react phase.
- Adding coagulant chemicals at various points in the system.
- Monitoring the supernatant from the rotary drum thickener, which was high in phosphorus.
- Limiting the amount of septage, also high in phosphorus.
- Adjusting backwash wasting from the disk filters that enters the plant's wet wells.

The study paid off; the plant met the 0.2 mg/L phosphorus limit on time, and has often achieved an average phosphorus level of 0.12 mg/L.

## INTENSIVE TRAINING

Although plant operators had ample experience with wastewater treatment equipment, they needed



Alan Zerbato checks on the status of one of two AquaDisk filter tanks (Aqua-Aerobic Systems).

training on the technologies that were new to them. "Each vendor's equipment is different, and the Aqua-Aerobic controls were the most sophisticated for us to get used to," Zerbato says. "But, everyone caught on pretty quickly."

Operators received two weeks of on-site hands-on training from Aqua-Aerobic. "They set up the equipment with certain parameters, but as we ran the wastewater treatment plant, some changes were made to enhance the overall plant efficiency, such as process phase times and dissolved oxygen settings," says Zerbato. "It took a few months for operators to feel comfortable with the equipment." The vendor also provides a 24-hour hotline for operators, and company experts can remotely troubleshoot the system if needed.

Vendors provided on-site training on all the other equipment. "We set up a schedule outlining which vendor would do the training at a given time, and all the sessions were recorded on video for future reference," Zerbato says. "The challenge was to do the needed training while still operating the old plant."

*(continued)*

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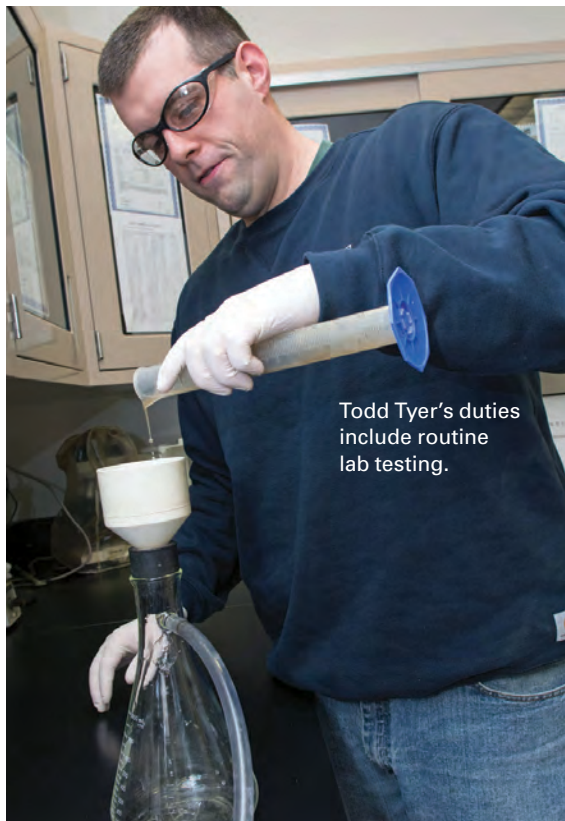
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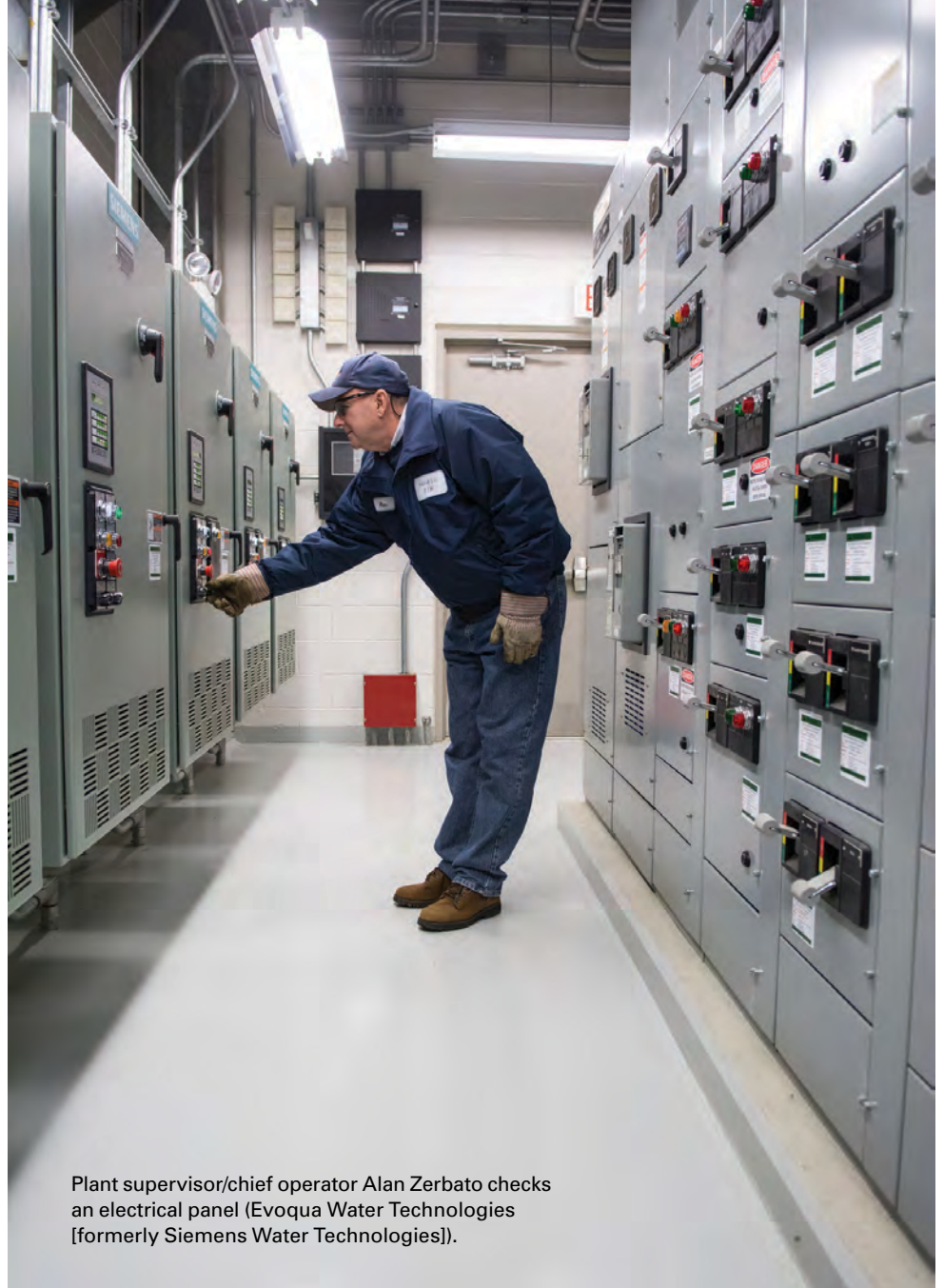


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Todd Tyer's duties include routine lab testing.



Plant supervisor/chief operator Alan Zerbato checks an electrical panel (Evoqua Water Technologies [formerly Siemens Water Technologies]).

Getting used to the SCADA system posed another challenge. “Our old plant was a lot more hands on, from manually starting pumps to monitoring the process,” says Zerbato. “SCADA training extended a little longer because we needed the new plant to be online. Once it was, the SCADA was extremely beneficial to performance. It monitors the whole plant, gives a summary of every parameter, and allows us to keep a continuous maintenance log.”

The plant has been reliable, with only a few small glitches. The four SBRs, two disk filters, four raw sewage pumps and two waste sludge pumps provide redundancy. “The SCADA system went down for a period of time because of an electrical issue,” says Zerbato. “While troubleshooting the problem, we were able to run the plant manually.”

## MEETING CHALLENGES

The new plant challenges the operators, who need more knowledge of equipment than before and must understand the SBR operation to ensure clean effluent. Zerbato himself is challenged to monitor more equipment and perform more required testing. “Discharge permit limits are becoming tighter,” he says. “You need to be proactive rather than reactive, and there’s no wiggle room. We used to have to test just one tank, and now we’re testing four SBR tanks. Flows are constantly changing from one tank to the other, requiring more testing and monitoring than with the previous plant.”

The operators’ biggest challenge is to keep the plant in constant compliance while maintaining five pump stations and 26 miles of collection system. “Since phosphorus is affected by runoff and weather, we need to anticipate changes and flows,” says Zerbato. “We have to consider where the septage is coming from, how much and what’s in it, and act accordingly.”

With three operators, staffing is adequate. The staff does the maintenance in-house except for large jobs like pump rebuilds.

Zerbato has been with the town for 28 years, 21 at the wastewater plant, and holds a Grade 6C operator license. Reporting to him are Craig Rand (6C,

13 years) and Todd Tyer (5C, 7 years), assistant operators; and Myron Ford (24 years), laborer. The DEP-approved staffing plan requires two certified operators Monday through Friday and one certified operator on weekends and holidays.

“The team members take pride in their job and performance, and they all want to achieve the same goal of producing the best effluent possible,” Zerbato says. “They are very conscientious and reliable. Whether it’s raining, sleeting or snowing, when an issue arises, they don’t stop doing their repairs. When you’re on call 24/7, you put the job ahead of everything else.”

The staff members also adapt to unusual circumstances: “If they see something during testing, or see flows increase on the printout that indicates something has changed, they will handle it.”

## BEEFING UP REVENUE

Keeping the plant running on a sound financial foundation has been another challenge. After the town installed water meters for all customers, they began conserving water, reducing flows and revenue at the wastewater treatment plant. As part of the response, the plant team added a septage receiving station (Huber Technology).



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“We wanted to increase our revenue, so we now take in 1.5 million gallons a year in residential septage throughout Berkshire county,” says Zerbato. “The \$160,000 we bring in offsets our electrical costs for the year.”

The plant is also going solar. “We’ll be installing a ground-based array in the soccer field in front of our building,” says Zerbato. “It will save us roughly \$25,000 a year in electricity costs.”

Zerbato doesn’t see a need for future plant upgrades. Pump station and infrastructure improvements continue, but the plant handles high flows. The plant has been level funded for four years, and with rising chemical, solids management and energy costs, it is a challenge to stay within the budget.

Still, Zerbato is happy with the way things have worked out. The plant’s 2012 EPA Excellence Award hangs on the wall outside his office — a reminder of success that followed a challenging seven years. He states, “I would like to thank the townspeople of Lee for their confidence in our ability to operate this plant, and the trust they put in us after the \$22 million investment they made.” **tpo**

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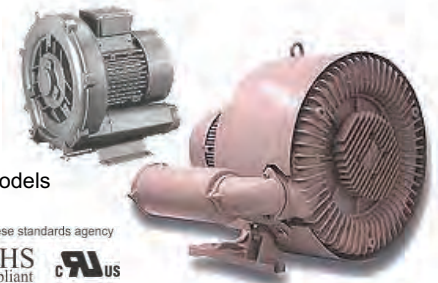
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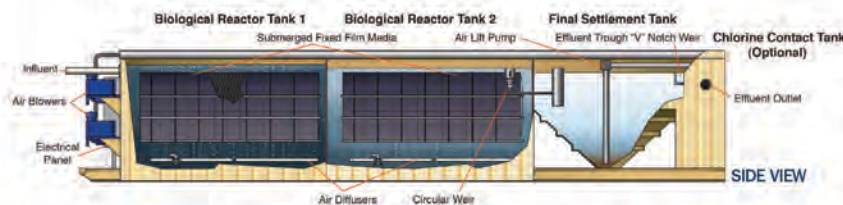
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Treatment Unit Details	Influent Flow (GPD)	Influent BOD/TSS (mg/l)	Influent NH4 (mg/l)	Effluent BOD/TSS/NH4 (mg/l)	Length (ft)	Width (ft)	Height (ft)
	75,000	200/200	40	10/15/3	42/23	12	12
	50,000	300/300	60	10/15/3	42/23	12	12
	37,500	200/200	40	10/15/3	37	12	12
	25,000	300/300	60	10/15/3	37	12	12
	15,000	300/300	60	10/15/3	25	12	10
	5,000	300/300	60	10/15/3	16	8	10

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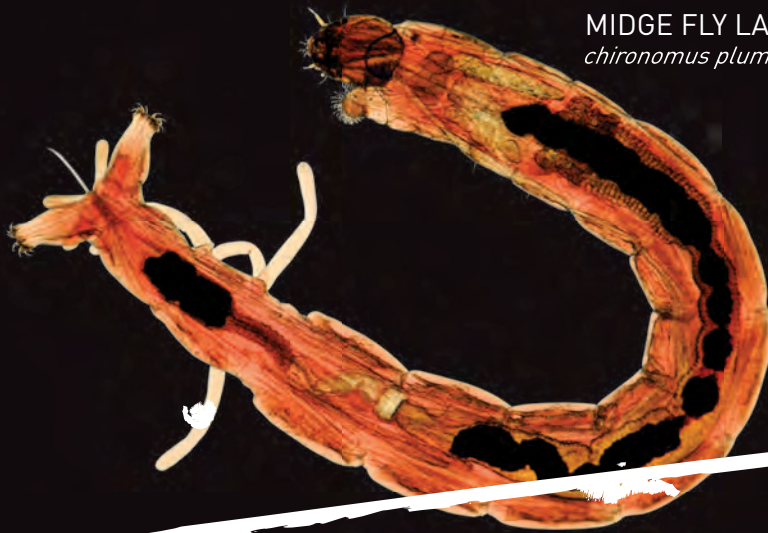
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# Getting to Low P

PILOT TESTING WITH CLOTH MEDIA FILTRATION DOCUMENTS ONE WAY TO ACHIEVE THE STRICT EFFLUENT TOTAL PHOSPHORUS LIMITS BEING PRESCRIBED IN TODAY'S PERMITS

By Ted J. Rulseh

**E**ffluent phosphorus limits are being ratcheted down in many states, challenging clean-water plants to find cost-effective ways to meet them. In Wisconsin, for example, plants face phosphorus limits as low as 0.075 mg/L. To remove phosphorus, operators have options that include chemical and biological treatment, technology solutions and adaptive management — working with upstream landowners to limit phosphorus contributions from runoff to the receiving stream.

Aqua-Aerobic Systems, which offers a variety of wastewater treatment technologies, has been pilot-testing cloth media filtration as a way for plants to hit today's extremely low phosphorus targets. The company deployed a portable pilot plant using a microfiber filter media to three clean-water plants in Wisconsin.

Aqua Aerobic Systems' Mark Hughes, senior process engineer, and James Horton, director of product management, along with Tom Dennis of Drydon Equipment, a distributor of the company's products, talked about phosphorus challenges and the pilot testing process in an interview with *Treatment Plant Operator*.

**tpo:** What was the impetus behind this pilot testing program?

**Hughes:** Plants in Wisconsin are facing some of the most stringent total phosphorus limits in the country. We've seen a number of permits with limits as low as 0.075 mg/L. Operators were asking us: Can your filters do this? Our answer was: Yes, we believe they can, and we set out to prove it with pilot testing.

**tpo:** Leaving technology aside for the moment, what is the potential role of adaptive management in reaching these low phosphorus limits?

“When you get down to a total phosphorus limit of, say, 0.5 mg/L, you definitely need a filter. The solids the filter removes may contain as much as 3 to 5 percent phosphorus.”

**MARK HUGHES**

**Dennis:** Adaptive management can work. It has been applied with success, generally in communities where more than just government entities are involved — where watershed organizations and other citizens groups are assisting. On the other hand, judging from research I've read and sources I've spoken to, the concern is that there is no policing of landowners. For example, suppose 15 farmers agree to do adaptive management to help a plant meet its limit. If, three years later, 10 of those farmers discontinue the management practices, there is limited recourse. The responsibility will then likely fall back to the treatment plant.

That is a concern many operators have. If adaptive management goes by the wayside and the plant is no longer meeting its limit, then fines come into play. Some plants are taking the stand that they are just going to spend the



Mark Hughes



James Horton

money on technology because they don't want to deal with adaptive management — it has worked well so far in some settings, but in the long term, we'll see.

**tpo:** What other basic options do plants have to achieve low phosphorus?

**Hughes:** Many plants already have biological or chemical phosphorus removal in their secondary processes. This works very well, especially when you have phosphorus limits around 1.0 mg/L, and sometimes even lower than that. We often see ferric chloride and alum used for phosphorus removal. Of course, in either case, you generate chemical solids that need to be removed. When you get down to a total phosphorus limit of, say, 0.5 mg/L, you definitely need a filter. The solids the filter removes may contain as much as 3 to 5 percent phosphorus.

**tpo:** Why can't low phosphorus limits be achieved with biological processes?

**Hughes:** A bio-P process will generally remove significant phosphorus, but you can't always get enough uptake by the microorganisms to get down to a very low effluent level. And if you have substantial solids in the effluent, that can prevent you from getting to low levels biologically.

**tpo:** Many clean-water plants use sand or mixed-media filters as a tertiary step. Why won't these filters achieve the necessary phosphorus removal?

**Hughes:** Granular media filters are great filters. The really ideal filter would be a very deep-bed gravity filter. That would remove almost all the solids if you made it deep enough. The challenge with that kind of filter is the headloss through it and the large footprint. You can only get so much flux through an area of sand filter, and you end up using a lot of space. And the cost of that filter can go up rather quickly because of all the civil work and the maintenance required on the sand.

**tpo:** What are the benefits of cloth filtration?

**Hughes:** Cloth media filtration can offer the performance of a sand filter in about a quarter of the footprint. Water flows into the filter tank and passes by gravity through the filter cloth. Our traditional cloth media has a pile layer — people say it looks like carpet. The cloth removes the solids in a couple of



“Removing more of the smaller particles means you effectively get more phosphorus removal with the same basic operational requirements. It effectively gives operators a safety factor over using a filter with a larger nominal rating.”

**JAMES HORTON**

ways. If a particle is too big to go through a pore, it will be removed. Particles are also trapped in the depth of the pile fibers.

**Horton:** You can think of this kind of cloth media as having two parts. One is the pile, which is analogous to the sand in a sand filter. That pile is woven into a backing material, which is analogous to the underdrain in a sand filter.

**tpo:** What led you to believe cloth media would be a solution for achieving low effluent phosphorus?

**Hughes:** Twenty years' experience told us cloth media did an excellent job of removing solids. And what was happening in Wisconsin wasn't new to us. In the Chesapeake Bay region, for example, we had seen permit limits in the range of 0.2 to 0.1 mg/L total phosphorus. So we thought 0.075 mg/L was achievable.

**tpo:** What is different about the microfiber cloth used in the pilot plant?

**Hughes:** Our standard cloth has worked well for many years, including in low-phosphorus applications, but we asked what would happen if we made a tighter cloth. Our standard cloth has a nominal pore rating of about 8-10 microns. Our microfiber cloth has a nominal rating of 3-5 microns. It's a much finer filter. That helps us remove more TSS, yet with the same hydraulic throughput and the same headloss as the standard cloth.

**Horton:** Levels down to 0.1 mg/L have been achieved with nominal 10-micron filters and screens. Moving to 3- to 5-micron microfiber captures more of the finer particles. That gets you to the effluent phosphorus level you need with less chemical addition. It also makes operators' lives easier. As you get to lower effluent limits, operator attention and responsibility tend to increase. Removing more of the smaller particles means you effectively get more phosphorus removal with the same basic operational requirements. It effectively gives operators a safety factor over using a filter with a larger nominal rating.

**tpo:** What does your pilot testing unit consist of?

**Hughes:** We have a trailer that travels on the back of a semi. It includes our Aqua MiniDisk cloth media filter, which is our smallest configuration. It provides the ability to add chemicals to the influent stream, and it includes substantial instrumentation.

**tpo:** How exactly did the pilot tests proceed?

**Hughes:** A recent pilot test in Wisconsin was at a site that faces a total phosphorus limit of 0.075 mg/L in the future. We began by testing a sample of secondary effluent in our lab for phosphorus speciation and filterability. We also did jar tests to determine the best coagulant or metal salt dose and the best polymer and polymer dose, so we had a good idea where we should be with chemical addition before the filter.

We found that there was a fraction of soluble reactive phosphorus in the water. By adding alum coagulant, we reacted it and formed solids. Those were very fine solids, so we added polymer to bind them up more.

Our pilot plant technician went to the site and repeated those tests on our trailer. Then we started pumping water into our filter at the chemical doses we had chosen, while monitoring the effluent. We used orthophos-



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“Phosphorus removal is a plantwide process. You can't just look at the filter — you need to look at all the processes leading up to it.”

**MARK HUGHES**

phate analyzers to monitor the influent and effluent, essentially live. We also analyzed composite samples and grab samples on the trailer. Those samples were split, and half was sent to the on-site lab. In the end, we achieved 0.075 mg/L effluent total phosphorus.

**tpo:** What happened at the other two test sites?

**Hughes:** The second site had the same effluent requirement of 0.075 mg/L, and our approach was very similar, although we used ferric as a coagulant. The challenge here was that our lab analysis found they had 0.05 mg/L of nonreactive soluble phosphorus — we couldn't touch that fraction. We monitored the speciation very carefully. Fortunately, the reactive phosphorus fraction remained at around 0.03 mg/L throughout the study, so that gave us a little more room and we were able to achieve the effluent target consistently.

We're currently doing a study at a third site. They have a limit of 0.2 mg/L total phosphorus, which is not challenging after we've achieved 0.075. But here the goal is to hit the effluent target with the lowest chemical dose possible.

**tpo:** What do you conclude from these pilot studies?

**Hughes:** The cloth media filters can help plants reliably meet effluent phosphorus targets at 0.075 mg/L. The right chemical dosing is a key component of that. In addition, the upstream processes need to be optimized. Phosphorus removal is a plantwide process. You can't just look at the filter — you need to look at all the processes leading up to it. You can't send the filter influent with 2 mg/L total phosphorus and expect to achieve these low limits. **tpo**



# Grit to Green

A COMBINED GRIT SEPARATION, WASHING AND DEWATERING PROCESS LEAVES A WISCONSIN TREATMENT PLANT WITH LOWER OPERATING COSTS AND TWO DESIRABLE BYPRODUCTS

By T.R. Gregg

The team at the Isle La Plume Wastewater Treatment Plant in La Crosse, Wis., wanted to optimize treatment process efficiency and effectiveness, but its grit screw system was not performing to expectation.

Because of the odor, hazardous nature, and sheer weight of the organics-laden grit, the plant's disposal fees were significant. Cleaning the grit would immediately reduce disposal costs, so the plant team set out on a process improvement initiative. They solved the problem by installing two RoSF 4 COANDA grit washer units from Huber Technology.

"We didn't realize that what we were doing was unique until we listened to comments made during tours of our facility regarding plant automation and the green contributions we're making in our community," recalls Jerod Greeno, plant superintendent.

## CUTTING THE WEIGHT

The Isle La Plume plant is one of two serving the city of La Crosse and several neighboring entities. The system includes 26 sanitary lift stations, and 188 miles of sanitary sewers that handle 10.5 mgd from 85,000 residents.

Isle La Plume's grit challenges revolved around weight reduction. Annual cost to aggregate and haul-off grit consumed a significant portion of the plant's budget. Because the existing process could not properly clean the grit and separate the organics at pretreatment, the plant team was left with a useless and rather odiferous and hazardous byproduct.

"Both the grit and organics byproducts are quite useful. In fact, the landfill actually wants our treated organics to use as cover, and the grit is suitable for use in all sorts of landscaping applications."

### JEROD GREENO

Annual grit haul-off alone cost \$7,530. The odor and harmful fumes from the organics in the grit made it undesirable and costly to landfill. The plant team knew the organics were the problem and that a grit-washing process would reduce the weight and the hazardous material content. If the organics removed could be further treated, both the grit and organic material could be turned into useful byproducts and more easily and economically removed from the plant.

## EXCELLENT FIT

The RoSF 4 COANDA grit washer met those objectives and easily integrated with the plant's existing automation. The system combines grit separation, washing and dewatering in one process and a single, compact unit. Combined classifying and sorting enables high separation efficiency and effective washing performance.

The solids in the flow (grit particles and organic material) are separated by way of flow diversion and flow velocity reduction. Grit particles sink to the bottom of the tank. The flow pattern in the system leads to more than 95 per-



One of two RoSF 4 COANDA grit washer units (Huber Technology). One unit operates at all times. By rotating the units, the plant can keep one on hand for standby and perform maintenance on one unit while the other is online.

cent separation of 0.20 to 0.25 mm grit particles.

The separated grit is then washed, detaching organic matter from the mineral grit particles. After removal of the organics, the clean grit is removed through a classifying screw, statically dewatered and discharged into a container. The organic material left in the grit washing plant is removed automatically for further treatment.

The Isle La Plume plant installed two units, one of which is operational at all times. By rotating the units, the plant never runs the system without the grit washers in place and never suffers system downtime from unit maintenance.

Startup required only priming of the system with enough grit for processing and then adjusting the minimum levels to fit the plant team's preferences. Greeno describes the system as working flawlessly with little operator attention. Periodic gearbox maintenance and oil changes are the only interruptions to the units' operation.

## POSITIVE OUTCOMES

Since the washing system went online, grit haul-off fees have been reduced significantly — through reduction in both volume and hazardous content. Whereas previously 125 tons of grit was hauled at a cost of \$65 per cubic yard (\$7,340 a year), now 48 tons are hauled (a 79 percent reduction) at \$12.50 per yard, totaling \$600 a year.

"The reduction in grit quantity and weight is so significant that we no longer need a dedicated hauling person, since our haul-off schedule has been reduced to one 7-cubic-yard dump container every five weeks," says Greeno.

The plant eliminated risk from the previous haul-off process and made the process much less equipment- and labor-intensive. Previously, the material was hauled to a dumping yard via a vat-dumping and load car system.

The grit washing system removes organic material so effectively that it can be delivered directly to the treatment process without human intervention.

The plant now produces sandbox-grade grit. "The RoSF 4 COANDA system leaves us with no waste," Greeno observes. "Both the grit and organics byproducts are quite useful. In fact, the city landfill actually wants our treated organics to use as cover, and the grit is suitable for use in all sorts of landscaping applications."

The dumping yard where the offensive grit had been stored is no longer needed and has been turned into part of a biking trail that runs from one end of La Crosse to the other.

## ABOUT THE AUTHOR

T.R. Gregg is national marketing manager with Huber Technology, a supplier of liquid-solid separation solutions for municipal/industrial wastewater treatment systems. He can be reached at [trgregg@bhbusa.net](mailto:trgregg@bhbusa.net). **tpo**



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# Nice Reward, No Risk

A NEW JERSEY VILLAGE GETS A COST-SAVING RENEWABLE POWER SYSTEM BASED ON BIOGAS AND SOLAR WITHOUT MAKING ANY CAPITAL INVESTMENT

By Doug Day

The Village of Ridgewood (N.J.) Water Pollution Control Facility is cutting its costs by adding biogas and solar power generation — that’s nothing new. But leaders in this village of 26,000 did it without spending money. Instead, they entered an agreement with other parties who provided the funds in exchange for sharing in project savings and revenue.

“We wanted to do it with a small plant in a community that wanted to be green, use renewable energy, save money, and do something good for the surrounding community and the environment,” says Dennis Doll, Middlesex Water Company CEO. “The plant ultimately

will be completely self-sustaining and will buy virtually no power from the local electric provider.”

Middlesex is one of the players in the public/private partnership that helped the Ridgewood plant save money without the capital outlay normally needed for such projects. Funds for the \$4 million project came from the private companies that own the equipment and will recoup their investment through a 20-year power purchase agreement.

Eventually, biogas and solar power will generate all the electricity for the village’s 1960s-era 5 mgd design flow/2.5 mgd average flow treatment plant.

## LIQUID WASTE FUEL

A 240 kW engine/generator from Kraft Power runs off biogas that previously was flared. Waste heat from the unit supplies two anaerobic digesters. The generator went online in February 2013. To augment the plant’s methane production and improve project economics, the village added a liquid waste receiving station in last October.

The liquid waste from restaurants and commercial establishments creates a revenue stream and helps local haulers. “Injecting liquid waste into the digesters dramatically enhances methane production, which accelerates electricity production,” says Doll.

“Haulers had been transporting liquid waste very long distances, as far as Pennsylvania. Those savings add to the value stream, besides reducing carbon emissions. The process also provides economic and environmental value by reducing chemicals used in the treatment process and reducing solids from the plant that were previously hauled away.”

The liquid waste program is still in its early stages — two or three trucks deposit material at the plant daily. “There’s plenty of market for the material,” says Doll. “In fact, we had to put in storage capacity because we’re getting more than we need at times.”

A solar array from Advanced Solar was also installed at the plant to add 50 kW of generating capacity. The electricity from the solar and biogas facilities is sold to the village at reduced cost of 12 cents per kWh (plus a 3 percent annual escalator). The plant used to pay about 15 cents per kWh for utility power. The plant expects to save 15 percent per year.



Technology used to convert methane gas to electricity includes anaerobic digesters, a 240 kW engine/generator from Kraft Power, and a 50 kW solar field from Advanced Solar.



## SHARING THE RISK/BENEFIT

The deal was done through a public/private partnership so that taxpayers in Ridgewood did not have to pay up front for any of it. Middlesex Water, Natural Systems Utilities and American Refining and Biochemical partnered with the village to form a new entity, Ridgewood Green RME.

“We own the physical assets and have a contract with the village,” says Doll. “The plant is run by Village of Ridgewood employees, with operations support by Natural Systems Utilities. We entered a 20-year partnership and expect to fully recover our investment and earn a fair and reasonable return.”

The village, meanwhile, gets a more efficient treatment plant and saves money. “Many municipalities are strained with their bonding capacity,” says Doll. “It’s often a difficult political sell to convince the local governing body to put out the funds for these projects. Under our business model, we not only develop the solution and implement it, but also finance it. That was very attractive to Ridgewood because they have

“It’s kind of a no-brainer in terms of value to the environment and the ability to reduce cost and create value for all the parties.”

### DENNIS DOLL

virtually no risk. All they have to do is buy all the electricity we can produce, and every kilowatt-hour they buy is cheaper than what they had been paying.”

Through Ridgewood Green, the project also generates high-value renewable energy certificates (RECs), sold under a multiyear agreement to 3Degrees, a marketer of renewable credits and carbon offsets. Doll says the project could have been viable without the credits, but they substantially improve the payback for investors. Along

## THE PLAYERS

The Ridgewood Green RME project is a team effort with a variety of players. In addition to the Village of Ridgewood, the owners include:

**Middlesex Water Company**, providing water and wastewater utility services mainly in New Jersey and Delaware through various subsidiaries ([www.middlesexwater.com](http://www.middlesexwater.com)).

**Natural Systems Utilities**, offering sustainable water and energy solutions for municipal, industrial and institutional clients ([www.naturalsystemsutilities.com](http://www.naturalsystemsutilities.com)).

**American Refining and Biochemical**, an investment company that manages private company, private equity fund and project equity investments dealing with environmental and renewable energy projects.

Other companies taking part in the project:

- **Bio-Organic Catalyst:** Optimization of the biogas system; supplying an organic product to enhance biogas production while reducing odors and grease build-up
- **HDR-HydroQual Engineers:** Engineering/design and construction assistance
- **Advanced Solar Products:** Turn-key installation of the solar energy equipment
- **3Degrees Group:** Maximizing revenue through purchase of solar and biogas RECs and sale of Green-e Certified RECs to make sure the project uses only renewable energy

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Four solar installations placed throughout the village help maximize energy production.

with the sale of RECs, the project purchases lower-cost Green-e Certified RECs that ensure that the plant will get 100 percent of its electricity from renewable sources.

### THINGS TO COME?

Such deals are becoming more common, adds Doll: "It's kind of a no-brainer in terms of value to the environment and the ability to reduce cost and create value for all the parties. It's in pretty wide use in Europe. As we've proposed this model in other cities, one question that keeps coming up is why there isn't more of this happening.

"We've found that there just hasn't been the need. There hasn't been the same intensity in this country on reducing costs at wastewater treatment plants through renewable energy. As more municipalities become aware of the technology and the opportunity, they are getting more interested in these solutions. The fact they don't have to finance them makes it that much easier."

For those taking the financial risk, Doll says, the outlook is good: "The customers are not going away. You have a steady feedstock — the wastewater influent is basically an endless supply. Those are relatively easy hurdles to get over." Doll expects the popularity of such partnerships to keep growing. This one received an Environmental Achievement Award from PlanSmart NJ for its leadership in protecting, restoring and enhancing the environment.

"We have proposals in other cities around the country to do something similar on a bigger scale," Doll says. "Everyone we've talked to likes the business model. I believe you're going to find this market opening up in the next several years, and you'll see more of these projects getting done." **tpo**

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# Small Is Beautiful

A TWO-MEMBER TEAM IN SHANNON, ILL., EXTRACTS AWARD-WINNING PERFORMANCE FROM A SMALL TREATMENT FACILITY BUILT AROUND AERATED LAGOONS AND ROCK FILTERS

By Jim Force

EGRETS AND TRUMPETER SWANS MAY KNOW MORE about the Shannon Wastewater Treatment Plant than the 757 folks it serves. These and other birds regularly visit the aerated lagoon plant, in the rural area in far northwest Illinois.

But public appreciation may be improving: The plant recently won Illinois Plant of the Year in Class 4 (for the smallest plants), awarded by the Illinois Association of Water Pollution Control operators, after nomination by the Illinois EPA and a thorough peer review. The local newspaper wrote about the award.

Plant supervisor Jason DeMichele, also the village's public works director, says the award was quite an honor for his small town. "There are 674 Class 4 plants in the state," he says. "Very few from our area of the state have been nominated before."

Dave Mitchell, state operator association executive, says winning plants exhibit exceptional effluent quality, good general appearance, sound maintenance, adequate spare parts inventory, accurate record-keeping, excellent lab procedures and sampling protocol and effective emergency planning. They must also demonstrate safe operation and effective training.

DeMichele takes pride in the way the grounds are kept, the plant's impeccable safety record (12 years without an accident), and the teamwork between himself and laborer Dale Haring. The facility has been violation-free since DeMichele arrived in 1995.

## SIMPLE SYSTEM

The Shannon treatment plant, built in 1987, is an aerated lagoon system with a design capacity of 180,000 gpd (actual flow averages 83,500 gpd). Flow moves by gravity through the village sewer system and through the plant all the way to lift pumps at the effluent discharge to Lost Creek.

Wastewater first enters Cell 1 of the lagoon system. The cell measures 285 feet by 230 feet, is 12.5 feet deep and has 4.5 million gallons capacity. Oxygen is supplied to the cell by four Aqua-Jet II floating mechanical surface

"I visually check the lagoons every morning, seven days a week, 365 days a year, and check the numbers and the flow volume in the effluent meter to make sure the system is operating properly."

## JASON DeMICHELE

aerators, supplied by Aqua-Aerobic Systems and installed in 2008. Detention time in Cell 1 is 25 days.

Treated water from Cell 1 passes through a rock filter and then to the first of two settling ponds, after which it moves on to Cell 2, a smaller aerated lagoon measuring 230 feet by 140 feet, also 12.5 feet deep and with 1.88 million gallons capacity. It is aerated by a single floating mechanical aerator (also Aqua-Aerobic). Detention time is 10.5 days.

A second holding pond accepts the finished water, which overflows onto another rock filter and then is lifted by pumps to the outfall. The flow is aerated again at the back end of the rock filter. Detention time through the final rock filter, which includes three feet of rip-rap type rock structure, is about one day.



Jason DeMichele, left, public works director and plant supervisor, and employee Dale Haring. (Photography by Mark Hirsch)





### CLOSE ATTENTION

Until the early 1990s, the plant added chlorine to the finished water before discharge, but there has been no need for that since because the effluent is so clean. The aerators are controlled by timers, which can be set on manual or automatic through an electrical control panel situated on a berm.

The facility includes a small laboratory where DeMichele tests for BOD, TSS, DO and pH once a month. The plant has an effluent meter (Gasvoda) installed in 2009, but no influent meter. DeMichele relies on old-fashioned eyeball observation to check performance most of the time.

"I visually check the lagoons every morning, seven days a week, 365 days a year, and check the numbers and the flow volume in the effluent meter to make sure the system is operating properly," he says. In winter, he pays close attention to the mechanical components — the lift pumps in the wet well of

## profile

### Shannon (Ill.) Wastewater Treatment Plant



<b>BUILT:</b>	<b>1987</b>
<b>POPULATION SERVED:</b>	<b>757</b>
<b>SERVICE AREA:</b>	<b>Village of Shannon</b>
<b>FLOWS:</b>	<b>180,000 gpd design; 83,500 gpd average</b>
<b>TREATMENT PROCESS:</b>	<b>Aerated lagoons, rock filter</b>
<b>RECEIVING WATER:</b>	<b>Lost Creek</b>
<b>ANNUAL BUDGET:</b>	<b>\$125,000 (operations)</b>
<b>WEBSITE:</b>	<b><a href="http://www.shannonillinois.com">www.shannonillinois.com</a></b>
<b>GPS COORDINATES:</b>	<b>Latitude: 42°09'16.55" N; Longitude: 89°44'20.32" W</b>





ABOVE: Jason DeMichele, shown beside the lagoons at the Shannon Wastewater Treatment Plant, takes pride in quality operations and good housekeeping, indoors and out. LEFT: DeMichele collects an effluent sample.



the finish pond and the surface aerators — to make sure they're operating properly in the cold conditions.

There has been no need to remove sludge from the ponds. He and Haring measured Cell 1 two years ago (using a Sludge Judge [Nasco] device) and at that time started researching biological enhancers. They got approval from the village board to begin adding 930 Municipal Lagoon Treatment, supplied by Mississippi Valley Pump (MVP). The enhancer contains micronutrients and a blend of organisms specially selected for the application.

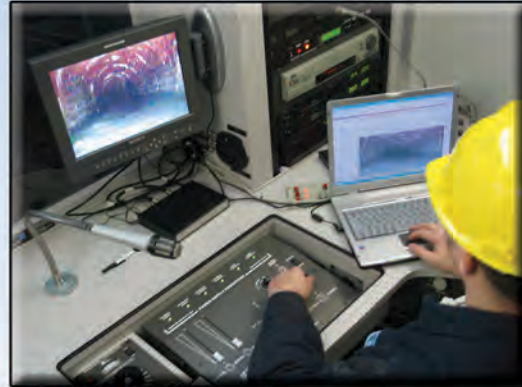
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## Shannon Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
<b>BOD</b>	76 mg/L	7 mg/L	25 mg/L
<b>TSS</b>	57 mg/L	7 mg/L	37 mg/L

DeMichele conducts a dissolved oxygen reading on a water sample using YSI laboratory equipment.

DeMichele adds two 1-pound dissolvable packets per week to Cell 1. The material uses no chemicals. “Since we’ve seeded the lagoons, our settled water is clearer, so we believe the enhancer is working,” DeMichele says. They measured the cell again in spring to check levels. “Sludge removal would cost us big bucks, so we hope we can avoid that.”

### BETTER AERATION

The surface aeration equipment brought another significant improvement in plant operations.

“Previously, we had large, heavy aerators — they were monsters,” De Michele says. “The motors were inside housings and were under water. They required a crane to pull them out. For a small town like ours, a crane at \$250 an hour is a pretty expensive proposition.”

“Since we’ve seeded the lagoons, our settled water is clearer, so we believe the enhancer is working. Sludge removal would cost us big bucks, so we hope we can avoid that.”

### JASON DeMICHELE

will investigate his sludge inventory and the possible need for solids removal from the holding ponds. Other than that, he and Haring plan to keep the snow shoveled, and grass mowed, and the safety fence around the property in good repair. It’s important to keep curious onlookers and stray critters away from the ponds and lagoons.

Except for those birds, of course. **tpo**

The new surface aerators are much easier to maintain and have presented no problems in the six years since they were installed. “The motors are on top, and we use a small truck-mounted crane to pluck them out and service them,” DeMichele says.

Looking to the future, DeMichele expects to see more work on sewer and water line maintenance as old lines handle increasing pressures and additional flows. A 2002 state grant supported separation of storm and sanitary sewers, as well as smoke testing and spot repairs.

At the plant itself, DeMichele

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## A ONE-MAN BAND

After hours, teen-aged Jason DeMichele would take his car down to the water plant where his father worked. “The operators all knew me, and they let me pull my car inside to work on or to wash,” he says.

In school, he created water and wastewater science projects using ideas his dad helped develop. In his spare time, he spent hours fishing the nearby river. At the time, he had no idea he would end up operating a wastewater treatment plant — and an award-winning one at that.

DeMichele grew up in Freeport, Ill., near Rockford, and worked as a processing manager in a bank before moving to Shannon. He arrived there in February 1995, and took a job with the public works department that December. “My first day I was out plowing snow off the streets before I had completely filled out the employment application,” he recalls.

“I’d never plowed before. The late Ron Zimmerman, the public works director at the time, told me, ‘If you can drive and shovel snow, you can figure this out.’ Ron was a hands-on guy, and that’s how he mentored me.”

As public works director, DeMichele wears several hats in addition to managing the wastewater plant. His responsibilities include the sewer, the water plant and water mains, streets, snow removal and leaf collection. He’s also zoning administrator.

He visits the wastewater plant once a day. “I record the effluent meter readings every day, 365 days a year, and check things out,” he says. “If something’s not working properly, usually I can see it.” It’s a far cry from the first day he visited the plant and worried about falling in.

Since then, he has earned his Class 4 sewer license and his Class C wastewater treatment operator license. One of his biggest challenges is time management, what with so many responsibilities and working with a small budget. He often borrows big equipment items — like sewer jettors — from neighboring communities.

“Back in school, I never imagined I’d end up in the water and wastewater treatment profession,” he says. “It’s crazy the way things sometimes work out.”





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# Talkin' Biosolids

PUBLIC OUTCRY — HOWEVER UNJUSTIFIED — CAN SET YOUR BIOSOLIDS PROGRAM BACK. HERE ARE SOME PRACTICAL TIPS FOR COMMUNICATING EFFECTIVELY WITH YOUR PUBLIC

By Steve Frank, APR, WEF Fellow

Clean-water operators don't hesitate to fix a malfunctioning bar screen or repair a clarifier pump. But ask them to talk to a news reporter or the public about biosolids and you're likely to get stiff resistance.

To operators, talking to the media is about as much fun as getting a wisdom tooth pulled. It's even harder when the subject is biosolids. Why? Because many operators are hazy about how biosolids work and what happens after the biosolids contractor's truck rolls out the gate.

"Operators know what happens to the solids inside their plants but not what happens after we take them out the gate," says Mike Scharp, vice president of Parker Ag Services, a biosolids contractor in Limon, Colo.

Bob Brobst, U.S. EPA Region 8 biosolids regulator, agrees. He says a contributing factor is that fewer operators today have agricultural backgrounds: "They don't understand and can't explain how biosolids improve the soil," as compared to operators in years past.

In addition, a 10-year-old biosolids public acceptance survey that Scharp co-authored showed most utilities don't put much effort into biosolids communication unless a project is in trouble.

Fortunately, help for operators is available.

## LOOKING SHARP

Often, the best communication is nonverbal. "People believe what they can see," says Brobst.

"KISS [Keep It Simple, Stupid] is best. We all want to explain the science, but most people aren't really interested.

Just answer their questions quickly and simply."

### MIKE SCHARP

It's important for biosolids operators, such as truck drivers, to look clean and neat, to appear as though they have nothing to hide, to be ready to talk to people, and to avoid smoking, chewing tobacco and eating around biosolids.

These commonsense recommendations come from *Guidance for Controlling Potential Risks to Workers Exposed to Class B Biosolids*, a document developed by the National Institute for Occupational Safety and Health. Brobst observes, "Although basic cleanliness and health precautions seem obvious, how people like drivers behave guides how biosolids are perceived by observers who don't want to take the time to read the science.

"People — especially reporters — don't understand the science. They don't have the background or time to learn. So we have to communicate in ways they can understand."

## RESOURCES TO GET YOU STARTED

Here are a few valuable sources of advice for communication about your biosolids program:

- To prepare to answer questions, download ***Biosolids Communication: A Media Guide***, published by the Oregon Association of Clean Water Agencies, at [www.oracwa.org/documents/ACWABiosolidsMediaGuide4-09web.pdf](http://www.oracwa.org/documents/ACWABiosolidsMediaGuide4-09web.pdf).
- For tips on health and safety for biosolids workers, see ***Guidance for Controlling Potential Risks to Workers Exposed to Class B Biosolids*** from the National Institute for Occupational Safety and Health at [www.cdc.gov/niosh/docs/2002-149/pdfs/2002-149.pdf](http://www.cdc.gov/niosh/docs/2002-149/pdfs/2002-149.pdf).
- The **Orange County Sanitation District Biosolids Contractor Requirements** are free for download at [www.ocsewers.com/bcr](http://www.ocsewers.com/bcr). A spill plan, a biosolids profile sheet in English and Spanish, and other useful documents are included.
- **Free information about biosolids** is available from the National Biosolids Partnership at [www.wef.org/Biosolids/](http://www.wef.org/Biosolids/).

## WORDS STILL MATTER

What you say is important, too. In the view of Scharp, who has 30 years' experience in the biosolids field, "KISS [Keep It Simple, Stupid] is best. We all want to explain the science, but most people aren't really interested. Just answer their questions quickly and simply."

For help with what to say about biosolids, a great resource is *Biosolids Communication: A Media Guide*, published by the Oregon Association of Clean Water Agencies. This free, downloadable booklet contains short, simple answers and solid guidance for talking with regular people and members of the media.

"We rolled it out at a biosolids workshop in April 2013," says Mark Jockers, government and public affairs manager with Clean Water Services and a co-author. "About 150 people showed up. The norm is about 75. It was the biosolids managers who came forward and said, 'We need this.'" The guide contains both strategic and tactical advice.



## HELP IN THE FIELD

It also helps to provide truck drivers and field operators with printed materials that help bridge communication gaps — especially when there may be a language barrier. Brobst cites a case in which a biosolids truck in Colorado got into an accident. The driver didn't speak English, and things got tense as he tried to explain to a police officer what he was hauling and how it should be handled. "A document similar to a material safety and data sheet [MSDS] in English and Spanish could have reduced the drama," Brobst observes.

The Orange County Sanitation District near Los Angeles developed such a document, a spill plan, and other critical materials as part of its biosolids contractor requirements. The documents, available for free download, are designed to be carried in the truck and given to police, health officials or curious citizens. They help calm down people who don't understand biosolids.

Another good item to have on hand is a "biosolids primer" — a brochure or booklet with answers to frequently asked questions. State operator groups or Water Environment Federation Member Associations can develop these. The Rocky Mountain WEA has produced such a booklet.

It should be written in plain English and can be reviewed and endorsed by the land grant university or state regulatory agency. It can show citizens that biosolids are not some exotic waste being hauled under the cover of darkness. Contact information for professors and the state biosolids regulator can make the material more credible. Also include the National Biosolids Partnership website at [www.wef.org/Biosolids/](http://www.wef.org/Biosolids/).

It's also important to inform gatekeepers — people who are key links in communicating about an issue, such as county commissioners and public health officials. These officials may not be in the permitting chain, but they can either shut your project down or help you significantly in response to a public outcry.

"Of course, it's best if you can keep all gatekeepers informed, but that's hard to figure out," says Scharp. "A weekly or monthly email to local and state officials about your project is not a bad idea, so that at least you can say they were informed."

## BEING PREPARED

Three keys to keeping a biosolids program running smoothly are regulatory compliance, preparation and communication. Preparation includes media training. Several key employees at any utility should be media-trained before you get a call from the press. It's almost certain that if only one person is trained, he or she will be on vacation or out sick the day you get the call.

One final thing that's almost a sure bet: A reporter sent to do a biosolids story will know nothing about the subject. Never mind that it's 21 years since the 503 regulations took effect. Reporters don't know what you do or how you do it, and they're drawn to the "yuck factor" like bees to honey. You start with two strikes if you don't know this and prepare for it.

From where reporters stand, that sewage stuff someone complained about is the main point of interest. They'll be curious. They'll want to see it and talk about it. They'll want their photographer to get pictures of it. That means you have to be ready.

So prepare. Study the Oregon media guide. Practice doing an interview. Treat your encounter with the media as an opportunity. Communicate. If you're prepared, you can help them understand the product and how you recycle it. Explain it to them. But remember: It's their audience you're talking to, not them. So keep it simple.

## ABOUT THE AUTHOR

Steve Frank is retired as public information officer for the Metro Wastewater Reclamation District in Denver, Colo. He now owns SDF Communications in Arvada and is a communications consultant for water and wastewater utilities. He can be reached at [sdfcomm@q.com](mailto:sdfcomm@q.com) or 303/957-7459. tpo

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# PROFESSIONAL GROWTH AND SECURITY

SOUTHERN KING COUNTY DISTRICT REAPS THE BENEFITS OF MARK FOGLE'S WILLINGNESS TO TAKE ON NEW TASKS, HIS FOCUSED EXPERIENCE AND HIS MECHANICAL APTITUDE

By L.K. Williams

EVERYONE CAN AGREE THAT MARK FOGLE IS ENGAGED IN WHATEVER he sets his mind to. Fogle, senior wastewater treatment operator at Lakehaven Utility District (LUD) in Federal Way, Wash., took that position in July 2013, during just his third year with the district.

He's in the profession thanks to a career change: He previously worked in aircraft manufacturing. "I used to work for Boeing," he says. "They would ramp up and then lay people off." When he got a pink slip during a downturn in 1999, he decided something needed to change.

Today, as a 13-year veteran of the clean-water profession, Fogle has found his sweet spot. He enjoys a job that promises long-term security, satisfying work and more work-life balance — the LUD's Lakota treatment plant is just 15 minutes from his home in Kent.

## A TEST FOR READINESS

Fogle is a lifelong resident of Federal Way, eight miles northeast of Tacoma and less than five miles from Dumas Bay, a 40-acre waterbody that is part of Puget Sound. Residents enjoy boating, fishing and crabbing in the bay, where LUD's Lakota and Redondo wastewater treatment plants discharge effluent.

After being laid off in the aircraft field, Fogle took a skills test, and the results indicated he might be successful in the wastewater profession. At first, the idea didn't appeal to him, but after some encouragement from an acquaintance, he decided to check it out. He toured two treatment plants and then enrolled in the Green River Community College in Auburn, intending to earn an associate degree in water and wastewater treatment.



Mark Fogle, senior wastewater treatment operator. (Photography by Michael Stolp-Smith)

By 2000, he had hired on as summer help at the Alderwood Water & Wastewater District in Lynnwood, where he met Tom Wilkie, then an operator at the Picnic Point treatment plant. When a water and wastewater position opened at a 60,000 gpd package plant at nearby Crystal Mountain ski resort, Wilkie advised Fogle to "Get your foot in the door and get your licenses." And so he did.

"I took that job and dropped out of school to do it," Fogle recalls. But he didn't stop learning. Within 18 months of choosing his new career, he received state certifications for water distribution manager I and water treatment operator I, as well as wastewater treatment plant operator Group II.

Fogle returned full time at Alderwood's 3 mgd activated sludge plant, where Wilkie had worked for some time. He calls Wilkie an inspiration because at Alderwood, he saw his mentor move from operator to supervisor and ultimately manager of the plant, a state-of-the-art membrane bio-reactor facility.

After eight years, Fogle moved to the Southwestern Suburban Sewer District in Burien, which operates a 3 mgd rotating biological contactor plant. He might not have left Alderwood except for its location: He had to drive three hours round-trip and then work 10-hour days, and he also performed

24/7 on-call duty. He stayed at the Southwestern facility, much closer to home, for about 18 months.

## THIRD TIME'S A CHARM

Fogle couldn't get on at Lakehaven despite his qualifications. "When I started applying for an operator position four or five years ago, they had two





"My family, my friends and I fish and crab in these waters, and I take my responsibility to protecting our environment seriously."

MARK FOGLE

# profile

ABOVE: Mark Fogle (foreground) and Klinton Caillier check clearances on a rotary lobe pump (Boerger). BELOW: The crew in front of the plant's Rotamat screw press (Huber Technology). From left, Klinton Caillier, Operator II; Pat Carlton, Operator I; Scott Hastings, instrument/PLC technician; Mark Fogel, senior operator; Dave Hamrick, Operator II; and Don Blaser, Operator II.

**Mark Fogle,**  
**Lakehaven Utility**  
**District, Federal Way,**  
**Washington**



**POSITION:**  
 Senior operator, Lakota  
 Wastewater Treatment Plant

**EXPERIENCE:**  
 13 years

**DUTIES:**  
 Coordinate the work of six  
 operators; lead projects

**EDUCATION:**  
 Ongoing at California  
 State University

**CERTIFICATIONS:**  
 Group IV Wastewater  
 Treatment

**GOALS:**  
 Continue education and  
 training and grow in  
 the career

**GPS COORDINATES:**  
 Latitude: 47°19'46.66" N;  
 Longitude: 122°22'29.42" W







Mark Fogle checks on the plant's emergency generators.

positions open," he says. "They were able to hire one person, and then were under a hiring freeze."

For another posting 18 months later, Fogle got an interview and his references were checked, but he didn't get hired because a crew member "bumped back into his operator position" after deciding a new spot he had taken with the district wasn't a good fit.

When the position was advertised again, Fogle almost didn't bother applying, but Chris McCalib, the Lakota plant's wastewater operations manager, called him directly and explained the previous circumstances. This time, he got the job.

"We're a fairly decent-sized plant, 6 mgd, and we've got a pretty big footprint," Fogle says. The Lakota activated sludge plant serves about 22,000 customers using two of its four primary clarifiers, two of four aeration basins, three to four of the six final clarifiers, and a UV disinfection system (UltraTech Systems). The solids are managed through dissolved air flotation thickeners, anaerobic digesters and a screw press (Huber Technology) for dewatering. (The Redondo plant uses a biotower to treat wastewater.)

With the promotion to senior operator, Fogle says, "I got more compen-

## REAL CAREER OPPORTUNITIES

Mark Fogle recalls a seminar at a wastewater industry conference where a speaker asked how many people in the room were in their 20s. No hands were raised.

When asked how many were in their 30s or 40s, several hands went up. Many hands went up when the speaker asked how many were in their 50s. The point, Fogle says, is that the wastewater treatment workforce is aging, and that leaves abundant opportunity.

Changing careers at age 35, Fogle found a job with great benefits and the potential for growth. He notes that within the next few years, some of the 11 operators at the two Lakehaven Utility District plants will retire. While many more processes are being automated, operators will still be needed for a long time to come.

"You get upsets and you make adjustments," Fogle says. "You have to keep the organisms in the tank happy, healthy and fed."

sation but a lot more responsibility." He coordinates the work of six operators on staff, orders supplies, prepares weekly progress reports on plant projects and fills in when other crew members are absent.

His project experience at Alderwood serves the Lakota plant well. Fogle and his team have managed two significant projects that helped save the district hundreds of thousands of dollars: one for disinfection and one for solids dewatering. The crew includes Mike Ming, senior operator of the Redondo plant; Dave Hornung, operator III; Gary Cook, staff electrician; Scott Hastings, PLC and SCADA technician; and Herb Anderson, labor and industries re-trainee.

## BETTER DISINFECTION

The treatment plant used to buy commercial sodium hypochlorite in bulk for use in return activated sludge to control filamentous organisms, in the odor scrubber system, and in the nonpotable water system to manage regrowth.

As a cost-saving replacement, the district chose to lease-purchase an RIO M3 mixed-oxidant generator, commonly called MIOX (MIOX Corporation). Fogle and Hornung installed it. At first Fogle thought he was getting in over his head, but the two "got it figured out."

The MIOX system was sitting on a pallet; the pressure regulators and various components were in a box. After checking with the manufacturer, Fogle and Hornung showed their rudimentary drawing for the plumbing to the product representative, who confirmed their design. They bought PVC fittings, piping and clamping and went to work. Cook made the electrical connections. Within two months the system was installed and commissioned.

"Now we have on-site generation and it's all automatic.

It's been online for two years and will be paid off in two years, and we should see it pay for itself in about three years."

### MARK FOGLE

The only issue was high water pressure, caused by a water-source algae outbreak that fouled the filters.

"Now we have on-site generation and it's all automatic," Fogle says. "It's been online for two years and will be paid off in two years, and we should see it pay for itself in about three years. With MIOX, everything was new. It was nice to manage a project where everything's new instead of trying to bandage old and new together and having reliability problems."



## IMPROVED CAKE

In 2011, the team then turned to the solids dewatering equipment. The district's two belt filter presses were 25 years old and did not perform well. They produced cake at only 11 percent solids, resulting in what Fogle calls "outrageous" costs for transport to farmland.

The operations staff did research, talking to people in the industry including local product representatives and operators who worked with dewatering systems. After trials, the team selected a Rotamat RoS 3Q-800 screw press (Huber Technology).

"This was a more complex project," Fogle says. It took a team of five a little over three months. One old belt filter press was on the second floor of the process building, anchored to the floor with a concrete tub around it. The team used saws and torches to disassemble the press, then lowered the pieces through a hatch in the floor and carted them out of the building for disposal.

"We then jack-hammered and ground the floor to remove the tub structure and re-poured the floor for the new press," says Fogle. "We disassembled the new equipment and pulled it through the hatch, then made stands and anchored them to the new floor. Reassembly, plumbing and electrical work finished off the project. Scott Hastings programmed and automated the process." The new screw press used the existing conveyor system.

After a year of operating the screw press, Fogle says the system has almost doubled efficiency, producing cake at 18 percent solids. "This unmanned press takes 22 hours to do a load, turns itself off and washes itself," he says. "With the old belt filter press, you would have to babysit it all day long."

## EARNED RECOGNITION

In 2012, McCalib nominated Fogle, then an operator III, for Pacific Northwest Clean Water Association Wastewater Treatment Plant Operator of the Year. "At first it was shocking," Fogle says. "Why would I get this? Then it was a pain because everyone was ribbing me."

While still taking classes online and earning continuing education units, Fogle has attained the state's highest level of certification — a Group IV wastewater license. With seven operators on staff, four of them on call, he wants the other three operators to become certified for on-call duty.

What keeps Fogle interested in the job? "Providing for my family is a big motivation. And the daily tasks are constantly changing. It never gets boring here. Something breaks or there's a snag in the pro-

cess and you get to figure it out." He stops for a moment and adds, "But having things break — that same thing can drive you nuts."

For those interested in pursuing wastewater treatment careers, he recommends continuous study and earning the highest certifications because, "You never know when opportunity will knock. I was in the right place at the right time, but I pushed myself on the certifications."

When not working, Fogle can be found on the golf course teeing off with his wife: "Her prerequisite for dating me was that I had to play golf." He also finds time to watch football and play with his grandchildren. There is less time now for restoring old cars, an earlier passion.

"As an operator, my number one job is to comply with our discharge permit limitations to protect the receiving waters we discharge to," Fogle says. "I care about the waters. My family, my friends and I fish and crab in these waters, and I take my responsibility to protect our environment seriously."

tpo

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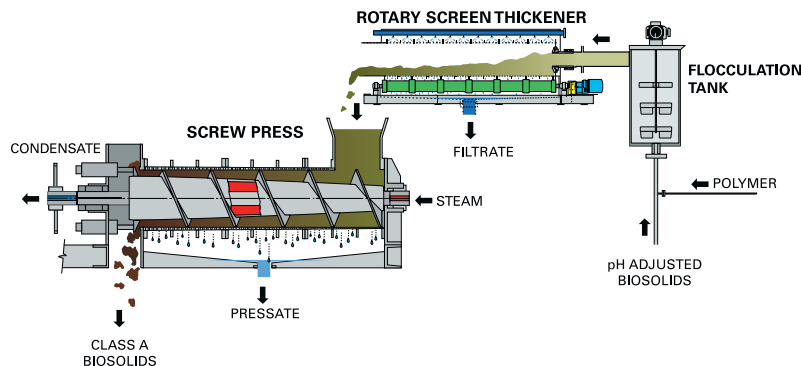
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# Understanding Alkalinity

KNOWLEDGE OF THIS PRINCIPLE OF WASTEWATER CHEMISTRY CAN HELP YOU CONTROL YOUR PROCESS EFFECTIVELY — AND PERFORM WELL ON LICENSING EXAMS

By Ron Trygar, CET

In my *TPO* article last December (“What Exactly Is pH?”), I explained pH in detail, including in-depth descriptions of atoms, atomic structure and molecules. The article’s subtitle mentioned “a look at what acidity and alkalinity mean at the molecular level.”

I didn’t mention alkalinity too often in that article. This article focuses on alkalinity, where it comes from and how it can affect wastewater treatment processes.

## WHAT IS ALKALINITY?

Alkalinity is the ability of a liquid or substance to resist a change in pH, or the capacity of water to buffer against an acid. However you might word it, the main principle is that alkalinity protects against acids.

Alkalinity is present in liquids as dissolved minerals like calcium and magnesium. These alkali metals are found everywhere in nature, especially in the earth’s crust. Potable water treatment plants sometimes use groundwater as a source, and this water may contain many milligrams per liter (mg/L) of dissolved calcium and magnesium. Some people notice this in their household fixtures and refer to it as hard water, or lime-scale buildup. Commercial products that dissolve this scale usually contain strong acids.

Once drinking water reaches a sink or shower drain, it becomes wastewater. Thus, the amount of alkalinity in wastewater treatment plant influent is usually close to the alkalinity in the potable water supply. There are exceptions, especially considering the source and type of drinking water treatment, industrial contributions to the sewer system and rainwater inflow and infiltration.

## MEASURING ALKALINITY

We measure alkalinity using test kits that contain reagents and dilute acid, or directly measure the pH while adding acid to a sample. Let’s look at measuring total alkalinity using the latter method, which is referred to in *Simplified Laboratory Procedures for Wastewater Examination*. It can be used to measure the alkalinity of samples like plant influent wastewater, plant effluent, mixed liquor suspended solids (MLSS), trickling filter and RBC fluids, and plant biosolids.

Starting with a 100 mL sample, measure the pH of the sample using a properly calibrated pH meter and probe assembly. Once the reading has stabilized, titrate the sample with 0.1 *N* or 0.02 *N* (*N* = normality) sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) using a buret and stirrer until the pH reading reaches 4.5. Read the



A portable alkalinity test kit (Hach) that uses powdered reagents and dilute sulfuric acid.

amount of acid used to reach pH 4.5. The amount of alkalinity in the sample is calculated using the formula shown:

$$\text{Alkalinity, mg/L as CaCO}_3 = \frac{(\text{mL H}_2\text{SO}_4 \times \text{NH}_2\text{SO}_4 \times 50,000)}{\text{mL of sample}}$$

In the equation above, 50,000 represents the equivalent weight of CaCO<sub>3</sub> (50) multiplied by 1,000 mg. Fifty thousand is a constant used in the formula. When alkalinity is reported, it is expressed as calcium carbonate, or CaCO<sub>3</sub>.

What if the sample used in the test above was distilled water? Distilled water has essentially nothing in it other than hydrogen and oxygen (H<sub>2</sub>O) and has no way to buffer the acid, so the pH drops rapidly toward 4.5 with little acid addition. Just 1 mL or 2 mL of acid might be enough to drop the pH to 4.5. The reported value of alkalinity for these samples might be expressed as 0 mg/L alkalinity as CaCO<sub>3</sub>.

If the sample described contains high amounts of calcium and magnesium, it may take a lot of sulfuric acid to get the pH to drop. In some areas, the drinking water could contain 200 to 400 mg/L of alkalinity, as CaCO<sub>3</sub>. Influent wastewater that contains roughly 200 to 250 mg/L of alkalinity as CaCO<sub>3</sub> usually contains enough buffering capacity to prevent low pH values at the end of the treatment process.

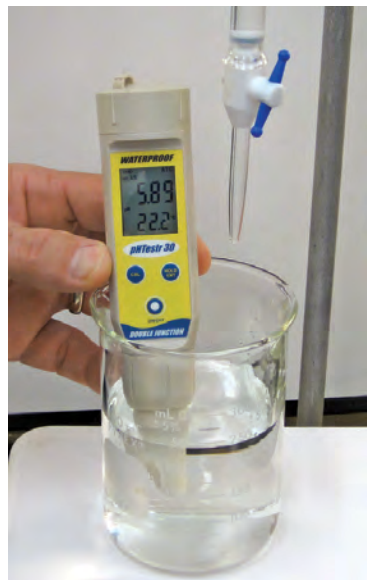
## ALKALINITY AND TREATMENT

Calcium and magnesium are essential elements bacteria need to carry on metabolic functions and reproduce. Other essential elements include nitrogen, phosphorus, potassium, iron, sulfur, oxygen, carbon and hydrogen. Without these elements present, the bacteria in treatment plants would not function properly, and could result in an over-abundance of nuisance bacteria — the kinds that cause odors or inhibit settling.

We need some alkalinity to buffer against drops in pH values. Processes that biologically produce acids or acidic chemicals include:

- Biological nitrification (the conversion of ammonium to nitrite then nitrate)
- Anaerobic conditions in sewer systems
- Anaerobic conditions in primary clarifiers
- Anaerobic sludge digestion processes
- Anaerobic fermentation basins in biological phosphorus removal systems
- Chemical coagulant addition (aluminum sulfate, ferric sulfate, ferric chloride)
- Pure gaseous chlorine for disinfection

(continued)



An operator uses a portable pH meter (Oakton pHTestr 30), buret and magnetic stir plate to titrate a sample to pH 4.5 during an alkalinity test.





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When these biological conditions occur in a treatment plant, or when acidic chemicals are added, the free hydrogen ( $H^+$ ) in the acid reacts with the negatively charged alkalinity, and the two effectively neutralize each other. If the water contained only the exact amount of alkalinity required to neutralize the acids, there would not be enough alkalinity remaining to protect the final pH value from falling if any additional acid were formed or added downstream.

Biological processes like nitrification and anaerobic digestion rely on alkalinity. Without alkalinity, organic acids formed during these processes would drive the pH down to a point where the bacteria would be inhibited or could no longer survive.

For instance, during the acid-formation stage of anaerobic digestion, volatile fatty acids are produced as acid-forming bacteria feed on the viscous, nearly septic sludge. A second group of bacteria, *methanogens*, then consume the volatile fatty acids. From this reaction, methanogens produce methane and bicarbonate alkalinity. The alkalinity they produce helps buffer the acid produced by the volatile acid formers.

In a properly operated anaerobic digester, the ratio of volatile acid to alkalinity is between 0.1 to 0.25 parts acid for every one part alkalinity per liter. If a digester is overfed and volatile acids are rapidly increasing, the methane formers can't consume the acids fast enough. This causes the alkalinity to become depleted.

For example, if the volatile acid climbs rapidly to 1,500 mg/L and the alkalinity is steady at 3,000 mg/L as  $CaCO_3$ , then the ratio becomes 0.5:1, and methane production slows down or even stops. If the operator does not take corrective action, the digester may become sour and stop working completely. In fact, if the operator did not pay attention to alkalinity and used pH as the sole operating process control parameter, the digester could become sour before the pH finally indicated an operating problem.

## SUPPLEMENTING ALKALINITY

If the alkalinity present in the influent is not sufficient, or if there is a need to increase alkalinity in the treatment plant, chemical addition can help correct the deficiency. Common chemicals used to increase alkalinity and pH include:

- Calcium oxide or calcium hydroxide (as lime slurry)
- Sodium hydroxide (caustic soda)
- Sodium carbonate (soda ash) or sodium bicarbonate
- Magnesium hydroxide or magnesium bicarbonate

Sodium hypochlorite (bleach) and calcium hypochlorite (granular chlorine) will raise the liquid pH and alkalinity while performing as disinfectants. Care must be taken when using these chemicals, not only because of their very high pH and corrosive effects, but also because of the dangerous chemical reactions that occur when they are added to low-pH liquids and biosolids. Always handle chemicals with caution; read and follow the recommendations found on the MSDS documents and labels.

In summary, alkalinity can be a useful process control tool. Keeping an eye on the alkalinity coming into the treatment plant, through the various unit processes and in plant effluent can provide clues to biological and chemical changes, sometimes helping prevent process upsets. Remember that pH and alkalinity are not the same thing — they are measurements of two distinct and separate chemical conditions.

### ABOUT THE AUTHOR

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

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*Operation of Wastewater Treatment Plants*, Volume II, Sixth Edition, California State University, Sacramento.

*Wastewater Residuals Stabilization*, MOP FD-9, Water Environment Federation, 1995.

## Test your knowledge of alkalinity

### 1. The amount of alkalinity present in raw wastewater is influenced by which factor?

- a. The amount of nitrite and nitrate present in the raw wastewater
- b. The amount of calcium and magnesium present in the plant effluent flow
- c. The amount of carbon dioxide present in the plant effluent
- d. The amount of alkalinity found in the drinking water supply

### 2. Calcium hydroxide and caustic soda have what effect on pH and alkalinity?

- a. These chemicals raise alkalinity but not pH
- b. These chemicals raise pH and alkalinity
- c. These chemicals reduce pH and alkalinity
- d. These chemicals have no effect on pH or alkalinity

### 3. If an anaerobic digester sludge contains 120 mg/L volatile acids and the alkalinity is 2,400 mg/L, which condition would exist in the digester?

- a. The digester would be sour and require draining and cleaning
- b. The digester is approaching a sour condition and the operator must take immediate action
- c. The digester is over aerated, and the DO must be reduced to promote nitrification
- d. The digester is operating normally

### 4. Which of the following is a biological process that will deplete alkalinity:

- a. Acid formation phase of anaerobic sludge digestion
- b. Denitrification in a five-stage Bardenpho process
- c. Methane formation phase of an aerobic digester
- d. Methane formation phase of an anaerobic digester

### 5. A wastewater treatment plant has a significant industrial contributor that discharges excessive ammonia and COD and has a low pH. To allow for biological nitrification of the ammonia to nitrate, the operator will need sufficient alkalinity. Which chemical could be used to increase the alkalinity of the MLSS?

- a. Sodium hypochlorite
- b. Calcium hypochlorite
- c. Magnesium hydroxide
- d. Ammonium nitrate

### 6. From the data given, calculate the total alkalinity:

Sample size:	200 mL
mL of acid used:	9.5 mL
Starting pH:	7.5
Ending pH:	4.5
Normality of sulfuric acid:	0.02

- a. 47.5 mg/L as  $CaCO_3$
- b. 95 mg/L as  $CaCO_3$
- c. 143 mg/L as  $CaCO_3$
- d. 237.5 mg/L as  $CaCO_3$

Answers: 1 - d; 2 - b; 3 - d; 4 - a; 5 - c; 6 - a





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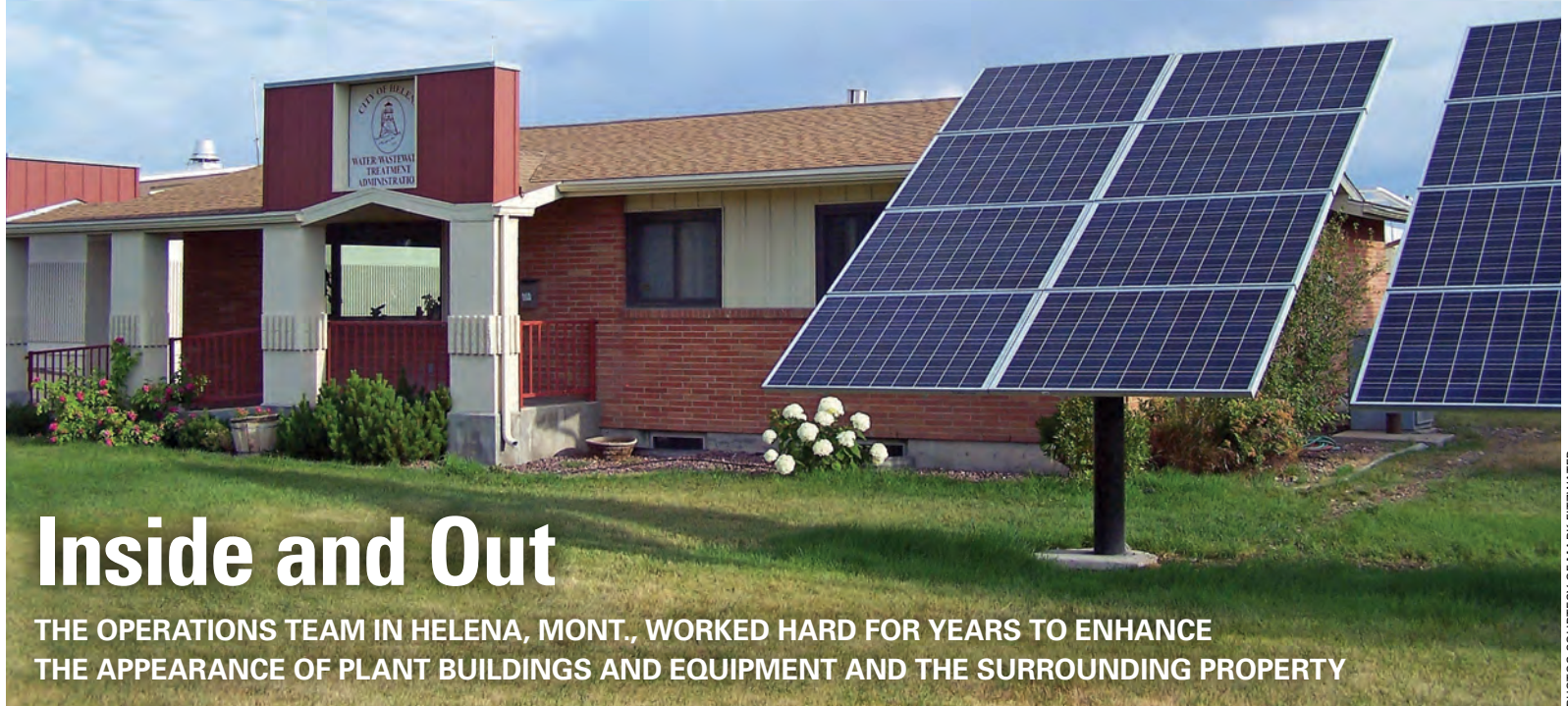
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The wastewater treatment administration building includes a 5,000-watt solar panel array that supplies power for the building.



PHOTOS COURTESY OF MARK FITZWATER

# Inside and Out

THE OPERATIONS TEAM IN HELENA, MONT., WORKED HARD FOR YEARS TO ENHANCE THE APPEARANCE OF PLANT BUILDINGS AND EQUIPMENT AND THE SURROUNDING PROPERTY

By Jeff Smith

**P**ride and teamwork among the operators and staff have led to total restoration of the 5.4 mgd (design) wastewater treatment facility in Helena, Mont.

“We have done so much to improve the appearance of the plant since 2000 that it’s hard to list it all,” says Mark Fitzwater, plant supervisor. The work includes sprucing up of buildings inside and out, extensive plantings of trees and shrubs on the plant property, and building an attractive sign to impress visitors and passers-by.

## FIX UP, CLEAN UP

It started inside, where almost every pump, compressor, valve and instrument was replaced or repaired. Controls were upgraded first to a DCS system and then to SCADA. Outside, plant team members contracted to have the buildings painted in a subdued tan with brown trim that blends in with the surroundings. It replaced a bright blue that was flaking and stood out as a “loud” color. They patched or replaced aging roofs. They replaced rusted chain link and dilapidated wooden fences with a modern security fence. They resurfaced dirt roads with asphalt and added curbing.

“Everyone who worked here was in on the improvements,” says Fitzwater, who started his career at the plant as an operator some 21 years ago. “Operators Darrell Langford, Tim Patera, Bob Cline and Pat Curry all pitched in with their ideas and leadership to improve the plant, as did Doug Howley, Jeff Brown, Ray Chapman and Fred Irby, who came along later. Bryan Lewis and Carol Ham, who are now retired, also contributed.”

Don Clark, who replaced Leonard Willet as plant superintendent, spearheaded the beautification while in his previous position of plant supervisor. “Ideas were coming in weekly from everyone,” says Fitzwater. “We discussed them as a group and usually improved upon them. Once we all felt we had the best solution, Don, with a lot of help from Lynora Rogstad, water/wastewater coordinator, and Phil Hauck, assistant public works director, found the

money, assigned a few people to the project and away we went.”

One example of teamwork was fixing a problem with buried non-potable water pipes that fed the sprinkler system. The pipes had a habit of bursting because of pressure spikes. After reviewing several possible solutions, the operators chose to install variable-speed drives on the pumps and add two relief valves to help maintain a constant pressure.

Clark received approval for the project and received funding through a grant for energy savings from Northwest Energy, the local electric utility. “This was a problem we had for many years, so no single individual discovered it,” says Fitzwater. “We all had a say in the fix.”

## CHANGING OF THE GUARD

The renewal effort began when a previous supervisor retired and at the same time the city hired John Rundquist as public works director (he has since retired, replaced by Randall Camp) and Tim Burton as city manager (he has been replaced by Ron Alles). Over the preceding years, capital investment funds had accumulated. Clark, Fitzwater and the entire operating staff appealed to the new management, and they made the funds available for operators to implement their plans.

“Morale improved one hundred percent,” says Fitzwater. Any operator who identified an area for improvement was put in charge of that project. Outside contractors helped on only a few jobs, like pouring the concrete



A refurbished conference room is among the amenities of the upgraded facilities.



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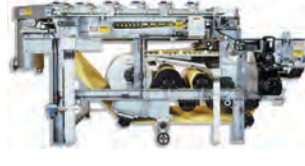
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### Belt Filter Press

- sludge dewatering
- high cake solids
- low polymer cost



### Gravity Belt Thickener

- sludge thickening
- high rates
- low polymer cost



### Dissolved Air Flotation

- sludge thickening
- wastewater clarification
- high float solids



### Rotary Vacuum Filter

- sludge dewatering
- wastewater clarification
- continuous operation



### Plunger Pump

- sludge transfer
- positive displacement
- high suction lift



The team at the Helena Wastewater Treatment Facility includes, front row, from left, Don Clark, water/wastewater superintendent; Mark Fitzwater, plant supervisor; Lynora Rogstad, water/wastewater administrative coordinator; and Jeff Brown, plant operator. Back row, Doug Hovley and Pat Curry, biosolids operators; Bob Cline, plant operator; Darrell Langford, lab technician/operator; Tim Patera, maintenance/operator; and Raymond Chapman, plant operator. Not pictured: Fred Irby, plant operator.

“Ideas were coming in weekly from everyone. We discussed them as a group and usually improved upon them.”

**MARK FITZWATER**

500 trees and bushes on the 20-acre plant site. There are 100 each of Austrian pine, blue spruce, burning bushes, snow bushes and potentilla, plus Virginia creepers, kerr, rosa rugosa, mock orange and other varieties planted around the buildings and along the property boundaries.

As part of the refurbishing, operators took advantage of energy conservation incentives offered by Northwest Energy. An array of two solar panels generates 5,000 watts to fulfill the electrical needs of a refurbished building containing office space, a conference room and storage area.

### ATTRACTIVE WELCOME

To make a better impression on visitors, the team took down an old entrance sign, repaired and repainted it, and moved it to a seldom-used access road gateway, making way for a new and more elaborate sign.

Fitzwater painted the new oval-shaped sign, which displays the crest of Helena (Montana's capital) and a landmark fire tower with the inscription, “Guardian of the Gulch.” The sign is mounted between two four-by-four wooden posts, covered with a gabled roof and mounted on a 9-foot-long, 4-foot-wide, 3-foot-high base made of brick, symbolic of the masonry construction used in Helena in the late 19th century to resist fires that plagued the area at the time.

Fitzwater and the team look back on all their work with great pride. “We all knew what it would take to make it right, but none of it would have happened without city support,” he says. “And the good part is that we’re no longer the eyesore people used to think we were.” **tpo**

curbs and installing the variable-speed drives. The operators and staff did most of the work, spread over three years.

Tim Patera, operator, directed the planting and watering of more than



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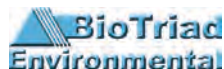
  
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roy.mistymountain@gmail.com  
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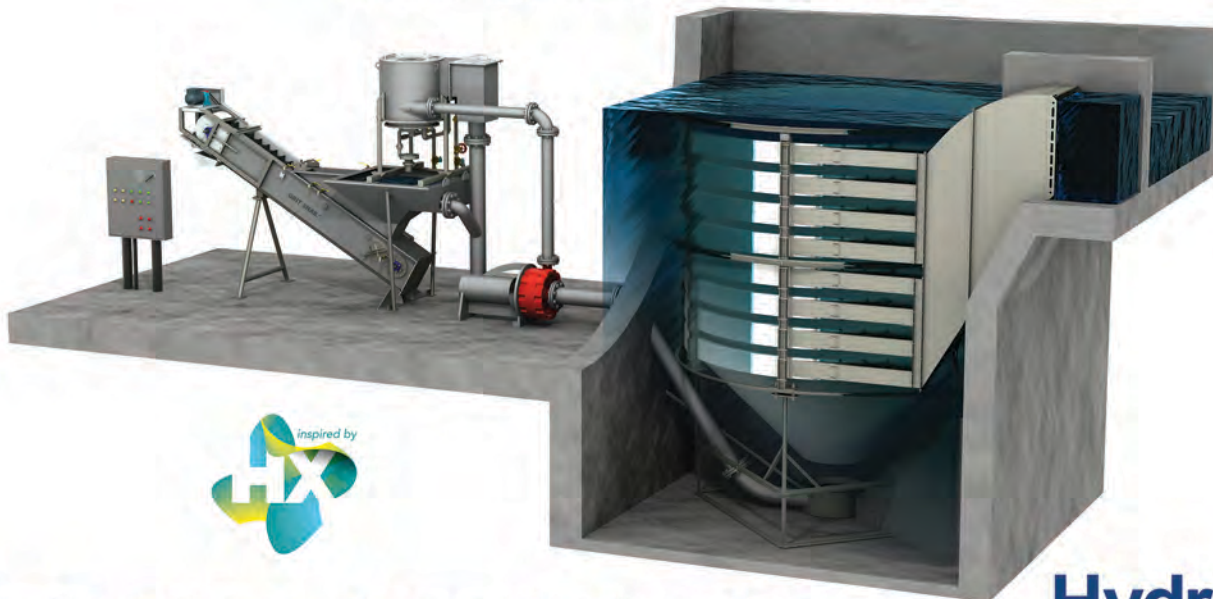
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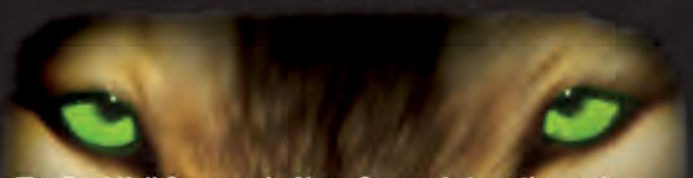
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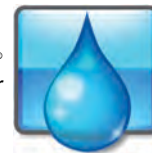
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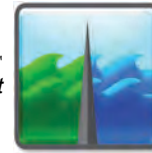
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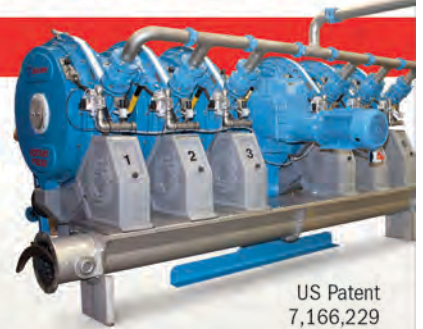
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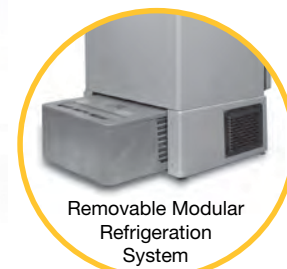


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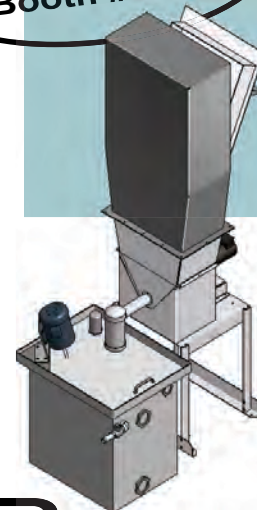
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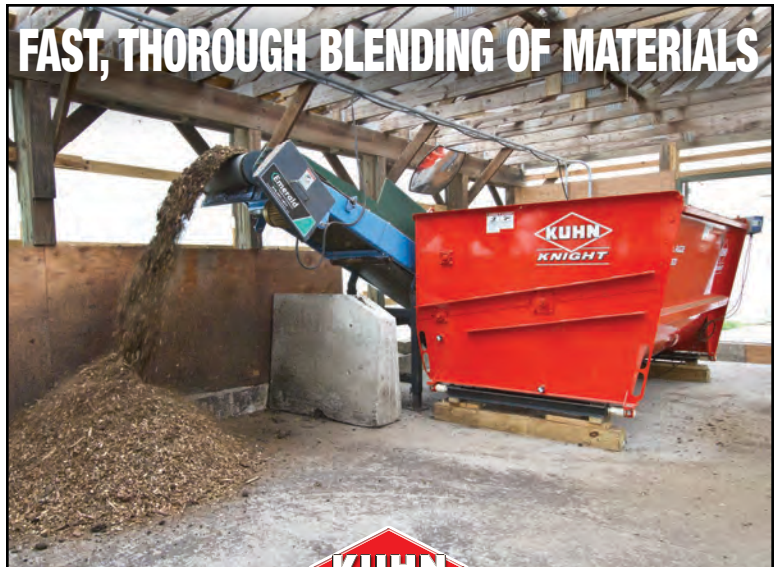
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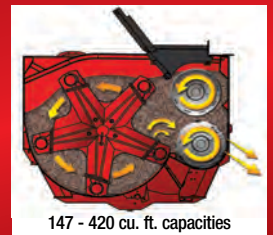
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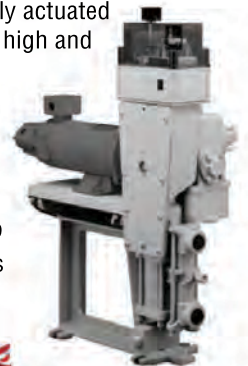


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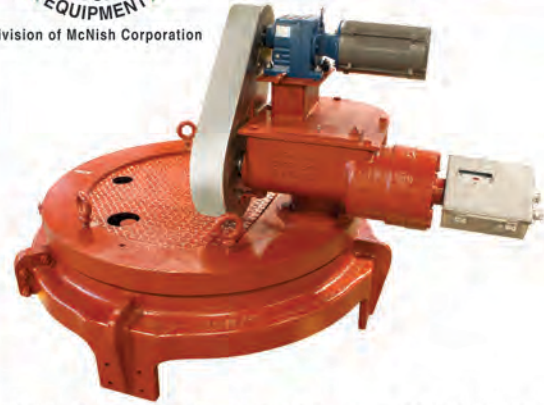
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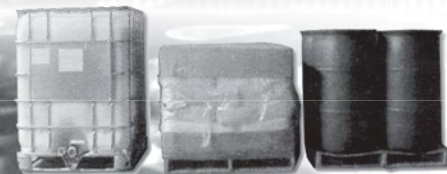


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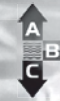
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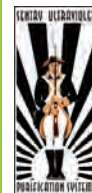
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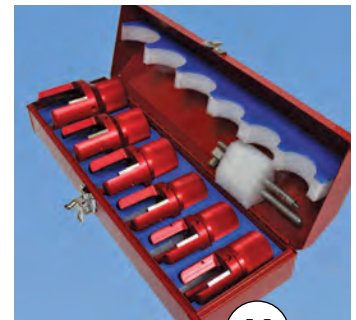
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### 1. PALMER WAHL PRECISION TEST GAUGE

The PTG100 precision digital pressure gauge from Palmer Wahl features fully temperature compensated accuracy from 32 degrees to 122 degrees F (0 to 50 degrees C). Available in accuracies of 0.5, 0.1, 0.05 and 0.025 percent of full scale, the 3.9-inch diameter dial model displays up to six digits on a backlit LCD screen, enabling the user to select up to nine engineering units, including models measuring over 36,000 psi. **800/421-2853; www.palmerwahl.com.**

### 2. BRENTWOOD STORMWATER SHIELD

The StormTank stormwater shield from Brentwood Industries is designed to improve sumped inlet treatment and reduce pollutant discharge through gross sediment removal and oil/water separation. The shield prevents debris from directly exiting the outlet pipe, increasing flow length and settling time while reducing pollutant discharge. **610/374-5109; www.brentwoodindustries.com.**

### 3. EATON WIRELESS ETHERNET MODEM

The ELPRO 450U-E licensed wireless Ethernet modem from Eaton offers long-range communications to extend Ethernet networks in difficult-to-reach locations. Options support 360 to 512 megahertz configurations. **877/386-2273; www.eaton.com.**

### 4. SENSOREX DIRECT-FIT REPLACEMENT PROBES

S465 series probes from Sensorex are designed as a direct-fit replacement for existing Acu-Trol pH and ORP probes. The chemically-resistant probes are made of PPS and deliver accurate measurement over a range of 0-14 pH or -1000 to 1000 mV for ORP. The probes are suited for a variety of applications with a temperature range of 0-80 degrees C (32 to 176 degrees F) and a maximum pressure of 100 psig. **714/895-4344; www.sensorex.com.**

### 5. FCI AIR/GAS FLOWMETER

The ST75 air/gas flowmeter from Fluid Components International, designed for lines ranging from 0.25 to 2 inches, optimizes the fuel-to-air ratio for plant burner control. Monitoring the mix of natural gas and air consumed by burners in heating plant boilers, ovens, heaters and other equipment minimizes fuel consumption, lowers plant energy costs and reduces emissions. The meter provides three outputs: mass flow rate, totalized flow and media temperature. **800/854-1993; www.fluidcomponents.com.**

### 6. B&B ELECTRONICS CELLULAR ROUTER

The Spectre cellular router and 60-day prepaid wireless data plan from B&B Electronics and RacoWireless is designed to connect, deploy



and use M2M applications on the secure USA T-Mobile 3G cellular data network. The kit includes Spectre 3G HSPA+/GPRS/GSM cellular router, 10/100 Ethernet, RS-232/422/485, 802.11 Wi-Fi, 100 MB data usage, 100 SMS, technical support and Raco Omega Management Suite for account management, control and reporting. **815/433-5100; [www.bb-elec.com](http://www.bb-elec.com).**

#### 7. PRIMEX DUPLEX LIFT STATION CONTROLLER

The Station View duplex pump controller from PRIMEX provides pump amp, pump flow, power loss and pump HOA selector switch monitoring. Features include intuitive setup, real-time clock and graphic backlit display. The controller has an SD card slot for data logging capabilities and operates with a 4-20 mA submersible transducer or four float switches. **800/746-6287; [www.primexcontrols.com](http://www.primexcontrols.com).**

#### 8. LUDECA TABLET-BASED PUMP MOTOR ALIGNMENT APP

The tab@lign tablet-based pump motor alignment app from LUDECA combines PRUFTECHNIK laser measurement technology with tablet and smartphone devices. The app runs on Apple and Android mobile devices and can be downloaded free from the Apple App Store or Google Play. **305/591-8935; [www.ludeca.com](http://www.ludeca.com).**

#### 9. NK TECHNOLOGIES POWER MONITORING SENSOR

The APN series power monitoring sensor from NK Technologies

measures three phases of current and voltage and computes 14 values necessary to track power usage in the RS485 Modbus RTU format. The monitor uses current transformers to measure amperes. The line voltage connects directly to the transducer, up to 600 volts AC. **800/959-4014; [www.nktechnologies.com](http://www.nktechnologies.com).**

#### 10. BIRD-B-GONE ELECTRIC DETERRENT

The Bird Jolt Flat Track low profile, electric track bird deterrent system from Bird-B-Gone produces a mild electrical shock when birds land on its surface. The shock does not harm the birds but conditions them to stay away. The system is available in 100 rolls of clear, black, stone, grey, red and terra cotta. An installation kit is available. **800/392-6915; [www.birdbgone.com](http://www.birdbgone.com).**

#### 11. ASAHI/AMERICA PREP TOOL

The socket welding PREP (peel, remove, edge and plane) tool from Asahi/America is designed for removal of oxidation on thermoplastic pipe and fittings before welding. The maintenance-free tool is available in six sizes, from 1/2 through 2 inches. Tools are available individually or in a kit. Manual handles and spare blades are available. **800/343-3618; [www.asahi-america.com](http://www.asahi-america.com).**

*(continued)*

## product spotlight

### Process performance optimizer designed to reduce energy costs

By Ed Wodalski

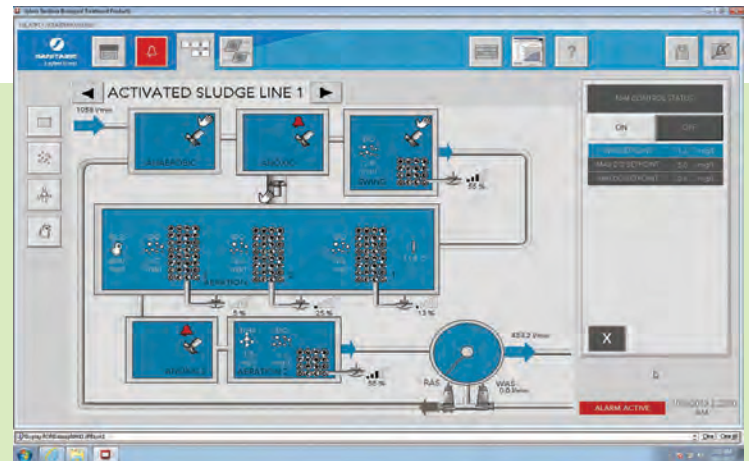
The **OSCAR** process performance optimizer from **Sanitaire - a Xylem Brand**, is designed to reduce energy consumption at wastewater treatment plants by as much as 65 percent. The system's intuitive interfaces provide instant, real-time process information, enabling operators to optimize process performance. It also can organize and present data for trend analysis and compliance reporting, as well as monitoring equipment usage.

"We didn't want it to be just another software system. We wanted it to be something customers felt they could depend on — and people typically depend on people," says Sarah Elger, process engineer at Xylem, of the product's cartoon-like logo. "Therefore we decided we would give personality to it — hence the name and animated OSCAR character."

OSCAR also was designed to portray certain personality traits. "He's obviously techy, but he's also friendly, approachable, a member of the team and always eager to help operators make their plants run at their best."

The process system continuously monitors parameters in the influent, treatment zones and final effluent. It stages and fine-tunes blowers, pressure, air flow and solids waste to deliver the desired effluent quality at considerable savings. A test at a plant in Sweden achieved energy savings of 65 percent.

"A new aeration system was installed at Sterno Wastewater Treatment Plant. One of two treatment lines was updated with a new screw blower, new Sanitaire Silver Series Low Pressure diffusers and an OSCAR perfor-



OSCAR process performance optimizer from Sanitaire - a Xylem Brand.

mance optimizer," Elger says. "The aeration system in the second treatment line, consisting of a lobe blower, fine bubble tube diffusers and DO control without cascade, was kept in place. This line was used as a reference in regards to energy consumption and nutrient removal."

Energy savings were gained from a combination of the airflow reduction, installation of a more efficient blower, as well as a reduced system headloss gained from the new aeration system and implementation of OSCAR's aeration control logic.

Elger says while potential benefits vary by plant, most facilities can improve both process performance and energy efficiency. "That is also why Xylem offers a condition audit as part of Sanitaire TotalCare services," she says. The report highlights improvement potential and recommendations for areas of improvement. "One plant might have massive energy savings to be capitalized upon, but another plant may benefit even more from optimizing and stabilizing the treatment performance either to meet more stringent requirements or even to increase capacity."

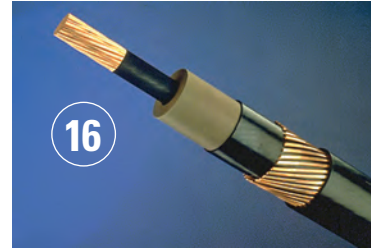
OSCAR can be implemented in a single SCADA system for the entire plant or installed to work without a SCADA and run with a smaller human-machine interface (HMI) screen. The modular system can be designed and upgraded to fit individual plant needs. **414/365-2200; [www.sanitaire.com](http://www.sanitaire.com).**



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## 12. KAESER ASD ROTARY SCREW COMPRESSORS

ASD rotary screw compressors from Kaeser Compressors are available in 25, 30 and 40 hp with flows from 106 to 194 cfm and pressures to 217 psig. Features include eco-friendly filter element, integral moisture separator with drain and Electronic Thermal Management system. Models are available with an integrated dryer. **877/596-7138; www.kaeser.com.**

## 13. SMITH & LOVELESS SYSTEM CONTROLS

QUICKSMART system controls from Smith & Loveless is a PLC-based controller designed to monitor and adjust pump station functions. Features include digital maintenance log, I/O status, Spanish language mode and help functions. Other features include alarm management, wet well level simulation, pump on/off levels, prime mode selection, environmental system set points and optional STATIONCOMM integration. **800/898-9122; www.smithandloveless.com.**

## 14. TINTOMETER WATER-QUALITY COLORIMETER

The Lovibond MD 600 colorimeter from The Tintometer Group (formerly Orbeco-Hellige) features a six LED photodetector array that supports more than 120 preprogrammed methods, including DPD chlorine, COD, phosphate and molybdate. Additional features include 1,000 data point storage, uploads via the Internet, infrared interface for data transfer and user calibration mode. **800/922-5242; www.tintometer.us.**

## 15. HAMMOND WALL MOUNT ENCLOSURES

HWSSHW 304 and 316L stainless steel wall mount enclosures from Hammond Mfg. are available in 30 sizes, from 24 by 20 by 6 inches to 60 by 36 by 16 inches. Corrosion and chemical resistant, the enclosures are designed for harsh industrial environments. The three-point, padlock-enabled handle provides extra security. **716/630-7030; www.hammond mfg.com.**

## 16. KERITE WET PERFORMANCE CABLE

Wet performance cable from Kerite, designed for harsh utility operating conditions, allows for full immersion and operation in water. **800/777-7483; www.kerite.com.**

## 17. BADGER METER ADVANCED METERING ANALYTICS

BEACON advanced metering analytics (AMA) from Badger Meter combines intuitive BEACON AMA software with ORION AMI technology for control over utility management. Built-in infrastructure management services and endpoint upgrades eliminate maintenance and technology concerns. **800/876-3837; www.badgermeter.com.**

## 18. ECD SULFIDE ION MEASUREMENT SYSTEM

The SMS-22 sulfide ion measurement system from Electro-Chemical Devices conditions the sample, measures the sulfide, neutralizes the sample, measures the pH, drains and rinses the cell. After measurement, the caustic sample pH is reduced to a safe level near pH 8. Sampling times are adjustable from two samples per hour to 10 samples per hour. **800/729-1333; www.ecdi.com.**

## 19. AUTOMATION PRODUCTS GROUP MODBUS NETWORK DISPLAY

The Modbus network display from Automation Products Group (APG) operates in sniffer or master mode to locally display volume, level, distance and/or pressure readings from up to 10 sensors in a Modbus RTU network. Readings are presented as a five-digit display with 0.4-inch characters for at-a-glance readability. **888/525-7300; www.apgsensors.com. tpo**



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## people/awards

The **City of Eustis** received a 2013 Domestic Wastewater Plant Operations Excellence Award from the Florida Rural Water Association.

**Darin Martin** of the City of Claflin was certified as a wastewater treatment operator by the Kansas Department of Health and Environment Bureau of Water.

**Richard Simmons** of the City of Salina was certified as a wastewater treatment operator by the Kansas Department of Health and Environment Bureau of Water.

**Chris Schadt**, lead operator, of the City of Asheboro Wastewater Treatment Plant received the 2013 Wilbour E. Long Jr. Operator of the Year Award from the North Carolina Water Pollution Control System Operators Certification Committee Commission.

**Michael Theriault** joined the Portsmouth, N.H., office of the Wright-Pierce engineering firm as lead project engineer. Theriault has 10 years of experience in the engineering design of wastewater treatment facilities.

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

## education

### Arkansas

The Arkansas Environmental Training Academy is offering these courses:

- May 12-20 – Basic Industrial Wastewater, Fort Smith
- May 19-20 – Basic Industrial Wastewater, Camden
- May 27-June 5 – Class I Wastewater, Camden

Call 870/574-4550 or visit [www.sautech.edu/aeta/schedule.aspx](http://www.sautech.edu/aeta/schedule.aspx).

### Florida

TREEO Center at the University of Florida is offering these classes:

- June 17-19 – Microbiology of Activated Sludge, Gainesville
- June 26 – Science of Disinfection, Tallahassee

Visit [www.treeco.ufl.edu/wastewater-courses.aspx](http://www.treeco.ufl.edu/wastewater-courses.aspx).

### Indiana

The Alliance of Indiana Rural Water is offering these courses:

- June 24 – Meeting Ammonia Limits in Lagoon Systems, Mulberry
- July 10 – Lift Station Troubleshooting and Pump Service, Warsaw
- July 17 – Financial Impact of Phosphorus Removal, Knox
- Aug. 28 – Financial Impact of Phosphorus Removal, Roachdale
- Oct. 21 – GIS Mapping, Scottsburg
- Oct. 29 – Lift Station Troubleshooting and Pump Service, Indianapolis
- Nov. 6 – GIS Mapping, Cloverdale
- Dec. 2 – Meeting Ammonia Limits in Lagoon Systems, Shipshewana

Visit [www.inh2o.org](http://www.inh2o.org).

### Kansas

The Kansas Water Environment Association is offering these courses:

- May 13 – Introduction to Water and Wastewater Chemistry, Dodge City
- May 15 – An Examination of Your Safety, Scott City
- May 20 – Special Topics-US and UV, Hays
- May 23 – An Examination of Your Ethics, Scott City
- May 28 – Wastewater Reclamation and Reuse, Hays

## CALENDAR OF EVENTS

### April 29-May 2

California Water Environment Association Annual Conference, Santa Clara Convention Center, Santa Clara. Call 510/382-7800 ext. 115, or visit [www.cwea.org](http://www.cwea.org).

### May 3-6

British Columbia Water & Waste Association Annual Conference and Trade Show, Whistler. Visit [www.bcwwa.org](http://www.bcwwa.org).

### May 12-16

New Jersey Water Environment Association Annual Conference, Bally's Atlantic City. Visit [www.njwea.org](http://www.njwea.org).

### May 18-21

Water Environment Federation Residuals and Biosolids 2014: Sustainability Made Simple, Austin Convention Center, Austin, Texas. Call 703/684-2441 or visit [www.wef.org](http://www.wef.org).

### May 31-June 3

Water Environment Association Air Quality and Odor Control Conference and Exhibition, Hyatt Regency Miami, Fla. Visit <http://www.wef.org/conferences>.

### June 2-4

New York Water Environment Association Spring Technical Conference and Exhibition, Hyatt Regency Hotel, Hauppauge. Visit [www.nywea.org](http://www.nywea.org).

### June 5-6

Canadian Biosolids and Residuals Conference, Sheraton Wall Centre, Vancouver, British Columbia. Visit [www.acwwa.ca](http://www.acwwa.ca).

### June 22-25

Michigan Water Environment Association Annual Conference, Boyne Mountain Resort, Boyne Falls. Visit [www.mi-wea.org](http://www.mi-wea.org).

### Aug. 26-29

One Water - Ohio Water Environment Association and American Water Works Association Joint Conference, Hilton Columbus Downtown, Columbus. Visit [www.ohiowea.org](http://www.ohiowea.org).

### Sept. 8-11

WaterJAM, joint conference with the Virginia Water Environment Association and the Virginia Section of the American Water Works Association, Hampton. Call 804/332-5286 or visit [www.vwea.org](http://www.vwea.org).

- May 30 – Natural Systems for Wastewater Treatment, Pratt
  - June 4 – Wastewater Reclamation and Reuse, Dodge City
  - June 10 – Special Topics-US and UV, Dodge City
  - June 18 – Small Wastewater Systems, Dodge City
- Visit [www.kwea.net](http://www.kwea.net).

### Michigan

The Michigan Water Environment Association is offering these courses:

- May 13 – Lab Practice Seminar, East Lansing
  - Sept. 11 – Collections Seminar, East Lansing
- Visit [www.mi-wea.org](http://www.mi-wea.org).

### New York

The New York Water Environment Association is offering these courses:

- May 16 – Solids Handling and Dewatering, Rexford
  - June 17 – Occupational Chemical Exposure, Hopewell Junction
  - July 17 – Occupational Chemical Exposure, Lockport
  - Oct. 23 – Solids Handling and Dewatering, Babylon
  - Oct. 29 – Solids Handling and Dewatering, Bath
- Visit [www.nywea.org](http://www.nywea.org).



## Ohio

The Ohio Water Environment Association is offering these courses:

- May 1 – Collection Systems Workshop, Lewis Center
  - May 21-22 – Operations/Lab Analysis Workshop, Lewis Center
- Visit [www.ohiowea.org](http://www.ohiowea.org).

## Virginia

The Virginia Water Environment Association is offering these courses:

- April 30-May 1 – Annual Education Conference, Richmond
  - June 12-13 – Operations Conference & Ops Challenge, Wintergreen
  - July 28-29 – Lab Practices Workshop & Seminar, Charlottesville
- Call 804/332-5286 or visit [www.vwea.org](http://www.vwea.org).

## Wisconsin

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

- May 15-16 – Energy Auditing and Efficiency Improvements for Water and Wastewater Facilities, Madison
  - Sept. 15-17 – Wastewater Treatment Processes and Technologies, Madison
  - Dec. 3-5 – Sanitary Sewer and Collection System Engineering, Madison
- Visit <http://epdweb.engr.wisc.edu>.

The Wisconsin Department of Natural Resources is offering these courses:

- May 6-8 – Pumps and Motors, Madison
- May 8 – Collection System Maintenance, Spooner
- May 13-14 – Advanced Asset Management Practices for Water and Wastewater, Madison
- May 14 – General Safety, North Fond du Lac
- May 15 – Collection System Maintenance, Valders
- May 15 – Leak Detection and Line Tracing, Crivitz

Visit <http://dnr.wi.gov>. **tpo**

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### POSITIONS AVAILABLE

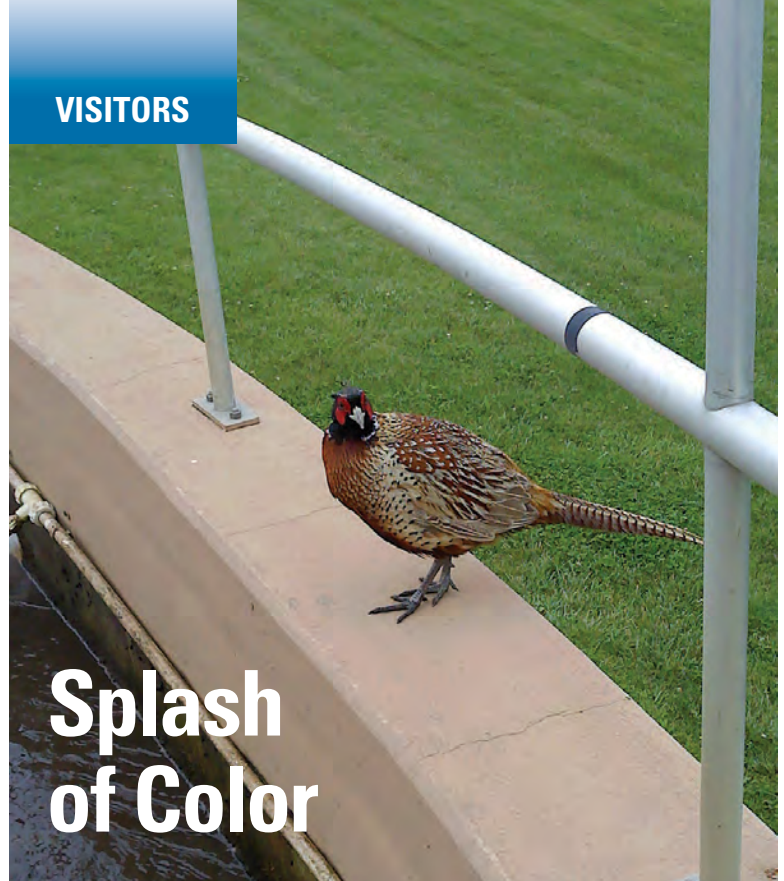
Hydro-Klean is looking for a detail-oriented, driven individual to join their team focusing on Pipeline Rehabilitation and CIPP to manage projects in the field. This position is based in South Dakota. This position will work with other managers to support the services offered to our customer and is responsible for ensuring the efficient daily operations through proper scheduling of requested activities. Clean driving record a must. 4 years CIPP experience required. Email resume to: [khenderson@hydro-klean.com](mailto:khenderson@hydro-klean.com) (P05)

Seeking Asst. Operations Manager: Sewer cleaning & inspection company seeks a hands-on Asst. Operations Manager with the following skill set: Project Management, Equipment Operation & Troubleshooting, PACP certified, People Development, Safety Program, etc. We operate in the greater southeast and are based in Nashville, TN. We provide a competitive salary and full benefits. Relocation considered. Please send a resume to [info@sani-techservices.com](mailto:info@sani-techservices.com) (P05)

### WATERBLASTING

Gardner Denver T-375M: Bare Shaft pump. Gardner Denver T450M Bare Shaft pump. Gardner Denver TF-375M 21 gpm @ 10,000 psi. Gardner Denver TX-450HB 21gpm @ 20,000 PSI. Gardner Denver TF-450MB 52gpm @ 10,000 psi. NLB 10-200. 34 gpm @ 10,000 psi. HT-150S 25 gpm max 10,000 psi max, Shell Side Machine, Wheatley 165: 30 gpm @ 10,000 psi. Wheatley 125 with aluminum bronze fluid end. Boatman Ind. 713-641-6006. View @ [www.boatmanind.com](http://www.boatmanind.com). (CBM)

## VISITORS



# Splash of Color

PHOTO COURTESY OF DAVID MITRO

By Ted J. Rulseh

Last summer while David Mitro was brushing the influent trough at the Kewaunee (Wis.) Wastewater Treatment Plant, something colorful caught his eye.

This male ring-necked pheasant appeared seemingly from nowhere — no pheasant-friendly habitat surrounds the plant, an activated sludge facility that serves a Lake Michigan village of 3,000 residents.

“We think the pheasant was nesting around our holding lagoon, which contains 32 million gallons,” says Mitro, a maintenance assistant with a Class 4 wastewater operator license. “It was very unusual for one to be around. He followed me around for a couple of days while I was working. He seemed interested in what I was doing. He stayed for about three days and then he was gone. He never came back, and I missed seeing him.” **tpo**

### Show us your visitors

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

“I believe plants must offer tours and interact with the public. Water is grossly underappreciated and unvalued in our country. Part of the plant operator’s job is to elevate the public’s understanding and appreciation.”

Greg Swanson, Utilities General Manager,  
City of Moline, Ill.

## Pride. It speaks volumes.

Hear what operators like Greg have to say each month in *Water System Operator*.

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### Hydraulic Institute, Empowering Pumps form training partnership

The Hydraulic Institute and Empowering Pumps formed a training partnership to promote and increase the utilization of HI/PSM education and training programs in 2014. The partnership includes e-learning classes, webinars and the Pump Systems Optimization one-day course.

### Magnetrol opens production facility in UAE

Magnetrol International, manufacturer of level and flow process control instrumentation, completed construction of a 550-square-meter (5,920 square feet) production facility in Jabel Ali, United Arab Emirates.

### Detcon controller receives TUV certification

Detcon's Model X40 NEMA 4X alarm and control system received cTUVus NRTL certification for nonhazardous locations. The controller is designed to monitor gas detection sensors and other field devices.

### KROHNE flowmeter approved for use in hazardous areas

KROHNE received North American approval for use of the H250 M40 variable area flowmeter in hazardous areas. The meter is approved for hazardous gas and dust areas, including usFMc for the United States and Canada, ATEX, IECEx, NEPSI, INMETRO, KGS, GOST-R and PESCO/CCOE.

### FMI releases 2014 product catalog

Fluid Metering Inc. released its 2014 catalog, featuring new products and expanded flow and configuration information. The catalog is available for download at [www.fmpump.com](http://www.fmpump.com).

### DeZURIK offers online material selection guide

The DeZURIK online material selection guide covers 700 corrosive media and common metals and elastomers used on valves. The guide can be downloaded at [www.dezurik.com/programs](http://www.dezurik.com/programs).

### Val-Matic names board chairman, CEO

Val-Matic Valve & Manufacturing Corp. named Patricia A. Nuter, previously president and chief executive officer, chairman of the board of directors. Ted Makowan, company cofounder, was appointed president and CEO. John V. Ballun, previously vice president of engineering, was promoted to executive vice president and chief operating officer.

### AEA completes acquisition of Siemens Water

AEA Investors LP has secured regulatory approvals and closed on an agreement to acquire the municipal, industrial and services water and wastewater treatment operations and assets of Siemens Water Technologies. The new company will be Evoqua Water Technologies LLC.

### Toshiba International forms speed drives, electronics divisions

Toshiba International Corp. formed the Motors & Adjustable Speed Drives and the Power Electronics divisions. Mike Ayers is president of the new TIC Social Infrastructure Group housing the divisions.

### NEW Works offers water management training

Mahattil International opened NEW Works in the Global Water Center in Milwaukee, Wis., offering hands-on training for water management professionals. The NEW Works mission is to train professionals, accelerate technology transfer and transform communities using appropriate technologies for water management. To that end, it has developed six practical learning courses: Water Purification, Water Supply, Wastewater Transport, Wastewater Treatment, Monitoring and Controlling Operations, and Energy Optimization in Water Treatment Plants.

### Kaman Industrial introduces fluid power catalog

Kaman Industrial Technologies introduced its fluid power catalog, featuring Parker Hannifin products. The catalog includes product features, descriptions, ordering information, images, engineering specifications, dimensions and diagrams. Copies can be requested at [www.kamandirect.com](http://www.kamandirect.com).

### Vidmar becomes part of Stanley Industrial & Automotive

Vidmar, a division of Stanley Black & Decker, is now part of Stanley Industrial & Automotive. The move represents the unification of 14 global brands. As part of the unification, the manufacturer of heavy-duty cabinets joins the Storage & Workspace Systems business unit with a new logo and tagline: Smart Versatile Storage.

### PSG reorganizes corporate structure

Pump Solutions Group, an operating company within Dover Corp., reorganized its corporate structure into three geographical regions, including the Americas; Europe, Middle East and Africa (EMEA); and Asia.



Ueli Thuerig Karl Buscher David Wang

Ueli Thuerig, previously president of PSG Europe, will serve as president of PSG EMEA. Karl Buscher, previously senior vice president, PSG commercial, will serve as president of PSG Americas. David Wang, previously vice president of sales and business development, Asia-Pacific, will serve as president of PSG Asia.

### Grundfos launches online learning for pump professionals

Grundfos launched Ecademy, its online training platform for professionals in the pump industry at [www.grundfos.us/ecademy](http://www.grundfos.us/ecademy). The platform features videos, slideshows, articles and interactive tools.

### Aqua-Jet aerator marks 45th anniversary

The Aqua-Jet surface mechanical aerator, introduced in 1969 by Aqua-Aerobic Systems, marks its 45th anniversary in 2014. Since its introduction more than 1.5 million units have been installed. **tpo**



“The team members are the greatest resource at this plant. They do the work. I’m support staff. I coordinate what they do, and the best way for me to do that is to listen to what they have to say.”

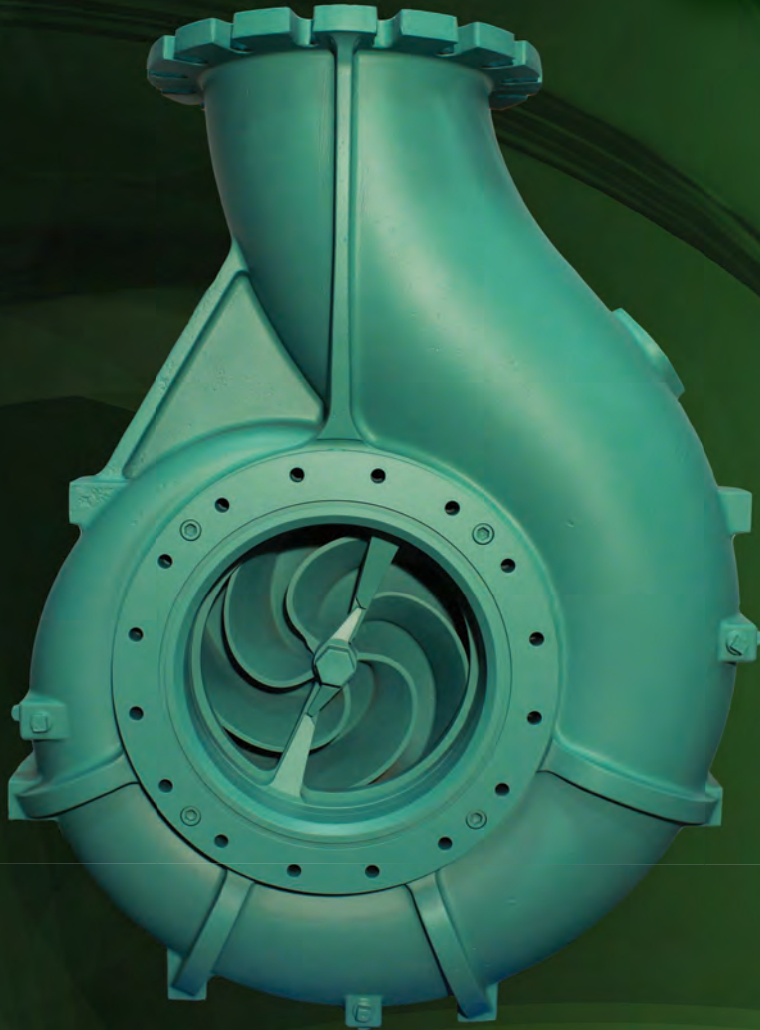
**Nate Tillis, Operations and Maintenance Supervisor  
Beloit (Wis.) Water Pollution Control Treatment Facility**

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Leading the crew is Chief Wastewater Operator Ed Brown. He works closely with USABlueBook to make sure his team always has the supplies they need to keep their facility up and running. "It's great to know that even when I don't know who to call, I can just call USABlueBook," shared Ed.

**"I ordered parts in the morning, and they were here later that afternoon!"**

Whether the team is ordering new chemical feed scales, or miscellaneous items for around the plant, USABlueBook has them covered. "My biggest surprise is always USABlueBook's shipping. I ordered parts in the morning, and they were here later that afternoon! When one of our guys said 'The parts are here,' I said, 'What parts?'" Ed laughed.

USABlueBook is proud to serve Algonquin, and provide them with the best treatment possible. We look forward to a continued partnership for many years to come.

Ed Brown  
Chief WW Operator  
Algonquin WWTP  
Algonquin, IL

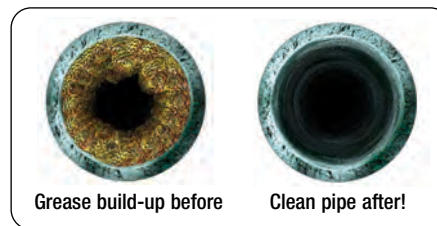


## Featured Products From **USABlueBook**

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Jetfoam, EHC-33 and Big Blue Bio-Blocks remove grease build-up to keep your lines clean and running at full capacity. These environmentally-friendly products eliminate stoppages, unpleasant odors and untimely service interruptions. Use separately, or together for a powerful 3-step solution.

For more information on these products, see pages 194-195 in USABlueBook Catalog 125.



#### 1 Jetfoam Emulsifier

Use with a sewer jetter to liquefy grease and keep it in suspension. Non-corrosive surfactant blend lets you clean twice as much sewer in the same amount of time.



DESCRIPTION	STOCK #	EACH
5-Gallon Pail	48163	\$ 134.95

#### 2 EHC-33 Bioenzyme

Breaks down proteins, fats and carbohydrates. Industrial-strength bacteria live and reproduce in an environment without free or dissolved oxygen.



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

#### 3 Big Blue Bio-Blocks

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



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



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