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JULY 2009

Top Performer: City of  
St. Peters, Mo.

PAGE 26

## Quiet *Competence*

DEAN NELSON'S SUPPORTIVE STYLE HELPS  
HIS STAFF ACHIEVE TOP PERFORMANCE IN  
OWATONNA, MINN.

PAGE 30

In My Words: Boot camp  
for superintendents

PAGE 33

Greening the Plant: Energy  
innovation in Saco, Maine

PAGE 36

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## features

**10 HEARTS AND MINDS: THE RIGHT SETTING FOR LEARNING**  
The Floyds Fork Environmental Education Center in Louisville, Ky., provides unique opportunities for hands-on outdoor instruction in water-quality issues.

By John K. Thompson

**14 TOP PERFORMER – PLANT: BETTER IDEAS**

The Wahoo Creek Water Pollution Control Plant earns recognition for consistent innovation in O&M, safety, training and compliance.

By Jim Force

**20 PLANTSCAPES: COMMUNITY FIRST**

The Brightwater treatment plant in Seattle, Wash., includes landscaping and habitat projects that the public can enjoy even before wastewater starts flowing.

By Mary Shafer

**26 TOP PERFORMER – BIOSOLIDS: GOING ORGANIC**

The St. Peters (Mo.) Wastewater Treatment Plant uses two would-be waste streams to produce high-quality compost and divert material from landfills.

By Diane Gow McDilda

**30 TOP PERFORMER – OPERATOR: QUIET COMPETENCE**

Dean Nelson's supportive and trusting management style helps his staff propel the Owatonna (Minn.) Wastewater Treatment Plant to award-winning performance.

By Jim Force

**33 IN MY WORDS: ADVANCEMENT PLANNING**

A 'boot camp' program helps wastewater treatment operators in Rhode Island prepare to move up and replace managers headed for retirement.

By Ted J. Rulseh

**36 GREENING THE PLANT: ALWAYS PUSHING FORWARD**

The Saco (Maine) Wastewater Treatment Plant applies technology and a progressive attitude toward its goal of becoming a net energy producer.

By Mike Grennier

**48 HOW WE DO IT: MEETING NUTRIENT REMOVAL GOALS**

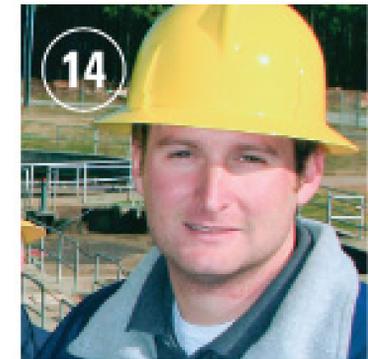
Advanced BNR technology and online process instrumentation help an Alabama treatment plant optimize efficiency and minimize lab work for process control.

By Bob Dabkowski

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### Product Focus: Engineering, Consulting and Contracted Services

- Top Performer – Plant: Sussex (Wis.) Regional Water Pollution Control Facility
- Top Performer – Plant: South Durham (N.C.) Water Reclamation Facility
- Top Performer – Operator: Dennis Wilson, Oxford (N.C.) Wastewater Treatment Plant
- Top Performer – Biosolids: Chambers Creek Regional Wastewater Treatment Plant
- How We Do It: Sand filtration in Rushville, N.Y.
- In My Words: Mobile laboratory training in Texas
- PlantScapes: Deer Island Wastewater Treatment Plant, Boston, Mass.
- Greening the Plant: Wind and solar power in Atlantic City, N.J.



## departments

**4 LET'S BE CLEAR: WHILE THE IRON IS HOT?**

One positive side to the current economy is that it builds a compelling case for clean-water careers. Maybe it's time to bring that front and center.

By Ted J. Rulseh

**6 LETTERS**

**24 INDUSTRY NEWS**

**38 PRODUCT FOCUS: PUMPS, VALVES, DRIVES**

Manufacturers offer the latest innovations to improve efficiency and treatment performance for municipal clean-water facilities.

By Benjamin Wideman

**44 PRODUCT NEWS**

Product Spotlight: Portable drive system provides quick, safe way to operate valves.

By Ed Wodalski

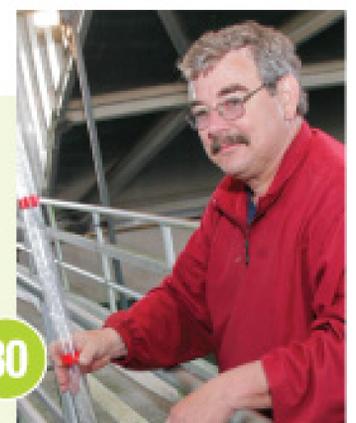
**46 WORTH NOTING**

People; Education; Calendar

### on the cover

Self-effacing is a good word to describe Dean Nelson, superintendent of the Owatonna (Minn.) Wastewater Treatment Plant. Nelson has led his staff to excellent performance and was recently recognized as Operator of the Year by the Central States Water Environment Association. (Photography by Mike Oldenburg)

30



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let's be clear

## While the Iron Is Hot?

ONE POSITIVE SIDE TO THE CURRENT ECONOMY IS THAT IT BUILDS A COMPELLING CASE FOR CLEAN-WATER CAREERS. MAYBE IT'S TIME TO BRING THAT FRONT AND CENTER.

By Ted J. Rulseh

**W**astewater treatment plant managers and superintendents often tell me how concerned they are about recruiting a new generation to the profession.

The concern is well placed, as many plant leaders and experienced operators are pushing retirement age. The industry is in danger of losing, in fairly short order, a large number of highly skilled people and a great deal of institutional memory.



Here's one case where perhaps the state of the economy can help, and I've spoken to a few people in the industry who already realize it. There are jobs in wastewater treatment. The field's importance is growing. The salaries and benefits are attractive. The education requirements are not extreme. And — best of all — the jobs are secure.

### TRIED BEFORE

The wastewater treatment industry would not be the first to try luring younger people with promises of employment in tough times. The military services have done it frequently and at high volume. Who doesn't recall the campaign: *Army. Navy. Air Force. Marines. It's a great place to start.*

Wastewater treatment may not offer the variety and glamour that the armed forces do, but what's to keep the industry from enticing young people — and for that matter, older and more experienced people — with the promise of good, interesting, well-compensated jobs that won't go away with the next bursting economic bubble?

Jobs in the field also offer room for advancement and the flexibility to pick up and move to different parts of the country. Moving around isn't for everybody, but many people like the thought of being able to uproot and live in different geographies, even if only for a while.

What's more, the industry offers a chance to do valuable work for the environment — a strong motivation for a lot of people these days.

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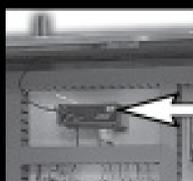
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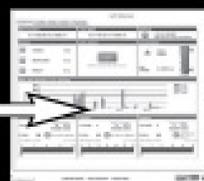
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In wastewater treatment, you don't have to chase booms (and busts) like oilfield work or post-hurricane reconstruction. Almost every city and village has a treatment plant. Just pick an area that appeals to you. Chances are, job opportunities will be there, if not immediately, then before long.

### RAISING THE PROFILE

If all the above is true, then perhaps it's time for the clean-water industry to say farewell to the low profile. The place to talk about secure, well-paying jobs is not in the privacy of meeting rooms or conferences but out in public — on the lecture circuit, at open houses, in the newspaper, on TV, on the Internet.

A recent issue of *Reader's Digest* carried a long article about "hot jobs." It listed environmental engineering and environmental services, but said not a word about wastewater treatment. We should be represented in such articles.

Wouldn't it be great to see a story on NBC or CNN about the clean-water business and all the promise it holds for bright, energetic people looking for rewarding careers with little fear of layoffs?

Another idea especially appeals: Amid all the doom and gloom, news media have been criticized for highlighting the negative and have been urged to air more stories about good things happening in the economy. Even the network news shows have been in on the act, looking for growing companies or for geographic areas where the economy remains vibrant.

Wouldn't it be great to see a story on NBC or CNN about the clean-water business and all the promise it holds for bright, energetic people looking for rewarding careers with little fear of layoffs? Maybe we can't trust a TV news show to create such a story without the usual attempts at juvenile potty humor. Then again, maybe a responsible journalist could do such a story proud.

### EXTENDING THE REACH

Of course, these days, we don't have to depend on TV or other traditional media to get a story out. Web sites devoted to career advice are abundant. Get a story about clean-water jobs to go viral on the Internet and who knows what might happen?

Of course, there remains the usual job recruitment channels — high school guidance counselors, trade and technical colleges, engineering schools, job fairs. In these venues perhaps the volume of rhetoric needs to be raised.

The times are what they are. The industry has a compelling story to tell. So let's yell it out. Great jobs. Good pay. Room to grow. A chance to help the planet. And best of all, jobs that will be there no matter what happens in the oil patch, in Silicon Valley, or on Wall Street. Apply today.

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## Words of Appreciation

To the editor:

I just started working at a small wastewater treatment plant for a meat company with flows of about 200,000 gpd. I saw your magazine on a desk in the main office at the other building and asked if I could read it, being new to this kind of work. I have spent 19 years dealing with hazardous chemicals in the past.

The other two operators and I were so floored by this magazine of yours, impressed with the information and to see how the water treatment industry is coming to be noticed more and more.

The best part about the magazine is the way you see the operators' viewpoints and the positive feedback they have about the industry. We are so used to being the low-level employees while only the higher-ups get noticed in these kinds of stories.

We enjoy reading stories from real people at this level. I have let other friends at my old chemical plant jobs read the magazine, and they, too, said it was nice to read the positive feedback and stories on how people in this industry help each other out. They are very uplifting.

I hope you continue the positive stories. And since you have written more than one story about the need for new operators due to the old ones moving on, maybe you could set up a help wanted page or two for these positions in the back of the magazine. Just update it every new issue.

This is a great magazine, and there is much to say that I have not. You can count on us looking forward to the future issues. Thank you for all your time and research.

**Jody McQuarters**  
Plainfield, Ill.

## A Few Suggestions

To the editor:

First of all, I would like to say great job on the new magazine. It is

full of great information about old and new techniques and technologies. I also appreciate the blue-collar point of view.

I am a wastewater treatment plant operator for OK Foods in Fort Smith, Ark. We are a poultry facility, and we discharge to the Arkansas River at about 2.4 mgd. I have a Class IV municipal wastewater license as well as an Advanced Industrial license and 11 years' experience. I have a few ideas for the magazine:

1. Make a section for industrial plants. We are pretty proud of what we do, too, and there are a lot of us.

2. Have a section for new environmental laws being looked at or passed at the state and federal levels.

3. Include a "tricks of the trade" section where operators can share how they troubleshoot and fixed certain problems when the textbook fixes didn't work.

I'm sure I will think of more as the issues come rolling in. The whole crew here likes to read your magazine. I have it delivered to my house and then bring it to work, where it is read cover to cover. Why, if we could get our picture on the cover of *TPO*, I'd buy five copies for my mother! Keep up the great work.

**Joe Young**  
Fort Smith, Ark.

## Two Critical Issues

To the editor:

I have comments on two important issues, to me, and I'm sure to others. The first is getting new blood into the field. This has been pretty easy in larger cities as there is a promotional path that will bring in some new people.

In the smaller cities and municipalities, similar to where I work now, there is very little to coax anyone into the job. Since jobs are pretty well dead-ended when there are some young operators already working, how do we entice our replacements?

The second issue is water reclamation facilities. What we do with

our reclaimed water. Well injection? Aquifer storage and recovery (ASR)? Release the excess into surrounding bodies of water? Some ideas and articles on this topic would be great.

Keep up the good start. I love the magazine and look forward to the next issue. Since it covers the whole USA, it really gives some of my operators who have never been in any other facility something to think about.

**Phil Pantaleo**  
Rockledge, Fla.

## Theory and Practice

To the editor:

I was weaned, so to speak, on the Water Pollution Control Federation *Journal*. I liked that magazine, and I like *TPO* magazine. What I would like is a section in *TPO* that takes the theory of the old WPCF *Journal* and the practice approach of *TPO* and closes the circle, with discussion about the relationship between practice and theory and vice versa — with encouragement to think outside the box in the process.

By way of illustration, in the early 1970s, while I was a treatment plant superintendent, I read an article in WPCF that seemed to be advising how to control the dissolved oxygen to avoid bulking sludge — a predominance of filamentous bacteria. Zoogeal bacteria, the clumpy ones, were considered the good guys. Their association in forming floc is important, as the filamentous forms the skeleton and the zoogeal the body of the floc particle. Go too far either way and you have an excess of floc in the effluent.

Many people, including the treatment plant inspectors, considered a DO 2.0+ in the aeration a necessity for the treatment plant to achieve its limit of 30 mg/l TSS and BOD, which it frequently did not.

I observed that the final effluent was always cloudy to some degree with floc. I also knew from other reading that the water from bulking sludge was very clear. So I decided

to try to find the Goldilocks point by dropping the DO slowly until I had bulking sludge. The article had said filamentous sludge grew very strongly below 1.0 mg/l DO.

It turned out that the point that worked well was around 1.1 mg/l. I then had the operators regulate the blower air output by checking the DO on an hourly basis and adjusting accordingly. As a result of the change, the final effluent was consistently in the range of 5 to 10 mg/l of TSS and BOD. An additional benefit was the saving of tens of thousands of dollars in electricity costs.

The strange thing in my mind was that the inspectors and middle management were very upset about the change in internal plant parameters, in particular the mixed liquor suspended solids at 1,000 mg/l, rather than the textbook value of 2,000 mg/l.

Had I had a forum I could call on to show that others were getting the same results as I was, I think I would have gotten a lot less grief, and the operational approach would have been accepted.

**Jack R. Jones**  
Riverdale Park, Md.

## The New Generation

To the editor:

I recently started to receive *TPO*, and I find it informative and interesting. I am a heavy-equipment operator and plant operator. I work for a solids-handling facility for Colorado Springs Utilities.

I would like to see more information about methods being used by utilities around the country to counteract not only the aging infrastructure but the aging workforce. Large numbers of folks are set to retire within a relatively short time, leaving magnificent room for opportunity for a younger generation.

With this being said, I will quickly fill you in on what Colorado Springs Utilities has done to combat their loss of its workforce. Several of the lead managers in the water and wastewater fields got together with

deans at the local community college (Pikes Peak Community College) and adopted an AAS Water Quality Management Degree program.

These leaders of our industry, knowing that something needed to be done to create competent recruits for our aging work force, have volunteered to instruct these classes at the local community college several nights a week. This new degree and certificate program in Water and Wastewater Technology is one of only two in Colorado, and it was created in response to critical local need for qualified technicians.

The curriculum includes solid foundations in science and math, water and wastewater techniques, and group projects. The program started out relatively slow, but it has been consistently growing. It kicked off about two years ago, and the first eligible class for getting the degree should be coming out this summer.

Thanks for all you do, and keep up the good work!

**Ramsey Knowles**  
Colorado Springs (Colo.) Utilities

## The Real Heroes

To the editor:

Your new publication, *TPO*, offers great insight to the many challenges operators face around the country. I am a certified operator in two states (Wisconsin and Indiana).

Now that I serve in a technical support role for private industry, I found the publication refreshing because it provided a great reminder how these challenges are faced on a daily basis by the true heroes in the water-quality profession: operators who positively affect the environ-

ment with their dedication to improving our quality of life.

Best wishes on your endeavors!

**Michael Keleman**  
Environmental Engineer  
InSinkErator

## Life After Retirement

To the editor:

I've enjoyed your publication for the past five issues — keep up the good work. I wanted to offer up a topic some of your readers may be interested in: life after wastewater operations. I retired after 31 years of working at a Class A wastewater treatment plant.

I hold a Class A Operator certificate for operations for any treatment plant in Michigan. After retirement, I was approached by Hubbell, Roth & Clark Inc., consulting engineers: They asked if I would keep my Class A permit active and join their staff as a senior project representative on a part-time basis.

I agreed to a contract and have been with them for two years now. I work on treatment plant construction projects as an observer and record keeper. I am also involved in studies for treatment plant upgrades. My wastewater experience gives their firm a leg up on other consulting firms with no one on staff with my experience.

I now work in Holt, Mich., on a new IBES digestion system at the Delhi Township treatment plant. It has been very gratifying to me to put my experience to work and stay involved in the business. Good luck with the magazine.

**Dennis W. Smith**  
Holt, Mich.

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By John K. Thompson



Students and teachers learn about wastewater treatment and other environmental issues at the Floyds Fork Wastewater Treatment Plant and Environmental Education Center in Louisville, Ky. (Photos courtesy of Paul Meyer, Louisville and Jefferson County Metropolitan Sewer District)

The Louisville and Jefferson County Metropolitan Sewer District makes environmental education a regular part of Floyds Fork Wastewater Treatment Plant operations.

Named for the Floyds Fork watershed, the area's largest, this 122-square-mile space has undergone rapid residential and commercial development. The treatment plant lies next to Floyds Fork Creek, where the City of Louisville and the nonprofit agency 21st Century Parks have worked to create a 27-mile-long series of parks to protect the region's natural assets.

The district's Floyds Fork Environmental Education Center stands next to the plant and part of the natural setting of the 130-acre Louisville Metro Miles Park. The center boasts an energy-efficient smart classroom, composting facilities, and a native plant garden. It provides space for learning opportunities that include MSD employee training, school teacher training, plant

tours for students, and resources for students fulfilling environmental science requirements.

## CERES PRINCIPLES

In 1990, the MSD board signed the CERES Principles, a model corporate code of environmental conduct created by the Coalition for Environmentally Responsible Economies (CERES), made up of investors, public pension trustees, foundations, labor unions and environmental, religious and public interest groups. The board expanded that commitment with an official Environmental Policy Statement in 1993.

Tours of the Floyds Fork Wastewater Treatment Plant are part of the educational experience.

While the CERES Principles were developed to guide the private sector, MSD has found creative ways to apply them. The principles are intended to guide all MSD employees in their day-to-day activities, purchasing decisions and long-range planning. Building an education center became one of the MSD's first big steps towards meeting customers' educational needs.

Principle 8 of the MSD plan encourages the district to "maintain an open communications network with employees and customers regarding environmental issues." To that end, the education center supports unique on-site education programs that teach young and old the importance of valuing water resources and practicing safe water-use habits.

## CLASSROOM LEARNING

Planned to meet the needs of students who have a stake in understanding the water treatment process, the education center offers large classrooms with tables equipped for small groups. The classrooms provide computer access and video projection equipment for large-group instruction. A spacious amphitheatre overlooks the treatment plant. For outdoor gatherings there is an extended, covered porch.

Visitors get hands-on learning experiences through access to instructional facilities that include the Floyds Fork Wastewater Treatment Plant itself. The goal from the start was to make the plant a safe and hospitable demonstration site for student tours.

Two years ago MSD formed a partnership with the Jefferson





The Floyds Fork learning experience helps young people develop interest and skills in environmental sciences.

In addition, the education center offers career information and curriculum support materials to teachers. Students and teachers who use the center have access to the facilities' green space and creeks to conduct environmental inventories, develop their skills, identify problems, and explore solutions to help the community protect vital waterways.

One set of materials, "From Sewer to Stream," outlines the treatment and filtration process using a color-coded diagram and a caricature named Stalk C. Microbe, who warns kids: "Remember, if it didn't come out of your body and it isn't toilet paper, don't flush it."

Goodwin says the Floyds Fork learning experience works, especially for youth interested in developing their environmental science skills. "When you get kids engaged in outdoor education, they are excited about it," she says. "They are thrilled to be in the outdoors learning. I become really charged by their desire to learn as much as they can while they work with us." **tpo**

"We actually take kids on the river, and it becomes an amazing learning adventure. We start at the flood pumping stations and work our way toward the city. As they go, they observe and test the environment and begin to understand how water is managed."

**KANDRIS GOODWIN**

County Public School District and Eastern High School to use the center for student environmental science courses. This allows certified classroom teachers to help students complete their academic requirements while studying environmental issues.

"The plant provides students the opportunity for experiential learning in a real-world setting," observes MSD environmental educator Kandris Goodwin. "In addition to learning about a working wastewater treatment plant, students explore watersheds and conduct biological, physical and chemical assessments on the creek.

"We actually take kids on the river, and it becomes an amazing learning adventure. We start at the flood pumping stations and work our way toward the city. As they go, they observe and test the environment and begin to understand how water is managed."

### THE EXTRA MILE

Going that extra mile to support learning, the program at Floyds Fork provides access to speakers, classroom instruction and field trip planning, including chances for students to canoe the urban waterways and visit other wastewater treatment plants.

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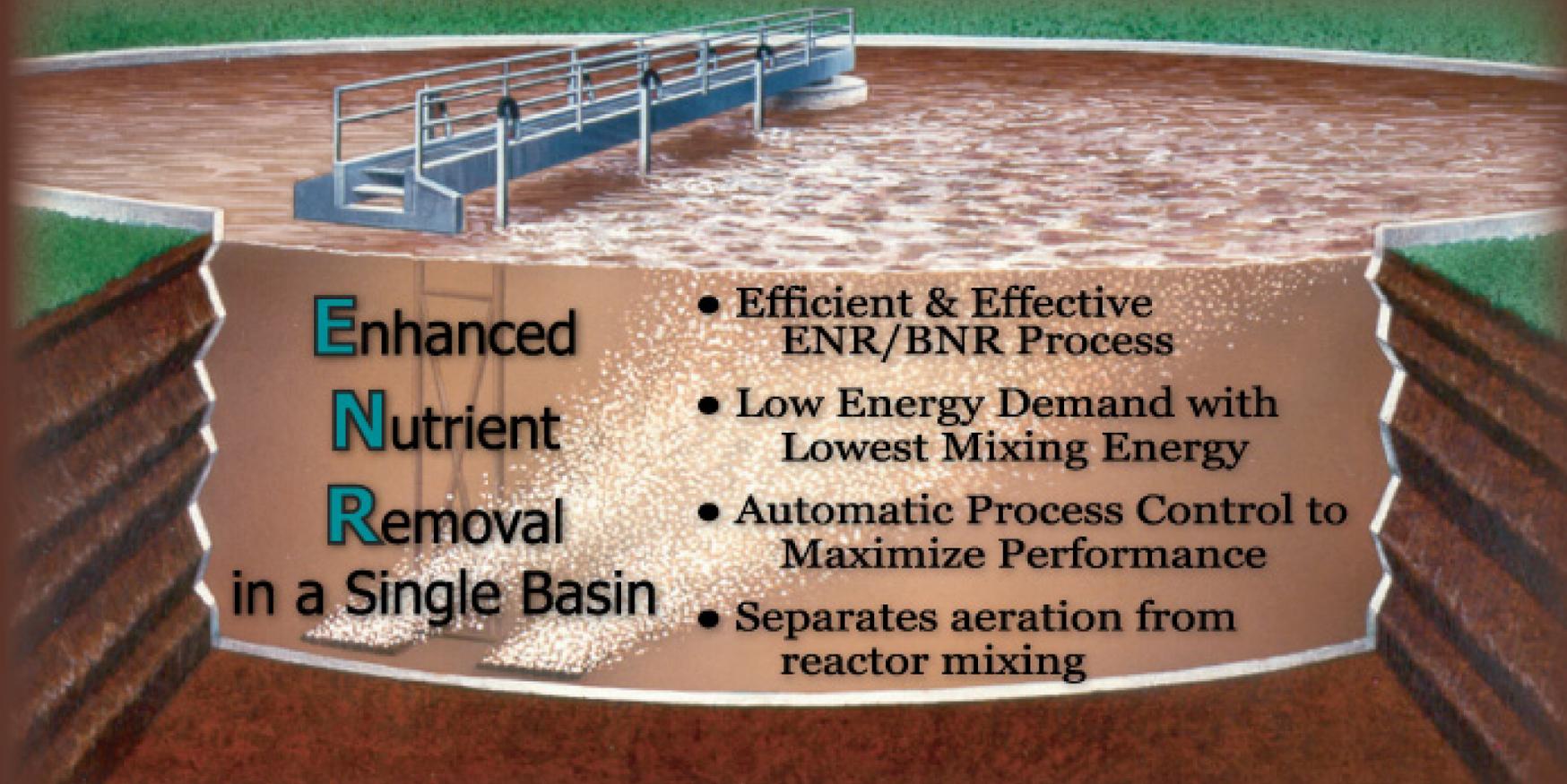
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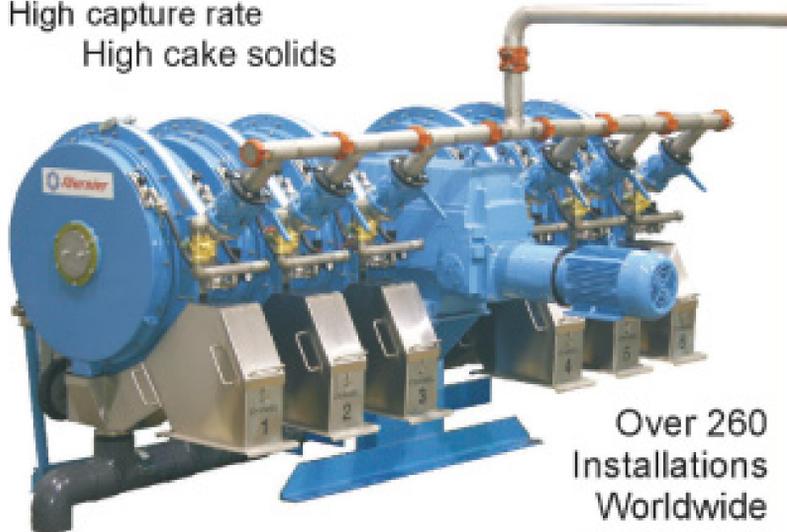
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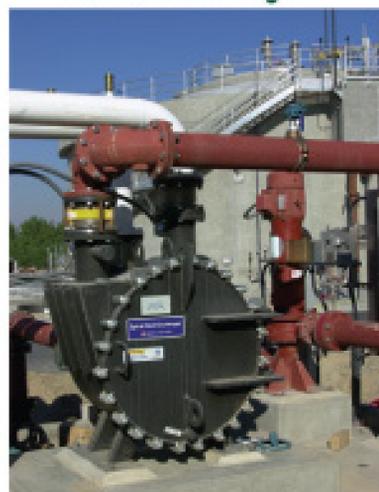
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Brandon Lovett, director of water operations, and Matt Kuehl, wastewater plant supervisor, hold the two EPA Clean Water Act Recognition Awards won by Wahoo Creek Water Pollution Control Plant for 2008. (Photography by Harris Hatcher)

# Better *Ideas*

## THE WAHOO CREEK WATER POLLUTION CONTROL PLANT EARNS RECOGNITION FOR CONSISTENT INNOVATION IN O&M, SAFETY, TRAINING AND COMPLIANCE

By Jim Force

**COMPUTER POP-UPS FLAG REQUIRED MAINTENANCE TASKS. A TRIVIA CONTEST** stresses safety. The compost site collects and treats its own leachate. A grease control program converts a problem substance into biodiesel fuel.

It's just another day of normal operation at the Wahoo Creek Water Pollution Control Plant, operated by Newnan Utilities in Newnan, Ga. The plant won a 2008 U.S. EPA Clean Water Recognition Award for operations and maintenance and recently was named Georgia Wastewater Treatment Plant of the Year by the Georgia Association of Water Professionals.

"We were really pleased to win these awards," says Brandon Lovett, director of water operations. "We're proud of our operation and our people. We put a lot of effort into making our plant the best it can be."

Lovett, along with wastewater plant supervisor Matt Kuehl, wastewater supervisor Todd Scarbrough, engineering manager Ed Strong, and administrative coordinator Katie Alexander, have built an impressive system of innovations that help them safely and successfully manage an average flow of 2.45 mgd. Many of their programs are models for others to follow.

The plant, a biological nutrient removal facility, dates to 1974. Along with a smaller companion Mineral Springs treatment plant,

it serves about 27,000 people and several industries in Newnan, 35 miles south of Atlanta.

### **BENEFICIAL BIOSOLIDS**

At Wahoo Creek, raw wastewater climbs up screw lift pumps to the headworks, where a pair of bar screens remove trash and debris, and an aerated grit collector removes grit. Lime slurry added to the influent channel bumps up the pH.

There are no primary clarifiers; flow passes directly to an anoxic basin that provides an oxygen-deprived environment for phosphorus removal. The wastewater then passes to an oxygen-rich aerobic zone, where bacteria remove ammonia. The treated water settles in a series of biological and chemical clarifiers.

Alum is added to flocculate and remove the phosphorus. The flow is chlorinated and then dechlorinated with sulfur dioxide before cascading through a re-aeration structure into Wahoo Creek, part of the Chattahoochee River basin.

For years, the Wahoo Creek plant sent biosolids to landfill. "But in 2006, we announced a long-term, practical solution for biosolids reuse with the development of our composting program," says Lovett. "Our composting site provides an alternative landfill, solidifying our position of accountable environmental management."

"We designed a collection system for the leachate and septic tank to hold it. Then it's pumped back to the treatment plant for processing. Nothing drains from the site."

MATT KUEHL



Team members of the Wahoo Creek Water Pollution Control Plant, operated by Newnan Utilities in Newnan, Ga., include (from left): Lewis Gable, operator; Bill White, lead operator; Chris Benning, operator; Willis McCarty, lab analyst and operator; and Matt Kuehl, plant supervisor.

## profile **Wahoo Creek Water Pollution Control Plant, Newnan, Ga.**



**OWNER:** Newnan Utilities  
**POPULATION SERVED:** 27,000  
**BUILT:** 1974  
**TREATMENT LEVEL:** Secondary, advanced  
**TREATMENT PROCESS:** Biological nutrient removal  
**FLOWS:** 3 mgd design, 2.45 mgd average  
**BIOSOLIDS:** Dewatered (centrifuges and belt filter presses); composted

**STAFF:** Brandon Lovett, director of water operations; Matt Kuehl, wastewater plant supervisor; Todd Scarbrough, wastewater supervisor; Bill White, lead operator; Willis McCarty, lab analyst and operator; Lewis Gable, Trish Bjork, Chris Benning, plant operators; Ed Strong, engineering manager; Katie Alexander, administrative coordinator

**WEB SITE:** [www.newnanutilities.org](http://www.newnanutilities.org)

### Wahoo Creek Water Pollution Control Plant **PERMIT AND PERFORMANCE**

	PERMIT	ACTUAL (2008)
BOD	18-30 mg/l	4.7 mg/l
TSS	30 mg/l	6.4 mg/l
P	10.68 kg/d	2.35 kg/d
NH <sub>3</sub>	1.1 to 5.6 mg/l	1.12 mg/l



In the open-air shelter composting facility, biosolids from the plant are mixed with wood chips in a 1:2 mixture until the desired temperature is reached. After that, it's taken out and windrowed and mixed periodically for at least 180 days.

After dewatering on belt presses, the 16 percent biosolids cake is trucked to the utility-owned compost site about 10 miles from the treatment plant.

"Wahoo Creek biosolids are mixed with biosolids from the Mineral Springs plant, and also with green waste from road crews and other Newnan utility partner agencies," says Kuehl. "Then it cures for about 180 days into an exceptional-quality product. So far we've been using the material ourselves to landscape the road cut into the compost site, but we want to take the product public very soon. We need to get it into the distribution channels." Capacity is about 11,000 cubic yards of Class A compost per year.

During the construction of the compost site, neighbors expressed concern about leachate contaminating the groundwater. "In response, we designed a collection system for the leachate and septic tank to hold it," says Kuehl. "Then it's pumped back to the treatment plant for processing. Nothing drains from the site."

### ALWAYS ON TIME

The Wahoo Creek plant staff takes the same painstaking approach to O&M. "To begin with, we have a maintenance contract with ITT-Flygt for all our submersible pumps," says Kuehl. "They're great people to work with."

But the maintenance program doesn't stop there. Alexander is responsible for an all-encompassing program built around an automated database containing all of the equipment manufacturers' specifications and O&M manuals. The program serves both the Wahoo Creek and Mineral Springs plants.

"We use Microsoft Outlook and Excel spreadsheets to track all equipment maintenance procedures and automatically generate e-mails to the staff ordering scheduled O&M procedures," Alexander says. "If a piece of equipment needs lubricating, that

## MAKING THE LEAST OF GREASE

That old gremlin — grease — is barely a problem in the Wahoo Creek collection and treatment systems. In fact, it's a bit of a boon to the Newnan area's energy resources.

"We've implemented a grease trap program among our customers, requiring standard maintenance and monitoring procedures," says Matt Kuehl, wastewater plant supervisor. As many as 150 restaurants operate in the Newnan area, generating millions of pounds of cooking oil and grease each year. The Wahoo Creek staff works with them to make sure they have grease traps and maintain them properly.

Then, Boca Industries, a private company, under contract with Newnan Utilities, picks up the grease on a regular schedule and takes it to a processing site, where it is made into biodiesel fuel. Kuehl says this arrangement reduces landfilling of grease and prevents sewer blockages.

The plant's Web site advises homeowners on proper grease disposal, especially for cooking grease. It also admonishes against flushing rags or other solids down the drain or toilet, or dumping materials that may block sewer lines into manholes.

In another initiative, the Wahoo Creek plant has installed a degreaser in its lift station. This, along with monthly sewer line maintenance, has reduced sanitary sewer overflows by 60 percent in the last four years.

order pops up on the operator's screen."

The system also generates a maintenance report detailing what work was done and how much the repair or maintenance



After the 180-day windrow period at the compost facility, a Wildcat trommel screen is used to separate the finished product from any larger debris. The debris is moved back to the open-air shelter where it can be reused.



Matt Kuehl, wastewater plant supervisor, views computer-generated notifications for the day's activities.

procedure cost. "That's the real value of the system," says Kuehl. "It tells us what we've budgeted per month or per quarter for maintaining a blower or other unit, and how much we're spending on maintenance. That way, we can determine when it's more cost-effective to replace a piece of equipment rather than continuing repairing it. We can track the break-even point for replacement."

The inspectors evaluating the plant for awards credited Wahoo Creek for its maintenance program. "They said it was outstanding compared to what they'd seen in the past, and we received bonus points for it," Lovett says.

## SAFETY FIRST

When Alexander isn't implementing the O&M system, she's coming up with creative ways to keep safety top-of-mind among staff members. "I think we've really taken safety to the next level here," says Lovett. "We're doing a great job in this area, and we have had no lost time accidents in several years."

To say Alexander is enthused about safety is an understatement. She lives it, and her creative ideas not only transfer that passion to others but make it fun. Plant staffers participate in a Safety Lunchbox the last Wednesday of every month. Topics range from self-contained breathing apparatus to DOT flagging to a CPR refresher.

Alexander stresses a hands-on approach. "We used to have a lot of lectures, but it's better for our crews to participate in hands-on learning," she says. One program involves going to a site and actually digging a trench box to practice trenching safety. The safety team also conducts unannounced spot audits, visiting a site once per quarter, reviewing safety, and writing a report and following up on any deviations or violations.

There's more. Every July, Alexander orchestrates a veritable safety fair: In a trivia contest, employees must beat a time deadline and answer safety questions that pop up on their computers. Those who answer correctly become eligible for a drawing for

prizes donated by area merchants. There's a drawing every hour for four days. The last hour of every day, Alexander conducts a free drawing in which everyone is eligible.

A game based on the TV game show "Jeopardy" tests employees' safety knowledge by asking questions on such topics as confined-space entry. Eight teams of employees sit around a table and punch a buzzer if they have the answer. If they're correct, they can choose the next topic. Teams take on humorous names like Close Enough Locators. Says Alexander, "Our people get really enthusiastic about getting the right answer. It's like excited chaos."

"Winning these awards was a great learning experience. Not only has our plant gained national recognition competing against hundreds of other plants, but the work we've put into it will allow for more efficient regular inspections and many other worthwhile benefits."

**BRANDON LOVETT**

## CREATING A BLUEPRINT

A new Safety Caching game will ask employees to use their GPS to find clues around the community, leading to further clues and ultimately to a prize for the employee who solves the clues the fastest. At the end, a key opens a box containing the final question — about safety — which must be answered correctly for the prize to be awarded.

"Safety is critical to our operation," says Alexander, "and I guess I'm just a creative person. I'm thankful to have the opportunity to develop these ideas."

The plant's recent recognition reflects hard work and innovation on the part of the staff, Lovett believes. "Winning these awards was a great learning experience," he says. "Not only has our plant gained national recognition competing against hundreds of other plants, but the work we've put into it will allow for more efficient regular inspections and many other worthwhile benefits."

Says Kuehl, "We now have a blueprint we can use for years to come. Our processes fall in line with our mission to protect the environment. It's helped us go above the call of duty in processing healthy water to be passed along to future generations." **tpo**

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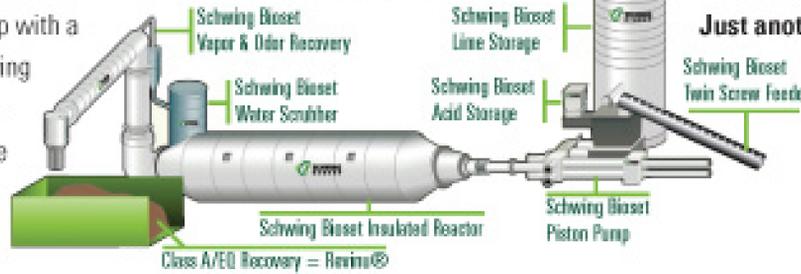
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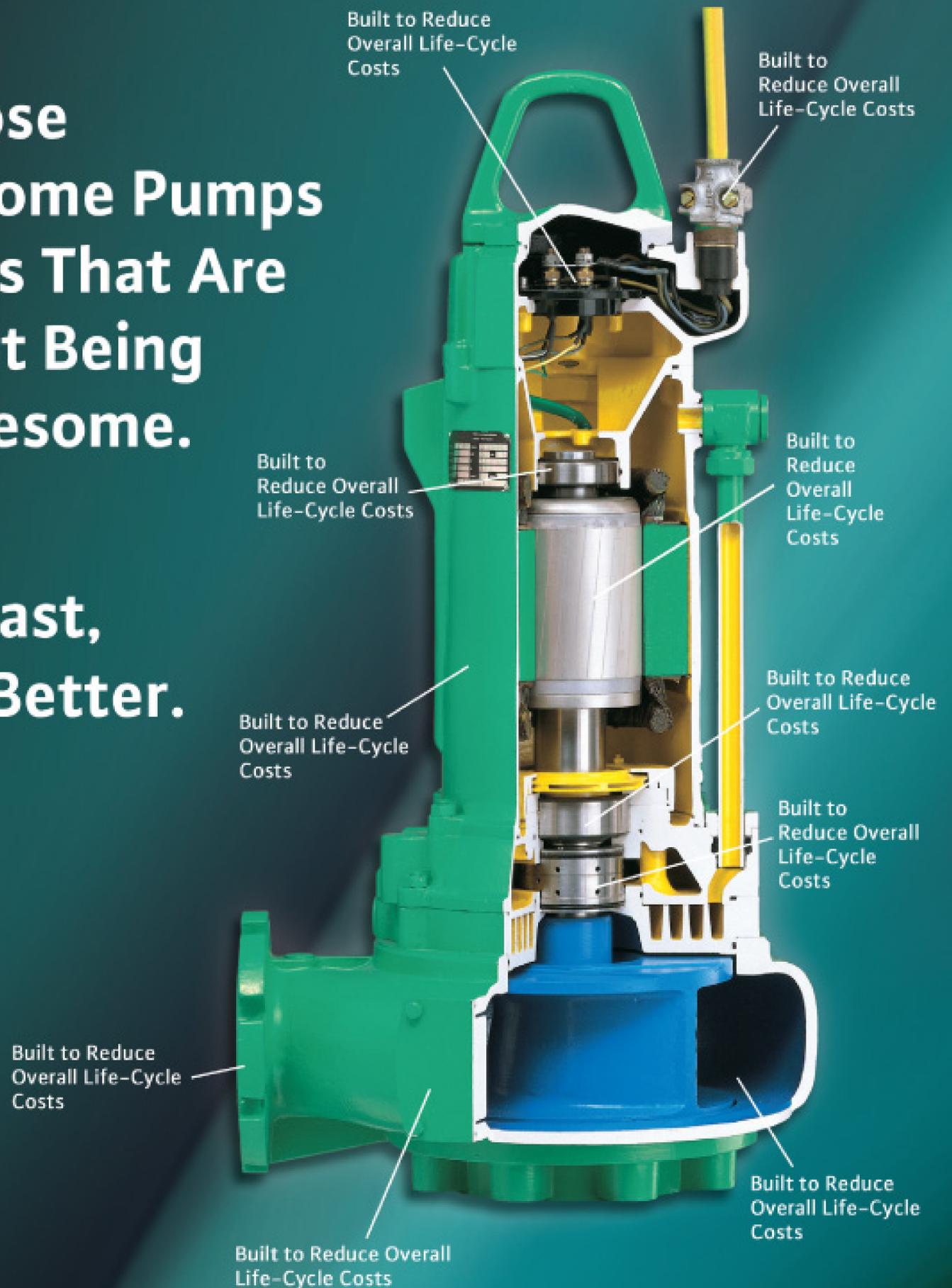
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Public tours of the Brightwater treatment plant's new 43-acre salmon habitat and reforestation area begins at a wetland boardwalk.

# Community First

BRIGHTWATER TREATMENT PLANT IN SEATTLE, WASH., INCLUDES LANDSCAPING AND HABITAT PROJECTS THAT THE PUBLIC CAN ENJOY EVEN BEFORE WASTEWATER STARTS FLOWING

By Mary Shafer

PHOTOS COURTESY OF KING COUNTY

**T**he new Brightwater Wastewater Treatment Plant in Seattle, Wash., goes on-line in 2010, but King County residents already enjoy its surrounding property.

The latest of three wastewater plants to serve about 1.4 million people in the Puget Sound area, Brightwater will also process wastewater from parts of Snohomish and Pierce counties. The plant will open with a capacity of 36 mgd. By 2040, that will increase to 54 mgd.

The entire 70-acre site is relatively flat. Treatment and support facilities cover 43 acres, and the rest is allocated for stormwater treatment, open space, wildlife habitat and wetlands. The design integrates landscape, architecture, wildlife habitat, engineering, art and education. Hargreaves & Associates of San Francisco was the designer.

## REDUCING POLLUTION

The Brightwater plant and its landscape design solve many problems, including persistent stormwater runoff through nearby auto salvage yards. For years, the polluted surface runoff poured into a local stream, destroying native salmon habitat.

Hargreaves designed surface systems that stopped flooding across Route 9 from the plant. During construction, that water is being pumped to a 40-acre section that is being restored to semi-wilderness conditions and will be managed as natural habitat.

The water is pumped through temporary sprayers in the forested area to help irrigate. After construction, it will flow by gravity to

detention ponds between plant buildings and the roadway.

Soil excavated or moved during plant construction was pushed to the front of the buildings and shaped into natural-looking landforms, which then were landscaped to create a buffer between the plant and the road.

## INTENTIONAL INVOLVEMENT

Nearly two dozen agencies, including the U.S. Army Corps of Engineers, the state Department of Environmental Protection, the state Department of Fisheries and Wildlife, and eight local jurisdictions were involved in reviewing or permitting of the project, says Michael Popiwny, architectural design and mitigation manager for the project.

"Regulations haven't been out of the ordinary, but our response has been," he says. "We went out of our way to create this facility as a community amenity. We've certainly exceeded minimum requirements.

"It was more about meeting our commitment to the community. We decided right away that we would rather spend the money to do proper environmental mitigation than spend it trying to fight the public on less responsible tactics. We reserved 10 percent of our budget for mitigation development."

## THE NORTH 40

The highly mitigated and restored area on the north end of the

A tour group comes out of the upper forest, which includes 22,000 native plants. Temporary irrigation lines are installed in the northern 43 acres of the site.

grounds is a showcase for the plant. The natural stream there had been reduced over the years to little more than a ditch running through canary grass. The channel was relocated and widened to make it a full stream again. Engineers employed weirs and daylighted part of the waterway that had run through a pipe beneath a parking lot.

They then created natural habitat by placing tree root wads alongside the stream bank, some reaching into the water. These will provide snags ideal for breeding areas. Two large ponds were added, the stream system was lengthened, and the stream bank reforested into a buffer zone.

All this provides a natural habitat for northwest salmon. To enable easier spawning migration, the project includes a series of pools and weirs that allow grade change, in effect creating a natural fish ladder. An amphibian shelf and ladder encourages breeding of the Pacific salamander and native toads.

Associated species come along with healthy salmon habitat. Red-tailed hawks, bald eagles, bobcat, deer and coyote are all expected to appear as the area settles into natural rhythms. A great horned owl, normally a fairly secretive bird, raised a family in a tree near the stream this year.

The Field House, a small, arched building with a series of roll-up glass doors on the front, provides about 1,200 square feet of covered outdoor work and discussion area for classes and tour groups. Solar panels on its sloped roof generate electricity. A cistern catches roof rain runoff to water the facility's test gardens.

## ENVIRONMENTAL EDUCATION

An elevated boardwalk winds through the forested wetland of the North 40, allowing visitors to look down into the ponds. It is part



Wildlife on the site includes great horned owls (two owlets shown).

“All utilities provide a framework for economic growth, so work with your local and regional communities. Involve them in your decision-making process. Try to be visionary: You really want to look at the big picture.”

**MICHAEL POPIWNY**

of a managed trail system marked with interpretive signage.

The boardwalk leads back to the Environmental Education Center in front of the facility's administration building near the treatment plant. The center is staffed by people drawn from existing county staff, such as educators for tours at the district's West Point treatment plant and school outreach workers.

County landscape staff, projected to be two full-timers, plus two or three summer helpers, will maintain the open space surrounding the whole facility. The North 40 will be allowed to evolve naturally. Grounds crews will clean up



trash and control invasive species. They will remove fallen trees only if they block trails.

Buildings are decorated with local artists' works acquired through the county's One Percent for Art Program, which sets aside 1 percent of funding for most county capital improvement projects for public art.

## GOOD RELATIONS

King County already sees public relations benefits from the project. Officials are discussing with the University of Washington how the school might use the habitat area and environmental center for research, outreach and student education.

“Just by having what will become a multi-use environmental education and community meeting facility, we believe Brightwater will become a hub of our interaction with the community,” says Popiwny. Popiwny believes public goodwill helped the project proceed more quickly and saved money by avoiding delays. He also believes the process offers a blueprint for other treatment plants seeking to expand.

“All utilities provide a framework for economic growth, so work with your local and regional communities,” he says. “Involve them in your decision-making process. Try to be visionary: You really want to look at the big picture.”

“Seek the best long-term regional solution and work to implement that, as opposed to a limited, narrow, meet-today's-need response. You'll end up with a positive result that will be a building block for your community.” **tpo**

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

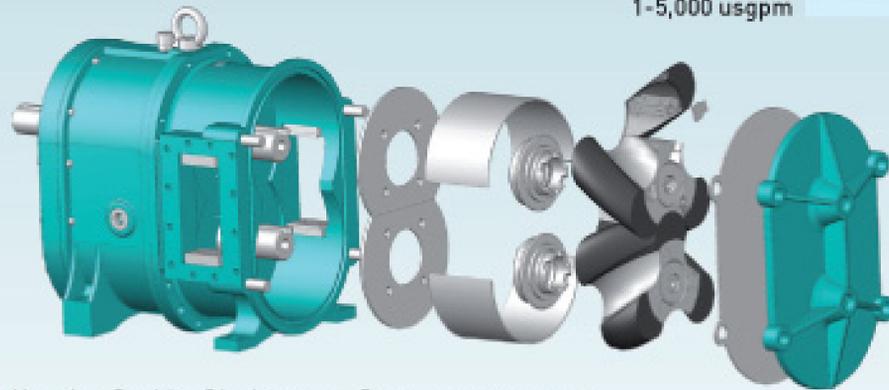
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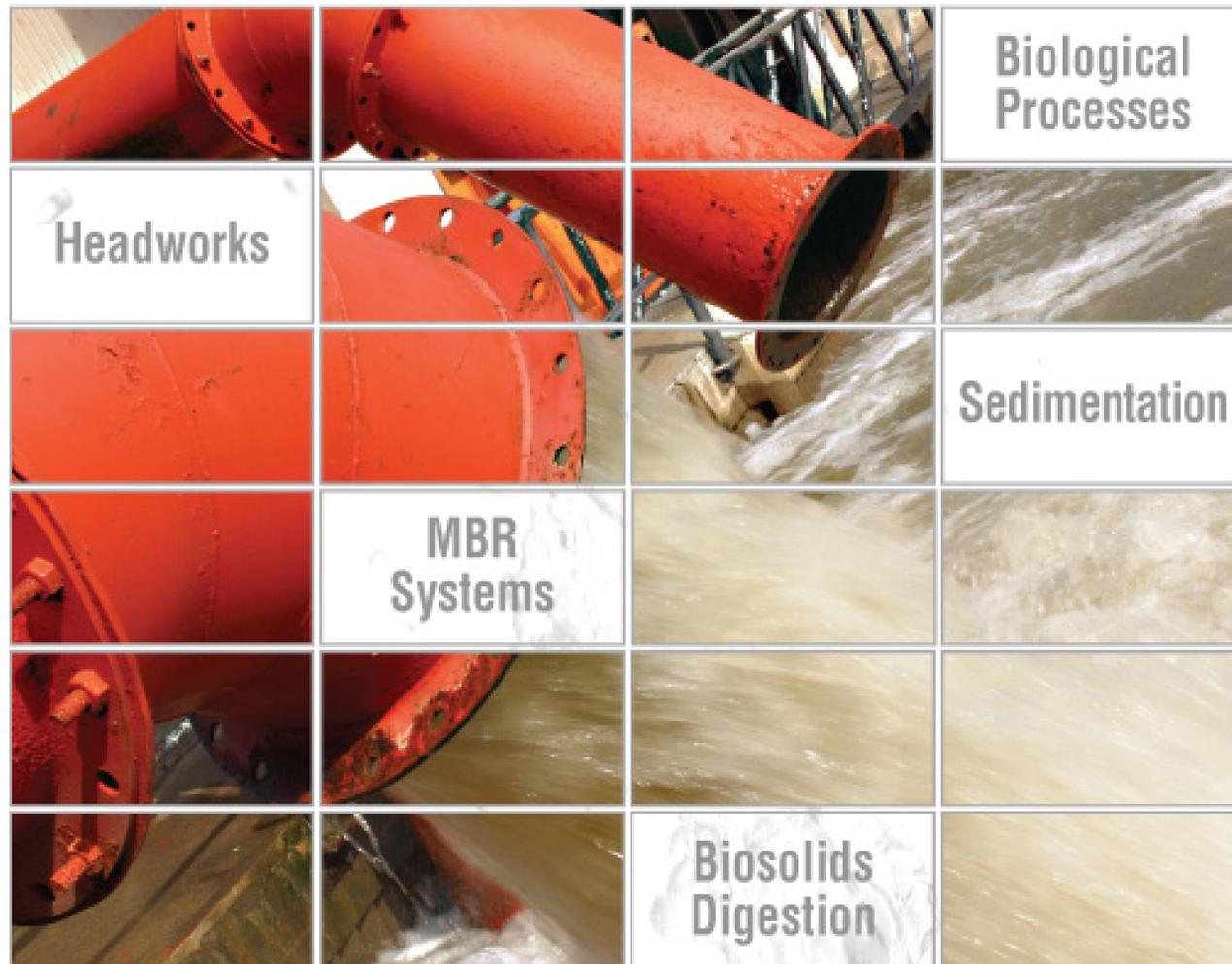
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### Staco Energy Names Regional Sales Manager

Sumit Chatterjea has been named Eastern Regional Sales Manager for Staco Energy Products Co. Chatterjea, based in Chicago, Ill., is responsible for developing and maintaining relationships with business partners in the Eastern Region of the U.S. He is a graduate of Purdue University with a bachelor's degree in electrical engineering.



Sumit Chatterjea

### Schweitzer Engineering Becomes Employee-Owned

Schweitzer Engineering Laboratories Inc. has become a 100 percent employee-owned company. Founded by president and CEO Edmund O. Schweitzer III in 1984, SEL has 1,800 employees worldwide and supports products in 126 counties.

### Ashbrook Simon-Hartley Acquires Centriquip

Ashbrook Simon-Hartley has purchased centrifuge equipment and decanter centrifuge manufacturer Centriquip Ltd. Centriquip supplies the wastewater industry with a range of liquid solid separation technologies as well as rotary drum thickeners, sand filters and odor control equipment.

### Parkson Opens Florida Research Facility

Parkson Corp. has opened Parkson Water Research Facility for the piloting of water and wastewater technologies. The Pompano Beach, Fla., facility includes an on-site laboratory, product design and development.

### Flowserve Receives Best Practices Award

Flowserve Corp. received the Frost & Sullivan Best Practices Award as the 2009 Global Centrifugal Pumps Growth Excellence Company of the Year. The award recognizes the pump division's consistent revenue growth through customer value programs, expansion of its global footprint, technological expertise and presence across diverse industries.

### Worlton Joins AMEC's Environmental Division

Mike Worlton, P.E., has joined AMEC's Earth and Environmental division and will be located in the company's Phoenix, Ariz., office. He is a registered civil engineer in Arizona and California and is a Leadership in Energy and Environmental Design (LEED) certified professional. President-elect of the Arizona Society of Civil Engineers, Worlton has bachelor's and master's degrees in civil engineering from Brigham Young University.



Mike Worlton, P.E.

### Environmental Operating Solutions Chooses Distributor

Environmental Operating Solutions Inc. has chosen Innoflow Technologies to distribute its MicroC products in New Zealand and Australia.

### Osprey Biotechnics Receives EPA Recognition

The U.S. Environmental Protection Agency recognized Osprey Biotechnics Inc. for use of its Munox product that biologically degrades animal and vegetable fats, oils and grease as well as petroleum hydrocarbons without emulsifying agents. The recognition was part of the EPA's Design for the Environment program on industrial and commercial biological wastewater treatment.



### Lowell Publishes Hand-Tool Catalog

Lowell Corp.'s latest hand-tool catalog features a variety of heavy-duty ratchet and socket wrenches. All wrenches incorporate Lowell's Bolt-Thru design, enabling bolts to pass entirely through the socket so that nuts can be secured on any threaded length, eliminating the need for deep sockets or open-end wrenches.

### Veolia Creates Canadian Treatment Subsidiary

John Meunier Inc., a subsidiary of Veolia Water Solutions & Technologies, has created the Canadian subsidiary, Veolia Water Solutions & Technologies Canada Inc. Based in Mississauga, Ontario, it will focus on municipal and industrial water and wastewater treatment. **tpo**

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# Going *Organic*

THE ST. PETERS (MO.) WASTEWATER TREATMENT PLANT USES TWO WOULD-BE WASTE STREAMS TO PRODUCE HIGH-QUALITY COMPOST AND DIVERT MATERIAL FROM LANDFILLS

By Diane Gow McDilda

THE PARALLEL WINDROWS LINED UP ON THE PROPERTY OF THE ST. PETERS (MO.) WASTEWATER TREATMENT Plant reveal a vital step in the biosolids process. The city combines biosolids with yard waste to produce compost as part of the St. Peters Earth Centre organic recycling program.

“The city has been active in organic resource recycling for more than 20 years,” says Bill Malach, director of utilities. “Over that time, the program has evolved and has been refined to meet community needs and create the highly successful recycling operation it is today.”

Malach sees composting as more than a way to handle biosolids. The organic recycling program also supports the community. “Early on, the city viewed biosolids as a valuable organic resource to be recovered and recycled, not as a waste product destined for disposal,” he says.

“In addition to providing a means for handling and processing these waste streams in a cost-effective way,” Malach notes, “the program produces products that are beneficial to citizens, environmentally sound for commercial businesses, and an alternative nutrient source for agriculture. The program has provided important environmental and economic benefits to

Operating foreman  
Jim Karll (left) and director  
of utilities Bill Malach.  
(Photography by Roy Sykes)



the city and region and will continue to do so in the future.”

### CREATING A WIN-WIN

Biosolids used in the organic recycling program come from the St. Peters treatment plant and from the Metropolitan St. Louis Sewer District (MSD).

At the St. Peters extended aeration plant, 4.2 dry tons of solids per day are pumped from two clarifiers to two 450,000-gallon aerated holding tanks. After three to four days of aeration, the material, at 1.5 percent solids, is pumped from the holding tanks to the press building, which houses two Ashbrook belt filter presses. The material is pressed to 16 percent solids and discharged from an elevated chute, collecting on a concrete pad.

Biosolids from St. Louis are generated through anaerobic digestion and trucked 10 miles to St. Peters. At 26 percent solids, that material is stockpiled separately, also on a concrete pad.

For tracking and operational purposes, the two biosolids streams are kept separate through the entire composting process. If sampling and analysis of the compost reveals that a parameter is out of compliance, the separate process makes it easier to trace the source. St. Peters is contractually bound to take MSD’s biosolids, but there is flexibility built in.

“We still have an agreement with St. Louis to take 12,000 tons per year, usually one to two loads a day,” says Malach. “But now we’re running low on the carbon source, brush and trees, so we are temporarily diverting their biosolids.”

Even with the temporary diversion, it’s a relationship that works out well for both plants. “It’s a win-win,” says Malach. “They get to save tipping fees at the landfill because we charge less. They’re saving money, and we’re getting reuse material.”

All told, the city produces 1,361 dry tons of biosolids at its own plant and receives 3,120 dry tons of biosolids per year from MSD. The material is mixed with 50,000 cubic yards of yard waste to produce 30,000 cubic yards of compost.

### OUT WITH THE OLD

The biosolids-handling system at St. Peters is relatively new. Construc-

#### ST. PETERS WASTEWATER TREATMENT PLANT PERMIT REQUIREMENTS

<b>BOD</b>	20 mg/l
<b>TSS</b>	25 mg/l
<b>Ammonia as N</b>	0.8 mg/l (May-Oct.) 1.4 mg/l monthly avg. (Nov.-April)
<b>Oil &amp; Grease</b>	10 mg/l

Mixed compost at the St. Peters treatment plant is ready for aging.



## profile

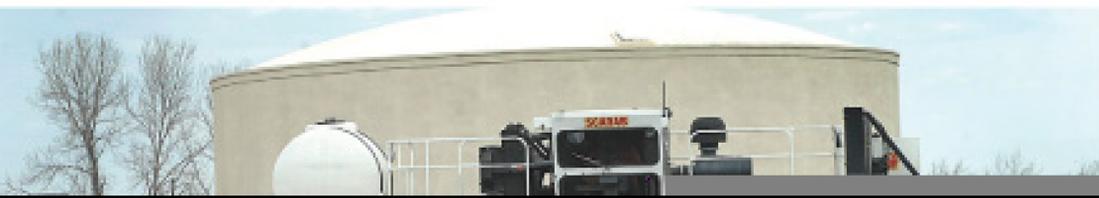


### City of St. Peters (Mo.) Wastewater Treatment Plant

<b>TREATMENT LEVEL:</b>	Secondary
<b>TREATMENT PROCESS:</b>	Extended aeration, activated sludge
<b>FLOWS:</b>	Design 6.9 mgd, peak 10 mgd
<b>RECEIVING WATER:</b>	Spencer Creek
<b>PLANT MANAGER:</b>	Jim Karll, plant operations foreman, Dual Class A drinking water/wastewater
<b>OPERATORS:</b>	Nancy Flier, Class A; Erick Kehoe, Class C; Ed Kern, Class A; Mike Mueller, Class C; Dave Martinek, Class A; Brad Schulz, Class C; Rosemary Slattery, Class A; Heather Wierciak, Class D
<b>BIOSOLIDS PROCESS:</b>	Windrow composting
<b>BIOSOLIDS USE:</b>	Land applied for agriculture; used for lawns and landscaping
<b>WEB SITE:</b>	<a href="http://www.stpetersmo.net">www.stpetersmo.net</a>

“We’ve overcome many concerns through education, pilot projects, and inviting participation in the process. The key to a successful program has been commitment to professional management and dedication to producing a high-quality product.”

**BILL MALACH**



**MOVING  
FORWARD**



The city's compost program includes a limited giveaway to city residents, sales to larger users and landscapers, and land application on a farm.

ters, eliminating odor. Construction is expected to start during the summer of 2009. Based on the preliminary design, there will be six to eight bunkers, each 30 feet wide, 60 feet long, and 9 feet high.

### MEETING REQUIREMENTS

After the criteria are met for Class A material, the windrows are broken down to curing piles where the compost continues to dry and age. After curing for six to nine months, the compost is run through a Wildcat trommel designed with a 1/2-inch screen that separates the unders (less than 1/2 inch in diameter) and overs (greater than 1/2 inch).

The unders make up the compost, which is both given away and sold. City residents can receive 2 cubic yards of compost every year. Residents who want more, along with commercial landscapers or other contractors looking for soil amendments and fertilizer, can pay \$10 per cubic yard. A discount of 20 percent is available for those who buy more than 500 cubic yards.

Leftovers are hauled to a farm owned by the city. The 200-acre farm is managed by a local farmer, who grows wheat and corn. Compost saves the farmer money on fertilizer.

Overs from the trommel screen go to one of two places. "They either go back to the compost pile as a carbon source, or they're used for erosion control," Malach says. Filtrex socks are filled with larger pieces and can be used on construction sites instead of silt fences. "The benefits of using the compost for erosion control is that it actually filters the water and can reduce the retention area required for a project," Malach says.

### GETTING BUY-IN

Even with the benefits of compost, the organics recycling program has

not always been an easy sell. "The city has had to overcome many obstacles over the years, including regulatory staff, farmer, political and public acceptance," Malach says. "We've overcome many concerns through education, pilot projects, and inviting participation in the process. The key to a successful program has been commitment to professional management and dedication to producing a high-quality product."

St. Peters has published articles in the city newsletter to help educate residents. The city also offers tours for schools and other organizations. Eventually, the city hopes the organics recycling program will be self-sustaining, but current numbers show that only 23 percent of the compost is sold, and 7 percent is given away. The remaining 70 percent goes to city projects or to farmland. But the system is still relatively new.

Ultimately, composting diverts a substantial amount of organic waste from the landfill. Instead, the material improves soil quality, increases crop yield, and makes yards and gardens greener and healthier. Malach and his staff hope it's just a matter of time before word spreads and compost becomes a popular amendment to more local landscapes. **tpo**

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# QUIET COMPETENCE

DEAN NELSON'S SUPPORTIVE AND TRUSTING MANAGEMENT STYLE  
HELPS HIS STAFF PROPEL THE OWATONNA (MINN.) WASTEWATER  
TREATMENT PLANT TO AWARD-WINNING PERFORMANCE

By Jim Force

WHEN PUBLIC RADIO HUMORIST GARRISON KEILLOR CHARACTERIZES Minnesotans as "self-effacing," he could well be describing Dean Nelson.

Nelson, the award-winning superintendent of the Owatonna Wastewater Treatment Plant, shrugs off as "pretty common" the steady performance of his facility. "We're not much different than anyone else," he says. "We're just out there doing our job."

He's being modest, of course. His plant has performed exceptionally, year after year, since the late 1980s, when it was modernized to meet current standards and he took over as superintendent. Much of the success has to do with his determined, deliberate management style, dealing with issues one at a time and keeping everything in perspective.

"Dean is a one-step-at-a-time kind of guy," says consulting engineer Mike Zagar, whose firm, SHE in St. Paul, Minn., designed the 1987 expansion, as well as a current headworks upgrade and the addition of phosphorus removal and belt presses for biosolids dewatering. "I've known him for a long time and he always breaks big issues down into simple parts. He believes that if you work out the various pieces of a project, the big picture will be solved in the end."

## SMOOTH OPERATION

Nelson was born and bred in southern Minnesota and came to Owatonna (population 25,000) out of high school in 1970. Like many others in the wastewater profession, he started working part-time at the treatment plant, was good at it, liked it, and made it his career. Along the way, he has achieved his Class A operator license and 503 biosolids certification. He is married and has two sons and several grandchildren.

His efforts were rewarded in 2008 when he earned the Central States Water Environment Association's Operator of the Year award. "Dean is one of a long line of outstanding operators in the Central States WEA," says Eric



Dean Nelson, superintendent of the Owatonna Wastewater Treatment Plant. (Photography by Mike Oldenburg)

Lucuyer, plant superintendent in Crystal Lake, Ill., and chair of the operator awards committee. "We honored him for his professional approach to the job and the exemplary performance of his treatment plant year after year."

Wastewater collection at Owatonna, 45 miles due south of the Twin Cities, dates to the early 1900s. The first treatment plant came on-line in 1940. Expansions followed in 1961 and 1987, when the current extended aeration plant was completed as part of a \$17 million capital project. The plant is designed for 5.0 mgd, and flow now averages about 3.5 mgd.

In the headworks, meters monitor the flow, which is screened. A trio of 3,000 gpm Flygt A-C Series pumps and a single 1,200-gpm pump transport it to an aerated grit removal tank. This area of the plant is getting a facelift: "We're putting in new pumps and a new grit-removal system," says Nelson.

Suspended solids settle out in two Eimco circular primary clarifiers before the wastewater enters four 180- by 32-foot aeration basins. A Sanitaire system consisting of 5,000 ceramic fine bubble diffusers introduces air to the liquid and provides a gentle mixing action.

The two 85-foot-diameter secondary clarifiers are covered by aluminum geodesic domes to protect against severe winter weather. Six gravity sand filters, with beds 4 feet deep, polish the effluent. Then the flow is chlorinated and dechlorinated with sulfur dioxide before discharge to the Straight River, which empties into Lake Pepin, part of the Mississippi River system.

## BIOSOLIDS REUSE

Diaphragm pumps move primary and secondary biosolids to a pair of anaerobic digesters. The primary solids digester is 60 feet in diameter with a fixed steel cover and two mechanical mixers. The secondary solids digester is also 60 feet in diameter with a floating gas-holding cover that provides storage

"Dean treats you like an adult and understands that you know what you're doing. He's very supportive and trusting. Plus, he's generous with praise and always credits the people around him for the success of the plant. That makes him easy to work for."

KEVIN LEMM

# profile

## Dean Nelson, Owatonna (Minn.) Wastewater Treatment Plant



- POSITION:** Superintendent
- EXPERIENCE:** 39 years
- RESPONSIBILITIES:** Treatment plant and collection system
- EDUCATION:** Advanced training and certification through the Minnesota Pollution Control Agency and Central States Water Environment Association
- CERTIFICATION:** Class A Wastewater Treatment Operator
- GOALS:** Successfully complete upgrades to headworks and biosolids facilities, plus addition of phosphorus removal process

Dean Nelson checks the oil level on the digester mixer.

## COLLECTIONS SIDE

The competence of the staff at the Owatonna Wastewater Treatment Plant is critical to public health and the well-being of the community. The team serves both the treatment plant and the collection system with its 15 lift stations.

"Two of our people make up the collections crew," says plant superintendent Dean Nelson. "They also fill in as plant operators on the weekends." To support them, the department maintains a combination jetter-vacuum unit and a crawler-mounted inspection camera.

Nelson's staff is also in charge of the industrial pretreatment program and an infiltration and inflow project. "We have a dedicated person (David Hager, a retired engineer working part time) going door to door throughout the community, visually inspecting all residential sewer connections," Nelson says. "At the moment, we're about 85 percent of the way through the approximately 9,000 homes in the city."

The I&I project also involves rehabilitation of some of the older sewer lines and connections in the central area of the city. "Communities in this part of the country all face these kinds of issues," Nelson says.



Dean Nelson backwashes a sand filter. Nelson has worked at the plant since 1970, starting part time and then making it a career.

### OWATONNA WASTEWATER TREATMENT PLANT PERMIT REQUIREMENTS

BOD	5 mg/l
TSS	30 mg/l
Ammonia N	1.5 mg/l
Phosphorus (future)	1.0 mg/l

engine jacket water and from plant effluent.

Two on-site biosolids tanks can hold up to 1.7 million gallons. In spring and fall, these biosolids (at about 3 percent solids) are injected into area farmland. The wastewater utility owns and operates two tankers and a TerraGator injection machine (AGCO Corp.).

"This is always a challenge for us because of the weather and road conditions," says Nelson. "We need a time frame in spring when the fields are dry enough to spread, and in fall after the crops are harvested. We land apply more than 3 million gallons every year."

The plant upgrade should make biosolids recycling easier. "We are adding belt filter presses and will be able to store cake and land apply the material just once a year," Nelson says.

A chemical addition system, the third leg of the upgrade, will enable the plant to remove phosphorus to meet a limit of 1.0 mg/l. It's part of an area-wide effort to limit phosphorus discharges into the Mississippi River system.

for methane gas. This methane is collected and burned in a Caterpillar engine/generator to generate electricity.

"We can generate about one-third of the electricity we need for the plant operation this way," says Nelson. The plant also cuts energy costs by recovering heat from the

These efforts should improve the Owatonna plant's already stellar performance. The plant easily meets or betters its limits of 5 mg/l BOD, 30 mg/l TSS, and 1.5 mg/l ammonia nitrogen.

### TEAM EFFORT

Nelson is quick to credit the staff for these achievements. His team includes lab manager Kevin Lemm, Class 1 lead operators Leon Ellis and Richard Olson, operators Ed Full, Keith Maas and Bruce Frandle, and heavy-equipment operator and collection system head Duane Perkins. "We have a good group here," Nelson says. "And we're fortunate to have had very little turnover."

The staff appreciates the quiet confidence that Nelson has in them and their abilities to do their jobs. Lab manager Lemm, a team member since 1990, says Nelson's management style enables employees to do their jobs without a lot of micro-managing.

"Dean treats you like an adult and understands that you know what you're doing," he says. "He's very supportive and trusting. Plus, he's generous with praise and always credits the people around him for the success of the plant. That makes him easy to work for."

Consultant Zagar observes, "One of Dean's strengths is his ability to transfer his knowledge to his staff. He helps them find solutions and lets them know that a crisis is not the end of the world. I think in this way he gets the best out of them."

Jeff Johnson, public works director and city engineer, agrees. "We're very pleased with Dean's work as our superintendent," Johnson says. "He has a lot of experience and a lot of knowledge, and we benefit from that. Our treatment plant and staff do a great job. The facility is clean and well-maintained, and performs exceptionally well. Dean stays educated, keeps informed, and has been honored with numerous awards. He's an old hand at this." tpo



Nelson and Kevin Lemm, lab manager, discuss a microscopic evaluation of a water sample.

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# Advancement Planning

A 'BOOT CAMP' PROGRAM HELPS WASTEWATER TREATMENT OPERATORS IN RHODE ISLAND PREPARE TO MOVE UP AND REPLACE PLANT MANAGERS HEADED FOR RETIREMENT

By Ted J. Rulseh

**W**hile clean-water agencies worry about finding the next generation of treatment plant leaders, a group in Rhode Island has acted.

The New England Interstate Water Pollution Control Commission (NEIWPCC), the Narragansett Water Pollution Control Association (NWPCA), and the state Department of Environmental Management (DEM) have collaborated to organize a Wastewater Operator Management Boot Camp, now completing its second year.

The DEM operates the boot camp, which is designed to help promising treatment professionals build the diverse skills they need to thrive as plant superintendents or in other leadership roles.

Coordinating the program is Bill Patenaude, principal engineer in the DEM Office of Water Resources. Patenaude explained the program, its aims and its successes to date in an interview with *Treatment Plant Operator*.

**tpo:** What was the rationale for the boot camp?

**Patenaude:** For some time, I have been aware of the need for succession planning. When all the regional trainers and certification officials from New England would meet every year, the topic would come up.

“I wanted to build a training program that would give promising people more education and experience and help them build confidence, so that when they had to step up to the plate, they would know how to swing.”

## BILL PATENAUDE

The urgency hit me the hardest about four years ago when a community in Rhode Island was searching for a plant superintendent and asked me to be on the interview panel. I was impressed by one candidate, someone I knew in the profession who was very active in the operators' association. He came in looking polished, and he did a good job in the interview, but he was lacking in certain areas.

Technically speaking, he was close to being qualified, but when it came to labor relations and managerial skills and how he would handle certain situations, he didn't have the vocabulary or the confidence to carry the conversation through.

I found myself wishing we could provide a broad overview to prepare people like him who wanted to move up the chain of command. I wanted to build a training program that would give promising

people more education and experience and help them build confidence, so that when they had to step up to the plate, they would know how to swing.

**tpo:** How did you go about organizing the boot camp?

**Patenaude:** We used to receive training grant funds from the federal government. We would transfer those funds to the NEIWPCC and work with them to develop our training plans, and they would administer the training for us. For a long time, we had classroom training, and some site-specific or problem-specific training programs.

Rhode Island doesn't have a requirement of retraining for certification renewal. As a result, we saw our training numbers go down. When the federal government began pulling back and eventually cut off the operator training money, we had to come up with another approach. We reached out to the NEIWPCC and worked with them to develop the boot camp.

With the small amount of money we had left over from the federal training grant program, they were able to get us a trainer for the first two sessions of the boot camp for both the first and second years. That trainer is Jon Jewett, who is a district facilities manager with the State of Vermont Buildings and General Services agency, and also a wastewater operator with experience in operations management training.

**tpo:** How is the boot camp structured?

**Patenaude:** We meet the last Thursday of every month for a full day or a half day, for 12 months. In the first two days, we cover technical issues — the areas where the participants feel the most comfortable. Over those first two sessions, we slowly weave in the management issues, such leadership, and labor relations. Those issues are sometimes more intimidating for operators.

With the exception of Jon Jewett, all the trainers are volunteers. They're from Rhode Island, mostly within the wastewater field. The Narragansett Bay Commission, which is the largest public wastewater utility in the state, has provided numerous staff members to give volunteer training on topics from microscopic observation to basic engineering. They have been a big help.

**tpo:** How are the boot camp participants selected?

**Patenaude:** I wanted to have a small group of people who were dedicated. But I didn't think it was in the state's interests to have my office select people for the program, because then there would be a



Bill Patenaude

sense that we were picking the best. That's not really a state agency's job.

Participants are nominated and selected by their peers, or they can self-nominate. They must commit to the program's time requirement of one day per month. Nominations require a letter of recommendation that includes job-history information, with special emphasis on why the person has the potential to manage.

In the summer of 2007, I sent letters out to all the plants' superintendents in the state and issued notices through the associations. The Narragansett WPCA, which is the operators' association in Rhode Island, was on board from the beginning. They took a very important role in receiving the nominations and vetting them. By August, we had our original 13 participants signed up.

We get people who are all over the spectrum in terms of age and experience. We have a number of folks who are coming to wastewater as a second career and need to be groomed in the profession. So we get folks in their 40s and 50s, and folks in their 20s, and anywhere in between.

**tpo:** Where are the training sessions held?

**Patenaude:** We have a large conference room here at the DEM in Providence, and we use that as a home base for the first sessions. Then we meet at different treatment facilities so they get out in the real world. For our November session this year, we focused on collection systems, and we went to the Warwick treatment facility. They had all their equipment on display. They had a camera truck set up for a demonstration. The city's GIS person came out and did a presentation.

Another thing I emphasize is getting these folks to meet and work with as many regulators as possible, whether it's enforcement people in my section or staff members from the EPA. It builds a sense of comfort to talk to those people and get to know them on a first-name basis. That's very important.

**tpo:** Do you find that the participants attend consistently?

**Patenaude:** Absolutely. Unless something comes up at the plant or something very important happens in family life, for the most part everybody is there, ready, willing and able. Some people are there half an hour early — they are that eager to get going.

**tpo:** In which areas do the participants need the most help?

**Patenaude:** Certainly labor relations. We spend a lot of time on that,

PHOTO COURTESY OF NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION



## BOOT CAMP GRADUATES SPEAK

Three graduates of Rhode Island's Wastewater Operator Management Boot Camp already have moved into management roles.

Peter Eldridge, a 20-year team member at the Town of West Warwick Wastewater Treatment Facility and a member of the first boot camp class in 2007-08, was named plant superintendent earlier this year. "The boot camp provided a lot of good information about what an operator doesn't see that a superintendent needs to get done, especially in regulatory affairs and relations with the union," Eldridge observes.

"Another excellent area of the class was on dealing with the media. We received some good tips, and I found that there's no reason to be afraid of the media." Two other members of the West Warwick team are enrolled in the current boot camp.

Another graduate, Janine Burke, moved from the assistant superintendent role at West Warwick to executive director of the Warwick Sewer Authority as of March 2008.

"I was almost the opposite of most other participants," says Burke, who has spent 10 years in wastewater treatment after 10 years with the U.S. EPA. "They all came with operations experience wanting to be in management. I had the management experience, so I absorbed more from the operations side — the microscopic analysis and collection system maintenance.

"I still learned a lot on the management side. It gave me confidence that I'm not alone. Other people have dealt with the same situations I face. There are resources out there that I can rely on if I have a personnel issue or another situation that is new to me."

Between what she learned in the boot camp and her work experience in her previous position, Burke was able to sit for her Grade 2 operator's exam. Upon passage, she earned a permanent Grade 2. "The boot camp helped put me over the top," she says. "I'm very proud of that license."

In addition, Ed Soltys of Veolia Water became project manager for Woonsocket Regional Wastewater Commission, moving from an operations supervisor role at Cranston, R.I. "I left each session with a gung-ho attitude," he says. "The class brought into focus things I was unfamiliar with, like administration and compliance."

Members of the first Wastewater Operator Management Boot Camp class are shown at the Massachusetts Water Resource Authority's Deer Island treatment plant. From left are Charlie Taylor, MWRA, Deer Island; Matt Pulgia, Rhode Island DEM; Tom Ciolfi and Mark Healy, Narragansett Bay Commission Fields Point treatment facility; Harry Clifford, Narragansett Bay Commission Bucklin Point treatment facility; Janine Burke, Warwick Sewer Authority; Jim DiCaprio, West Warwick treatment facility; Bill Patenaude, Rhode Island DEM; Gwin Cox, Warwick treatment facility; Peter Eldridge, West Warwick treatment facility; Scott Goodinson, Cranston treatment facility; and Chuck Conway, New England Interstate Water Pollution Control Commission. Boot camp members not pictured: Jarod Doyle, Dave Gee, Dave Perrotta, Edward Soltys, Jim Locke and Rob Sheridan.

and they always want more — from how to conduct a disciplinary conversation, to what is the role of the union, to where do they go for help.

In our state, collection system and CMOM issues are important. Our department put out a new regulation last spring that requires any community that has a collection system to put together an operations and maintenance plan. We're involved with the EPA on a joint project in SSO reduction.

“Do I expect them to become subject matter experts in every area we cover? No. But they gain experience. They gain knowledge. And they meet people in the industry locally to reach out — people they now know on a first-name basis.”

**BILL PATENAUDE**

We give them a full day of basic engineering so that they can understand the process of how a community goes from the facility planning stage all the way to blueprints. We try to take some of the mystique out of that, because consulting engineers can be intimidating to people who don't have an engineering background.

Another item we cover is media relations. We have one TV reporter and one print reporter who give an hour of their time to talk with the group about the needs of their media and how to work with them. Then we do role-playing. It's an experiential exercise that helps them gain confidence by working on their skills in a safe environment.

**tpo:** What do you expect in terms of outcomes for people who take part?

**Patenaude:** People have asked me: Do you really think 12 courses are all it takes for someone to become qualified as a plant superintendent? My answer is no. The participants may benefit from the boot camp in a variety of management positions, such as shift supervisor. We're not necessarily preparing them to be superintendents.

Do I expect them to become subject matter experts in every area we cover? No. But they gain experience. They gain knowledge. And they meet people in the industry locally to reach out — people they now know on a first-name basis.

I think just the interaction with different people who are professionals in their own right gives the participants something of great value. What we're really trying to do is not so much transfer knowledge — although that's important — but to provide these folks with a sense of confidence in their own abilities.

Of course, one thing I emphasize right from the beginning is that boot camp is in no way a promise that they're going to get a new job or a promotion.

**tpo:** What kinds of reactions have you seen so far from people who have been through the boot camp experience?

**Patenaude:** I think they would tell you the experience is making it easier for them and has helped them to a large degree. One guy, when we were handing out certificates of completion at the state association trade show and clambake in September, said, “This is the biggest thing I've done since I graduated high school.”

On the other side of the coin, I had a plant superintendent tell me he was delighted to have had his chief operator at boot camp. The guy was young, and the program gave him a new appreciation for what it takes to be a superintendent. Before, he would always be saying, “Why don't we do it this way? Why do we have to do it that way?” But he learned why as time went on, and he backed off on his criticism.

**tpo:** Do you see opportunities for other state agencies or clean-water organizations to replicate this program?

**Patenaude:** Definitely. I've had meetings with people from other states, and when this topic comes up, there's always, “Yeah, but ...” or “We can't do it because ...”

If that was the attitude we had here, we never would have done it. Regions can do this. Groups of communities can bundle together and do something similar.

The critical point is that government can do this. It doesn't have to be expensive. One thing that makes our boot camp a success is that it's relatively cheap. In the future, all our trainers will be volunteers. They do it because they appreciate the importance and are excited about helping people who want to grow.

I hear a lot of people say they can't do it like this. Well then, don't do it like this. Do something else, but do something. **tpo**

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# Always Pushing Forward

THE SACO (MAINE) WASTEWATER TREATMENT PLANT APPLIES TECHNOLOGY AND A PROGRESSIVE ATTITUDE TOWARD ITS GOAL OF BECOMING A NET ENERGY PRODUCER

By Mike Grennier

**T**he ultimate goal of the Saco (Maine) Wastewater Treatment Plant is to be an energy producer rather than an energy consumer. The plant is well on its way with a broad range of initiatives that include wind power, solar collectors, high-efficiency aeration, biosolids reduction, and even geothermal energy from wastewater.

At this 4.2-mgd secondary treatment plant, saving energy and protecting the environment are constants. "If you're coasting, you're going downhill," says John Hart, chief operator at the treatment plant. "We always strive to do better and never sit back, no matter

"We always strive to do better and never sit back, no matter what. Energy efficiency and environmentalism are just excellent goals."

JOHN HART



Deputy director of public works Howard Carter (left) and chief operator John Hart are shown with Viessmann solar collectors installed on the roof of the grit-handling building. The system, which feeds two water storage tanks, provides radiant heat that keeps the temperature in the headworks building at 50 degrees F even during the coldest months. (Photography by Liz Gotthelf)

what. Energy efficiency and environmentalism are just excellent goals."

The plant's commitment to the environment is also gaining attention. In 2008, it received a certificate of achievement from the Maine Department of Environmental Protection. It also won an operations and excellence award in 2002 from the U.S. EPA.

## PROGRESSIVE APPROACH

The Saco plant's progressive attitude is part of a citywide effort to save money and help the environment. The treatment plant has taken the lead on a number of fronts. One pioneering effort is a 1.8-kW Skystream (Southwest Windpower) wind turbine that supplements electrical power for the plant's administration building.

The plant taps about 400 kWh from the turbine, a fraction of the plant's annual consumption of 600,000 kWh. However, the turbine also satisfies another need: public education. The city wanted to demonstrate the viability of wind technology and needed to find the right spot to capture wind energy. There was no better place than the treatment plant since the property boasts a popular river walk trail. There is no mistaking the 75-foot-tall tower from the trail.

"People started seeing the wind turbine and said, 'That's really cool,'" says Howard Carter, deputy director of public works, who serves on the city's Energy Committee that he helped form. "At that point, we started rounding up public support for it." The city subsequently installed a larger wind turbine at the city's train station.

Solar power is also gaining favor among city officials. The treatment plant had Viessmann solar collectors installed on the roof of its grit-handling building in 2006. The system, which feeds two water storage tanks, provides radiant heat

Hart points to a solar tube on the roof of the administration building.

that keeps the temperature in the headworks building at 50 degrees F even during the coldest months.

Carter expects a 7- to 10-year payback on the system, which cost about \$15,000. The system is virtually maintenance-free – the crew simply checks the glycol fluid every now and then. “We could have accomplished the same thing with electrical heaters, but the cost is minimal and we’re reducing our carbon footprint,” Carter says.

### EFFICIENCY IN BIOSOLIDS

Although wind and solar are attractive alternative energy sources, Carter and Hart have never lost sight of lower energy costs through old-fashioned plant efficiency. It’s a main reason the plant has invested more than \$30 million in upgrades over 20 years.

One major success is an improved biosolids process. In 2003, the plant replaced a belt press with a Fournier rotary press. It later changed out a gravity belt thickener for an FKC rotary screen thickener. Both take the place of a high-maintenance and cumbersome

wet process involving a water pump system. The new process saves \$10,000 per year in energy and has cut biosolids tonnage in half, reducing disposal costs by \$50,000 a year.

Compared to the old belt systems, Hart says maintenance is as different as night and day. “The new system takes some operator expertise, but for the most part, there’s no mess once it’s running,” Hart says. “We can just set it and forget it.”

Saco also targeted other obvious areas for energy savings including the aeration system and virtually all motors and pumps. In the past, the plant relied on mechanical aeration and ceramic diffusers for its aeration basins. The diffusers would clog with sludge, and the tanks then had to be emptied once per year for cleaning. Clogged diffusers also meant the aeration system was less than efficient.

To address the issue, Saco replaced the ceramic

diffusers with Sanitaire fine-bubble diffusers and installed more efficient centrifugal Spencer blowers. The membrane diffusers eliminate clogging.

“We achieved energy savings right off the bat because we had a lot more efficient transfer of air,” Carter says. “When you’re running 75-hp blowers 24 hours a day, it all adds up.”

Toshiba variable-frequency drives (VFDs) are used on the aeration system and on most of the facility’s pumps and blowers. The plant began to transition to VFDs in the mid-1980s. It also committed to installing energy-efficient devices in all replacements. The result is a drop in electricity use of about 15 percent.

“Looking back, it’s a no-brainer to use VFDs and things like high-efficiency motors,” Hart says. “Yet we’ve also done things that are

considered experimental, even today. When you take the lead, you may experience some failures here and there. Fortunately, we haven’t had any of that, but that’s always a risk you take.”

### EXCITING TIMES

In the immediate and more distant future, the Saco plant will continue exploring innovative ways to save energy and reduce its carbon footprint. A prime example is a recent decision to use an effluent thermal heat pump to heat and cool a new \$4.3 million process building and garage, scheduled for construction this summer. The engineering firm, Woodard & Curran Inc., is designing the effluent heat pump system.

The state-of-the-art system will use the plant’s treated effluent, typically in the range of 50 degrees F, as the heat sink/source. Although the effluent’s temperatures and flows vary slightly, it is useable for a heat pump system. A refrigeration cycle within the heat pump system transfers energy from the effluent to the building during the heating season, and conversely, from the building to the effluent during the cooling season.

“Our goal is to be energy producers rather than energy consumers within 20 years. We’re going to see a lot of technologies involved in that here at the plant and throughout the city. It’s an exciting time to be in the field.”

**JOHN HART**

Depending on the season, hot or cold water is circulated from the heat pump to terminals that contain heating and/or cooling coils. A fan in each terminal unit draws air across the coils and distributes the conditioned air throughout a given space to satisfy the space set-point as defined by the automated temperature control system. The heat pump will be located in the process building and will route hot/cold water to the garage via insulated piping.

The new building will also optimize energy wherever possible. A backup generator will be its only fossil-fuel-driven equipment. “Our goal is to be energy producers rather than energy consumers within 20 years,” Hart says. “We’re going to see a lot of technologies involved in that here at the plant and throughout the city. It’s an exciting time to be in the field.” **tpo**



A 1.8-kW Skystream wind turbine supplements electric power for the plant’s administration building. A solar panel is on the side of the building.

### more info:

**FKC Co. Ltd.**  
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www.fkcscrewpress.com

**Fournier Industries Inc.**  
418/423-4241  
www.rotary-press.com

**ITT Water & Wastewater – Sanitaire**  
414/365-2200  
www.sanitaire.com

**Southwest Windpower**  
928/779-9463  
www.skystreamenergy.com

**The Spencer Turbine Company**  
860/688-8361  
www.spencerturbine.com

**Toshiba America Inc.**  
800/231-1412  
www.toshiba.com

**Viessmann Mfg. Co. Inc.**  
519/885-6300  
www.viessmann-us.com

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

# Pumps, Valves, Drives

MANUFACTURERS OFFER THE LATEST INNOVATIONS TO IMPROVE EFFICIENCY AND TREATMENT PERFORMANCE FOR MUNICIPAL CLEAN-WATER FACILITIES

By Benjamin Wideman

## VERSATILE SIZING

**Flygt submersible wastewater pumps from ITT Water & Wastewater** range from 3- to 32-inch discharge with integral motors from 2 hp to beyond 1,000 hp. N-Technology solids-handling pumps can handle sludge with up to 8 percent solids and are available in hardened cast iron and 25 percent chrome cast iron. These N-Pumps deliver clog-free operation with sustained high operating efficiency and reduced energy consumption. Flygt submersible mixers and low-head, flow generation pumps are constructed of stainless steel and range from 1 hp to 40 hp. **203/380-4700; www.ittwww.com.**



## SUBMERSIBLE SOLIDS PUMPS

**Submersible solids-handling pumps from Chicago Pump Co.** are designed for wastewater, sewage, sludge and light slurry applications. They offer high-efficiency semi-open and enclosed impellers, rugged cast iron design, and sili-

con carbide seals. Moisture detection sensors and thermal overload protection are standard.

Dry-pit submersible models use closed-loop cooling and are rated for continuous non-submerged operation under full load. Wet-pit submersible models are available with the Easy-Life guide rail system. Free-standing and portable models are available. Motors are designed, manufactured and tested per NEMA MG-1 for Design B motors and are equipped with the Modu-Cab modular cap and cable system for ease of servicing or replacement. **630/236-5700; www.chicagopump.com.**

## SOLIDS TRANSFER

The **2000 HS System from Moyno Inc.** is designed as a cost-effective alternative for dewatered sludge transfer in municipal wastewater treatment. It has an integral hopper with a twin-screw auger feeder and Moyno G4 progressing cavity pump that handles semi-dry, high solids, dewatered

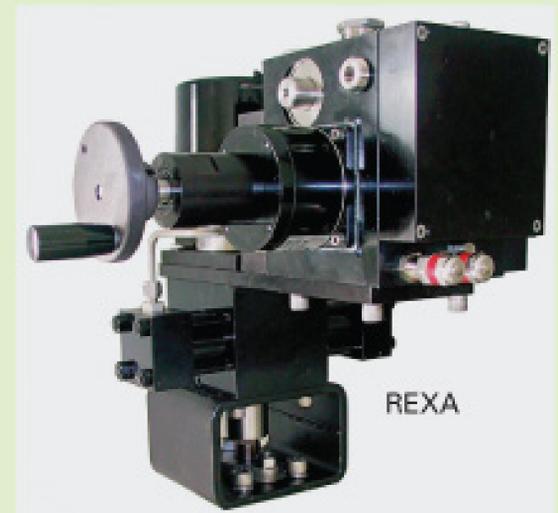


municipal sludge to greater than 50 percent solids. The system uses a non-pulsing flow, which significantly lowers operating pressures. Its twin-screw feeder supplies a constant pressurized feed rate to the pump, resulting in a 100 percent cavity fill rate. **877/486-6966; www.moyno.com.**

## ELECTRAULIC ACTUATORS

**Electraulic Actuators from REXA** use hydraulics to eliminate mechanical gears. The remote mount electronics and watertight cylinder allow for limited submersion installations. Each self-contained electro-hydraulic unit includes a motor, pump, oil, actuation cylinder and controls. The only required inputs are the control signal and power source; available outputs include position indication, limit switches and alarm relays.

The actuators can be mounted on ball valves, butterfly valves, plug valves, gate valves and dampers. Typical applications include: effluent valve, RAS valve, WAS valve, backwash valve, ozone/oxygen flow control, dissolved oxygen flow, aeration blowers, flare dampers, metering valves, influent valve, sludge line to filter press, air scour valve, and altitude valve. **508/584-1199; www.rexa.com.**



## GRINDER SYSTEM

The **MultiCrusher twin-shaft grinder from Boerger LLC** is designed as a robust, reliable unit for downstream protection of pumps and other equipment. With external gear reduction, the unit is suited for applications from gross solids handling to fine particle-size control. The company offers many construction and design configurations, including external stone

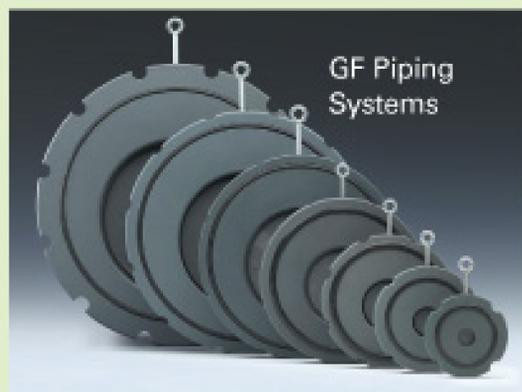


catchers and control panels. When used in tandem with the company's rotary lobe pump technology, benefits include identical quenched mechanical seals and other components that allow consolidated parts inventories. With Maintenance In Place (MIP) features, inspection and maintenance can be performed without disconnecting piping or drives. **877/726-3743; www.boerger-pumps.com.**

## EASY INSTALLATION

**GF Piping Systems** has introduced the **Type 369 Wafer Check Valve** in sizes up to 12 inches for water and wastewater treatment. The valve eliminates the need for glue or tools for installation – it is simply inserted between two standard ANSI or ISO/DIN flanges for easy installation or removal in the field. Centering eyelets provide easy fitting.

A spring option available in either 316 SS or Hastelloy C allows valve operation in the horizontal position. The unit also incorporates a swinging, flap-type door that enhances flow characteristics. The valve is available in sizes from 1 1/2 to 12 inches and with a PVC body and EPDM or FPM seals. It meets ANSI and ISO/DIN standards. A specially designed sealing Q ring makes it compatible with flat or serrated flanges. **800/854-4090; www.gfpiping.com.**



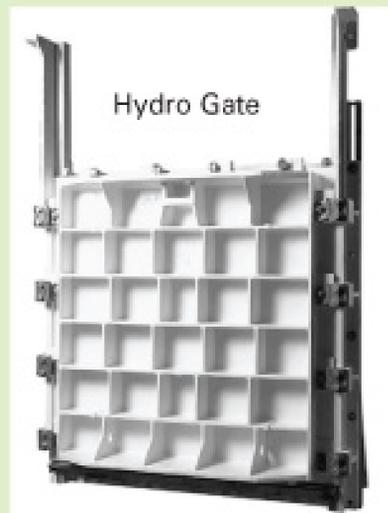
### EFFICIENT SIZE REDUCTION

**The Sewer Chewer Severe-Duty Grinder from Yeomans Chicago Corp.** is designed for efficient solids size reduction in wastewater and sludge handling. A twin shaft arrangement and patented cutter design have low headloss characteristics. A variety of motor and mounting options are available. TEPC gear motors are standard; explosion-proof

and submersible (IP68, FM Listed) models are available. Standard NEMA 4X controllers provide digital keypad-type operator interface for user-configurable control and operation. **630/236-5500; www.yccpump.com.**

### FLOW REDUCTION GATES

**Cast iron gates from Hydro Gate** have an efficient reinforcement design that withstands high pressure and a precision-machined wedging system for leakage control for unseating heads. The silicon bronze seating faces provide corrosion-resistant sealing surfaces. Durable design, including self-cleaning metallic seating faces, makes the gate effective where large buildup of particulates and solids is a concern. **800/678-8228; www.hydrogate.com.**



### PLUG AND PLAY

**The complete mobile skid-mounted decanter centrifuge system from Alfa Laval** is a plug-and-play solution for reducing sludge volumes. It allows for rapid and easy installation on site and includes all essential components for dewatering and thickening biosolids. The layout reduces

floor-space requirements and eases maintenance. Automatic operation eliminates continuous attendance, and the central control panel enables trouble-free operation and built-in safety. The system can be customized. **866/253-2528; www.alfalaval.us/wastewater.**

### GENTLE MIXING

**DME 375 and 940 pumps from Grundfos Digital Dosing** cover most dosing needs with capacities from 0.00066 up to 248 gph. Offering turndown ratios

of up to 1:1000, the pumps deliver a broad spectrum of doses. Simple, logical user-interface displays make it easy to set the required dose in any of 14 preprogrammed languages. Adjustable suction speed makes dosing of viscous fluids reliable and precise, and the design delivers a full stroke length every time, helping to prevent gas buildup and providing a gentle, even mix. **913/227-3400; www.grundfos.us/industry.**



Grundfos Digital Dosing



### PACKAGED PUMPING

**The ReliaSource 8x12 packaged pumping system from The Gorman-Rupp Co.** is the latest in the company's line of fully engineered, assembled and tested lift stations. The configuration accommodates Gorman-Rupp Super T Series, Ultra V Series or VS Series pumps and has interior walls that allow for sophisticated controls. Side access panels and a removable roof enable easy maintenance. **419/755-**

**1011; www.grpumps.com.**

### LARGE GRINDER

**The Channel Monster XD 3.0 sewage grinder from JWC Environmental** stands 13 feet tall, weighs 9,300 pounds and produces 7 tons of cutting force at peak loads. It combines rotating screen drums and a Muffin Monster grinder to shred solids while processing up to 59 mgd. The grinder shreds rags, plastics, wood and trash so particles flow easily through pumps and pipelines. The unit has multiple motors: a 15-hp grinder and 1-hp motor for the drums. The grinder has 3-inch hex drive shafts and stainless steel coil drums with 0.5-inch-diameter rod. The design includes larger cutters, shafts and housings to process heavy debris and first-flush storm loading. **800/331-2277; www.jwce.com.**

JWC Environmental



### CUSTOM-DESIGNED

**Wastewater lift stations from Romtec Utilities** are custom-designed. The system includes a 6-foot-diameter precast concrete wet well with a Thern crane, safety hatch and pump disconnect panel mounted on the wet well's precast concrete top. Within the wet well are two submersible pumps by ITT Flygt and level

sensing probes and pump guide rails for lowering and lifting the pumps for maintenance. **541/496-9678; www.romtecutilities.com.**

(continued)

## DRY MOTOR CHAMBER

**WILO Pumps with HC-Type motors from WILO USA LLC** have a dry motor chamber cooled by a hermetically sealed, water/glycol-filled cooling system. (The motors are sometimes referred to as jacketed.) Waste heat is dissipated by way of a labyrinth high-efficiency heat exchanger. The motors have cooling bearings with 50 percent higher bearing capacity. They are available in discharge diameters from 3 to 10 inches, and in sizes from 6 hp to 31 hp. **866/476-0323; [www.wilo-emu-usa.com](http://www.wilo-emu-usa.com).**



## AUTOMATIC FILTRATION

**The Series DF fabric filtration system from Serfilco** automatically indexes media for continuous filtration, even with varying input or solids content. Contaminated solution is pumped to a diffuser tray that distributes flow across the full width of the filter bed. Particle separation starts immediately via gravity flow through the media to the clean reservoir below the conveyor frame.



Filtered solution can then gravity drain to waste or be returned to the process by a pump. Consumed fabric is advanced to the sludge box as fresh media and simultaneously indexed to the solution flow. The unit is available in carbon steel, 316 stainless steel, CPVC or polypropylene, in sizes from 1.5 to 113 square feet of filter surface area and flow rates to 650 gpm at 80 micron. **800/323-5431; [www.serfilco.com](http://www.serfilco.com).**

## DUAL DIAPHRAGM PUMP

**The Dual Diaphragm Pump from Pumps 2000** is a redesign of the AODD and is suitable for all wastewater applications. Features include patented diaphragm and valves and an air motor that is stall-free and kept running with low air consumption and no oil lubrication. The plastic design is light and resists deterioration even in low-pH locations. **412/963-9200; [www.pumps2000usa.com](http://www.pumps2000usa.com).**



EPG Companies



## SMALL-DIAMETER SOLUTION

**The TSP submersible pump with level sensor mount from EPG Companies** is designed for small-diameter vertical wells. It can be installed in wells as small as 4 inches in diameter. It offers stainless steel construction for corrosion resistance and E-Glide bearings for extended life and is powered by Franklin Electric motors.

Flow rates range from 2 to 1,200 gpm. A SurePump vertical sump drainer (VSD) provides a sealed unit, ensuring that liquid flow is drawn past the motor for optimum cooling, and facilitating drawdown to the bottom of the vessel. The standard vent valve system purges air from the sump drainer, preventing pump air lock. **800/443-7426; [www.epgco.com](http://www.epgco.com).**



## STANDBY LIFT STATION PUMP

**An innovative pump station design from Thompson Pump & Manufacturing** lets municipalities and utilities replace traditional emergency backup systems (generator with automatic transfer switch) with a diesel-driven dry prime pump. This independent unit is designed to be more cost-effective for handling pump station problems, such as sewage pump failures. The diesel dry prime pump also can supplement lift station pumps during maintenance or emergency repairs.

The system meets U.S. EPA sound standards at 76dBA or below at 23 feet. The unit is available in 3- to 18-inch sizes with flows to 11,000 gpm, heads to 430 feet, and solids handling to 4.25 inches. It has automatic start/stop systems using floats or transducers and includes automatic monitoring and notification that the backup pump is running. **800/767-7310; [www.thompsonpump.com](http://www.thompsonpump.com).**



## PUMP AND VECTOR DRIVE

**Seepex Inc. has released an integrated drive for its line of metering and general transfer progressive cavity pumps.** The pump integrates pumps with a single reduction gear reducer, a four-pole, TEFC, inverter-rated 1/2-hp electric induction

motor and vector-type, variable-frequency drive in a NEMA 4 enclosure. External or special fabricated control enclosures are not required for high pressure or run-dry applications. The pump and drive combination can cover a performance band of 0.08 gph to 4.7 gpm and pressures to 360 psi. **937/864-7150; [www.seepex.com](http://www.seepex.com).**

## SLUDGE-HANDLING PUMPS

**The 6100CT Series cup-type recessed impeller pumps from Morris Pumps, a division of Yeomans Chicago Corp.,** are designed for high-grit sludge handling. Features include high-chrome iron construction, reversible casing, bi-directional impeller, replaceable suction cover and rear liner, machined registered fits with O-ring sealed interfaces, stainless steel shaft with hardened stainless steel sleeve, universal stuffing box with packing or mechanical seal. The vortex pump design provides large solids-passing capacity and reduced abrasive wear. Heat-treated 28 percent high-chrome iron offers consistent hardness throughout the pump castings, eliminating soft spots and irregular hardness patterns. **630/236-6900; [www.morrispumps.com](http://www.morrispumps.com).**



## VACUUM FEED VALVE

The **OV-110 Omni-Valve vacuum chemical feed valve from Hydro Instruments** features a direct linear-drive design and 3-inch captured v-notch valve stem to automatically control chemical feed rates (gaseous or liquid) using any desired control method. **215/453-3102; www.hydroinstruments.com.**

Hydro Instruments



Charles Austen Pumps Ltd.



## SINGLE SOURCE

The **SW Series of submersible water pumps from Charles Austen Pumps Ltd.** complements its Enviro air pump/blower, enabling users to single source both types of pumps in sewage treatment plants. Designed for use inside a treatment tank, the pumps feature a strike-resistant and anti-corrosive stainless steel or plastic casing. Performance ranges from 2,500 L/hr up to 20,000 L/hr. Models SW4500F and SW7000F include float switches for applications that require the pump to start and stop automatically. **www.charlesausten.com.**

Performance ranges from 2,500 L/hr up to 20,000 L/hr. Models SW4500F and SW7000F include float switches for applications that require the pump to start and stop automatically. **www.charlesausten.com.**

## VARIABLE-SPEED PUMPING

The **H2O Drive from SJE-Rhombus** is designed for variable-speed pumping applications and features integrated Advanced Pumping Software designed to read discharge pressure and adjust pump speed to maintain constant output pressure without the need for a PLC or separate controller. The drive is available from 5 hp to 150 hp at 200-230 volts and 5 hp to 500 hp at 380-480 volts, and can be set for single or multiple pump operation. The standard drive is supplied in NEMA 1 enclosure with pressure transducer and can be customized for specific requirements. **888/342-5753; www.sjrhombus.com.**



SJE-Rhombus

## PLUG VALVE

The **Cam-Centric plug valve from Val-Matic** is designed to handle wastewater and industrial slurry. The vee-type packing is field adjustable and replaceable without removal of the actuator. Both the packing and stainless steel radial bearings are protected by grit seals in the upper and lower bearing journals. The 100 percent port flow design minimizes turbulence, head loss and energy consumption. Sizes range from 1/2 inch to 48 inches with either flange or mechanical joint end connections. **630/941-7600; www.valmatic.com.**



Val-Matic

## VALVE ACTUATOR

The quarter-turn **Limiterque QX smart electronic valve actuator from Flowserve Corp.** is designed to enhance safety and reduce downtime through improved diagnostics, built-in self-test and LimiGard fault protection. Its brushless DC motors are engineered to eliminate sparks, reduce mechanical and electrical noise and dissipate heat. The LCD screen can be rotated 180 degrees and is available in 10 languages. **972/443-6500; www.flowserve.com.**

## FLOATING BALL VALVES

Floating ball valves from **Innovative Pressure Technologies** feature a two-way floating ball design to deliver reliable operation in most on/off applications up to 10,000 psi. **814/833-5200; www.inpressure.com.**

Innovative Pressure Technologies



Griffin Pump & Equipment Inc.

## NON-CLOG PUMPS

**Non-clog pumps from Griffin Pump & Equipment Inc.** can deliver flows up to 17,000 gpm with head capacities of 240 feet. The impeller can handle stringy materials and 3-inch solids, while the large cleanout port facilitates debris removal without having

to disassemble the suction pipe or hose. Options include vacuum assist or compressor prime, electric or diesel engines, internal fuel tanks for 24-hour operation, trailer mount and sound attenuation. **866/770-8100; www.griffinpump.com.**



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## CENTRIFUGAL PUMPS

**E, F and G Series centrifugal pumps from Griswold Pump Co.** provide up to 3,000 gpm and heads up to 310 feet in a broad range of sizes and configurations. The pumps are equipped with either close-coupled NEMA electric motors or are frame-mounted with coupling to electric motors, engines, steam turbines or belt drives. Key features include bronze shaft sleeve,

bronze wearing rings, carbon, ceramic, Buna and stainless steel mechanical shaft seal components and a single-piece, enclosed impeller made of cast bronze and keyed to the shaft. **800/843-9222; www.griswoldpump.com.**

## METERING PUMPS

The **Tacmina PZ Series electronic metering pumps from Neptune Chemical Pump Co. Inc.** are available in a range of sizes and pressures, from 1 to 1,300 mL/min at pressures up to 220 psi. The pulse metering pumps are available in manual control, external input and programmable models. Models PZD-32/52 and all PZiG models have built-in calibration and allow accurate direct entry of feed rate in mL/min. Control features are onboard every programmable pump, including pH and residual chlorine control. **215/699-8700; www.neptune1.com.**



Neptune Chemical Pump Co. Inc.



Vaughan Co.

## SELF-PRIMERS

**Vaughan Co. offers self-priming Chopper Pumps** for lift stations, scum wells, portable cleanouts, or retrofits of clogging pumps. A high-efficiency chopper impeller design allows priming up to 25 feet and flows up to 6,000 gpm. **360/249-4042; www.chopperpumps.com.** (continued)

## VACUUM PUMP INLET TRAPS

Vacuum pump inlet traps from MV Products can be customized to match specific pumps or pump and blower packages. The traps are designed for vacuum systems ranging from less than 1 cfm to greater than 5,000 cfm. PosiTrap can hold from one to four filter elements, while the Multi-Trap features a knock-down stage and up to six separate stages, each holding multiple elements. Filter media include activated charcoal, Sodasorb, Resisorb, stainless steel and copper gauze, molecular sieve, activated alumina and pleated polypropylene. 978/667-2393; [www.massvac.com](http://www.massvac.com).



## MOTOR CONTROL

The Square D Model 6 low-voltage motor control center offers increased plant floor intelligence and motor protection with the **Schneider Electric TeSys T motor management controller**. In addition to monitoring a motor's current, power consumption and voltage, data communications protocols like CANopen, DeviceNet, Ethernet, Modbus and Pro-

fibus are built into the TeSys T controller and feed information back to centralized process control via on-board I/O, allowing facility management to make critical adjustments to maintain uptime.

The controller is Ethernet-enabled — an advantage for a plant that requires Ethernet capability at the individual motor starter level. The TeSys T controller monitors the current state of motors that power pumps, blowers, fans, compressors and conveyors. It can alert centralized process control if there is a problem with a motor or if a problem is imminent.

The controller can be configured via laptop PC for specific applications and to monitor current or voltage parameters. It has six discrete inputs and three relay outputs, along with an RJ45 port for connecting a laptop PC or the optional TeSys T expansion module, which monitors voltage and features four additional logic inputs. A door-mounted human machine interface (HMI) is also available. 800/392-8781; [www.schneider-electric.us](http://www.schneider-electric.us). **tpo**



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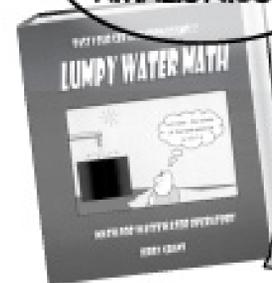
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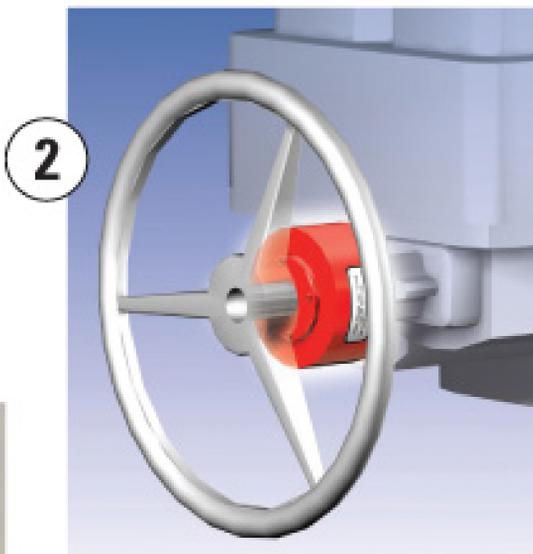
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### 2. AUNSPACH INTRODUCES OVERTORQUE PROTECTORS

Overtorque protectors from Aunspach Controls Co. Inc. are designed to prevent valves, sluice gates, manual and electric actuators and other equipment from damage caused by excessive torque. All models feature epoxy coating and stainless steel components for corrosion protection. Mechanisms are permanently lubricated and hermetically sealed. Units are supplied fully calibrated and ready to mount. No special tools or equipment modifications are required. **636/376-2395; www.aunspachcontrols.com.**

### 3. ASHCROFT OFFERS TYPE 1259 PROCESS GAUGE

The Type 1259 process gauge from Ashcroft Inc. has a 4 1/2-inch solid front safety case, 316 stainless steel or Monel wetted parts. Offering ASME B40 Grade 2A accuracy of plus or minus 0.5 percent FS, the gauge also features a Duratube Bourdon tube, 300 series stainless steel movement and in-field liquid fill capacity. **800/328-8258; www.ashcroft.com.**

### MAZZEI INTRODUCES PIPELINE FLASH REACTOR

The Pipeline Flash Reactor from Mazzei Injector Co. LLC is designed for post-treatment aeration or pure oxygen injection in wastewater treatment applications. The system utilizes a small sidestream passed through an injector to draw in ambient air or concentrated oxygen. The aerated sidestream is then delivered to the reactor where it aggressively mixes with the main flow, uniformly transferring the oxygen in the effluence pipeline. Where space is an issue, the reactor eliminates the need for post-treatment cascading systems or diffuser basins. **661/363-6500; www.mazzei.net.**

### 4. CAMPBELL INTRODUCES SUBMERSIBLE PRESSURE TRANSDUCERS

CS450 and CS455 submersible pressure transducers from Campbell Scientific Inc. can measure pressure with a static accuracy within plus or minus 0.1 percent over a 32-degree F to 140-degree F range. The units

can output either an SDI-12 or RS-232 signal interface to Campbell Scientific dataloggers or other recording devices. Both sensors are available with six pressure range options, from 0-2.9 psig up to 0-145 psig. They feature a piezoresistive sensor housed in a metal case. The CS450 has a 316L stainless steel case, while the CS455 has a titanium case that allows it to be used in saltwater or other corrosive environments. The transducers have a Hytrel cable that remains flexible, even under harsh environmental conditions. The cable serves as a vent tube to compensate for atmospheric pressure fluctuations. **435/753-2342; www.campbellosci.com/pt.**

#### 5. HOFFMAN OFFERS CLIMAGUARD HEAT EXCHANGER

The Climaguard outdoor heat exchanger from Hoffman removes up to 3,000 watts of enclosure heat and features a double-crimped and dip-sealed core for protection against leaks in harsh environments. Units can be surface- or recess-mounted. **763/421-2240; www.hoffmanonline.com.**

#### 6. SJE-RHOMBUS INTRODUCES COLOR-CAPPED SWITCHES

Color-capped switches from SJE-Rhombus offer easy identification and reduced chance of error. Yellow caps signify the SJE SignalMaster normally open control switch. Blue caps represent the SJE MilliAmpMaster low-voltage control switch. Green caps signify the SJE SignalMaster SPDT (single-pole, double-throw) control switch, and white caps represent the SJE SignalMaster normally closed control switch. **888/342-5753; www.sjerrhombus.com.**



#### 7. ELECTRO STATIC INTRODUCES SHAFT GROUNDING RING

AEGIS SGR bearing protection rings from Electro Static Technology are designed to extend the lives of motors controlled by variable-frequency drives through the elimination of harmful currents that can damage bearings. The ring is maintenance-free and works with virtually no friction or wear for the life of the motor. Because it comes in halves, the ring can be installed in the field without disconnecting the motor from coupled equipment. A U-shaped mounting plate fits around the motor shaft. **866/738-1857; www.est-aegis.com. tpo**

## product spotlight

### Portable Drive System Provides Quick, Safe Way to Operate Valves

By Ed Wodalski

The Easi-Drive portable valve operator from Smith Flow Control Inc. is engineered for one person to open and close valves quickly and safely. The drive is available in electric-, hydraulic-, pneumatic- and battery-powered options. It weighs from 6 to 39 pounds, and delivers 350 to 8,500 foot-pounds of torque.

The tool can be used on any size valve, says Kim Swinford, U.S. business manager for the manufacturer. The system includes an adapter and reaction set for safe operation. The adapter stays fixed to the drive stem of the valve, enabling a technician to actuate any number of valves with a single gun.

The reaction arm allows the drive to be completely self-supporting and transfers any reaction from the gun back onto the valve or a fixed point, rather than to the operator. The continuous-drive gun has an adjustable torque output level, which protects the valve from damage by preventing over-torque.

Introduced last year to the wastewater industry, the system has many applications on large gate and sluice valves. "For valves that are difficult or virtually impossible to operate manually, the Easi-Drive's high-torque output makes it an excellent solution," Swinford says. "Or, if you have a gearbox-operated valve, which is easy to operate but requires numerous turns, the Easi-Drive would significantly reduce the time involved to operate that valve."

A remote-control option is available, enabling the operator to be a safe distance from high-heat or high-decibel areas. **For information, call 859/578-2395 or visit www.smithflowcontrol.com. tpo**



Easi-Drive portable valve operator from Smith Flow Control Inc.

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worth noting

TPO invites your national, state or local association to post notices and news items in this column. Send contributions to [editor@tpomag.com](mailto:editor@tpomag.com).

## people

**Mike Fogle** retired from the Des Moines Wastewater Reclamation Facility after 42 years of service.

**Ed Calder** retired from the Canadian Forces Base in Gagetown, New Brunswick, after 38 years on the job as a boiler operator and wastewater treatment plant manager and maintenance person.

TPO welcomes your contributions to this "People" listing. To recognize members of your plant team, please send notices of new hires, promotions, service milestones, certifications or achievements to [editor@tpomag.com](mailto:editor@tpomag.com).

## education

### Colorado

The Rocky Mountain Water Environment Association will offer a full curriculum of classes for water and wastewater plant operators, as well as distribution system operators, July 20-24 at Colorado Mountain College in Leadville. The program is designed to help participants upgrade operational skills, get required training units for certification renewal, or prepare for certification exams. Call 303/783-6843 or visit [www.rmwea.org](http://www.rmwea.org).

### Kentucky

The Kentucky Water and Wastewater Operators' Association has these workshops:

- July 15 – Confined Space, Radcliff
  - July 16 – Confined Space, Radcliff
  - Aug. 13 – Confined Space, Bowling Green
  - Aug. 20 – Various topics (water and wastewater), Morehead.
- Call 502/226-8149 or visit [www.kwwoa.org](http://www.kwwoa.org)

### North Carolina

The North Carolina AWWA-WEA has these classes:

- July 13-17 – Western Biological Wastewater Operators School, Morganton
  - Aug. 17 – Back to the Basics for Wastewater Operators, Fayetteville
  - Aug. 26 – Wastewater Treatment, Metro Convention Center, Hickory.
- Call 919/784-9030 or visit [www.ncsafewater.org](http://www.ncsafewater.org).

### Texas

The Texas Water Utilities Association is offering these workshops:

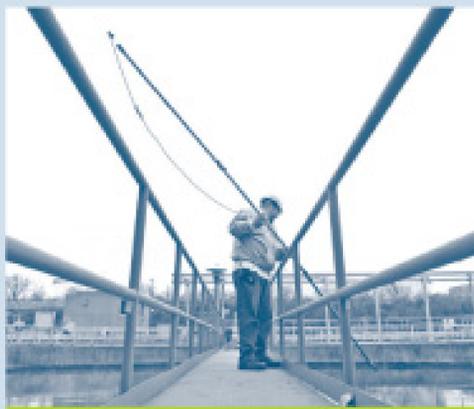
- July 14 – Wastewater Collection, Waco
  - July 21 – Utilities Calculations, Carrollton
  - Aug. 11 – Wastewater Collection, Victoria.
- Call 888/367-8982 or visit [www.twua.org](http://www.twua.org).

### Wisconsin

The University of Wisconsin-Madison Department of Engineering Professional Development is offering the following CEU, LU, PDH classes at the Madison campus:

- July 21-22 – Water Reuse in the United States: Strategies, Trends and Onsite Applications
- July 23-24 – Improving Your Energy Efficiencies in Water and Wastewater Treatment, Collection and Distribution.

Call 608/262-2061 or visit <http://epdweb.engr.wisc.edu>. tpo



## CALENDAR OF EVENTS

### July 12-15

Kentucky-Tennessee Water Professionals Conference, Lexington Convention Center, Lexington, Ky. Call 502/468-4772 or visit [www.kytnwpc.org](http://www.kytnwpc.org).

### July 26-29

Microconstituents and Industrial Water Quality 2009 Conference, Marriott Inner Harbor at Camden Yards, Baltimore, Md. Call 703/684-2441.

### July 28-31

Minnesota Wastewater Operators Association Conference, Grand Rapids, Minn. Visit [www.mwoa.net](http://www.mwoa.net).

### Aug. 4-6

International Society of Automation Water/Wastewater Automatic Controls Division Symposium, Orlando, Fla. Visit [www.isa.org/wwac](http://www.isa.org/wwac).

### Aug. 9-12

Georgia Association of Water Professionals Annual Conference and Expo, Savannah. Call 770/618-8690 or visit <http://gawp.org>.

### Aug. 9-12

Total Maximum Daily Load (TMDL) 2009: Combining Science and Management to Restore Impaired Waters, Minneapolis, Minn. Visit [www.wef.org](http://www.wef.org).

### Aug. 9-14

International Association of Hydraulic Engineering & Research (IAHR) Biennial Congress, Vancouver, British Columbia. Visit [www.wef.org](http://www.wef.org).

### Aug. 11-14

Chesapeake Section American Water Works Association Annual Conference, Rocky Gap, Md. Call 703/716-0770.

### Aug. 16-19

American Society of Civil Engineers International Pipelines Conference, San Diego, Calif. Call 703/295-6000 or visit [www.asce.org](http://www.asce.org).

### Aug. 27-28

Biosolids and Odor and Corrosion Conference, Embassy Suites, San Marcos, Texas. Call 512/693-0060 or visit [www.weat.org](http://www.weat.org).

### Aug. 31-Sept. 3

Kansas Water Environment Association and Kansas Section of American Water Works Joint Conference, Capitol Plaza Hotel, Topeka. Call Marc Pedrotti at 913/677-3366 or visit [www.kwea.net](http://www.kwea.net).

### Sept. 1-4

Chesapeake Water Environment Association and the Water and Wastewater Operations Association of Maryland, Delaware and the District of Columbia Joint Conference and Exhibition,

Clarion Fontainebleau Hotel, Ocean City, Md. Visit [www.wwoa-cwea.org](http://www.wwoa-cwea.org).

### Sept. 10-12

Canadian National Conference and Wastewater Management Policy Forum, Hilton Fallsview Hotel, Niagara Falls, Ontario. E-mail [admin@weao.org](mailto:admin@weao.org) or visit [www.weao.org](http://www.weao.org).

### Sept. 13-15

Canadian Residuals and Biosolids Conference, Hilton Fallsview Hotel, Niagara Falls, Ontario. Call 416/410-6933 or visit [www.weao.org](http://www.weao.org).

### Sept. 13-16

Rocky Mountain Sector AWWA/ Rocky Mountain WEA Joint Annual Conference, Albuquerque (N.M.) Convention Center. Call 720/859-4338 or visit [www.rmsawwa.net](http://www.rmsawwa.net).

### Sept. 13-16

Pacific Northwest Clean Water Association Annual Conference, Boise Centre on the Grove, Boise, Idaho. Visit [www.pncwa.org](http://www.pncwa.org).

### Sept. 14-15

New York Water Environment Association Watershed Science and Technical Conference, Hotel Thayer, West Point, N.Y. Call 315/422-7811 or visit [www.nywea.org](http://www.nywea.org).

### Sept. 16-18

South Dakota Waste and Wastewater Association Conference, Holiday Inn, Spearfish, S.D. Visit [www.sdwaa.org](http://www.sdwaa.org).

### Sept. 20-23

Western Canada Water Conference and Trade Show, Winnipeg, Manitoba. E-mail [wwall@city-plap.com](mailto:wwall@city-plap.com) or visit [www.wcwwa.ca](http://www.wcwwa.ca).

### Sept. 24-26

Tri-State Seminar on the River, Primm Valley Resorts, Primm, Nev. Visit [www.tristateseminar.com/contact.aspx](http://www.tristateseminar.com/contact.aspx).

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# Meeting Nutrient Removal Goals

ADVANCED BNR TECHNOLOGY AND ONLINE PROCESS INSTRUMENTATION HELP AN ALABAMA TREATMENT PLANT OPTIMIZE EFFICIENCY AND MINIMIZE LAB WORK FOR PROCESS CONTROL

By Bob Dabkowski

**T**he Greenville (Ala.) Wastewater Treatment Plant has installed online instruments that provide real-time monitoring of its biological nutrient removal (BNR) process, enabling critical immediate adjustments that boost performance and efficiency.

Nutrient levels in effluent are a rising concern as regulatory agencies seek further improvements in effluent quality. As a result, plant managers and operators face more demanding nutrient-removal requirements, especially in areas threatened with eutrophication.

In addition, many managers, anticipating tightening regulations, operate to “goal” levels, removing even nutrients not currently regulated. For plants like Greenville, this means meeting even more stringent standards while maintaining plant efficiency. A critical element to that efficiency is the ability to use new online instrumentation.

## CRITICAL ADJUSTMENTS

The Greenville plant is a mechanical aeration, activated sludge



PHOTOS COURTESY OF THE GREENVILLE WASTEWATER TREATMENT PLANT



One of the two aeration basins at the Greenville Wastewater Treatment Plant that uses the Schreiber CSR process with a Hach SOLITAX sc suspended-solids analyzer and Hach Luminescent DO (LDO) probe.

plant that treats an average of 1.2 mgd and serves 2,800 customers. After primary aeration, the flow is split between two continuously sequencing reactor (CSR) basins.

The plant's Schreiber CSR system is designed to be a constant-flow, single-basin, complete-mix reactor. Activated sludge is added to basin influent, and a bridge that runs from the middle of the basin to the edge rotates, maintaining a constant mix of solids independent of aeration.

Meanwhile, oxygen levels are manipulated to create oxic, anoxic and anaerobic phases that generate specific bacterial biological reactions aimed at nutrient removal. Besides occupying a small footprint, the automated, energy-efficient CSR system operates by running blowers only intermittently. To optimize the CSR process, the plant has installed online instruments for continuous monitoring of DO, mixed liquor suspended solids (MLSS), and oxidation/reduction potential (ORP).

“Our aeration basins basically operate individually from the other,” says Bruce Branum, plant superintendent. “In each basin we primarily monitor DO. To aid process treatment and energy savings, we also use online ORP measurement. To help us keep a better eye on our bugs (bacteria), we use online sensors to monitor our suspended solids.”

## ONLINE MLSS MEASUREMENT

The accurate measurement of MLSS is critical to the CSR system. “By knowing the mixed liquor concentrations, the volume of the tank and the BOD, we calculate an accurate food-to-mass ratio,” Branum says. “We want to know if there is adequate food coming in for the activated sludge microorganisms in the tank.”

The Greenville plant had long relied on laboratory analysis for MLSS readings. But recently installed online sensors now provide real-time MLSS measurements, significantly reducing reliance on intermittent and time-consuming laboratory analysis.

The plant's new suspended-solids analyzers (Hach SOLITAX sc)

Bruce Branum, plant superintendent, cleans a Hach Luminescent DO (LDO) probe in an aeration basin. The ORP sensor and suspended-solids analyzer (Hach SOLITAX sc) probes are also shown at his right. A Hach UVAS sensor is installed near the headworks.



The Hach SC1000 control box for the aeration basin probes is shown in the foreground at left.

use dual-beam infrared scattered-light photometers and receptors to monitor the mixed liquor. The analyzer provides accurate and continuous measurements completely independent of color. Real-time monitoring of MLSS concentrations in the aeration basins has allowed the Greenville plant to maintain target MLSS levels consistently.

“Before we installed the probes, we had to go out and take samples, measure the mixed liquor of each basin through lengthy laboratory tests, and then make our judgment of whether to waste sludge for further processing,” says Branum. “Now, it’s instantaneous.

“Before we installed the probes, we had to go out and take samples, measure the mixed liquor of each basin through lengthy laboratory tests, and then make our judgment of whether to waste sludge for further processing. Now, it’s instantaneous. We can look at a screen and see how many solids we currently have in each basin, 24 hours a day.”

#### BRUCE BRANUM

We can look at a screen and see how many solids we currently have in each basin, 24 hours a day.”

By knowing the MLSS concentration at all times, plant operators can optimize the biomass quantity and quality to meet variations in influent flow and load. The plant has installed a SOLITAX probe in each aeration basin and one at the plant headworks, along with a Hach UVAS sensor.

“The probe at the headworks monitors solids loading of the influent wastewater and lets us know when certain industries are discharging to the plant,” Branum says. “The UVAS probe measures the mixture for toxic shock and tells us if we are receiving an influx of high BOD.”

#### DO AND ORP PROCESS MONITORING

Two primary process control measurements in the CSR process are oxidation/reduction potential (ORP) and dissolved oxygen (DO). The Greenville plant has ORP and DO probes in each aeration basin and can use either type for blower control. DO control allows for a steady rate of air delivery, while ORP control allows air-delivery rates to be maximized for the BNR process.

“Think of it this way,” explains Branum. “DO tells us how well the bugs are breathing, ORP tells us when they should breathe to maximize nutrient removal.” To meet DO measurement requirements, the plant installed Hach Luminescent DO (LDO) probes in each aeration basin. When DO reaches a certain level, the bacteria have enough air and are satisfied. The blowers can then be cycled on and

off to create anoxic and anaerobic environments.

“The great benefit of this process is that it’s power-efficient,” says Branum. “We save power by not having to aerate all day long.” He also finds the LDO probes easy to maintain: “About once a month we clean them off a little bit, and once a year we replace the tips.”

#### OPTIMIZING CSR SYSTEM

BNR processes typically require three tanks for nutrient removal. With the Schreiber CSR system at Greenville, one tank serves all three stages. As influent enters the basin, activated sludge provides the necessary bacteria or biomass for the biological reactions that result from manipulation of the oxic, anoxic and anaerobic phases. The changes between phases are automated based on real-time DO and ORP readings.

During the oxic stage, the blowers add sufficient oxygen to the mixture to obtain a DO value of 2.0 ppm. During this time when the DO is high, the ORP increases to a predetermined set point and turns the blowers off. During the oxic stage, nitrification occurs, converting ammonias to nitrates and water.

After the blowers shut off, the process enters the anoxic stage and DO drops to an undetectable amount. During this time, the nitrates reduce to nitrogen gas, producing oxygen, which is used in

the respiration of the denitrifying organisms. When there is no more free oxygen, the basin enters the anaerobic stage, and bacteria become stressed and release orthophosphate.

At a low enough ORP level, the system triggers the blowers, and oxygen is reintroduced into the basin. Then the basin is back in the oxic phase, and the stressed bacteria reabsorb the phosphorous, but at two to three times the normal level. The phosphorous is removed when the sludge is wasted.

The Greenville plant discharges an effluent that is well under regulatory standards as established in its NPDES permit. The CSR system provides an efficient and productive BNR process. **tpo**

#### ABOUT THE AUTHOR

*Bob Dabkowski is a wastewater specialist for Hach Co. and a licensed wastewater operator in Colorado. He is the author of several papers, articles and application notes on wastewater treatment and has 10 years of experience at Hach advising on process control and automation solutions. He can be reached at 970/663-1377, ext. 2191, or BDabkows@hach.com.*

*TPO welcomes news about interesting methods or uses of technology at your facility for future articles in the How We Do It column. Send your ideas to editor@tpomag.com or call 877/953-3301.*

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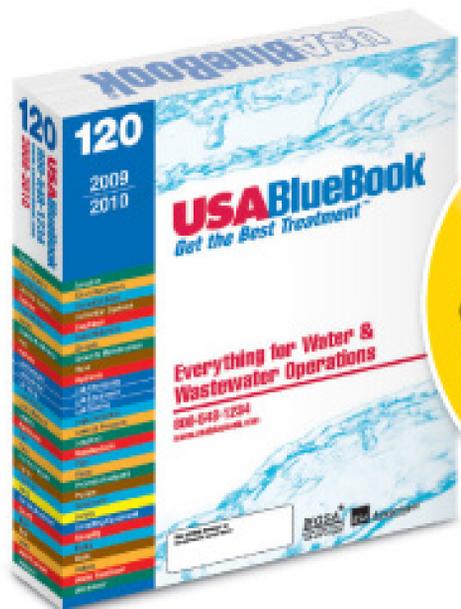
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