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JULY 2010

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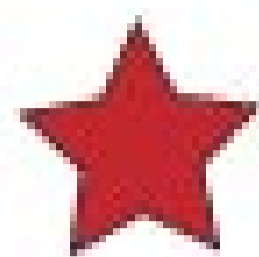
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Published monthly by:



1720 Maple Lake Dam Rd., PO Box 220
Three Lakes WI 54562

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In U.S. or Canada call
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Elsewhere call 715-546-3346

E-mail: info@tpomag.com

Web site: www.tpomag.com

Fax: 715-546-3786

Office hours Mon.-Fri.,
7:30 a.m.-5 p.m. CST

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ADDRESS CHANGES: Submit to TPO, P.O. Box 220, Three Lakes, WI, 54562; call 800-257-7222 (715-546-3346); fax to 715-546-3786; or e-mail nicole@colepublishing.com. Include both old and new addresses.

ADVERTISING RATES: Call 800-994-7990 and ask for Phil or Kim. Publisher reserves the right to reject advertising which in its opinion is misleading, unfair or incompatible with the character of the publication.

EDITORIAL CORRESPONDENCE: Address all editorial correspondence to Editor, TPO, P.O. Box 220, Three Lakes, WI, 54562 or e-mail editor@tpomag.com.

REPRINTS AND BACK ISSUES: Visit www.tpomag.com for options and pricing. To order, call Jeff Lane at 800-257-7222 (715-546-3346) or e-mail jeff@colepublishing.com.

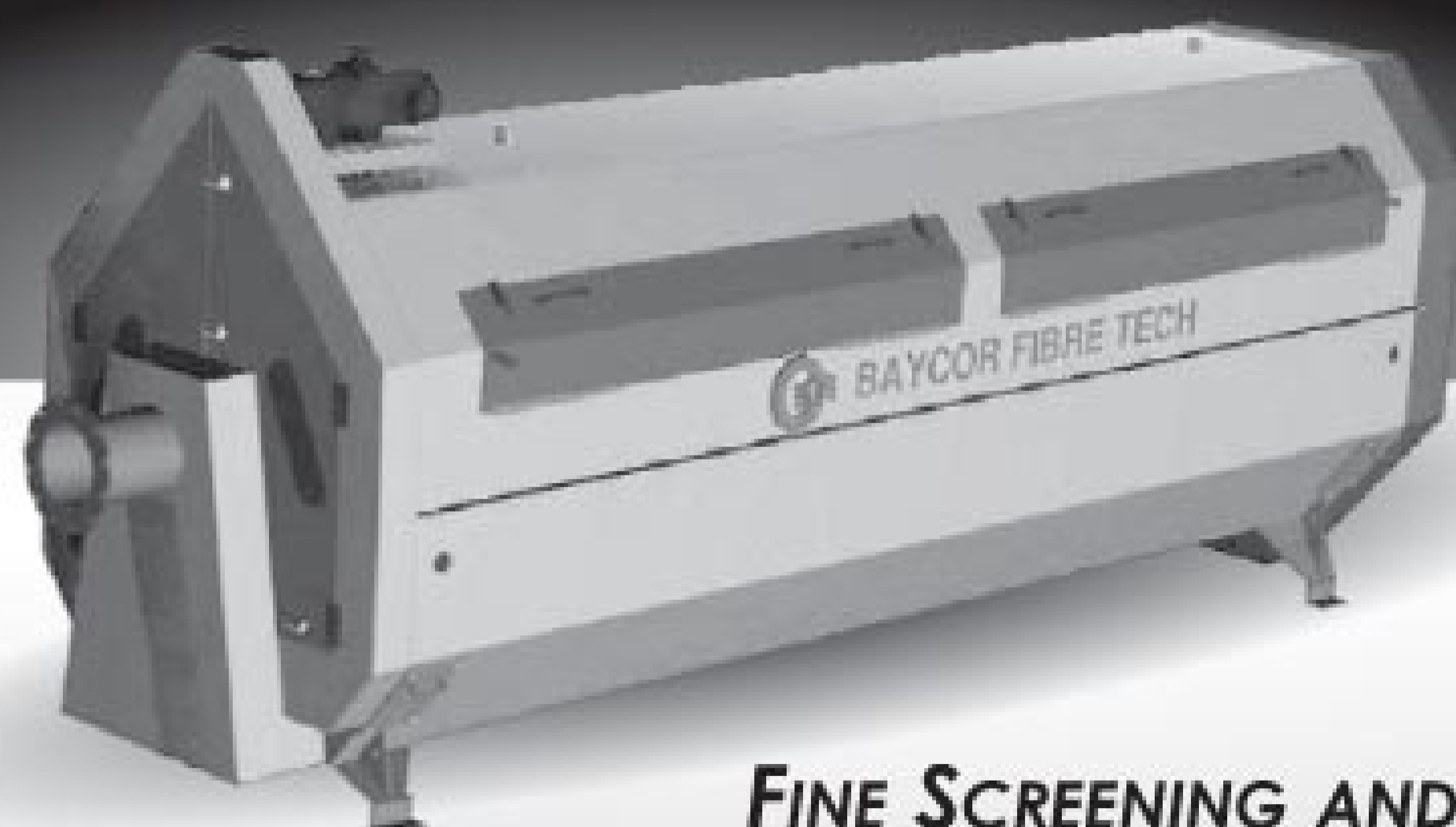
CIRCULATION: Circulation is controlled at 73,000 copies per month.

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BLUE OCTO EXISTS!

ANOTHER SIGHTING

Two appearances in one week give hope to G.R.A.N.D. scientists.

An unidentified blue object (UBO) was spotted by Shannon Littleton of Rockbridge, Ohio, at approximately 2:45 p.m. on June 28. The witness was hiking the upper trail to Ash Cave in Hocking Hills State Park Monday afternoon, when the sound of shuffling leaves drew her attention to the rim of the gorge across from her. What she claims to have seen is what people refer to as the "Blue Octo."

"At first I was stunned," she said, "I could see it clear as day, but in my shock I just stood there for what seemed like an hour—though I know it was only for a few seconds. As it began to move out of sight, I grabbed my camera and tried to snap a few pictures. Only one caught it (shown above) before it moved behind some trees." Shannon attempted to give chase, but it darted off the trail and she lost track of it in the dense forest.



Only one other witness came forward, though there were a few dozen hikers in the same area. This has led skeptics to question the photograph's authenticity, as well as Shannon's story. Investigators from G.R.A.N.D. are examining the image with a team of experts who specialize in photo imaging, and they hope to have the results made public soon.

The name, Blue Octo, was coined by the first witness to the UBO, Will Jafford, in mid-2010. At the time, he was only able to make out its color and shape—blue with 8 sides. When describing it to police, he said, "It looked like a blue-octo-thinga-ma-jig." As more and more sightings surfaced, witnesses began referring to the elusive entity as the "Blue Octo." You can read more about Blue Octo and see definitive proof of its existence at www.blueoctoexists.com.

www.blueoctoexists.com

This news article is a fabrication by Gorman-Rupp. It is in no way associated with an actual publication.

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By Trude Witham

on the cover

Dan and Dawn Hanthorn approach wastewater treatment from two different perspectives — his municipal, hers industrial — but they share a passion for the career and for protecting water resources. While they have earned awards and are active in the community, their goal is simply to “make a difference.”
(Photography by Peter Krupp)

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- How We Do It: Multi-parameter analyzer in Nicholasville, Ky.
- How We Do It: Real-time process measurements in Rogers, Ark.
- Greening the Plant: Solar-powered aeration in St. Henry, Ohio
- In My Words: Helping new operators enter the profession

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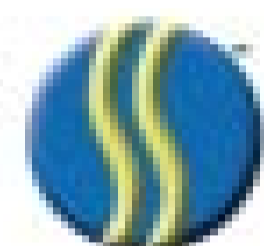
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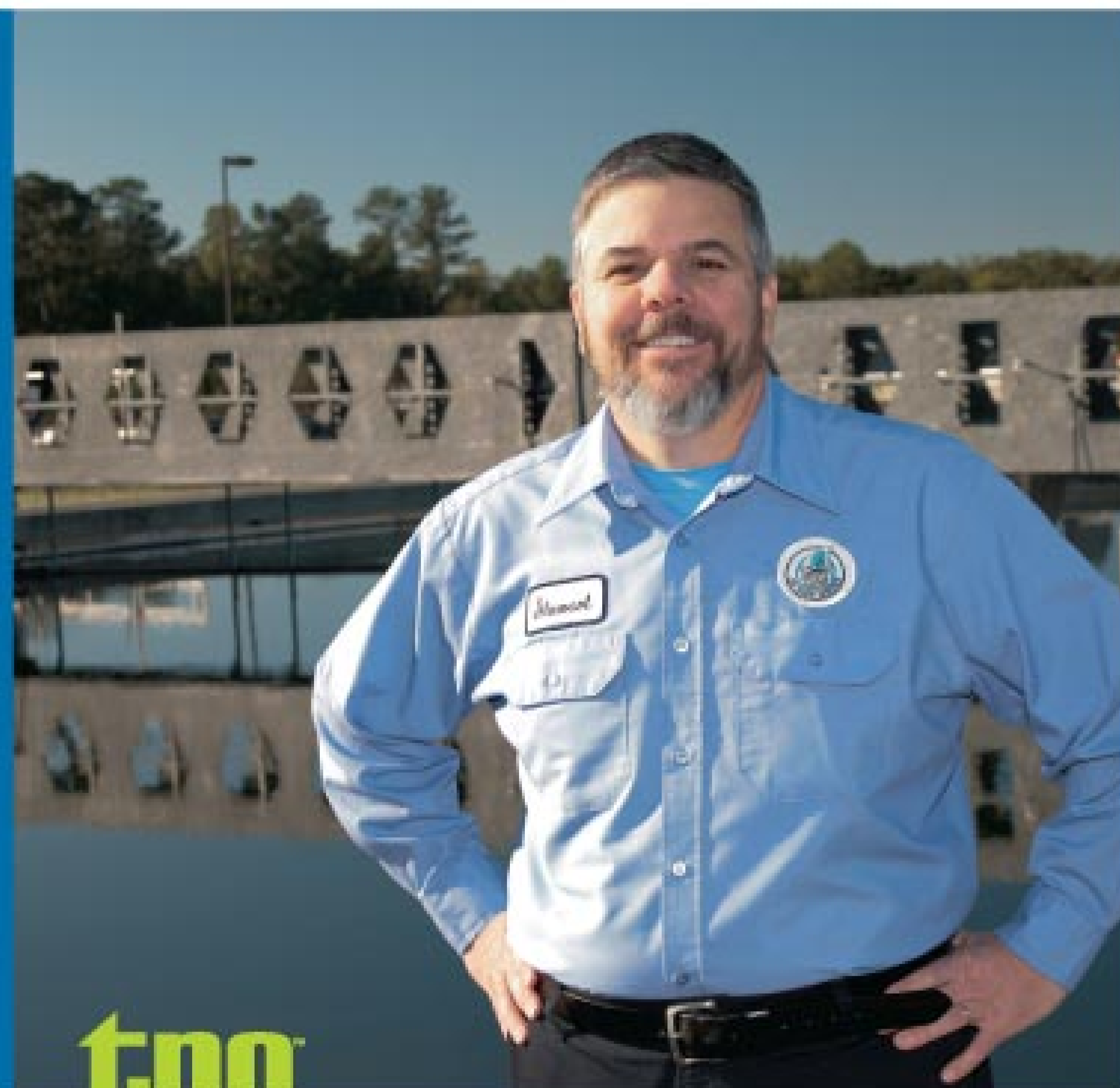


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let's be clear

Show Your Face

WHAT DO PEOPLE SEE WHEN THEY DRIVE THROUGH YOUR GATE AND UP TO THE DOOR OF YOUR TREATMENT PLANT? WE'D LOVE TO SEE PICTURES OF YOUR SIGNS AND LANDSCAPING.

By Ted J. Rulseh, Editor

When my son was younger, he and I used to enjoy looking at business signs as we drove through town and noting those that had sections of lights out, or letters missing, or other defects.

For example, one drugstore had a "One Hour Photo" sign perpetually missing the final O. The local Wal-Mart had bold blue lettering on the side proclaiming, "We *ell* For Less." A drive-in that featured the "Big Penny" hamburger instead advertised the "Big *ny*." Another sign had letters hanging upside down by a single nail or screw.



Usually a maimed sign would stay that way for a long time. Why, we wondered, would a business allow its most visible, most public identity to remain impaired? The reason is pretty obvious: A business has so many priorities that fixing the sign (and paying for the repair) becomes one of those "I'll have to

get to that soon" things that no one ever does get to.

But what is the consequence? What does it say about, for example, a shop that sells and repairs bicycles if the sign on its storefront has missing letters or is faded, or peeling, or cracking? Perhaps substantial business gets lost because people see the sign and say — consciously or not — "I wonder how well they fix bikes. I think I'll try that other store across town."

WHAT YOU'RE SELLING

What about your sign? You may think it matters less because, after all, nobody comes to your place to buy things. And signs cost money — the ratepayers might not appreciate a big, splashy sign.

Perhaps as a consequence, (and here I'm going strictly on my own experience), clean-water plant signs tend to be unobtrusive. Often they consist of plain lettering painted on a couple of boards nailed between two posts, saying simply, "Anytown Wastewater Treatment Plant."

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They show no colorful logo or catchy slogan. They're not embellished with flowers or ornamental stone or shrubbery. They tell visitors, "Here you are," and that's about it.

But when you think about it, you do sell something, and it's very important. You sell a service that is vital to every homeowner and business, to the general public health, and to the well being of local waters. So why hide your light?

People from the community do come to your plant: Teachers with classes of students, tour groups, young people seeking employment, service contractors. What they see on your grounds gives them their first impression, and first impressions tend to stick.

In general, the plant signs I have seen are well maintained, because it's not in the nature of treatment operators

People from the community do come to your plant: Teachers with classes of students, tour groups, young people seeking employment, service contractors. What they see on your grounds gives them their first impression, and first impressions tend to stick.

to let things deteriorate. But I do wish the signs could be a little bolder and brighter, a little more prideful, a little more welcoming.

WHAT DOES YOURS SAY?

And so, with that, here's a request. If you have a great sign, or some great-looking landscaping at your gate or along the walkway to your front door, step outside, take a picture of it, and send it in. We'd like to show it to your colleagues in the profession in hopes they might draw inspiration from it.

Here's something any clean-water plant can do to send a message that says, "What goes on here is important, and we are proud of it." So take those pictures and send them along. We would love to include several of the best ones in a near-future edition of *TPO*. Just e-mail your digital photos to me at editor@tpomag.com.

If your sign and landscaping are low-key and unassuming, think about what it might be worth to change that. A new sign and some colorful plantings can be a good start toward kissing the low profile goodbye and standing up for the industry and all the good it does. **tpo**

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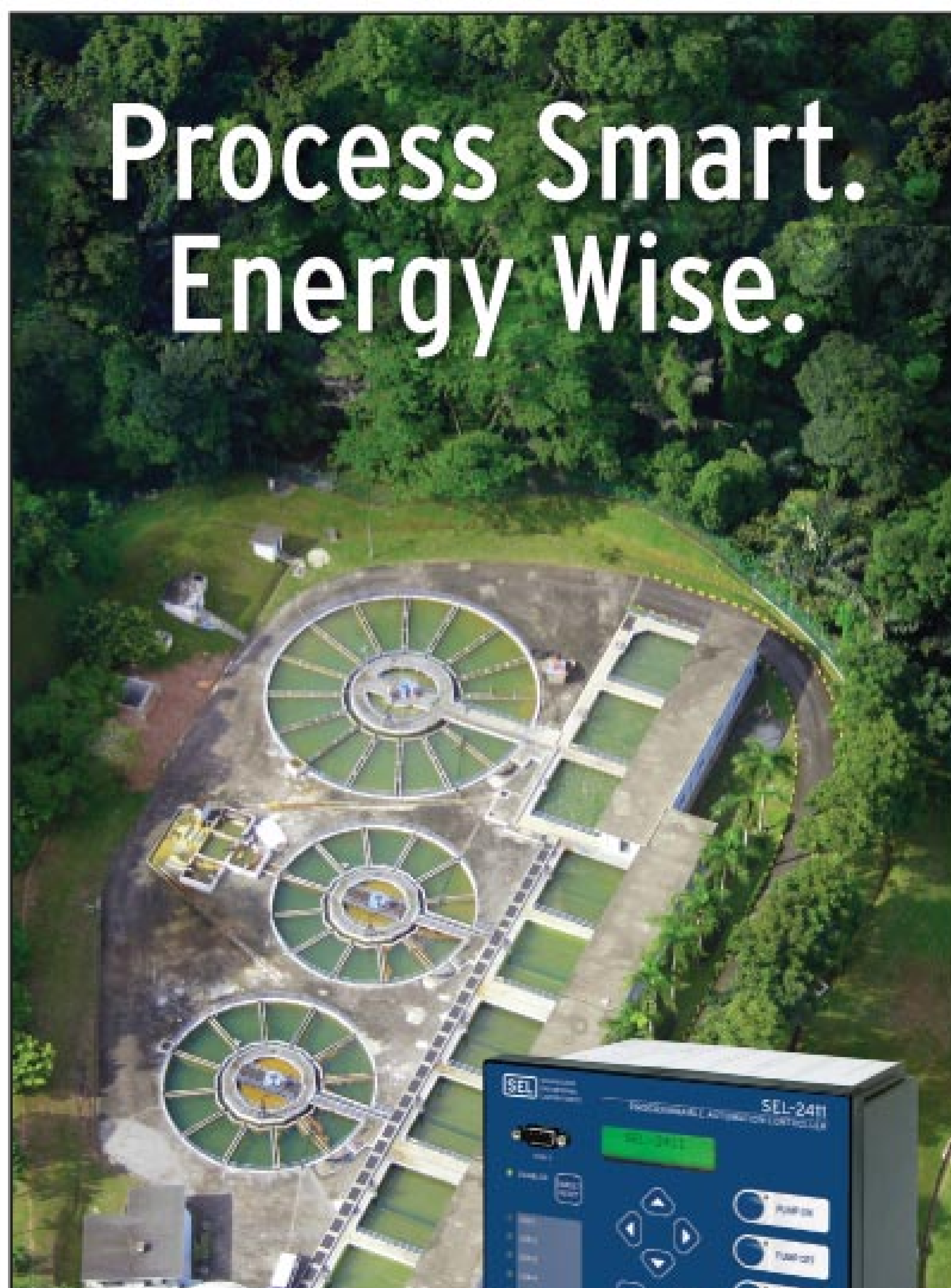
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Commandeering the Classroom

STUDENTS IN LITTLE ROCK LEARN ABOUT THE WASTEWATER FROM CAPTAIN SEWER, THE LARGEST AND CUTEST OF SEWER RATS

By Diane Gow McDilda

Captain Sewer, the mightiest rodent at the Little Rock Wastewater treatment plant, is a legacy. Born out of a 1980s Halloween superhero costume, this mascot of all things flushable is alive and well and educating kids at schools and community events in the capital of Arkansas.

"It started as a joke," says Joseph Schaffner, community relations coordinator for the LRW in Arkansas. "Rick Barger [then operations manager] came to a meeting in tights and a cape, with a plunger as a weapon and a toilet seat lid for protection. After that, he was invited to a school presentation."

When Barger retired in early 2000, the torch, or plunger, passed to Mike Kline. But he was in the environmental health and safety group, and it seemed more appropriate to assign the mission to someone in communications. Schaffner was just the man.

About then, the utility decided to reassess Captain Sewer, transitioning him from a superhero to a super rodent. "We

thought a super hero was a little mature for kids in K-5," says Schaffner. "We thought an animal would be more appropriate."

A rat, as in sewer rat, was the obvious choice, and the costume, with full pirate regalia, was conceived. It's a cumbersome outfit, but Schaffner wears it with pride.

"At first I was reluctant," he says.

A newspaper article featured Captain Sewer out and about with kids. Also shown is the Honorary First Mate certificate earned by students who promise to protect the environment, especially water resources.

ADVENTURES
of
**CAPTAIN
Sewer**



A new activity book with an updated rendering of Captain Sewer was a joint effort between Little Rock Wastewater and its consulting firm, CJRW.

"It's a lot of work to get the suit, clean the suit, and load up the van. But then I look down and all these doe-eyed kids are looking up at me. It's rewarding. They're excited about the character and they're excited about learning."

PUTTING ON A SHOW

Captain Sewer has an accomplice, first mate Brenda Willis. Because the Captain's voice is muffled under the costume, Willis does all the

"At first I was reluctant. It's a lot of work to get the suit, clean the suit, and load up the van. But then I look down and all these doe-eyed kids are looking up at me. It's rewarding. They're excited about the character and they're excited about learning."

JOSEPH SCHAFFNER

talking, sometimes leaving Captain Sewer with time on his hands. It's not unlike Captain Sewer, armed with his plunger, to sneak up on his first mate in a friendly attack. But, rather than detract from the presentation, the physical banter keeps things light and entertaining.

The two deliver their message in classrooms and school auditoriums and at other events. "One school had a Water Fest," says Schaffner. "We had a booth outside with a set presentation. We did about five or six in a row."

At events like the Little Rock Zoo's Earth Day observance, the two can modify their presentation, but typically they're in the classroom. While some younger children shy away from the costume, others embrace it — literally.



PHOTO AND GRAPHICS COURTESY OF LITTLE ROCK WASTEWATER TREATMENT PLANT



Joseph Schaffner is Captain Sewer, and his first mate is Brenda Willis.

"Kids that aren't bothered are all over me — it's magical," says Schaffner. "You have that age, they don't see me as Mr. Schaffner, but as Captain Sewer, and it changes their perspective." And while Schaffner doesn't pop in and out of phone booths like Super Man, he works to keep his identity a secret.

"I sneak in and out because it keeps the magic alive," he says. "I bring my suit and change in the teacher's lounge. When I'm in costume, I'm in character." Schaffner has no experience in theater or acting. He just works from his gut: "I go by seeing what the kids enjoy."

TAKE-AWAYS

When the mascot was revamped, so was the rest of the education program. The utility updated the handout materials and parting gifts and developed a new activity book starring Captain Sewer.

The activity book was a joint effort between LRW personnel and its consulting firm, CJRW, based in Little Rock. Artist Lyuba Bogan and the firm's design team created the new Captain Sewer look. "Basically, we provided CJRW with the information, and they made it into a fun children's activity book," Schaffner says.

The book includes coloring pages and puzzles, provides water facts, and walks readers through the water cycle. A spread illustrates the collection of water from buildings through the sewer system and then follows the water to the treatment plant and out to the river. It even shows biosolids, initially full of Pac-Man looking microbes, being settled out, stored and trucked off for recycling.

Students who promise to protect the environment, especially water and wastewater, earn Honorary First Mate certificates. Other giveaway items promote Little Rock's Can the Grease campaign. "Grease is a huge problem for the facility, so we provide cans and heat-resistant liners that can be used to collect grease," says Schaffner.

Between the lovable Captain Sewer character, the activity book, and Can the Grease giveaways, Little Rock educates students on the best ways to protect the environment and the wastewater treatment plant itself. **tpo**

What's Your Story?

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METICULOUS HOUSEKEEPING AND TOP PLANT PERFORMANCE GO HAND IN HAND FOR THE STAFF AT THE NEW MBR TREATMENT PLANT IN NORTH LIBERTY, IOWA

By Jim Force

IN THE WASTEWATER PROFESSION, A CLEAN PLANT USUALLY MEANS A WELL-RUN PLANT. SO IT'S NO SURPRISE that the performance record at the North Liberty (Iowa) Water Pollution Control Plant is essentially perfect. The place is spotless as a result of a rigorous cleaning and maintenance program run by plant manager Dave Ramsey and his staff.

"Dave runs a tight ship," says project engineer Steve Troyer of Fox Engineering, who partnered with Shive-Hattery Engineers in the design of a recent expansion at North Liberty that includes Iowa's first membrane bioreactor (MBR). "When you walk into the plant, right away you notice how clean and organized everything is."

Ramsey explains, "We have a regular cleaning schedule set up, and we allot a large amount of time to cleaning and maintenance. Our operators are cross-trained in all areas of plant operations, and they know exactly what needs to be done and when." One reason the plant is kept so pristine is that it represents the largest capital investment in city history — \$8.4 million.

The money went to expand capacity and improve treatment in this community of 12,000, located in the fast-growing corridor between Cedar Rapids and Iowa City. The community had operated a sequencing batch reactor (SBR) system since 1998, but with new homes and schools lining up along the plant's receiving stream, city officials wanted better treatment. They opted for the MBR system, and residents agreed to pay the higher cost.

"There was little hesitation on the community's part," observes Troyer. "They wanted to go to advanced treatment, and the MBR seemed to fit."

GROWTH SPURT

As late as the 1960s, North Liberty had fewer than 1,000 residents. Sewers were installed and a trickling filter plant went online in 1967. As the population grew, the city built a new plant using SBR technology for biological treatment.

But within a few years, that plant was overwhelmed; a 5.5-million-gallon equalization basin built in 2005 was being used to store influent instead of



The North Liberty plant has two 350,000-gallon sludge aeration basins with Sanitaire fine-bubble diffusers and four ABS submersible mixers. (Photography by Mark Tade)



North Liberty (Iowa) Water Pollution Control Plant

BUILT:
1967 (major upgrades 1998, 2008)

TREATMENT LEVEL:
Advanced

FLOWS:
4.3 mgd design, 1.4 mgd average

POPULATION SERVED:
12,000

PROCESSES:
Membrane bioreactor

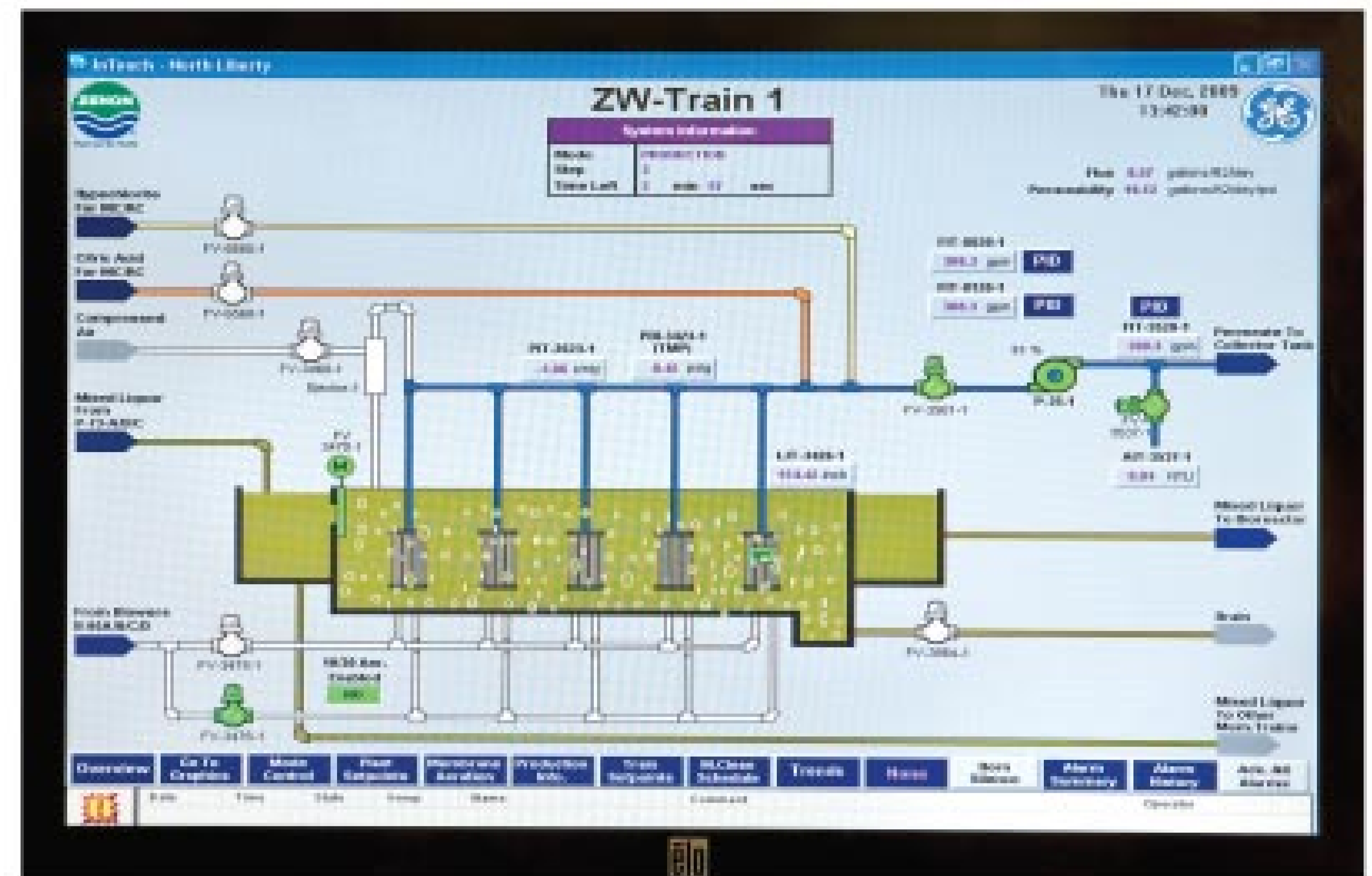
BIOSOLIDS:
Aerobic digestion, land-applied by contractor

ANNUAL BUDGET:
\$2.4 million (operating)

WEB SITE:
www.northlibertyiowa.org



Plant manager Dave Ramsey is shown in the permeate pump section of the membrane bioreactor building. The gauge is a turbidity meter, showing very low turbidity in the final effluent.



The plant SCADA system shows a schematic of the plant's ZeeWeed membrane train from ZENON Environmental Inc., A Division of GE Water & Process Technologies.

A COMMUNITY INVESTMENT

What must have seemed like a huge challenge to city officials in North Liberty several years ago is now a rewarding experience.

Their wastewater treatment plant, once a nagging problem, today puts out effluent that's "second to none," says city administrator Ryan Heiar. Furthermore, folks who used to be the city's worst critics are now staunch allies.

"They were critical of our old plant, and rightly so," says Heiar. "But now they support us." That change in attitude is one of the chief benefits of having spent the money and made the commitment to improve the North Liberty Water Pollution Control Plant.

Heiar explains that before Ramsey and the current plant staff arrived, the old plant was in poor shape and wasn't running properly, polluting Muddy Creek and attracting criticism from citizens and conservation groups. "But our city council made the commitment," he says. "We did our research, in concert with Fox Engineering, Shive-Hattery, and the staff, and decided to go the membrane bioreactor route. We knew this would cost more, but clean water isn't free."

The commitment involved local pocketbooks, as well. The \$8.4 million came from the state Revolving Loan Fund. But it's been worth it. "I love to show people a sample of our effluent compared to drinking water," Heiar says. "You can't tell the difference. In one sense, the commitment was easy for us because we had really let things go. We hadn't planned well enough for the growth we faced. If there's a lesson here, it's to stay ahead of the curve."



North Liberty plant operator II Tom Arey and plant operator I Drew Lammers perform routine maintenance on one of the Baycor screens in the MBR facility.

smoothing flow through the plant during rain events. "The SBR facility was running at 125 percent of capacity," Ramsey says. "The community was simply outpacing the treatment plant."

The move up to an MBR presented Ramsey and his staff with several challenges. "Before plans were finalized, we visited a number of MBR plants in Georgia," says Ramsey. "We wanted to see the equipment and get answers to a lot of questions we had."

During construction of the new treatment plant, he kept the old SBR running, even as the new MBR was coming online. "I needed to know the MBR was going to work," he says. "It needed to be proven to me 100 percent, because once we shut the SBR system down, there was no going back."

Sludge hauling increased significantly, too, as one of the aerobic digesters was converted to an aeration tank for the MBR. "The new digesters for the MBR plant were still being used for the SBR, which left us with very little digester capacity for treatment of waste activated sludge," says Ramsey. The MBR plant (4.3 mgd design capacity) started up in August 2008. It is already piped and prepared for a Phase II expansion to 5.27 mgd in the future.



The North Liberty team includes, from left, Kevin Stensland, assistant plant superintendent; Mark Farrier, plant operator II and lab specialist; Dave Ramsey, plant manager; Tom Arey, plant operator II and maintenance specialist; and Drew Lammers, plant operator I.

INTEGRATED PROCESS

North Liberty's wastewater is collected in 55 miles of sewers, helped by eight lift stations that Ramsey and his staff maintain. It enters the treatment plant through a 1/4-inch bar screen (Lakeside Equipment Corporation), and then flows to a grit removal system (Hydro International). Three 2,000 gpm self-priming pumps (Gorman-Rupp Company) deliver it to the MBR.

During times of high inflow and infiltration, wastewater can be diverted through an additional series of pipes and pumps to the equalization basin. In the MBR, two 1-mm rotary-drum fine screens (Baycor Fibre Tech Inc.) remove

"We get compliments whenever a group comes to tour. They say it's the cleanest plant they have ever seen, especially our laboratory. You could eat off the floor in there."

DAVE RAMSEY

hair and other inorganic material. The membranes need very clean activated sludge for efficient operation.

The wastewater then enters a biological treatment area consisting of an anoxic zone where denitrification takes place, followed by an aerobic zone for nitrification and BOD removal. Four submersible machines (ABS USA) mix the contents. Three 125 hp blowers (Aerzen USA) provide air through fine-bubble diffusers (ITT Water & Wastewater – Sanitaire).

Mixed liquor from the biological process tanks is transferred to the membrane tanks by three return activated sludge pumps (Flowserve Corporation) and distributed to three 35- by 9- by 12-foot membrane tanks,

NORTH LIBERTY (IOWA) WATER POLLUTION CONTROL PLANT PERMIT AND PERFORMANCE

	INFLUENT (Annual average)	EFFLUENT (Annual average)	PERMIT (30-day average)
CBOD	121 mg/l	<2.0 mg/l	25 mg/l
TSS	197 mg/l	0 mg/l	30 mg/l
NH3-N	18.7 mg/l	<1.0 mg/l	19-42 mg/l (seasonal)
Fecal coliform	–	0 (without disinfection)	200/100 ml (Mar. 15-Nov. 15)

each containing four ZeeWeed 500 ultrafiltration membrane cassettes (ZENON Environmental Inc., A Division of GE Water & Process Technologies), each containing 48 modules. The hollow-core fibers have a 0.04-micron pore diameter and provide a physical barrier to suspended solids, colloidal material, bacteria and viruses. Total membrane surface area is 195,840 square feet.

Generated by three 40 hp permeate pumps (Boerger LLC), a relatively low-pressure vacuum draws water through the surface of the membranes from the outside in. Festo Corp. Air Cyclic actuators and ABZ valves provide aeration to the bottom of the membrane cassettes.

Biosolids withdrawn from the system pass to a pair of 570,000-gallon aerobic digesters and then on to an 800,000-gallon storage tank. A private contractor, Nutri-Ject Systems Inc., hauls the liquid biosolids sludge to area farm fields for use as fertilizer several times each year.

The effluent, with turbidities that average 0.03 to 0.05 NTU, is near drinking water quality and is well below all the plant's NPDES permit limits. The

extremely clear water is discharged to Muddy Creek which flows to the Iowa River. A UV disinfection system (Trojan Technologies) is available if needed.

PUSHING PERFORMANCE

Ramsey and his staff have worked diligently to get the utmost performance from the system. Foaming is an ongoing problem, especially with Iowa's extreme climate changes and with extremely old sludge age and mixed liquor in the 10,000 to 13,000 mg/l range.

The city asked the plant's system integrator to change the SCADA system so that operators can adjust the on/off cycles for the aeration tanks. "This gives us operational control over foaming and also provides substantial electricity savings," says Ramsey.

The staff also altered the membrane backwash system, which originally pumped permeate water in a reverse flow through the membranes every 12 minutes to expand the fibers and remove solids. "Now we run it in relaxed mode," says Ramsey. "We shut off the suction and let the biomass fall off. This has increased our removal efficiencies of bacteria and viruses from ultrafiltration to the nanofiltration range. It also creates less wear and tear on the pumps without affecting transmembrane pressures."

"All inspections are documented, and so are the safety classes the staff attends regularly. The MSDS are kept up regularly, and we do a full yearly inventory of chemicals."

DAVE RAMSEY

turns heads. "We get compliments whenever a group comes to tour," says Ramsey. "They say it's the cleanest plant they have ever seen, especially our laboratory. You could eat off the floor in there."

Mark Farrier, plant operator II, manages the state-certified laboratory. "He is charged with all operations, such as lab procedures, control testing, and record keeping, and does so with exceptional expertise," says Ramsey. "He performs at least three times the amount of testing that our NPDES permit says we need to do."

Assistant superintendent Kevin Stensland explains that every floor in every office gets mopped once a week, and the entire plant is swept and vacuumed regularly. "We have an ongoing painting schedule, and wipe down every motor, pipe and blower weekly," he says. "We keep a regular cleaning and painting checklist, and operators get to these items as they have downtime. We probably devote 15 man-hours a week to upkeep."

The plant maintains a complete supply of spare parts and materials. "An advanced treatment plant is expensive to run and maintain," he says. "We spent \$90,000 on spare parts last year and plan to budget for several hundred thousand dollars more in the future."

Stensland keeps a detailed computerized inventory of all spare parts and runs the maintenance program for the entire plant and the eight lift stations. He monitors times and hours on all equipment and initiates work orders accordingly. Amp readings are taken monthly on every piece of equipment to monitor motor efficiencies.

Plant maintenance specialist Tom Arey and plant operator I Drew Lammers check every piece of equipment in the plant at least twice a day. "They do an exceptional job of maintaining all equipment," says Ramsey. The city also maintains a comprehensive safety program, including lock-out/tag-out, confined-space entry, arc flash and more.

Another change added a control matrix to the aerobic digester controls to cycle the air on and off throughout the day. This operational strategy provides more anoxic time, increasing alkalinity and in turn helping the staff control pH in the digesters. The SCADA system supplier is Automatic Systems Company in Ames, and Ramsey and his staff work closely with the company's programmers to make modifications like these.

SQUEAKY CLEAN

Still, it's the clean and well-maintained condition of the plant that



Tom Arey and Drew Lammers perform routine maintenance on an EBARA 20 hp submersible pump, one of two alternating pumps at a lift station serving a new subdivision in North Liberty.

Staff members perform monthly safety checks, including fire extinguishers, emergency lighting, eyewash and emergency showers, hoists, gas meters, SCBAs and fall protection. "All inspections are documented, and so are the safety classes the staff attends regularly," Ramsey says. "The MSDS are kept up regularly, and we do a full yearly inventory of chemicals."

For its environmental impact and exceptional effluent quality, the North Liberty plant earned the 2009 Iowa Governor's Environmental Excellence Award in Water Quality. You can bet the plaque on the wall gets polished once a week — maybe more often than that. **tpo**

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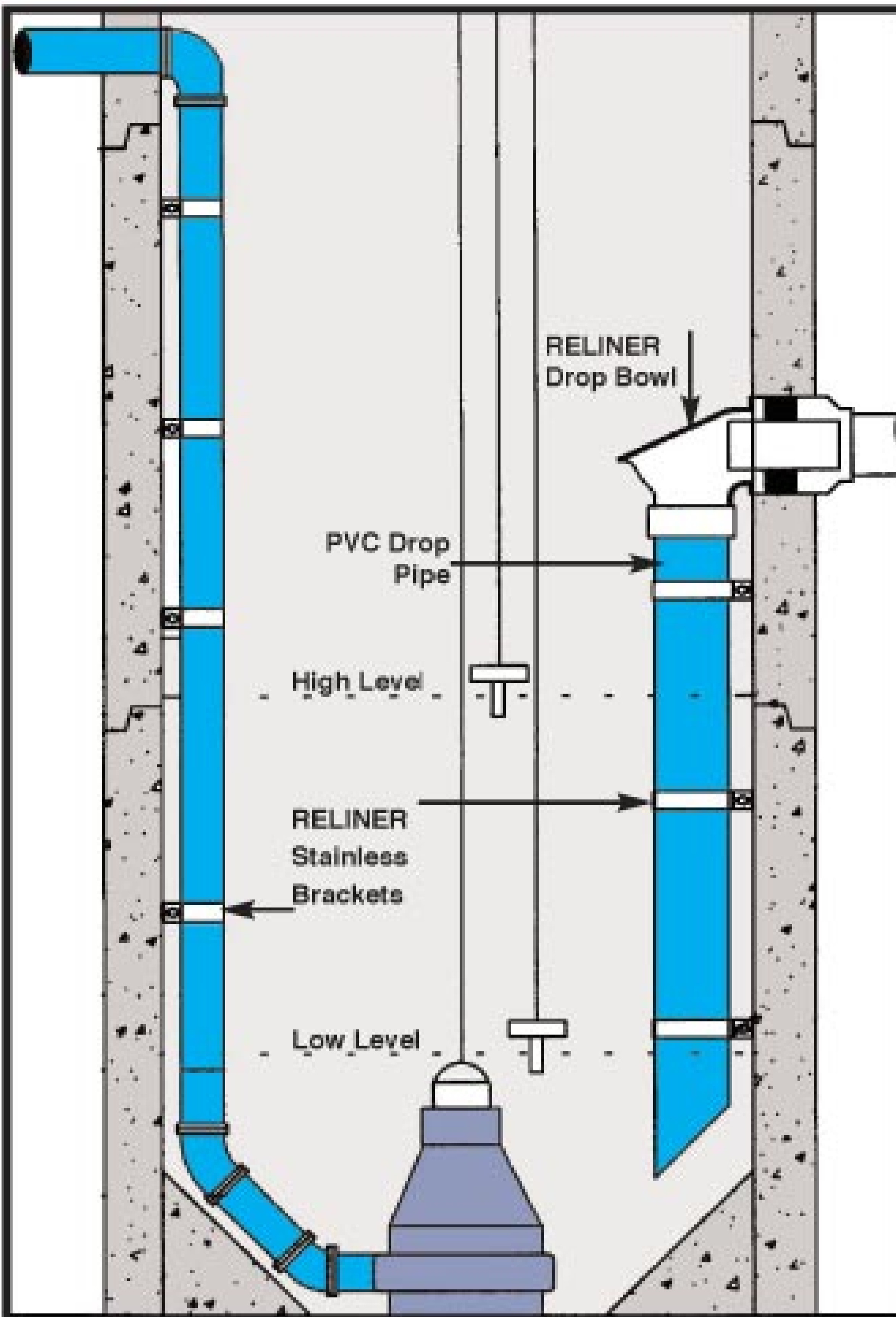
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The Aquuary

THE BROAD RUN WATER RECLAMATION FACILITY TAKES A UNIQUE INDOOR-OUTDOOR APPROACH TO PUBLIC AMENITIES AND EDUCATION

By Mary Shafer

It's such a different concept, they had to make up a name for it. They called it the Aquary, an interpretive educational center aimed at children and families, at Broad Run Water Reclamation Facility in Ashburn, Va. The Aquary introduces water awareness and the value of treatment and conservation with interactive exhibits and displays. It's just one of the educational and public amenities at the plant, which serves eastern Loudoun County.

Built on the shores of Broad Run, a Potomac River tributary, the 11 mgd (design) plant began operations in May 2008. Loudoun Water moved its headquarters there from Leesburg to be in the heart of the service area and encourage public visits.

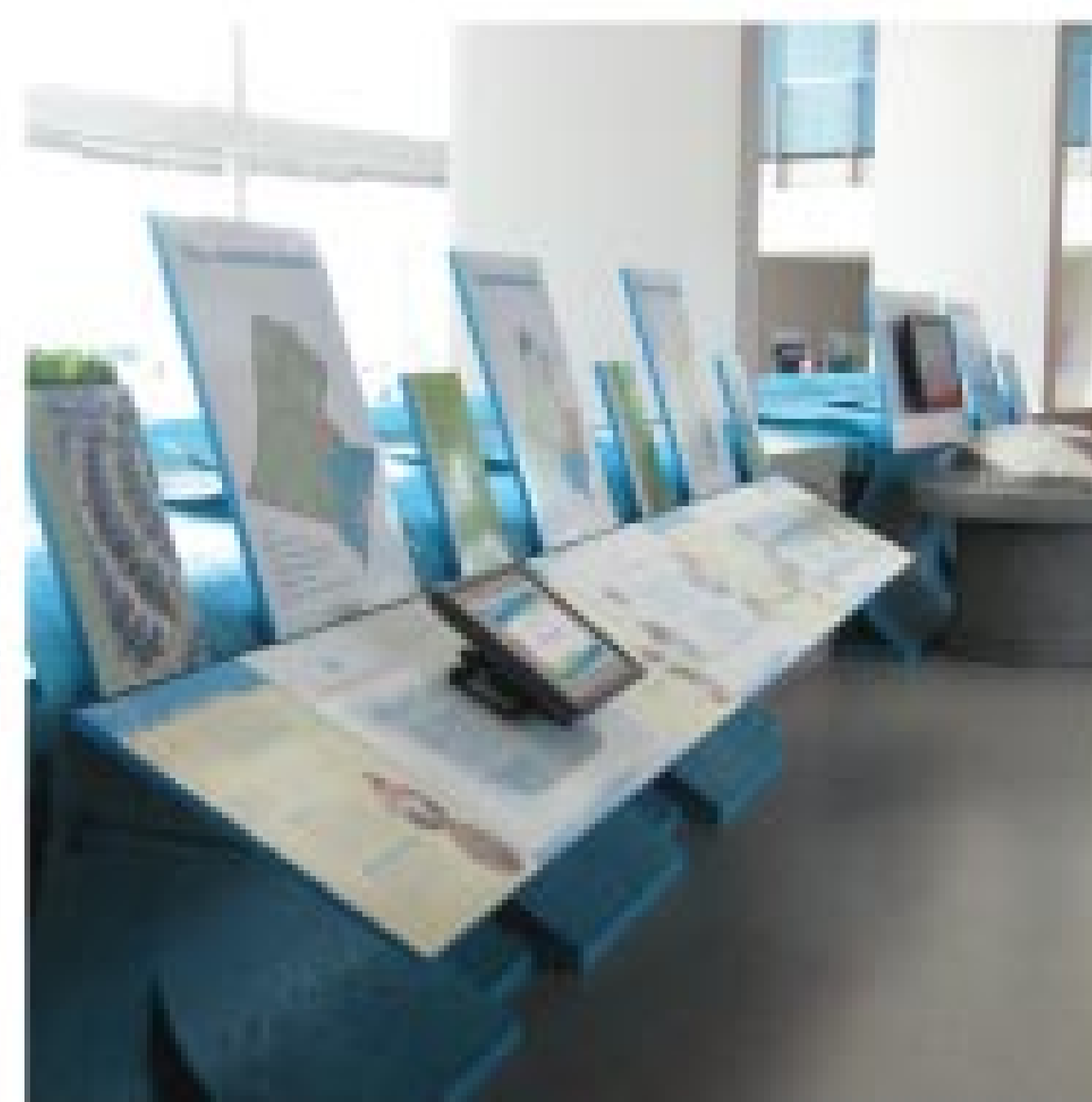
BIG IDEAS

The new plant was designed with a campus-like setting. "It creates a welcoming place that invites people to come find out how much water is a part of our daily lives," says Samantha Villegas, Loudoun Water communications manager. "Knowing what's coming in the future and in the outlook globally, we want people to start thinking about water as a top-of-mind subject."

Work began with a citizen advisory board of about 20 people of diverse backgrounds, to plan a multi-use facility. An outdoor trail system links the treatment plant to the administrative offices. The philosophy was to demystify the science behind the process and create a supportive community.

"We thought the trail system was the perfect way to invite the public in," says Villegas. "We learned there was an active adult community across the street, and we couldn't have been happier. Our trails provide an ideal place for recreation and fitness walking, and a reflective space for their use. We've had visitor groups from there, including residents who are retired engineers. They saw the potential for how we could interact with them and have become a real resource."

Loudoun Water created the Aquary (the name came from one of the citizen advisors) for a direct presentation of the scientific concepts behind wastewater treatment.



PHOTOGRAPHY BY ROGER FOLEY

MAKING IT HAPPEN

The trails mirrored the project's public message. They are paved with fine, packed gravel to remain pervious to rainfall while being ADA accessible. They run a figure-8 around intermittent streams that flow to on-site ponds. The outside trails are open to the public around the clock.

The plant entrance and trail-head lie uphill from the plant outfall, so some effluent is pumped to that point to create a series of runnels coming out of a wall. The water flows into a stone pool surrounded by vegetation. From there, it flows in an intermittent stream throughout the campus, winding among tall grasses and trees. A bridge over the stream interprets the role of intermittent streams in ecology.

Interpretive stations developed by The Design Minds of Alexandria, Va., support messages presented inside the Aquary. One station is a bioretention basin that shows how nature slows rainfall runoff and cleanses it of pollutants. It contains trees, bushes and smaller plants, which flower in different seasons.

Interpretive signage, an Eagle Scout project, describes the types of plants and mulch used so that visitors can build such basins at home. A station at the engineered outflow discusses water turbidity, clarity and odor in the treatment process. The first station, at the visitor parking lot, offers trail maps and printed guides.

Broad Run staff members with landscaping backgrounds did much of the

CLOCKWISE FROM LEFT: A pond near the facility entrance; one of many educational displays; an outdoor display beside the bioretention basin; the Re:Source area that highlights treatment processes at the Broad Run Water Reclamation Facility; and clean water flowing from the plant.

Share Your Ideas

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

Fast Track

When you don't have time to view all the exhibits, the Fast Track captures the essence of the water cycle, in one quick glance. Starting with your home on one end, the Fast Track takes you through the three main steps we use to reclaim wastewater before returning it to the environment.

On the flip side, we share with you the reverse path to get water back to your house.

Virginia Standards of Learning Met:

Site Model

You can't go in the plant, but you can get a close-up view. The site model is a scaled reproduction of our campus. The video takes you through the plant's treatment process to give you a visual snapshot of what's happening behind its walls.

Virginia Standards of Learning Met:

Watersheds

What happens in your backyard doesn't stay in your backyard. Find out how your actions can influence the quality of the Chesapeake Bay. Type in your address at the Watershed Address kiosk to find out how water travels to and from your home. *Virginia Standards of Learning Met:*

Re:Source

Resource is the star of the show. Created in two concentric half circles – the outer ring takes you through the reclamation process from your home back to nature (ending at an aquarium). The inner circle provides the reverse path of how drinking water gets from the source to your home.

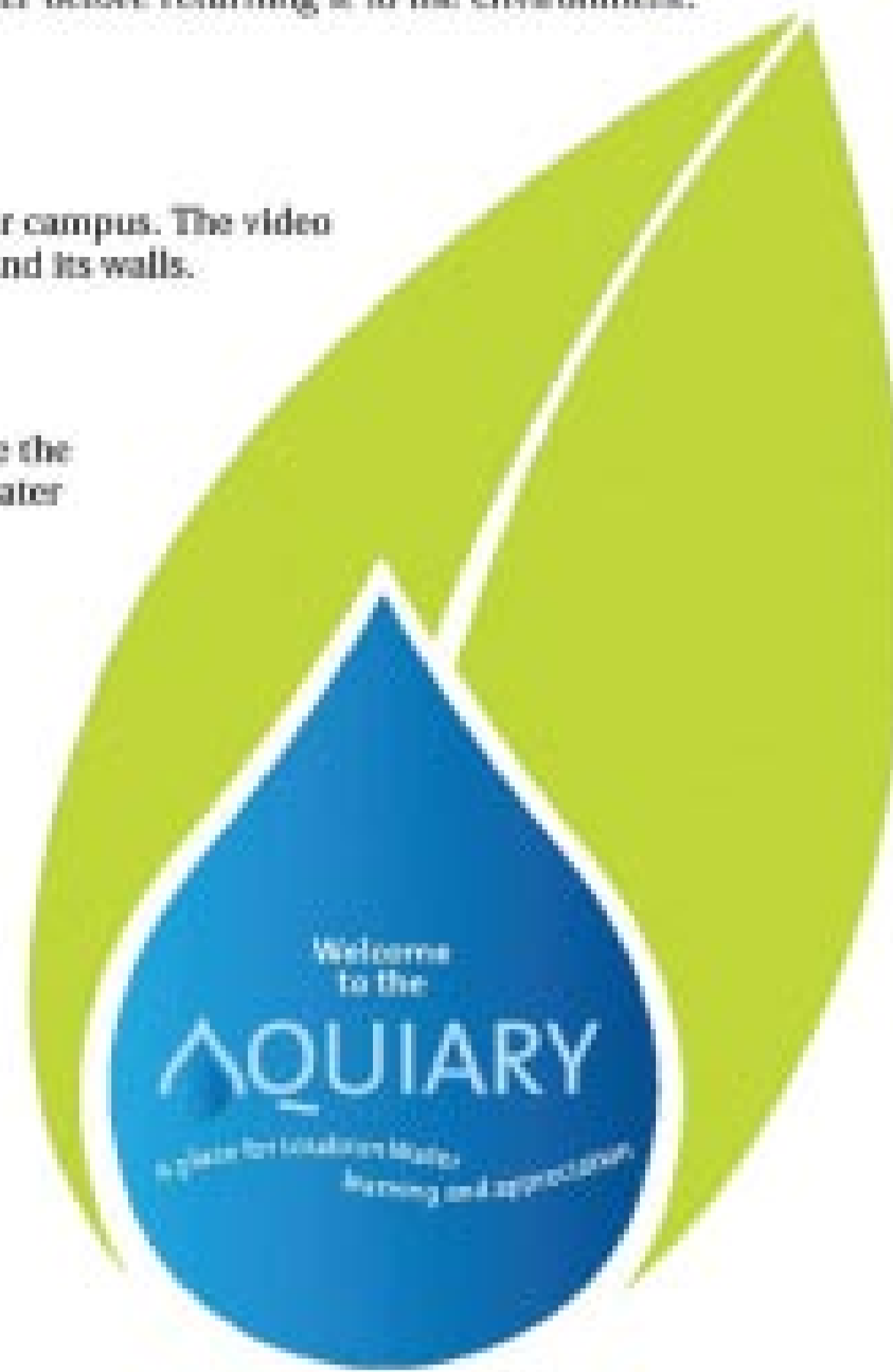
Virginia Standards of Learning Met:

Water's Worth

You can't go a day without touching water. It's that important. Explore the Water's Worth area to learn more about how we use this critical resource, and how to ensure there will always be plenty available for years to come. *Virginia Standards of Learning Met:*

Beneath the Surface

To get the inside scoop on the underground, visit Beneath the Surface. We'll show you how all the pipes and cables are typically laid out beneath your feet. It's a deliberate design to ensure safety and reliability. *Virginia Standards of Learning Met:*



A Guide to Exhibits helps teachers match up concepts taught in the Aquary to state DOE educational standards.

"We thought the trail system was the perfect way to invite the public in. We learned there was an active adult community across the street, and we couldn't have been happier. Our trails provide an ideal place for recreation and fitness walking, and a reflective space for their use."

SAMANTHA VILLEGAS

trail construction, with help from contractors. The total project cost, including exhibit design and fabrication, is about \$2 million to date.

CATCHING ON

The property attracts abundant wildlife, some less than welcome. A guano abatement program helps keep the trails clean of Canada goose droppings. Poisonous copperhead snakes swim in the water and ticks live in the tall grass. Tour guides stay informed about such problems to make sure everyone stays safe.

The general public hasn't yet caught on to the site's appeal. "We really want to go after the busy family that doesn't think twice about buying a case of bottled water every week and aren't environmentally aware," Villegas says. Her department is creating a video tour of Broad Run to send to area schools, hoping they'll send students for field trips. They're even setting aside funds to help get visitors onto the trails at their unique, green haven just off the busy, urban Potomac. **tpm**

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Going Beyond Green

REPLACING OLD TREATMENT EQUIPMENT HELPS THE ENVIRONMENT, IMPROVES PERFORMANCE, SAVES MONEY AND HELPS THE ECONOMY GROW IN ROME, N.Y.

By Doug Day

An upgrade to the Rome (N.Y.) Wastewater Treatment Plant that allows for the treatment of specialized waste helped attract a new business to the city.

The upgrade also helped the plant slash electrical costs, while the new aeration equipment increased capacity and allowed operators to provide better treatment with less effort. And that is all good for the environment.

The upgrade was named Project of the Year by the American Public Works Association/Central New York. The plant has also been praised by the New York Water Environment Association and the state Department of Environmental Conservation.

The 35,000 residents of Rome are pleased, as well, because the \$6.2 million turnkey project was self-funded. It will pay for itself through savings. In fact, the city expects to receive \$8.6 million in savings and revenue enhancement over a 15-year performance contract with Johnson Controls, which developed and implemented the improvements.

“We can put the exact airflow and dissolved oxygen exactly where we want it. That allows us to better manipulate the plant biology and manage our activated sludge process.”

BILL BAYNES

UPDATING NEEDED

Before the upgrade, the plant’s mechanical aerators were more than 30 years old and in dire need of replacement, according to Bill Baynes, chief operator at the 12 mgd plant. “Air capacity was a limiting factor in our ability to treat additional loading and even to meet our current permit requirements,” he says.

City officials already knew it would cost \$1.2 million for custom parts to improve the existing equipment, and it would take about a year to have those parts fabricated. So they turned to Johnson Controls in February 2008. The company was in the midst of making energy efficiency improvements in many city buildings.

The Johnson Controls project team, which included CDM engi-



PHOTOS COURTESY OF ROME, N.Y. WASTEWATER TREATMENT PLANT

A new aeration system at the Rome Wastewater Treatment Plant is sharply reducing energy costs and improving treatment performance. The system is part of an award-winning plant upgrade.

What’s Your Story?

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neers, put together a plan for the wastewater plant that included fine-bubble aeration with single-stage centrifugal variable-vane blowers, dissolved oxygen controls, more efficient membrane diffusers, and instrumentation and control equipment.

The work was completed and the plant was back to full operation on Nov. 1, 2009. In the first month, the plant saved \$11,500 in energy costs, right in line with the guaranteed savings of \$111,000 per year under the 15-year performance contract. Annual energy savings are projected at 30 percent.

AUTOMATED CONTROL

“We have ten aeration tanks in three basins and each now has its own Endress+Hauser dissolved oxygen probes,” explains Baynes. “The readings from the probes control the output of the variable-vane blowers (Turblex Inc. – A Division of Siemens Water Technologies).”

Turblex also supplied the automation instrumentation. “The system maintains a minimum air pressure and precise airflow and allows for the automatic flexing of the AeroStrip membrane diffusers (Eimco Water Technologies) to reduce fouling,” Baynes says.

“The amount of oxygen capacity is increased 50 percent going from mechanical aeration to the new blowers. We had plenty of capacity in our clarifiers and digesters, and solids handling was fine. Air was our limiting factor; it was what prevented us from treating any more volume or organic loading.”

“Energy savings were certainly a benefit, but that’s just one part of what made this project work. We can really control the process and the biology of the plant like we never could before.”

BILL BAYNES

He saw that limitation first-hand when the plant treated waste from the 200,000 people who attended the 1999 Woodstock reunion concert in Rome. “It was such strong waste that it almost shut down our system,” he recalls. “We could only treat about 20 gpm from the concert because of our aeration limitations. That was a heads-up for us.”

The plant’s SCADA system was modified to include trending of aeration process data. “It allows our operators to make adjustments to achieve greater energy savings and improve effluent quality,” says Baynes. “We also added baffles to improve the hydraulic distribution and detention time in the aeration basins.”

Baynes sees great improvement over the old plant, built in 1931 and upgraded several times. “The only way we could control the dissolved oxygen was to raise or lower the weir at the end of a line of tanks,” he says. “But we couldn’t control the individual tanks, so some tanks got too much air and some not enough.”

FLEXIBILITY FOR OPERATORS

The new system gives operators more control. “We can put the exact airflow and dissolved oxygen exactly where we want it,” Baynes says. “That allows us to better manipulate the plant biology and manage our activated sludge process.”

Operators find that such control helps them manage nitrification and denitrification, filament growth and energy use. Three containerized blowers, one 125 hp and two 250 hp, enable operators to set the airflow anywhere between 1,250 and 8,000 cfm to meet oxygen demand and provide better treatment.

“We used to draw from 240 to 270 amps with the mechanical aerators,” Baynes says. “That’s half of the total electrical use in the plant. Now we draw 75 to 85 amps.”

Operators can also monitor and trend the effects of different control strategies, monitor energy savings, and fine-tune the process. “Energy savings were certainly a benefit, but that’s just one part of what made this project work,” says Baynes. “We can really control the process and the biology of the plant like we never could before.”

ECONOMIC DEVELOPMENT

Rome is the site of the former Griffiss Air Force Base, which was



At the time of the upgrade, the plant’s mechanical aerators were more than 30 years old and badly needed replacement.

One of the three Turblex energy-efficient variable-vane blowers installed at the Rome treatment plant.

closed in the mid-1990s and is now a 3,500-acre business and technology park. “We want to be able to serve any business opportunities that might come along,” says Baynes.

The plant’s ability to treat high-strength waste helped influence the location of a cellulose ethanol demonstration plant that began operations in February 2009. “Hopefully down the road, we’ll have other opportunities with businesses that can come into Rome because we have the capacity to treat their waste,” Baynes says.

The plant can now treat more high-strength leachate and septage from existing customers, such as a local landfill. Last year, the plant treated about 2.5 million gallons of leachate, and it will take at least 5 million gallons this year.

Baynes expects to see \$156,000 in annualized operational savings in the first year alone from increased revenue and reduced maintenance costs. That is in addition to the energy savings. He estimates the plant is also avoiding \$200,000 a year in capital costs by not repairing the old mechanical aerators. The plant may also receive energy rebates from the state — the status of the rebates will be determined after one year of operation.

Baynes believes the new features and automated controls in the new system will provide the flexibility to deal with unforeseen circumstances and provide plant capability to support future economic development. **tpo**



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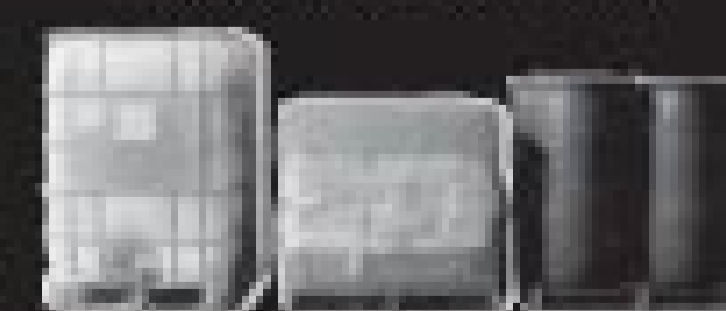
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Back In Business

OPERATORS DEVISE IMPROVEMENTS TO MODIFY AN RBC PLANT TO AN ACTIVATED SLUDGE/RBC SYSTEM, ENHANCING CAPACITY AND ALLOWING THE LIFTING OF A SEWER MORATORIUM

By Jody St. George and Frank Cavaleri



PHOTOS COURTESY WOODARD & CURRAN INC.

SCADA improvements enable the staff at the Charlton facility to monitor process conditions and adjust chemical dosing, improving efficiency in nutrient removal.

sewer connections in June 2004. Then in 2005 the commission elected to proceed with a competitive procurement process to hire a contract operations firm to manage the facility.

PLAN IN MOTION

Without the moratorium limiting flow, the plant would have been further compromised and would not meet EPA-mandated discharge parameters. The only exception to the moratorium was that tie-ins were allowed for failed Title 5 inspections.

Needing to address loadings problems, compliance issues and inadequate staffing, the commission members knew they had to act. Early in 2006, the commission hired Woodard & Curran, an engineering, science, and operations firm, to operate the facility.

Woodard & Curran brought in plant operations and maintenance staff to assist the lone plant operator and to troubleshoot and identify system improvements. The plant staff made modifications that improved treatment efficiency, enhanced hydraulic capacity and enabled the moratorium to be lifted.

That process found insufficient alkalinity as a key performance-limiting factor for the nitrification process. The operations team tackled that problem by improving quantity and control of chemical feed, then introducing recycle flow back into the equalization tank, and improving aeration control to create an anoxic treatment zone and reduce the burden on the RBCs.

The staff experimented with different rates of recycled sludge and found 80 to 90 gpm to be optimum. Because of the configuration of the treatment process, they were able to recycle strictly by gravity at no added cost, and monitor the rate with a flowmeter. At this point, they scaled back from six RBCs to four, achieving the goal of using one half of the facility's equipment for one half of the flow.

The end result is that the original RBC facility now operates in a hybrid activated sludge/RBC mode and uses the equalization basins for both treatment and equalization.

Troubleshooting also found that a local assisted care facility, which contributes 50,000 gpd, was flushing

Sometimes numbers can be deceiving, and the Charlton (Mass.) Wastewater Treatment Facility is a case in point.

This rotating biological contactor (RBC) plant, rated for 450,000 gpd, was typically treating an average of 220,000 gpd, making it appear that it was running at half capacity and could easily take on additional flow.

But factor in the loadings the facility accepts from the Charlton rest areas on the north and south courses of Interstate Route 90. Loads from those rest areas — the busiest rest areas in the state — have three to five times the strength of residential wastewater, par-

The net effect was to increase the plant's hydraulic capacity by some 100,000 gallons, enabling the commission to lift the moratorium on sewer connections.

ticularly ammonia, nitrogen and BOD. As a result, about 80 percent of the treatment equipment was needed to treat about half the hydraulic capacity of the plant.

At the same time, the Charlton Sewer Commission was having difficulty hiring qualified operations staff for the sewer department. Meanwhile, compliance problems with ammonia, phosphorus and aluminum led to several consent orders.

The commission, left with no choice, enacted a moratorium on

Share Your Idea

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With the addition of sodium hydroxide at an automatically controlled rate, the facility consistently achieves pH 7.0 in final effluent.

Another problem was that because of the use of ferric chloride, effluent pH was sometimes very low. To maintain pH within permit limits, staff added 50 percent sodium hydroxide and installed a pH monitoring probe before UV disinfection. With that, plus the SCADA system monitoring sodium hydroxide dosing, the plant achieved almost a straight trend line for effluent pH at 7.0.

ENDING THE MORATORIUM

The hybrid activated sludge/RBC design has improved nitrification capacity and overall plant stability, and the facility is now in compliance with effluent limits, passing toxicity tests and meeting its 0.2 mg/l phosphorus limit.

The net effect was to increase the plant's hydraulic capacity by some 100,000 gallons, enabling the commission to lift the moratorium on sewer connections. The lifting of the moratorium is a big step, and the town has begun work to address even stricter permit parameters in the facility's new NPDES permit.

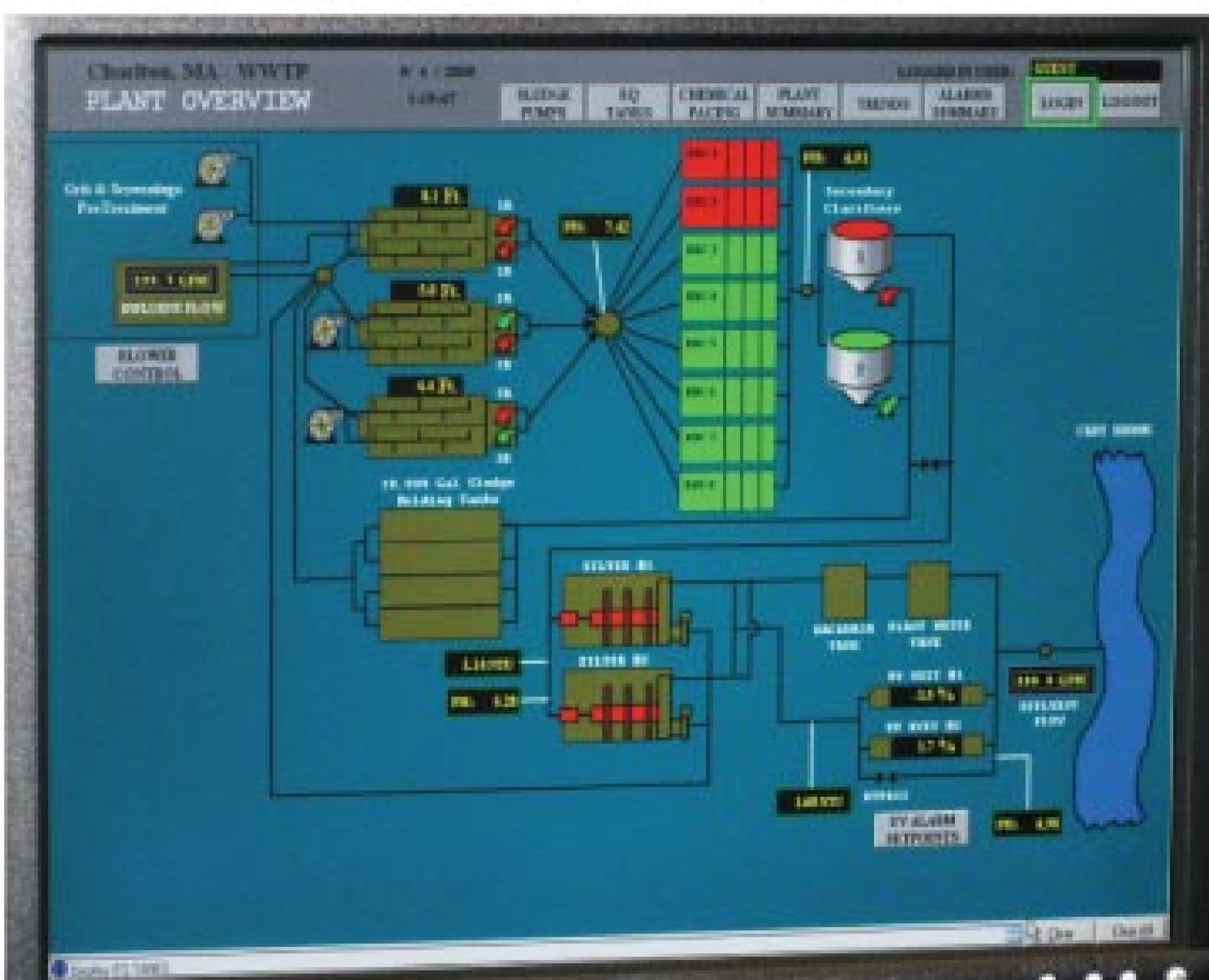
Construction of an upgrade recently began, and it includes the addition of two RBCs, process improvements to further reduce nutrient levels, and the installation of the CoMag process (a new phosphorus removal technology), to meet stricter phosphorus permit limits. **tpo**

ABOUT THE AUTHORS

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By flow-pacing chemicals and monitoring the pacing through the SCADA system, the plant staff can fine-tune chemical dosing to achieve the optimum results.

pharmaceuticals and causing failed effluent toxicity tests. At the chief operator's request, the facility stopped the practice. Since then, the plant has been in full compliance with effluent toxicity testing.

In addition, the team upgraded the chemical feed system to provide a broader range of adjustments and multi-dose point options, improving phosphorus and metals removal. SCADA improvements enabled the staff to track, trend and adjust chemical dosing, improving treatment efficiency for overall nutrient removal.

PHOSPHORUS LIMITS

Charlton's influent total phosphorus runs from 6.5 mg/l to 15 mg/l, but the plant's permit limits were 0.2 mg/l during summer. By flow pacing chemicals and monitoring that pacing through the SCADA system, the plant staff was able to fine-tune chemical dosing to obtain optimum results.

Before the flow pacing, staff straight-lined the chemicals, which meant that regardless of flows, the chemical dosing rate was the same. At lower flows, chemicals were being overdosed (wasted), and at higher flows, chemicals were underdosed, and treatment was ineffective. Now the dose rate is tailored to the flow, and the plant consistently attains 0.2 mg/l total phosphorus, and most of the time phosphorus levels average 0.1 mg/l or less.

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Teaching Moments

WORLD WATER MONITORING DAY CREATES HANDS-ON EXPERIENCES FOR ALL AGES THAT HELP CALL ATTENTION TO WATER-QUALITY ISSUES LOCALLY AND GLOBALLY

By Ted J. Rulseh

Remember the date: Sept. 18. That's World Water Monitoring Day, a tailor-made chance for clean-water agencies to reach out to the community about the importance of water quality and wastewater treatment.

Sponsored by the Water Environment Federation (WEF) and the International Water Association (IWA), this international education and outreach program builds awareness and involvement in protecting water resources around the world.

Last year nearly 123,000 people worldwide celebrated the day by sampling their local streams, rivers and lakes for parameters like dissolved oxygen, pH, temperature and turbidity. People from 81 countries reported data on their sampling. In the United States alone, participants monitored 4,155 sites. People perform simple water-quality tests using kits created by LaMotte Company in cooperation with WEF and IWA.

Although Sept. 18 is the official observance, volunteers can sample waterbodies

reach program — would you have any interest in taking it on?" We jumped at the chance, and the program was transferred to WEF in 2006.

We co-coordinate the program with the International Water Association as equal stakeholders. The involvement of IWA goes back to 2004, when what was then National Water Monitoring Day became a worldwide event.

tpo: Participants record data on local waters to an online database. What's more important — the data itself, or the awareness the event helps create?

Walsh: Definitely the latter. Our mission is to boost awareness of water-quality issues, to educate the public about some key indicators of water quality, and to get people hands-on engaged with their local waterbodies, so that they become more attuned to what they can do to protect water resources.

tpo: What is done with the data the participants collect?

Walsh: We do post it online. It creates a nice sense of community when you have people at sites all over the world collecting data. We're now taking the data and putting it up on a map that will run off Google Maps. So all the sites will be represented there, and all the data collected.

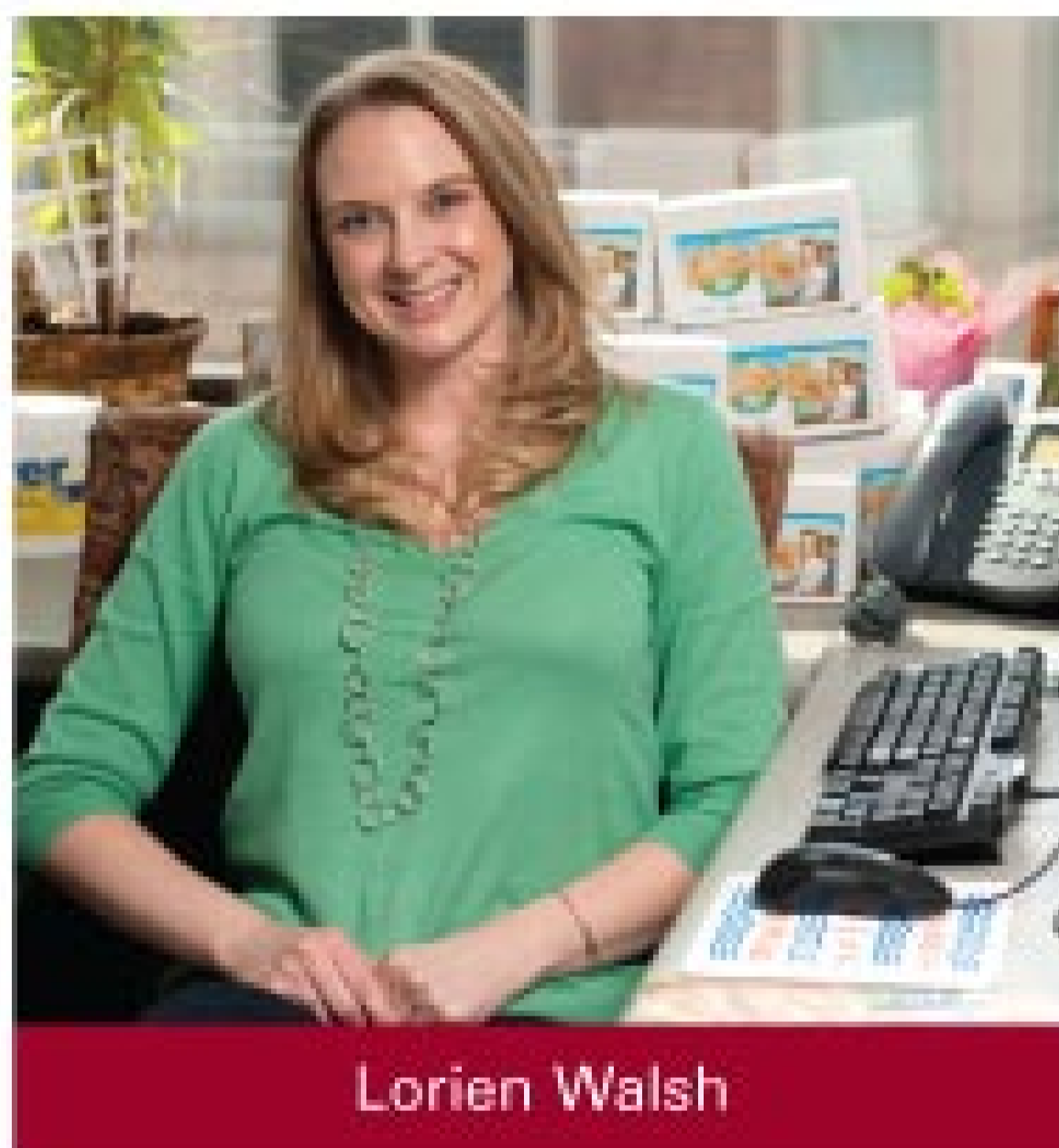
We're also looking at ways to do some quick visual comparisons so that, for example, people can see how their monitoring site in Virginia rates as compared with other sites in that state. There might be a bar graph showing how one site's dissolved oxygen compares to the state average or the national average. We hope to make

it a little easier for people to visualize what the results are.

tpo: The test kits for sampling are extremely simple. How was it possible to make the sampling so easy and inexpensive?

Walsh: Our partner, LaMotte Company, has been involved since the beginning. One of their areas of expertise is developing kits that are very hands-on and are designed for educators. The kit was initially developed between LaMotte and America's Clean Water Foundation.

When WEF came on board, we made some improvements, such as adding to the instructional booklet that goes along with the kits. Instead of just having text descriptions, we did some illustrations to make it easier for children or people who don't speak English to figure out how to conduct the tests.



Lorien Walsh

"In the United States, we'd really like to have a partnering group in each of the 50 states. We have partnering groups in about half the states right now. We would like to engage our Member Associations, get their public education committees excited about it, and get them to filter the information down to the individual cities and agencies."

LORIEN WALSH

and report data to the program's database anytime from March 22 to Dec. 31. You can find details on the Web site at www.worldwatermonitoringday.org.

Lorien Walsh coordinates World Water Monitoring Day at WEF. She sees the program as a great way for WEF Member Associations and clean-water agencies to engage the public and generate more interest in water-quality issues. She shared her thoughts about the day and its impacts in an interview with *Treatment Plant Operator*.

tpo: What is the history behind World Water Monitoring Day?

Walsh: World Water Monitoring Day was created in 2002 by America's Clean Water Foundation. That group dissolved in 2006, and at that point they came to WEF and said, "We have this wonderful out-

LaMotte has some basic technology for the tablet tests for DO and pH. The tests are pretty reliable. In my experience, doing the more advanced tests with electronic probes and titration, and comparing the results to what the test kits give you, there's not a whole lot of difference. It's accurate enough for the lay person. It's sort of a Water Quality 101 experience.

tpo: How would you describe the range of organizations that take part in World Water Monitoring Day?

Walsh: The range is very broad. They all have their own reasons for participating. We get a lot of school groups, and they range from elementary to high school, although we are pretty concentrated in the upper elementary age range.

We get a lot of Girl Scouts and Boy Scouts, who tend to focus on outdoor environmental activities. Some civic organizations like Rotary

“The nice thing about the program is that it's pretty basic, so it really can be adapted based on the group's individual needs. The test kits cost \$13, and you get enough materials to do up to 50 rounds of testing. You get a lot of bang for the buck.”

LORIEN WALSH

and Lions pick it up, as do service groups like Engineers without Borders, Save the Children and the Peace Corps.

There are corporate participants also. Particularly for wastewater utilities or for engineering firms that work in water quality, it's a nice tool for doing outreach in the communities where they work. The same is true for our corporate sponsors.

tpo: How much participation do you get from cities and clean-water plants?

Walsh: I would say we don't have as many as we would like. We have groups that are closely affiliated. Some of WEF's Member Associations have gotten engaged. For example, the New England, Rocky Mountain and Florida Water Environment Associations are quite active.

In the United States, we'd really like to have a partnering group in each of the 50 states. We have partnering groups in about half the states right now. We would like to engage our Member Associations, get their public education committees excited about it, and get them to filter the information down to the individual cities and agencies.

tpo: How do the municipalities and clean-water agencies take part?

Walsh: It's a mixed bag. Some will use it as a tool to get into the schools and speak about water quality, and loop that back to what they do as their core business. Others actually bring the students to their facilities and have a tour, and they might test some nearby waterway.

Still others will take part in local environmental fairs or Earth Day celebrations. They might have a booth there where they talk about what they do, and they'll have a little World Water Monitoring Day demonstration.

The nice thing about the program is that it's pretty basic, so it really can be adapted based on the group's individual needs. The test kits cost \$13, and you get enough materials to do up to 50 rounds of testing. You get a lot of bang for the buck.

tpo: Are you developing any educational programs or materials to help support the monitoring program?

Walsh: We're constantly working on supplemental resources. We have a story book for elementary students. It's actually a fictional tale, but it highlights the water monitoring activity. It's educational

without being overtly so, and it's also very entertaining. We make that available free of charge to groups that are hosting events or going to schools.

We hope to collaborate very soon with an organization that develops water-quality lesson plans to create a series of lessons that teachers could easily pick up and use. They would deal with water quality beginning with the watershed viewpoint and moving through land use and the effects different land uses have on the waters. The lessons culminate in World Water Monitoring Day and the monitoring activities.

tpo: What do you see as some of your biggest successes so far?

Walsh: I'm very impressed by some of the groups from developing countries. They don't have a lot of resources but they have a lot of enthusiasm. Last year, Malaysia took over the top spot for partici-

pation — they had 50,000 people involved around the country. That's largely thanks to Kalaimani Supramaniam, who is a teacher at a national secondary school and the Environment Online Asia coordinator spearheading outreach efforts throughout the region, particularly tree planting and water-quality monitoring.

Another hot spot is Spain, where the program is coordinated by WEF Member Association ADECAGUA and program manager Federico Garcia. They implement World Water Monitoring Day through funding from the Spanish Ministry of Environment. In 2009, ADECAGUA purchased and distributed 2,000 test kits and logged data from more than 1,600 sites.

tpo: Where do you see World Water Monitoring Day going in the next five to 10 years?

Walsh: Our ultimate vision is a world where everyone assumes personal responsibility for our water resources and everyone has a basic understanding of how their personal behaviors affect water quality.

The nice thing about this program is that it starts locally, with people learning about their own waterbodies and what's going on right in their own backyard. But then it has an umbrella effect in that all water is interrelated through the water cycle.

If something happens in Malaysia, how down the road does that affect what's happening here in the United States, and vice versa? It's all connected. If you take that very personal and local approach and multiply it out, suddenly you're making a big impact worldwide. **tpo**

The advertisement features a central image of a tpo E-Zine cover. The cover shows a group of people in blue shirts and white hard hats at a water treatment facility. The text on the cover includes "tpo", "Operations is King", and "SANTA ANA DISTRICT OF WATER SUPPLY". To the right of the cover, there is a large graphic that says "Have you seen the tpo E-Zine?". Below this, it says "Go to tpomag.com to view the e-zine." The background of the advertisement is a repeating pattern of "E-ZINE" in a light green color.

top performer:

PLANT

Chris Farinacci, lab technician, takes a sample from the aeration process at the Pittsburg treatment plant. (Photography by Philip Lucas)

When Older *Is Better*

THE PITTSBURG (KAN.) WASTEWATER TREATMENT PLANT USES TRICKLING FILTERS AND INGENUITY TO WARD OFF WET-WEATHER FLOWS AND STAY IN PERMIT COMPLIANCE

By Jim Force

IN THE OLD DAYS, COAL MINING SUSTAINED THE economy of Pittsburg, Kan.

Today, the abandoned mines contribute to serious infiltration and inflow that can push volume at the city's 3 mgd wastewater treatment plant to 14 mgd and beyond. Rainwater floods the old pits and mine shafts, forcing it into the sewer system, much of it clay pipe construction.

But the wet-weather flows have not overwhelmed the treatment plant, operated by superintendent Mike Brown and his staff of six. In fact, using old technology and plenty of ingenuity, they created an effective wet-weather plan that has kept the plant in compliance, with no violations in the last 10 years.

Critical to success are two rock-filled trickling filters installed decades ago. It might be a case of older being better. "We have a plant with a large footprint and some antique equipment, but Mike and his staff make it work," says Jim Tush, director of public utilities. "They've made a number of operational changes that enable the plant to withstand the I&I flows."

NORMAL TIMES

Flow enters the plant from Pittsburg's 140 miles of sanitary sewers, passing through a bar screen before being lifted by screw pumps to a "pre-air" grit removal area. Circular primary clarifiers with scum removal gear are next

"We have a plant with a large footprint and some antique equipment, but Mike and his staff make it work. They've made a number of operational changes that enable the plant to withstand the I&I flows."

JIM TUSH

in the line, followed by the trickling filters, 140 feet in diameter and 10 feet deep. In one, wastewater is fed to the media through a two-ended distributor arm. The other has a retrofitted four-ended distributor mechanism supplied by WesTech Engineering Inc.

Further treatment and nitrification is provided by a Schreiber LLC extended aeration activated sludge system. After final clarification, the effluent flows to a two-train, 16-bulb Aquionics UV light disinfection system before discharge through a cascade re-aeration channel to Cow Creek.

Biosolids and floatables from the primary clarifier move to an anaerobic digester that operates in the mesothermic range. Digester gas is used to heat the digester via heat exchange, and any excess is flared off. Secondary solids are digested aerobically. Both solids streams are conditioned with polymers



Pittsburg Wastewater Treatment Plant team members include, from left, Rodney Talcott, operator II; Chris Farinacci, lab technician; Mike Wagner, operator I; Randy Ryan, operator II; Mike Brown, superintendent; Grant Gilmore, operator I; and Ken Bell, maintenance supervisor.

profile **Pittsburg (Kan.) Wastewater Treatment Plant**

POPULATION SERVED:	17,000
BUILT:	1940s; upgrades in 1995 and 2007
TREATMENT LEVEL:	Secondary
TREATMENT PROCESS:	Trickling filters, activated sludge
FLOWS:	6 mgd design, 3 mgd average, 14+ mgd wet weather
BIOSOLIDS:	Anaerobic and aerobic digestion, dewatering, land spreading
STAFF:	Mike Brown, superintendent; Chris Farinacci, lab technician; Ken Bell, maintenance technician; Randy Ryan and Rodney Talcott, operator II; Mike Wagner and Grant Gilmore, operator I
OPERATING BUDGET:	\$500,000
WEB SITE:	www.pittks.org

before dewatering on an Ashbrook Simon-Hartley belt press. The staff takes care to select a polymer that will work effectively on both primary and secondary solids.

City trucks haul the dewatered cake to area farm fields and spread it using a city-owned tractor and slinger machine (KUH North America). In cases where additional solids accumulate, the plant has drying beds available for additional dewatering.

WHEN IT RAINS

That's the design flow scheme, but when it rains, Brown and his crew have developed a number of different paths for overflows to follow so that the plant stays in compliance. It's like rerouting traffic when the main road becomes congested.

"We can handle up to about 6 mgd through our normal system, although at that flow rate we would bring on both UV units," says Brown. "At normal flows, we would use only one."

At flows of 6 to 14 mgd, the excess water passes through the old trickling filter plant and still gets treatment but is routed around the activated sludge system. "We use our tricklers, but we take the excess flow from the tricklers directly to our secondary clarifiers and then to discharge," Brown says.

At even higher flows, which occur with some regularity during especially wet seasons, excess flow passes through the screens and is lifted by the screw pumps directly to discharge.

A number of control structures help Brown and his staff manage these wet-weather events. Maintenance supervisor Ken Bell explains that the structures are actually gates that can be raised or lowered manually to help control or divert flows. During normal weather, control structure No. 2

allows the staff to bypass the trickling filter and the pre-air grit removal step and pass flow directly to the activated sludge system.

Control structure No. 3 lets operators return flow from the secondary clarifiers to the activated sludge system for additional treatment. "But when we're running hot and heavy, we use control structure No. 2 to store overflow ahead of the activated sludge system and prevent washouts," says Bell. "Control structure No. 3 can be adjusted to ease flow to the secondary clarifiers."

A gate at the head end of the plant provides additional control. "We've set it at about seven feet so that as soon as the pumphouse starts getting overwhelmed, we can pass excess flow directly to the screw pumps and to discharge more quickly," says Brown.

EXTRA CONTROL

The Pittsburg crew has made changes to these structures to provide even more control of the overflows. They've raised the weirs and created a space below the weir line that they can open or close to let more or less

MORE THAN CLEAN WATER

Residents of Pittsburg, Kan., get more than clean effluent out of their wastewater treatment plant. The facility serves as a community compost site for yard waste, as well. It's a partnership that works well.

"We used to pick up yard waste around the city and haul it to a landfill," says Mike Brown, plant superintendent. "That was not only wasteful, it was expensive." Now, residents collect their own yard waste and haul it to the wastewater plant in trash bags. The waste is ground and chipped and used to make compost in windrow piles. The compost is available to the public free of charge. The compost site is open until 7 p.m. daily.

"The system has been really well received," says director of public utilities Jim Tush. "Residents get good-quality compost, and it costs the city very little. It's a cool thing."

"We're spending our funds on the sections that give us the most impact, and we still have a lot to do. Ours was not intended to be a combined sewer system, but we're making progress. This was a pretty leaky system."

JIM TUSH



water through. "It's a better way to manage this water," he says.

Another wet-weather management technique involves close monitoring of various manholes along the sewer system where known I&I issues exist. Through visual monitoring and an increasing number of flowmeters, the Pittsburg team is developing a better picture of the location and scope of the problems during rain events.

All these adjustments have paid off. The plant stayed in compliance on the basis of its seven-day and monthly average permitted levels, and things are a lot less hectic at the plant and around the system. Brown recalls that before, the plant would fill up and sewer backups were common. "We'd have the pumps on and be frantically bypassing as fast as we could," he says. "And it might last for a day or a day and a half."

Now, he says, bypassing seldom extends beyond four or five hours before operations return to a level his staff can handle. "We're able to control the things we can control in managing stormwater," Brown says. "We've alleviated the pressure on the plant."

LEFT PHOTO: Plant superintendent Mike Brown. LOWER PHOTO: Rock-filled trickling filters are still a mainstay of the process at the Pittsburg plant.





LEFT PHOTO: Superintendent Mike Brown checks the plant's UV disinfection system from Aquionics. LOWER PHOTO: Grant Gilmore cleans the outputs on a four-arm drip distributor from WesTech Engineering Inc.



KEEPING UP THE KILL RATE

The staff at the Pittsburg treatment plant has developed a detailed cleaning and maintenance program for the UV light disinfection system, and the effort guarantees efficient and adequate kill rates in the treated wastewater that passes through the units.

"Depending on water quality, we usually clean the UV bulbs one or two times each week, using a lime-removal product," says plant superintendent Mike Brown. The staff also cleans the quartz sleeves and sensors to maintain high kill rates and changes out the sleeves, sensors and rubber wipers as needed.

The UV system manufacturer (Aquionics) replaces at no charge any bulbs that fail before 3,000 hours of use. "The UV units give us excellent control of *E. coli*," Brown says.

FIXING THE SEWERS

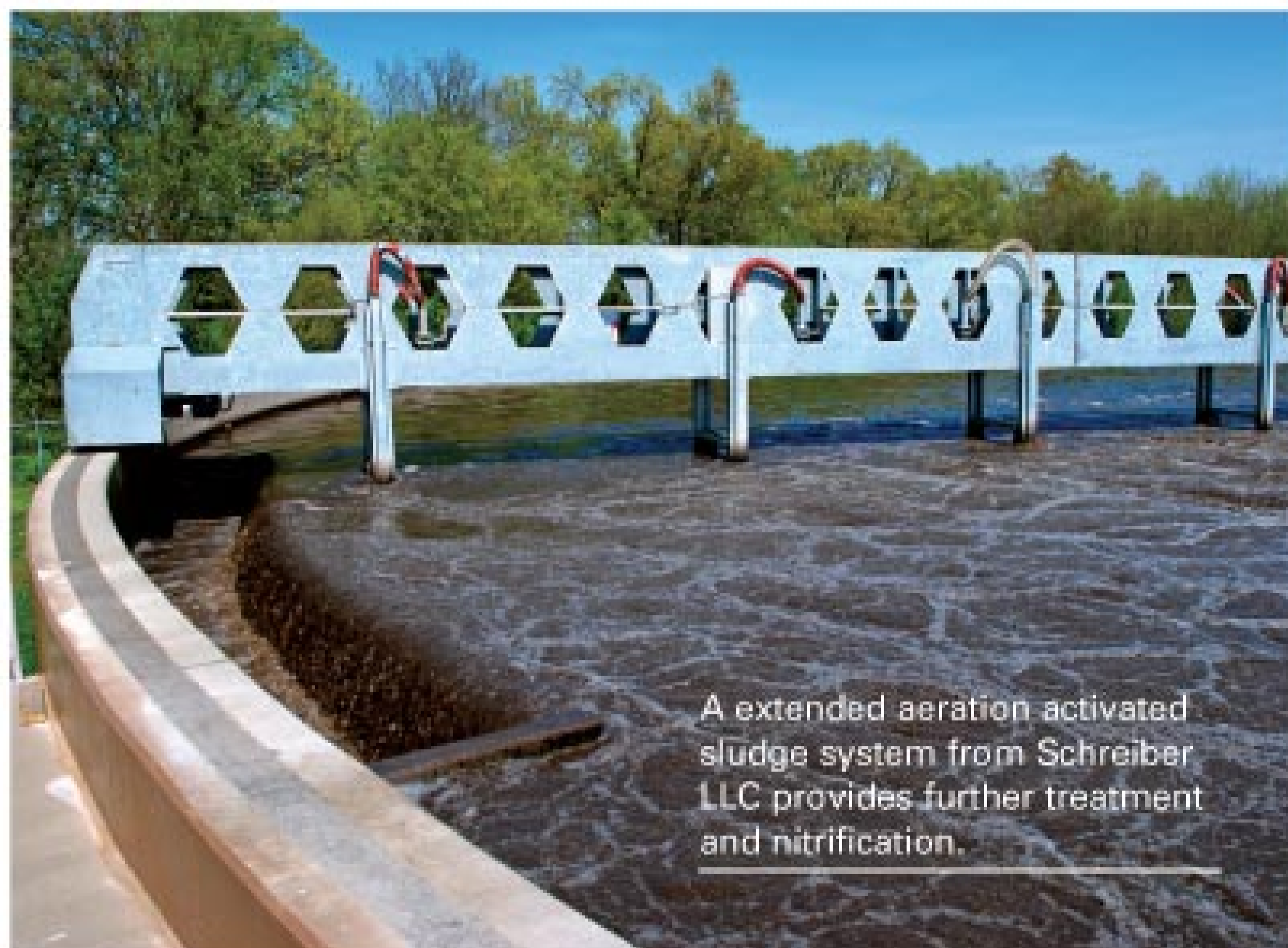
Pittsburg is also addressing the problem of aging sewers. Tush explains that the city is using State Revolving Loan funds to replace, repair and line sewers one section at a time, and to continue installing flow-monitoring systems.

"We're spending our funds on the sections that give us the most impact, and we still have a lot to do," he says. "Ours was not intended to be a combined sewer system, but we're making progress. This was a pretty leaky system."



Pittsburg (Kan.) Wastewater Treatment Plant
PERMIT AND PERFORMANCE (2009 MONTHLY AVERAGES)

	INFLUENT	EFFLUENT	PERMIT
BOD	223 mg/l	3.6 mg/l	Oct.-June: 30 mg/l weekly, 20 mg/l monthly July-Sept.: 25 mg/l weekly, 15 mg/l monthly
TSS	232 mg/l	6 mg/l	45 mg/l weekly, 30 mg/l monthly
Ammonia	N/A	0.1 (yearly average)	Varies by month from 2.7 mg/l to 8.6 mg/l
Fecal coliform (colonies/100 ml)	N/A	77 (yearly average)	Nov.-March: 2,358 April-Oct.: 160



A extended aeration activated sludge system from Schreiber LLC provides further treatment and nitrification.

Two projects on the immediate horizon will also help. The old Centennial pump station will be shut down, and all existing equipment will be replaced and located on an adjacent site. Centennial is ancient and is starting to rust through and fall apart. The dry well is 30 feet deep and is a safety issue. Bell says new submersible pumps being installed there will make the station much easier to maintain.

At the Southeast station, equipment is old, dating to the 1970s. "The update will include new pumps and controls, including variable speed drives," says Bell. Both stations have been maintenance headaches, and the improvements will help ease frustrations.

"When it rains, I know I'm going to get a call to go out to one or both of these old stations," Bell says. Brown adds, "With the new equipment, we'll have much more confidence in our system." **tpo**

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It's How You Finish

OPERATORS AT A FLORIDA MBR PLANT SHOW HOW PROCESSES CAN BE ADAPTED TO OVERCOME LOW-FLOW STARTUP CHALLENGES WHILE MEETING STRINGENT TOTAL NITROGEN LIMITS.

By Dennis Livingston, P.E.

Building a new wastewater treatment plant generally involves a delicate balance between meeting both present and future needs. While the industry continues to innovate ways to phase in treatment capacity by increments as demand increases, it is all too common that the capacity of a new plant far exceeds actual loading for many years.

In addition, in the interest of keeping costs down, new plants often lack sufficient flexibility (turndown) to meet stringent total nitrogen limits at startup flows. Without built-in turndown, the onus is on operators to understand the biological process and find innovative ways to meet the limits until loading increases to design levels.

The experience of an MBR treatment plant in Florida shows how operators can cost-effectively adjust processes to handle low startup flows while still meeting strict permit limits on total nitrogen in effluent.

UNDERSTANDING THE PROCESS

In an activated sludge plant, various biological processes are selected for use in different zones to convert nitrogen pollutants into either biosolids (through assimilation) or harmless nitrogen gas.

Without getting into the details, two significant steps must occur at one or more points in the process to convert enough nitrogen to meet tough limits. These are nitrification (conversion of ammonia nitrogen to nitrates) and denitrification (conversion of nitrates to nitrogen gas). The trick is making sure enough of each is happening somewhere in the plant, at some time.

There are many ways to combine process zones, also called selectors, to achieve specific process objectives like total nitrogen removal. The myriad combinations are lumped into categories (flowsheets) with different names like MLE, AO, A³O, Bardenpho and UCT.

Our example looks at an MBR system (Figure 1) where denitrification happens at three steps: in the pre-anoxic (PRAX) zone, the

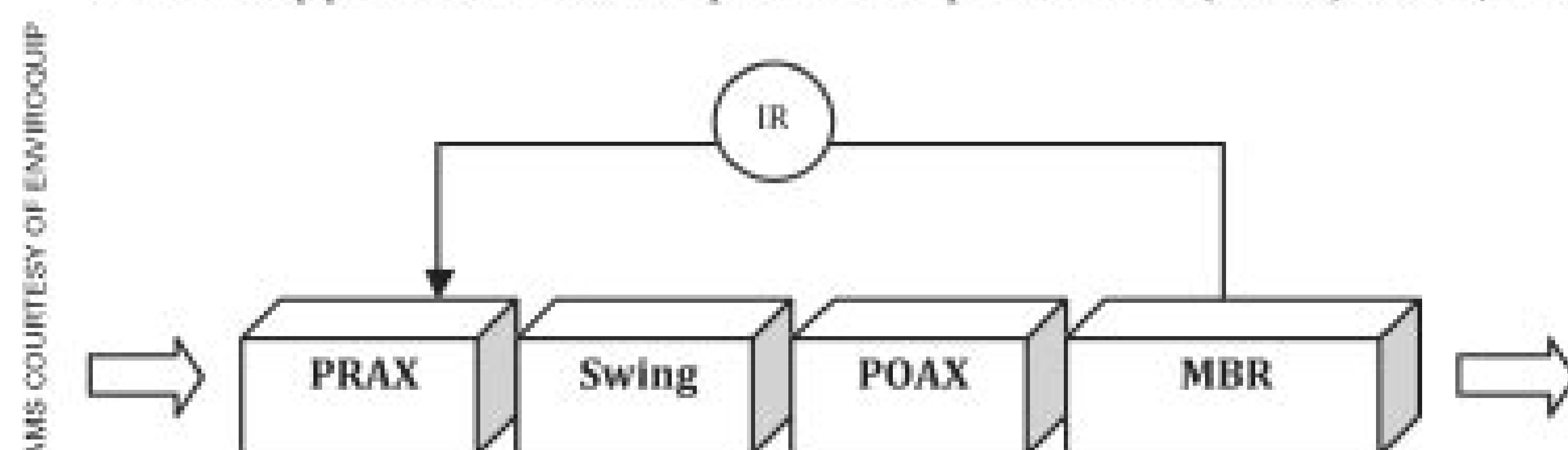


Figure 1: Flow Diagram of MBR Process with 3-Step Denitrification

swing zone and the post-anoxic (POAX) zone. On the other side, nitrification is designed to occur in both the swing zone and in the MBR (also called the membrane zone). A single internal recycle (IR) stream returns nitrates to the front of the process for denitrification.

For those not familiar with this type of MBR process, a comparison to a similar flowsheet using sedimentation appears in Figure 2. Note that the oxic zone implies aerobic conditions, or most likely the use of fine-bubble diffusers followed by a clarifier.

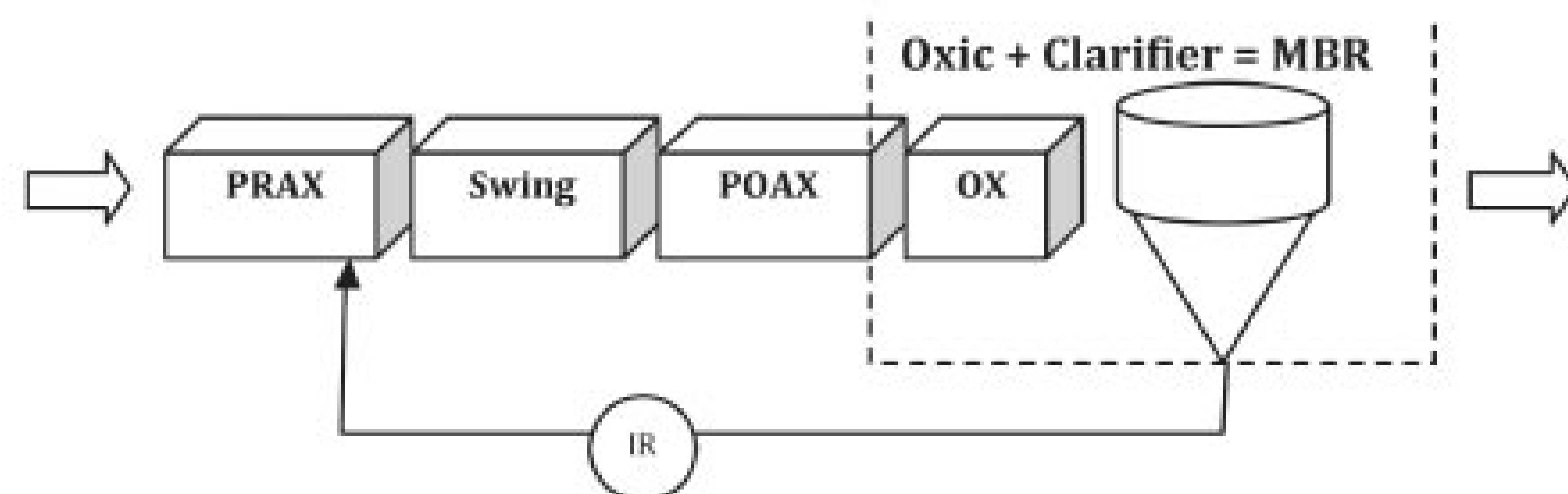


Figure 2: Flow Diagram of Conventional MBR Process

PERFORMING A MASS BALANCE

Once the process is understood, the next step is to figure out what is actually happening, and where, by conducting a mass balance. A mass balance amounts to a simple accounting of oxygen and nitrogen species in the process. Measuring dissolved is usually straightforward and can be accomplished using handheld or online analyzers.

For tracking nitrogen, online analyzers can be leased or purchased and moved around the process for use in trending ammonia and nitrates. Simple snap kits are also effective for putting together a useful mass balance. A sample mass balance around one process zone is shown in Figure 3.

Note, there are two parts to a mass balance: the species concentration and the flow rate of the stream. Often overlooked or misunderstood is the flow part to a mass balance, specifically the amount of nitrification that is supposed to occur in the MBR.

The confusing part is the perception of low concentration. For example, it is easy to look at the numbers in Figure 3 and determine that not much nitrification is happening in the MBR. After all, only 2.0 mg/l of ammonia is coming into the zone.

But savvy operators need to consider the mass of ammonia going into the zone, which is substantial. Assuming typical municipal strength

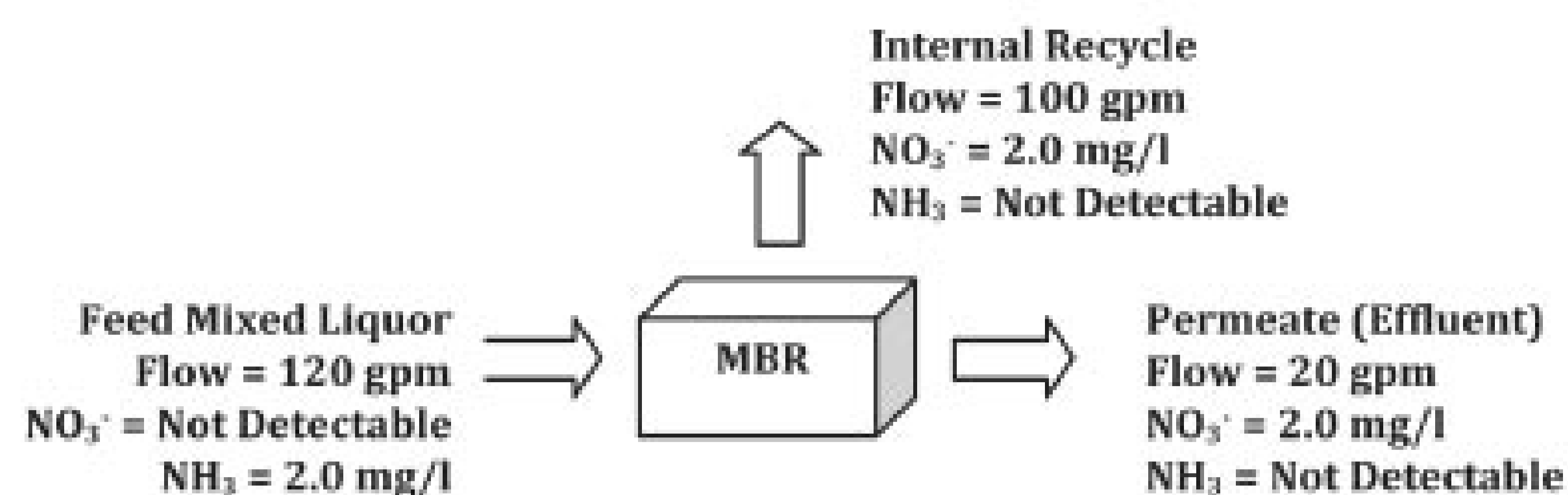


Figure 3: Mass Balance: Sample Conventional Flowsheet

waste (30 mg/l NH_2), and assuming that 20 gpm is coming into the plant (equal to permeate leaving), roughly 30 percent of the nitrification is happening in the MBR — not an insignificant amount. This ratio is for illustration purposes, but is not too far off the mark for real plants.

So once you have done the homework to understand how the plant is supposed to work, and you have completed the testing to figure out what is really happening in each process zone — now what? What options do you have to make fixes without spending a lot of money on potentially short-term remedies?

POTENTIAL SOLUTIONS

In any MBR system, diffused air is used to scour submerged membrane units during filtration, and that inevitably adds some amount of dissolved oxygen to the process. A unique aspect of the flowsheet presented here is the single recycle from the MBR back to the PRAX zone.

This cost-saving measure can be effective with sufficient built-in aeration turndown, but can be problematic with little or no control of air scouring. The problem of excessive aeration can be compounded by built-in filtration redundancy (installing extra submerged membrane units) and the lack of supplemental aeration turndown (the fine-bubble diffuser system and blowers).

So, if you're having trouble with turndown, three suggestions to improve nitrogen removal efficiency are:

- Implement a control strategy to bring on process and filtration capacity incrementally as a function of actual demand. This may involve programming changes. Also consider proportional air scouring as a function of membrane flux, depending on supplier recommendations.
- Implement a control strategy to allow for flexible on/off times (semi-batch mode) of diffused air systems (for example, in the swing zone).
- Temporarily modify the flowpath through the plant or convert zones (for example, equalization to PRAX) to deoxygenate the mixed liquor or promote additional denitrification.

CASE IN POINT

So what proof is there that some variation of these strategies can help you improve total nitrogen removal in the face of low loading and limited turndown?

Turndown and flexibility are in reality functions of cost. If money is no object, rarely the case, a new treatment plant can be built to handle any and all conditions efficiently. But in most cases, cost-benefit decisions constrain the capacity of a plant to a narrow range of operating conditions, leaving operators to figure out what to do outside the design envelope.

Such was the case with the Nassau (Fla.) Regional Wastewater Treatment Plant, where the staff figured out how to produce effluent with a total nitrogen of less than 3.0 mg/l while treating roughly 33 percent of design

load and managing feed from more than 45 independent lift stations.

The plant actually has three effluent permits, one for reuse on site that has a total nitrogen limit of 12 mg/l, and permits for off-site reuse or wetland discharge, both total nitrogen limits of 3.0 mg/l.

The Nassau MBR plant was built for roughly \$10.4 million. Based on rated capacity, the normalized cost of the plant is \$5.20 per gallon, or about 40 percent less than the national average for similar MBR systems, which is \$8.60 per gallon.

The initial decisions that were made to control costs included low blower turndown (1.2:1), reduced freeboard (about 7 inches), elimination of equalization and reduced permeate control. All these factors made operating outside the intended design more challenging, but achievable.

The plant faced extreme diurnal flow variations coupled with lower-than-expected daily loading. Therefore, the effluent nitrogen was such that the water was initially best suited for on-site reuse, rather than off-site reuse or wetland discharge, until some of the strategies presented here were implemented and performance improved.

For some time after commissioning, nitrogen excursions would drive up total nitrogen numbers to as high as 10.4 mg/l. But now, effluent nitrogen is consistently less than 3.0 mg/l, even going as low as 1.6 mg/l. In fact, looking at the year of data in Figure 4, one could say, "It's not how you start, it's how you finish." Operators took a challenging startup and turned the plant into a solid performer. **tpo**

ABOUT THE AUTHOR

Dennis Livingston, PE., is MBR systems director for Enviroquip, a division of Eimco Water Technologies, based in Austin, Texas. He can be reached at 512/834-6019 or Dennis.Livingston@glv.com.

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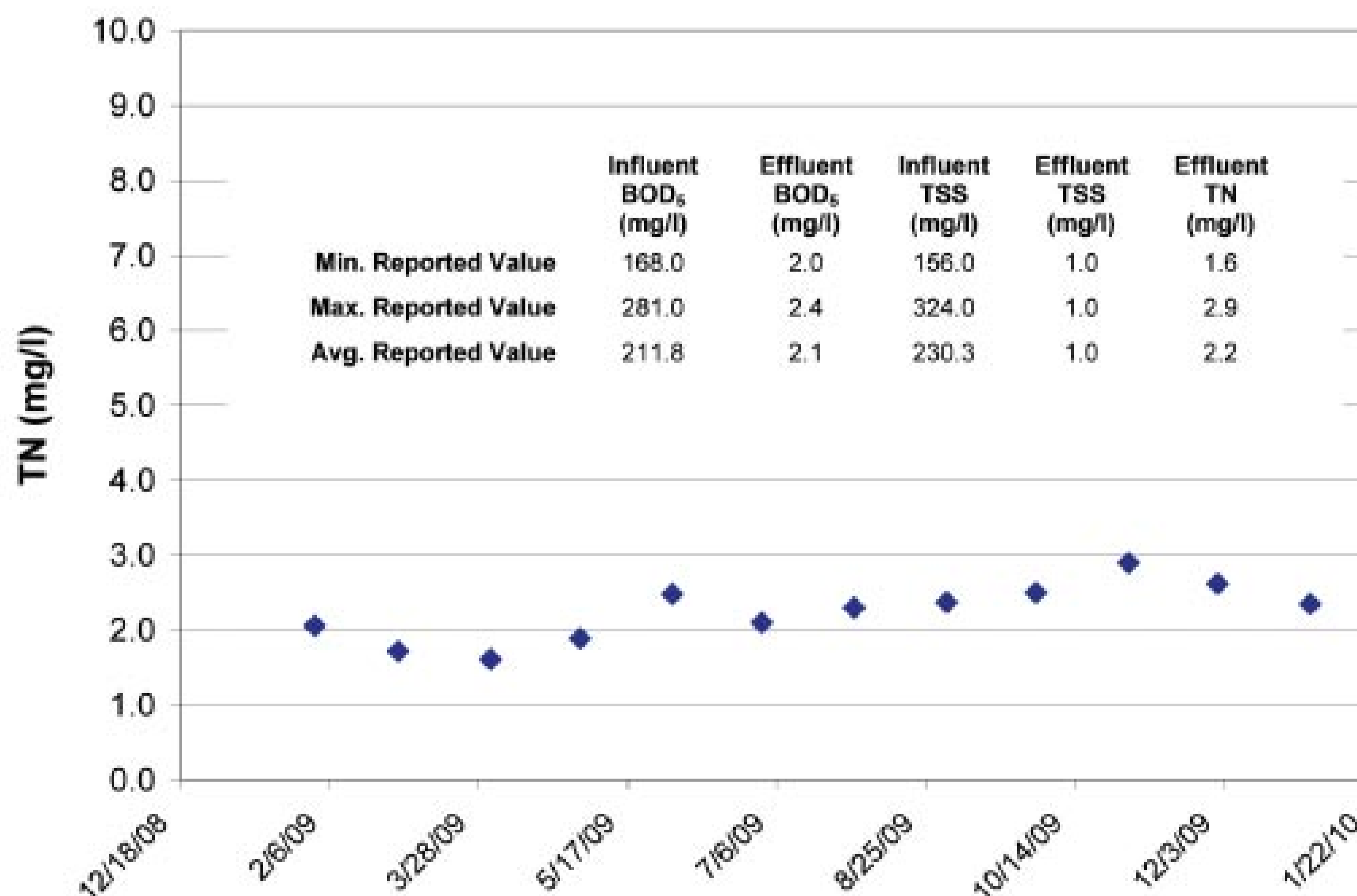


Figure 4: Nassau Regional Wastewater Treatment Plant (2009 Plant Effluent Data)



1. HACH INTRODUCES POCKET PH METERS

H-Series miniLab pocket pH meters from Hach Co. feature a non-glass silicon chip sensor that provides readings in seconds. It requires no filling solutions and stores dry for easy maintenance. Three different models are available, providing 1-, 2- or 3-point calibration, temperature display and pH resolution up to 0.01. **800/227-4224; www.hach.com.**

2. FLUIDYNE OFFERS ISAM SLUDGE REDUCTION

The ISAM sludge reduction system from Fluidyne Corp. incorporates a constant-level anaerobic basin followed by a surge/anoxic/mix (SAM) tank, and an aeration basin that incorporates BOD, TSS and nitrogen removal along with sludge reduction in an integrated system. Complex organic solids undergo hydrolysis to simpler soluble organics, which pass to the SAM tank. In addition to flow regulation, the SAM tank provides an anoxic environment for rapid denitrification of recycled nitrates and concurrent stabilization of the soluble organics from the I-tank. The conditioned mixed liquor then passes to the final aerobic tank for completion of BOD and nitrogen removal and solids separation. **312/266-9967; www.fluidynecorp.com.**

3. AEROMIX OFFERS TWISTER AERATOR

The high-oxygen transfer of the TWISTER low-speed aerator from AEROMIX Inc. makes it useful for high-oxygen-demand biological treatment applications. Designed for long-term continuous operation, the unit uses a composite material in its hydrodynamically efficient rotor. The rotor is molded to optimize the spray of water droplets, resulting in high-oxygen transfer rates. Models are available from 2 to 150 hp. **763/746-9294; www.aeromix.com.**

4. LONGWATCH RELEASES V5.1 VIDEO SURVEILLANCE SYSTEM

The Version 5.1 video surveillance system from Longwatch Inc. is available in three platforms, eliminating the need for custom programming and creating a "fast track" for integration with a process control, HMI/SCADA or automation control system. The console recorder platform monitors what operators are watching on HMI displays and records their keystroke action, revealing what operators saw on the screen during an "event" and what they did about it. The video historian platform automatically links and synchronizes historical trend information and stored video from multiple cameras in the field or process, enabling the operator to see what happened when various trend conditions occurred. The surveillance platform eliminates blind spots in video surveillance. Event messages automatically contain video snippets that show what happened before, during and after an event to help reduce false alarms. **781/255-7400; www.longwatch.com.**

5. SEL OFFERS SATELLITE-SYNCHRONIZED CLOCK DISPLAY

The SEL-9929 satellite-synchronized clock display kit from Schweitzer Engineering Laboratories Inc. includes the SEL-2401 satellite-synchronized clock, SEL-3401 digital clock display, GPS antenna and all cables. Accurate to plus or minus 100 nanoseconds, the clock generates IRIG-B standard time synchronization code, communicating the time to a digital clock display, featuring 3-inch LED digits for hours, minutes and seconds that is readable up to 200 feet. Multiple clock displays can be connected to cover a wide area. **509/332-1890; www.selinc.com.**

6. KROHNE INTRODUCES OPTISWIRL 4070 FLOWMETER

The Optiswirl 4070 C flowmeter from Krohne Inc. combines a vortex flow sensor with built-in temperature compensation and optional integrated pressure in a two-wire configuration. The meter is designed to deliver accurate measurement of standard volumetric and mass flow of conductive and non-conductive liquids, gases and vapors. It features a non-wearing, fully welded stainless steel structure that is resistant to corrosion, high pressures and temperatures. It also features an Intelligent Signal Processing System that allows for stable flow readings while eliminating noise and spurious frequencies. **800/356-9464; www.krohne.com/northamerica.**

7. FORSTA INTRODUCES LOW PRESSURE FILTERS

The Low Pressure Series of self-cleaning water filters from Forsta Filters range from 2 to 30 inches with flow rates to 20,000 gpm in a single housing. The filters can be backwashed with line pressure as low as 15 psi. Featuring Green-Clean technology, the point-of-suction backwash takes less than 16 seconds and uses less than 1 percent of the total flow per backwash without interrupting the main flow. Filters are available in stainless steel, carbon steel with epoxy coating or duplex stainless. **888/936-7782; www.forstafilters.com.**

8. BEST CONTROLS INTRODUCES PC 4000 CONTROLLER

The PC 4000 controller from Best Controls is a dedicated controller for pressure control applications using variable-frequency drives. Features include 1 to 4 pump configuration, P.L.D. control, 0-200 psi pressure transmitter, graphic screen display with backlighting, automatic alteration, password protection and serial communication. **800/349-1905; www.bestcontrolscompany.com.**

ACEOPS OFFERS POWERPOINT-BASED TESTING PROGRAMS

Endless Math and Easy Test PowerPoint-based testing programs for wastewater operators from the Alliance of Certified Operators, Laboratory Analysts and Specialists (AceOps) feature multiple-choice and some true-and-false questions. Questions are randomly displayed. Individuals can choose the number of questions they would like to try and can exit the program at any time. Score is kept but not recorded. Some questions have references based on WEF manuals and the California State manuals. Some questions have video, graphics and PDF files attached. A computer with CD player and PowerPoint 2003 or 2007 is required to run the program. **515/255-4580; www.aceops.org.**

product spotlight

ClearLogic MBR filter system combines two membrane technologies

By Ed Wodalski

The ClearLogic membrane bioreactor filtration system from WesTech Engineering Inc. uses a submerged hollow-sheet polyvinylidene fluoride (PVDF) membrane with a nominal pore size of 0.2 microns.

The membrane combines the advantages of hollow fiber and flat-sheet technologies. The hollow filter offers high packing density, backflushing and self-healing, and the flat sheet limits fouling while enabling low-pressure operation with fewer chemical cleanings. Together they provide even flux distribution and ultra-low transmembrane pressures (TMP), reducing the accumulation of mixed liquor on the membrane surface.

Lower TMP also means fewer components, less fouling, fewer cleaning cycles, less maintenance and longer life. Typical TMP levels for Title 22 testing range from 3 inches H₂O at average flows to 30 inches H₂O for peak hourly events.

The system is available in single, double and triple membrane module configurations. The MFM100 offers 1,668 square feet of filtration, the MFM200 3,326 square feet, and the MFM300 4,984 square feet. Made of 316 stainless steel, the modules measure 4 feet by 4 feet and stand 6.55 feet (MFM100) to 13.24 feet (MFM300) tall.

"One advantage of the flat sheet is that it is open on the top and bottom," says Brad Hansen, MBR group leader. "The mixed liquor and wastewater are free to move around the sheet. That helps it stay cleaner. The hollow fiber is potted on one end or both ends, which means the mixed liquor does not have a clear path to get through, and so it requires more cleaning. Another benefit of flat-sheet technology is that it takes less pressure to pull permeate through. The result is less fouling."

The ClearLogic system reduces that pressure even more. By combining tiny pores on the filter surface with a polypropylene spacer between the sheets, the amount of force needed to pull permeate through the membrane is reduced to 0.5 psi. The result is less fouling, less cleaning and even flux or greater distribution across the surface, Hansen says.

No pumps are needed to pull permeate through the filter. Ultrasonic welds along the filter sheet prevent separation or ballooning of the membrane when backflushing. That helps promote self-healing in case tiny tears occur. A tongue-and-groove design enables membrane modules to be stacked so that less air is required during cleaning. Stacking also enables more membrane surface to be packed into a smaller footprint. **801/265-1000; www.westech-inc.com.**



ClearLogic membrane bioreactor filtration system from WesTech Engineering



9. ECD OFFERS CDA-22 CHLORINE DIOXIDE ANALYZER

The CDA-22 chlorine dioxide analyzer from Electro-Chemical Devices Inc. features a panel-mounted plumb-and-play design and automatic flow control in a low-maintenance complete measurement system. The unit is designed to measure chlorine dioxide in concentrations ranging from 0.05-20 ppm. It incorporates a ClO₂ sensor, automated flow control device and analyzer/controller mounted on a PVC panel and can run up to one year between electrolyte/membrane changes. **800/729-1333; www.ecdi.com.**



10. FCI OFFERS ST51 FLOWMETER

The ST51 flowmeter from Fluid Components Inc. is designed for the measurement of methane (CH₄) and other combustible greenhouse gases. The explosion-proof device requires virtually no maintenance and features no moving parts. The flow element, for 2- to 24-inch diameter lines, is made with a 316L stainless steel body and Hastelloy C-22 thermowell sensors to resist corrosion and includes built-in temperature compensation circuitry. It operates at temperatures from 0 to 250 degrees F and can withstand pressures up to 500 psig. **800/854-1993; www.fluidcomponents.com.**



11. ATI INTRODUCES GAS SENSOR FOR WET ODOR CONTROL SCRUBBERS

The Model Q45S gas sensor from Analytical Technology Inc. is designed to continuously measure hydrogen sulfide in the wet atmosphere of scrubbers using hypochlorite solution to remove odorous H₂S from air streams. Measurements can be made as high as 200 ppm and as low as 0.5 ppm. The sensor provides both alarm relays and an isolated 4-20 mA signal for control. **800/959-0299; www.analyticaltechnology.com.**



SCHNEIDER INTRODUCES SMALL PANEL HMIS

Magelis STO and STU small panel human machine interfaces (HMI) from Schneider Electric offer data logging, USB port application download and remote Web access. The STO has a 3.4-inch widescreen with 200 x 80 pixels of resolution and two versions of a monochrome screen. The screens are either green/orange/red backlight or white/pink/red backlight, designed to be visible to the operator at a distance. The STO also features serial, mini USB and USB Type A ports. The STU can send e-mails and offers access via the Internet with embedded Web pages. It also offers serial port and Ethernet connectivity, as well as a 3.5-inch full-color graphic touchscreen with QVGA and TFT 65,536 colors. **919/334-7375; www.schneider-electric.us.**

12. QUALITY CONTROL OFFERS AS SAMPLER

The AS Series of wastewater samplers from Quality Control Equipment Co. can be placed indoors or outdoors in temperatures from -20 degrees to 122 degrees F without a separate enclosure. The sampler has a UV-protected, molded cabinet with more than 2 inches of PIR insulation and thermal reflective wrapping. The CVE-07 version provides pulse or time-actuated samples in composite containers up to 20 liters. The self-calibrating version is fully programmable and repeatable to plus or minus 4 ml per sample. The sampler is capable of pulling heads to 28 feet and horizontal runs to 200 feet. It also comes in a dual-control version that can pull samples from two locations up to 300 feet apart. **515/266-2268; www.qcec.com.**



ROTEX OFFERS GRADEX 2000 PARTICLE SIZE ANALYZER

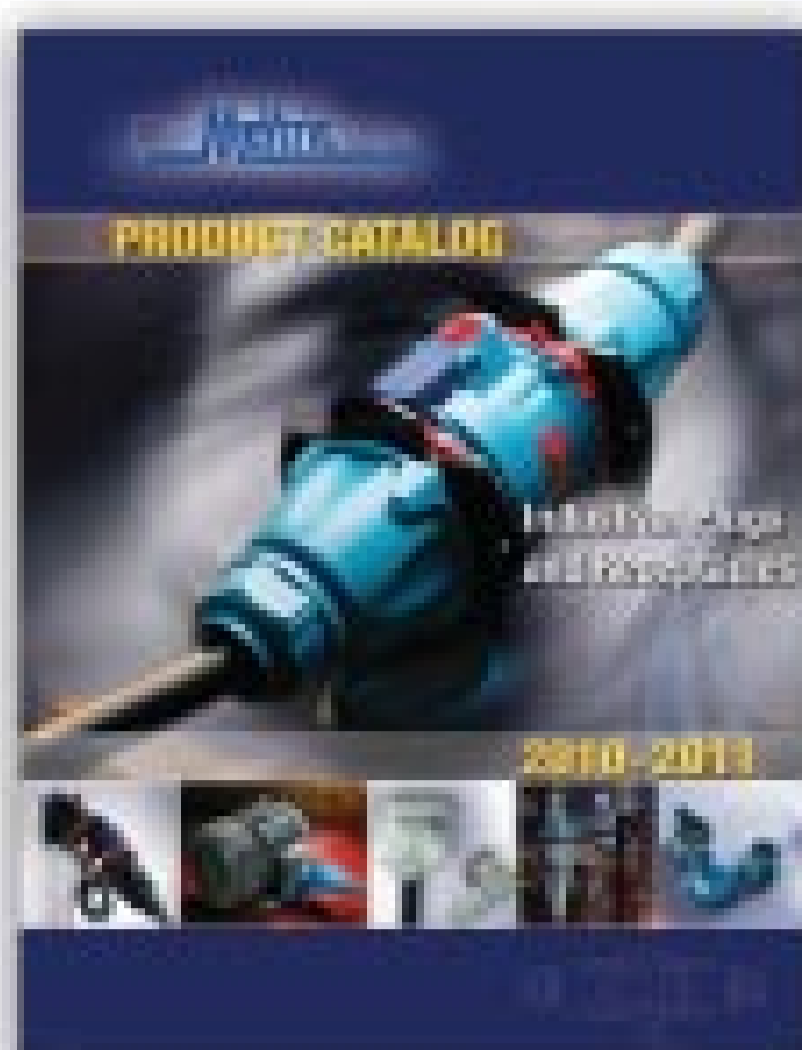
The GRADEX 2000 particle size analyzer from ROTEX Global LLC is a PC-controlled device designed to improve efficiency and accuracy of quality control programs by providing fully automatic sieve analysis in the lab or plant floor. Up to seven test samples can be initiated with a single keystroke. Full automation also allows for closer control of raw material receipts, materials in process and finished products. **800/453-2321; www.rotex.com.**

13. R+W AMERICA OFFERS ST2 TORQUE LIMITER

The ST2 series high-capacity torque limiter with integral flex coupling from R+W America makes use of a vibration damping jaw-type coupling in conjunction with a resettable torque limit function. After reaching the preset disengagement value (from 738 to 118,000 ft/lbs) the coupling fully disengages and freely rotates over a high-strength internal bearing until the machine shuts down, helping avoid damage to gearboxes and shafts due to overload. Resetting the coupling requires snapping the individual plungers back into engagement with a pry bar or mallet. The safety couplings have four body sizes and from three to nine plungers, depending on torque setting. The adjustable plungers can be added or removed after installation should the release torque value be miscalculated. **630/521-9911; www.rw-america.com/torque-limiters. tpo**

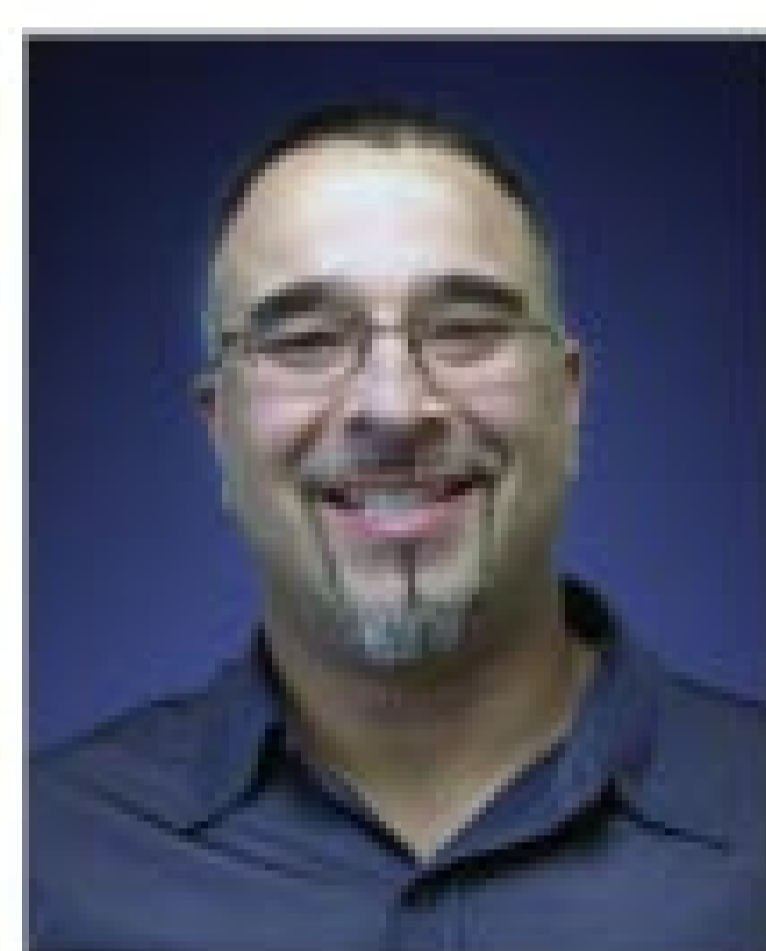
Meltric Releases Latest Product Catalog

Meltric Corp.'s latest product catalog features Decontactor Series switch rated plugs, receptacles and connectors. The 224-page catalog also provides information about the company's other plug and receptacle offerings, including hazardous-duty rated devices, PF high-ampacity devices (up to 600 amps) and a variety of Multipin devices (up to 37 contacts).



LobeStar Pump Changes Name to LobePro

LobeStar Pumps, Brunswick, Ga., has changed its name to LobePro. The rotary pump manufacturer produces products for pumping sludge, slurries, corrosives and waste.



Walter Bonnett

Pump Solutions Names Bonnett VP of Marketing

Dover Corp.'s Pump Solutions Group has promoted Walter Bonnett to vice president of PGS Marketing. Bonnett has 10 years of industry experience. He will be responsible for image building, market intelligence, brand promotion, E-business, Web strategies, marketing services, community relations and voice-of-the-customer interaction.

Badger Meter Purchases Cox Instruments, Flow Dynamics

Badger Meter Inc. of Milwaukee, Wis., has purchased Cox Instruments LLC of Scottsdale, Ariz., and its subsidiary companies Flow Dynamics Inc. and Exact Flow, suppliers of precision and industrial flow measurement instrumentation. The acquisition combines the resources of the three flow measurement companies into a wholly-owned subsidiary of Badger Meter Inc. named Cox Flow Measurement Inc., which will continue to be based in Scottsdale, along with its management team. **tpo**

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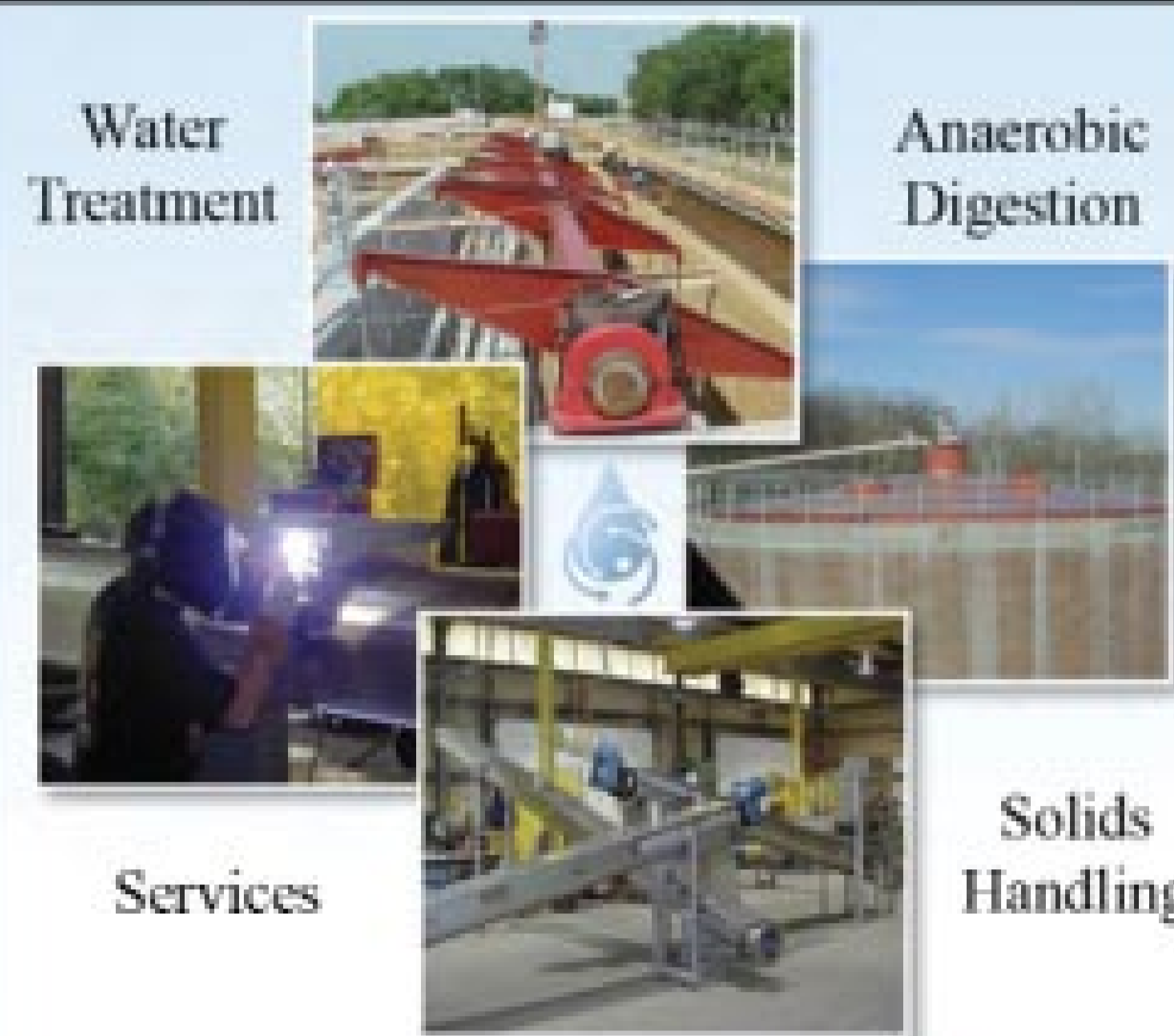
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TWO PATHS, ONE MISSION

DAN AND DAWN HANTHORN SHARE A COMMITMENT TO WASTEWATER TREATMENT, APPLYING THEIR SKILLS ON THE MUNICIPAL AND INDUSTRIAL SIDES OF THE BUSINESS

By Trude Witham

DAN AND DAWN HANTHORN ARE A SUCCESSFUL TEAM, BY MARRIAGE and profession. They support each other in their jobs and their lifelong passion for water and wastewater treatment. While they have earned several awards and are active in the community, their goal is to simply “make a difference.”

Dan Hanthorn, a 40-year wastewater professional, is operations supervisor at the Corvallis (Ore.) plant. Dawn, in the profession since 1995, has worked in several municipal water and wastewater treatment plants and is now wastewater treatment plant supervisor for Meduri Farms Inc., in Dallas, Ore.

The Hanthorns met on the job. She landed her first internship at the Corvallis treatment plant, and Dan was her coach. “At the time, wastewater treatment was an untraditional role for women, and I needed all the encouragement I could get,” she recalls. “Dan gave me a lot of that and showed me how to be a professional in the field.”

Dan agrees that things were tougher for women in those days. “Right into the 1990s, the business was pretty male-dominated, whereas now, nearly half the operators at the Corvallis plant are women,” he observes.

Two years after her internship ended, Dawn contacted Dan for a reference, and not long after that they began dating. They married in September 1998. Both are dedicated to sustainability in wastewater treatment — in particular the recycling and reuse of wastewater.

LIFE-CHANGING DECISION

Dawn entered the profession after deciding that her previous jobs in various fields were not getting her anywhere. She enrolled at Clackamas Community College, and took a career counselor's suggestion to take the one-year water and wastewater certificate course. On completion, she trans-



Dan Hanthorn is operations supervisor at the Corvallis (Ore.) treatment facility. His wife, Dawn, works on the industrial side of the industry. (Photography by Peter Krupp)

ferred to Linn-Benton Community College and graduated in 1995 with an associate degree in water and wastewater technology.

“The most difficult decision I faced after graduating was whether to work in water treatment or wastewater treatment,” she says. “I liked them both. There were many jobs to choose from, and I wasn't sure which one I was most interested in.”

She worked for different municipal water and wastewater facilities before taking her current position at Meduri Farms in 2008. She currently works four days a week, supervising two operators, and is on call at all times.

Family-owned Meduri Farms, just south of Portland in the Willamette Valley, supplies specialty dried fruits to food manufacturers worldwide. The company built its treatment plant about three years ago mainly to remove sugar from the waste stream before sending recycled water to farms for irrigation. Methane from the plant's digester (Ecovation Inc., a subsidiary of Ecolab Inc.) will soon fuel a generator to produce electricity for the food processing facility.

COMMUNITY SERVICE

Dawn plans to get her Grade 4 wastewater treatment certification this year and to continue focusing on her supervisory skills. She stays active in the Pacific Northwest Clean Water Association

(PNCWA), where she is past-president of the Oregon Region's West Central Operators Section and serves on the board of directors.

In 2003, she was inducted into the Selected Society of Sanitary Sludge Shovelers (SS) for the personal time she spent working for the PNCWA, conducting workshops, writing newsletters and chairing the awards committee. In 2005, she chaired the Oregon Technical Advisory Committee (OTAC) for accredited environmental laboratories.

"The most difficult decision I faced after graduating was whether to work in water treatment or wastewater treatment. I liked them both. There were many jobs to choose from, and I wasn't sure which one I was most interested in."

DAWN HANTHORN

Operator Denise Eason provides an update to operations supervisor Dan Hanthorn on plans to grow algae in the biosolids storage basins. Sunlight, water, nutrients and carbon dioxide from biogas combustion will promote rapid algae growth. The algae will be harvested and used as an anaerobic digester feedstock to increase biogas production. **BELOW:** Two trickling filters with rock media operate in series configuration to provide a stable and low-cost nitrification process at the Corvallis treatment plant. WesTech HydroDoc distributors optimize distributor speed to maintain a desirable biomass and prevent overgrazing of media by snails.

profile

Dan Hanthorn, City of Corvallis, Ore.

POSITION: Wastewater treatment plant operations supervisor
EXPERIENCE: 40 years
EDUCATION: Associate degree, water and wastewater technology, Clackamas Community College, Oregon City
CERTIFICATION: Wastewater operations, Grade 4
GOALS: Advance the practice of water recycling and reuse

Dawn Hanthorn, Meduri Farms Inc., Dallas, Ore.

POSITION: Wastewater treatment plant supervisor
EXPERIENCE: 16 years
EDUCATION: Associate degree, water and wastewater treatment, Linn-Benton Community College, Albany, Ore.
CERTIFICATIONS: Water treatment Grade 3, wastewater treatment Grade 3, wastewater collections Grade 1, water distribution Grade 1
GOALS: Earn Grade 4 wastewater treatment certification; advance sustainability in plant operation





The Corvallis combined sewer system collects 4.2 billion gallons of wastewater each year for treatment at the wastewater recycling plant. Effluent quality is consistent throughout the year at 3 to 5 mg/l for BOD and TSS.

For now, she is content at Meduri Farms. “My employer is supportive and really shows appreciation,” she says. “The plant is expanding, and I’m excited about the new equipment that will soon be part of the operation.” A new influent pump station and a Dontech Industries Inc. preliminary treatment-rotating screen will be installed this summer.

Her long-term goal is to help the environment by making treatment plants more sustainable. “Here at Meduri, there is a need to recover resources, conserve power, and produce energy from food and beverage waste,” she says. “There aren’t a lot of skilled operators in this area, so there may be opportunities to consult for other plants that need assistance, or conduct training workshops, perhaps through a new industrial waste operators’ section within the PNCWA.”

40 YEARS AND COUNTING

Dan Hanthorn didn’t always know he wanted to be a wastewater operator, but he knew he didn’t want to work in one of the local paper mills. In 1968, he enrolled in the new water and wastewater treatment program at Clackamas Community College, earning an associate degree in water and wastewater technology.

His first job was with the City of Tualatin, where he stayed for eight years. He then worked for Clean Water Services, a wastewater treatment organization that operates multiple plants in Washington County. After 10 years, he moved on to Corvallis and has been there for 22 years.

The home of Oregon State University, Corvallis is a growing city of 55,000. Its trickling filter activated sludge plant treats 4.2 billion gallons per year and employs seven operators, a pretreatment specialist, a laboratory technician, and maintenance and facilities automation staff.

As wastewater operations supervisor, Dan supervises the operators and the pretreatment and lab staff and is on call around the clock. One operator leads the biosolids program and another runs a Superfund groundwater remediation site managed by the city.

“It’s an amazing plant,” Dan says. “During the summer, we run the trickling filters in series and get significant nitrification at very low cost. The two trickling filters have rock media and are equipped with HydroDoc rotary distributors (WesTech Engineering Inc.). In the activated sludge stage, we have

an anoxic zone to denitrify, which further lowers the cost and stabilizes the process. Our BOD and TSS permit levels are both 10 mg/l for the summer months, and we actually achieve those levels year-round.”

The original 4.6 mgd dry-weather-flow treatment plant was built in 1955. It was upgraded in 1964 to 6.4 mgd with trickling filters, and upgraded again in 1978 to 9.7 mgd with the addition of the activated sludge process. In 2000, a separate 85 mgd combined sewer overflow treatment facility and new digester complex were built. The plant discharges to the Willamette River.

KEEPING A STEP AHEAD

Dan couldn’t be happier in his professional life. “My philosophy is to be a facilitator, an enabler, to provide the support operators need to be successful,” he says. “If they are successful, then I am successful.”

He cites a major achievement 20 years ago as an example of teamwork. “In 1990, we had 12 full-time operators, including swing shift and graveyard

“We have the capability to recover and recycle nearly everything that comes to the plant — energy, nutrients, even heat in the water. Over time, landfill operators evolved to become experts at recycling solid waste. I see our operators becoming experts in recycling liquid wastes.”

DAN HANTHORN

shift operators. An over-achieving graveyard operator researched, specified, installed and programmed a distributed control system to fully automate plant monitoring and control. Over a two-year period we achieved our goal of unattended operation and reduced staffing to one 10-hour shift per day.”

The wet-weather treatment facility self-starts in stages as needed, collects samples, feeds chemicals, logs information and shuts down when the rain event has ended. With an operator’s push of a button, the entire treatment train will self-drain, flush, clean up and reset for the next event. Automation has saved the plant money, enabling stable rates for customers.

The operator responsible for the changes moved to a new job overseeing automation of the city’s wastewater plant expansions, two drinking water plants, and all the off-site lift stations, water booster stations and reservoirs. The operators who were no longer needed moved up into other city programs.

“This automation project is just one example of why it’s so exciting to work here with people who bring the skills that let us continue to improve,” Dan says. “They are very, very sharp people. I’m just trying to keep one step ahead of them.”



CHALLENGING THE TEAM

Dan makes sure his employees can excel and grow according to their interests. A swing shift operator earned an engineering degree, incorporating plant improvements into class work. He went on to become a professional engineer in the city Public Works Engineering department. A lab employee, who wanted to be an operator went back to school, became certified, and now holds an operator position at the Corvallis plant.

In all his years at Corvallis, Dan has had to replace only four operators. "It's been a very stable operation, and when I do have an opening, almost everyone who applies has Grade 4 certification," he says. "It's like the Marines: I don't need very many, but they have to be good!"

He attributes the high retention rate to the plant's size. "There are a variety of interesting things to do," he says. "People get the opportunity to apply their unique skill sets. We are not so small that each person has to do everything, or so large that the jobs are narrowly defined."

SETTING PRIORITIES

Besides his staff, Dan's priorities in firm order are safety, permit compliance, preventive maintenance and projects. "My mantra is safety, and of course we have to meet our permit; that's why we're here," he says. "As for preventive maintenance, we all share that load." As for projects, in past years the team has:

- Designed and built a tipping-walkway loading dock for the two 6,000-gallon biosolids tanker trucks.
- Developed a snail removal system for the trickling filters that collects up to three cubic yards of snails per day.
- Made Corvallis the state's first wastewater laboratory to achieve compliance with the National Environmental Laboratory Accreditation Program.

- Designed and constructed an anoxic zone in the secondary treatment process to enhance nutrient removal, using salvaged equipment.
- Initiated an environmental monitoring program to detect and abate illicit sources of pollution in the area's five streams.

MORE RECYCLING

For the future, Dan's goal is to "see the term 'wastewater treatment plant' abolished. We have the capability to recover and recycle nearly everything that comes to the plant — energy, nutrients, even heat in the water. Over time, landfill operators evolved to become experts at recycling solid waste. I see our operators becoming experts in recycling liquid wastes."

He regards clean water as the industry's byproduct, soon to be widely recycled, as well. He believes that 100 percent recycling is not far off. Because sustainability is important in Corvallis, Dan's initiatives toward recycling have strong support from his management and from the community.

He has applied for feasibility study grants for energy generation projects, such as a 2 MW solar array and a digester gas cogeneration project using engine technology from Stirling Biopower. These projects most likely will be owned and operated by private developers using tax incentives, and the city will buy the green power — enough for the plant to become energy independent. Other projects include:

- Using glycerol (co-produced with biodiesel) and algae grown in wastewater as a feedstock for the digester to generate more biogas.
- Processes to treat landfill leachate coming to the treatment plant and make ammonium magnesium phosphate and ammonium sulfate fertilizer products.
- A water-recycling project that will serve the Oregon State University golf course, an irrigation district and a gravel mine reclamation site.

Dan recently served on an Oregon Department of Environmental Quality task force to update the state's water recycling rules.

As busy as he is, he finds time to take vacations. Sometimes, he and Dawn take their work with them: "Actually, we visit other treatment plants, talking to operators and sharing best practices." Now, that's dedication! **tpo**

more info:

**Ecovation Inc.,
a subsidiary of Ecolab Inc.**
585/421-3500
www.ecovation.com

WesTech Engineering Inc.
801/265-1000
www.westech-inc.com

WELL DECORATED

Dan and Dawn Hanthorn have received a collection of awards during their combined 55 years in the water and wastewater profession. Both are members of the Water Environment Federation and the West Central Oregon Operators Section of the Pacific Northwest Clean Water Association.

The Corvallis Wastewater Treatment Plant, where Dan is operations supervisor, received a 2000 EPA National Award for CSO Control Program Excellence and a 2002 Oregon Chapter Wastewater Plant of the Year Award from the PNCWA. The plant also earned a 2006 EPA Clean Water Act Recognition National First Place Award for Pretreatment Program Excellence.

The pretreatment award followed an initiative that reduced headworks mercury loading by 90 percent. The program encouraged dentists to install amalgam traps in

their offices and worked with schools to remove mercury thermometers from classrooms.

The plant has also earned multiple Peak Performance Awards from the National Association of Clean Water Agencies for NPDES discharge permit compliance. Since it first applied for the awards in 1992, Corvallis has achieved 100 percent compliance for all years except 2003, when the plant exceeded a single parameter. To date, the tally of award plaques is one Silver Award, 17 Gold Awards and three Platinum Awards.

Dawn received the PNCWA's 2000 State of Oregon Wastewater Treatment Operator of the Year Award. She also earned that association's Golden Shovel award and Outstanding Service awards in 2003, and its Outstanding Leadership award in 2004.

Pumps, Drives, Valves, Fittings

By Benjamin Wideman

EQUIPMENT MONITORING

The ProSmart wireless machine health monitoring system, from ITT Monitoring and Control monitors all types of rotating equipment. It brings real-time remote monitoring to equipment previously monitored by handheld data collection equipment.

The device continuously monitors machine health using inputs from vibration, temperature, oil condition and level, fluid flush and leak, pressure and speed, together with patented algorithms, to create Smart Alarms that notify users of machine condition via cell phone, pager, e-mail and a Web-based browser. **315/568-2811; www.ittmc.com.**



ProSmart machine health monitoring system from ITT Monitoring and Control



Thermoplastic valves from GF Piping Systems

THERMOPLASTIC VALVES

GF Piping Systems offers thermoplastic corrosion-resistant valves in ball, butterfly and diaphragm body styles, as well as check valves, pressure-regulating valves, tee valves and

other specialty valves. Sizes range from 1/4 to 24 inches. The butterfly valves are double eccentric, ensuring good frictional behavior, low wear, long service life and low maintenance. The diaphragm valves include a variety of valve bodies, diaphragm materials and end connectors. **800/854-4090; www.gfpiping.com.**

SEWAGE PUMPS

Patterson Pumps Company offers H2O Works Type F sewage pumps for applications where sludge or other unscreened solids up to 8 inches complicate pumping. The pumps are available in sizes from 12 inches to 48 inches, and custom alterations for special requirements can be made. Type F units are available in 17 standard models and numerous custom configurations. All include a self-cleaning ring that prevents clogging. Capacities range from 500 to 100,000 gpm, with heads to 150 feet. Type F pumps also are available with a sealing arrangement that requires no flush water. **706/886-2101; www.h2oworkspumps.com.**



H2O Works Type F sewage pumps from Patterson Pumps Company

ENERGY SAVER



iQpump Saver from Yaskawa Electric America

The iQpump Saver application from Yaskawa Electric America is available on Apple iTunes for iPhone (OS 3.0 or later) and iPod Touch. This mobile application estimates energy savings when using an iQpump Intelligent Pump Controller on centrifugal pumps instead of conventional volume control methods. The device regulates pump speed to match system demand, allowing the pump to work at its best efficiency point. **800/927-5292; www.yaskawa.com.**

LOW NOISE

Sound-attenuated pumps from BakerCorp can be used where noise is a factor. At 67 dBA, the unit ranges from 4 to 8 inches and handles solids up to 3 inches. The pumps operate at up to 2,000 rpm and at flows from 200 to 2,600 gpm.

The units include a double-wall diesel fuel tank compliant with UL Standard 142 with fluids containment, DOT trailer, and enclosures of 14-gauge steel with lockable doors. The digital control system is housed in a NEMA 4X polycarbonate enclosure. The waterproof controller fits environmentally sensitive applications or harsh conditions. Floats or pressure transducers measuring liquid or pressure levels allow for automatic unattended operation. The control panel can be integrated with an autodialer. **800/225-3712; www.bakercorp.com.**



Sound-attenuated pumps from BakerCorp

LEVEL CONTROLLER



PSL pump station level controller from Greyline Instruments Inc.

The PSL pump station level controller from Greyline Instruments Inc. uses a non-contacting ultrasonic sensor, isolated 4-20 mA output and six programmable control relays for pump control, pump alternation and level alarms. An automatic pump run-time logging and reporting system helps operators to plan pump maintenance and identify lazy pumps before they fail.

Each unit includes a software program. Operators can prepare and save calibrations in advance and download to the PSL directly through its password-protected RS232 interface. They can also dial up pump stations through regular phone lines and modems to adjust calibration and observe level and relay states in real time. Calibration and relay set points can be changed through a built-in keypad. **888/473-9546; www.greyline.com.**

ENGINE-DRIVEN CONFIGURATION

Gorman-Rupp Company offers Ultra V Series pumps with an engine-driven configuration. The units have high pressure, flow and efficiency. Low-maintenance features include shimless adjusting, atmospheric vents, and self-cleaning wear plates. Engine-driven models are available in 3-, 4- and 6-inch sizes for flows up to 2,050 gpm and maximum head of 175 feet. The pumps are powered by air- or liquid-cooled diesel engines, all of which meet the latest EPA Tier emission standards. **419/755-1011; www.grpump.com.**



Ultra V Series pumps from Gorman-Rupp Company



HT centrifugal trash pump from Thompson Pump & Mfg. Co.

CENTRIFUGAL TRASH PUMP

The HT self-priming, multi-purpose centrifugal trash pump from Thompson Pump & Mfg. Co. is well suited for dewatering. The cast-iron pump has rubber-lined wear plates and dry-running, abrasion-resistant tungsten carbide mechanical seals with viton elastomers. It is quick to self-prime and requires little maintenance. Each model includes two or three vane impellers in sizes from 3 to 8 inches, with capacities up to 2,600 gpm and heads to 142 feet. **386/944-4145; www.thompsonpump.com.**

CHOPPER PUMP

The Series 5300 Chopper pump from Fairbanks Morse uses an enclosed impeller with a rugged cutting profile. Contoured cleanouts are standard on both the pump suction and the volute to provide immediate access for removal of large objects without disturbing suction or discharge piping. The cutter bar, impeller and rear backplate are made of hardened steel. Horizontal and vertical configurations are available. **913/371-5000; www.fmpump.com.**



Series 5300 Chopper pump from Fairbanks Morse



EZ2 Insertion Valves from Advanced Valve Technologies

INSERTION VALVES

EZ2 Insertion Valves from Advanced Valve Technologies have a removable valve bonnet and a built-in isolation valve for easy installation. The valve bonnet allows either a permanent insertion valve or a temporary line stop. The bonnet may be used as needed for other projects. Installation requires only one excavation, and the compact components install in less than one hour. Installation on 16-inch pipelines is provided by company-authorized installers and is typically done within four hours. The device installs under pressure, maintains pipe integrity and meets AWWA material specifications (C-509-09). **877/489-4909; www.avtfittings.com.**

SCREW PUMPS

Schreiber LLC incorporates the Archimedean screw pump concept in its tube-mounted and open-flight screw pumps. The concept provides variable capacity at a constant speed up to its design maximum. The tube-mounted pumps transport liquid inside a stationary tube, simplifying structure design and eliminating grouting. The factory-assembled units can be set at a fixed angle, or the lower end can be supported by a hoist to vary the pump angle and for maintenance access.

The open flight pumps transport liquid using a concrete trough and are typically installed at a 30- or 38-degree angle of inclination. Schreiber screw pumps use a single-row spherical roller, self-aligning, combination radial/thrust lower support bearing with a minimum L-10 life of 100,000 hours. The lower bearing lubrication system is simple and reliable, requiring only a transparent oil reservoir and feed tube to provide oil by gravity. A simple flanged bearing provides radial support at the upper shaft. **205/655-7466; www.schreiberwater.com.**



Screw pumps from Schreiber LLC



Gusher self-priming centrifugal pumps

SELF-PRIMING CENTRIFUGAL PUMPS

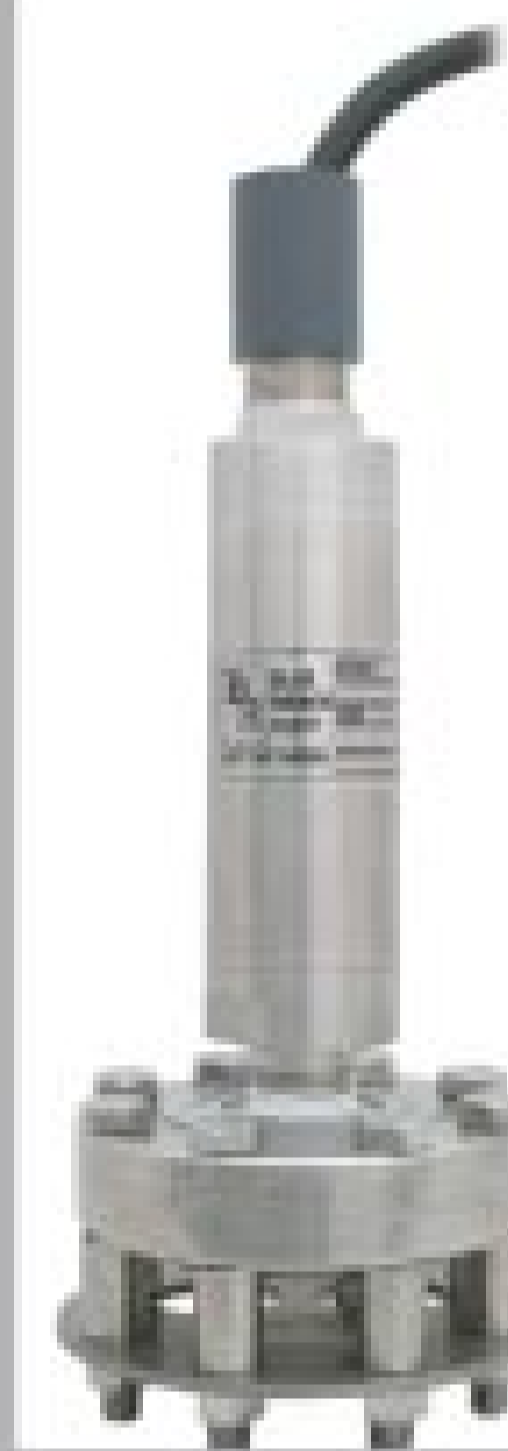
Gusher self-priming centrifugal pumps have a large-volute design that allows them to re-prime automatically without suction or discharge check valves. Self-priming is achieved with the pump casing only partially filled with liquid, and with a completely dry suction line. Maintenance is simplified with complete access to the pumps' rotating assembly. **800/548-1234; www.usabluebook.com.**

SEAL-LESS PUMP

The dry-running, self-priming, seal-less MiniPump from Eccentric Pumps LLC comes in three sizes with flow capacities from 1 gph to 2 gpm. The pump runs in both directions and creates high vacuum for suction lift applications. **404/816-760; www.eccentricpumps.com.**



MiniPump from Eccentric Pumps LLC



Lift station level transmitter from Blue Ribbon Corp.

LEVEL TRANSMITTER

The lift station level transmitter with Birdcage design from Blue Ribbon Corp. is designed for low-maintenance operation in lift station or raw sewage level applications. A 3-inch diameter sensing body eliminates plugging. The Birdcage design includes an all-welded stainless steel body coupled to a jacketed polyurethane cable. An integral vent tube provides a barometric reference, and a hydrophobic vent filter protects against moisture. **716/773-9300; www.blueribboncorp.com.**

SHAFT GROUNDING RING

The 841 bearing isolator shaft grounding ring from AEGIS protects heavy-duty motor bearings from harmful VFD-induced shaft currents and contaminants and is suited for IEEE 841 motors controlled by variable-frequency drives. **866/738-1857; www.est-aegis.com.**



841 bearing isolator shaft grounding ring from AEGIS



Shaft collars and couplings from Stafford Mfg. Corp.

CORROSION-RESISTANT COLLARS AND COUPLINGS

Shaft collars and couplings for pump drive and structural systems from Stafford Mfg. Corp. are offered in 303 and 316 stainless steel, brass, bronze and other materials for various power transmission and structure system requirements.

The corrosion-resistant collars come in one-piece, two-piece and set-screw styles in sizes up to 16 inches inside diameter. Couplings are available in one-piece, two-piece and three-piece styles up to 6 inches inside diameter. All can be modified with special bores, keyways, mounting holes, flats, hinges and threads. **800/695-5551; www.staffordmfg.com.**

QUIET BLOWER PACKAGE

Qube blower package from Tuthill Corporation, featuring the Qx blower, comes in a powder-coated steel enclosure to reduce noise, offering 24 dBA attenuation. Additional features include an integral check valve, discharge from the back and a flexible discharge connector. **800/825-6937; www.vacuum.tuthill.com.**



Qube blower package from Tuthill Corporation



Smart Stator Technology (SST) from Seepex

QUICK STATOR REMOVAL

Smart Stator Technology (SST) from Seepex enables quick removal of the stator and of any blockages without the need to remove the stator or discharge pipes. Progressive cavity pumps no longer have to be removed from the installation

for maintenance. A built-in adjustable stator provides for longer service life of the rotor and stator. **937/864-7150; www.seepex.com.**



GRINDER PUMPS

Environment One Corporation offers high-flow 3F Series and high-head 3H Series grinder pumps. The heavy-duty pumps are suitable for high-flow applications. 3F Series pumps are available in 3 and 5 hp; 3H Series pumps are available in 3, 5 and 7.5 hp. Simplex and duplex stations are available. **518/346-6161; www.eone.com.**



S Range Pumps from Grundfos

3F and 3H Series grinder pumps from Environment One Corporation

SEWAGE TRANSFER

Grundfos S Range Pumps are heavy-duty, long-lasting submersible and dry-pit submersible sewage pumps. The units can be used for transfer sewage on any scale and are available in ratings from 15 to 700 hp, and up to 108 psi and 30,000 gpm. **630/236-5500; www.grundfos.us.**

LIFT STATION ALARM

The I-Link Lift Station Notifier from SJE-Rhombus uses a Web-based gateway to collect and report system status and alarm events to a database via a cellular phone modem. The unit can be installed in new control panels or retrofitted. Two-way communication allows the user to monitor system performance and program system parameters from a PC. **888/342-5753; www.sjrhombus.com.**



I-Link Lift Station Notifier from SJE-Rhombus

HIGH-FLOW PUMPS

The ECO high-flow gear pump and ISO-CHEM high-flow magnetic gear pump from Pulsafeeder Inc. operate at up to 1,750 rpm. A KOPkit is available to convert existing pumps to a high-flow model. **585/292-8000; www.pulsafeeder.com.**



ECO high-flow gear pump from Pulsafeeder Inc.

PORTABLE FLOWMETER

The Arrow Hunter Plus-Handheld from ECHO Process Instrumentation Inc. is a clamp-on flowmeter used to verify pump flow throughput for liquids in up to 118-inch pipe diameters. It uses Dual DSP technology for high accuracy and repeatability and measures flow velocity. It can measure any municipal flow application, including low-flow chemical feed to large concrete-lined raw sewage pipes. The device has hazardous-area sensors. **850/609-1300; www.echopi.com.**



Arrow Hunter Plus-Handheld from ECHO Process Instrumentation Inc.



Lightnin Clean Edge Impeller from SPX Corporation

RAGLESS IMPELLER

The Lightnin Clean Edge Impeller from SPX Corporation fills needs where a ragless impeller is specified or required. The product remains free of fibrous debris while delivering blending performance equal to a hydrofoil impeller. The unit prevents rag accumulation and keeps the mixer operating smoothly at design power and without harmful vibration or tripping out due to overload. **888/649-2378; www.spxft.com.**

AC PUMP DRIVE

The ACS310 pump and fan AC drive from ABB is an energy-efficient unit with automatic features for controlling pumps in parallel, supervising inlet/outlet pressure, soft-start-and-stop (pipe-fill function) to reduce mechanical stress and water hammer, detection of underload and overload, and pump-cleaning sequence to prevent pump jamming. Sizes range up to 30 hp in a compact footprint.

Built-in PID controllers vary drive performance in response to changes in pressure, flow and other external data. The controllers can eliminate an external PLC, and help save energy and up-front costs.

A pump and fan control (PFC) modulates the speed of the main pump or fan and brings auxiliary pumps or fans online as necessary. The drive can manage switching between pumps or fans to share working hours evenly. Energy savings can be monitored using a built-in energy counter. **800/365-4357; www.abb.us/drives.**



ACS310 pump and fan AC drive from ABB

NON-CLOG SUBMERSIBLE

The Amarex N pump from KSB Inc. is a cost-efficient non-clog submersible pump designed for continuous duty cycles. The pump has two true independent tandem mechanical seals to seal the shaft. The cable entry system is completely water tight and non-wicking and uses a plug and receptacle connection to ensure operator safety and fast installation and removal. The pumps use FM approved explosion-proof motors to Class 1, Division 1, Group C and D and are available with a free flow impeller or with cutters. **804/565-8328; www.ksbusa.com.**



Amarex N pump from KSB Inc.



REXA electrohydraulic actuators

SELF-CONTAINED ACTUATORS

REXA electrohydraulic actuators use a microprocessor-based, self-contained, electro-hydraulic principle. Each unit includes the motor, pump, oil, actuation cylinder and the logic controls to operate them. The only required inputs are the control signal and power source, and various options are available for both.

Stable, repeatable control, independent of load variations, is provided with high-pressure, non-compressible fluid in the actuation cylinder. Digital

controls and direct-coupled feedback allow for immediate response and a variety of factory and user-settable attributes. The devices can be mounted on ball valves, butterfly valves, plug valves, gate valves and dampers. **508/584-1199; www.rexa.com.**

STAND-ALONE DRIVES

PowerFlex 7000 medium-voltage drives from Rockwell Automation incorporate embedded communications and significant commonality across multiple platforms, networks, operator interface programming and hardware. These general-purpose, stand-alone drives control speed, torque, direction, starting and stopping of standard asynchronous or synchronous AC motors. The air-cooled and liquid-cooled drives meet applications up to 34,000 hp. **888/483-4833; www.ab.com.**



PowerFlex 7000 drives from Rockwell Automation



CTS chemical treatment system from Fluid Metering Inc.

CTS DELIVERY SYSTEM

The CTS chemical treatment system from Fluid Metering Inc. is designed to deliver caustic soda and other pH adjusting chemicals for treatment of water and wastewater. The CTS features valveless piston technology. A single rotating and reciprocating ceramic piston accomplishes both the pumping and valving functions, eliminating the need for check valves and associated maintenance. Sapphire-hard internal ceramics ensure accuracy over time. The unit measures 15 1/2 by 13 1/2 by 7 inches

and weighs 14 pounds. Fluids are contained in a NEMA 4X enclosure that can be wall-mounted. **800/223-3388; www.chloritrol.com.**

HYDRAULIC DRIVE

The S3T pump from Hydra-Tech Pumps can be driven by any open-center hydraulic source. It is lightweight and durable with a cast aluminum body and stainless steel impeller. It pumps up to 450 gpm and handles 2.5-inch solids. The compact unit can move product against heads of 70 feet.

Setup requires no suction hose; the user simply connects the two hydraulic lines and the discharge hose. During operation, adjustment of the hydraulic input flow varies the pump speed to suit the job and ensures efficiency. The unit is fully field serviceable. **570/645-3779; www.hydra-tech.com.**



S3T pump from Hydra-Tech Pumps



DV-600c Power Prime pump from Rain for Rent

PORTABLE CENTRIFUGAL PUMP

The DV-600c Power Prime pump from Rain for Rent has a maximum flow rate of 28,000 gpm; produces 96 feet of head; suction lifts up to 28 feet; and handles solids up to 5.25 inches. The portable centrifugal 30- by 24-inch pump has a 170-square-foot footprint.

A 430-gallon integral fuel cell provides 22 hours of run time. **800/742-7246; www.rainforrent.com.**

REGENERATIVE BLOWERS

TT regenerative blowers from FPZ Inc., offer tri-stage technology. Vacuums to 17 inches Hg and pressures over 12 psi can be obtained with the reliability and low noise levels of regenerative blower technology. Airflows over 500 cfm can be achieved. **262/268-0180; www.fpz.com.**



TT regenerative blowers from FPZ Inc.



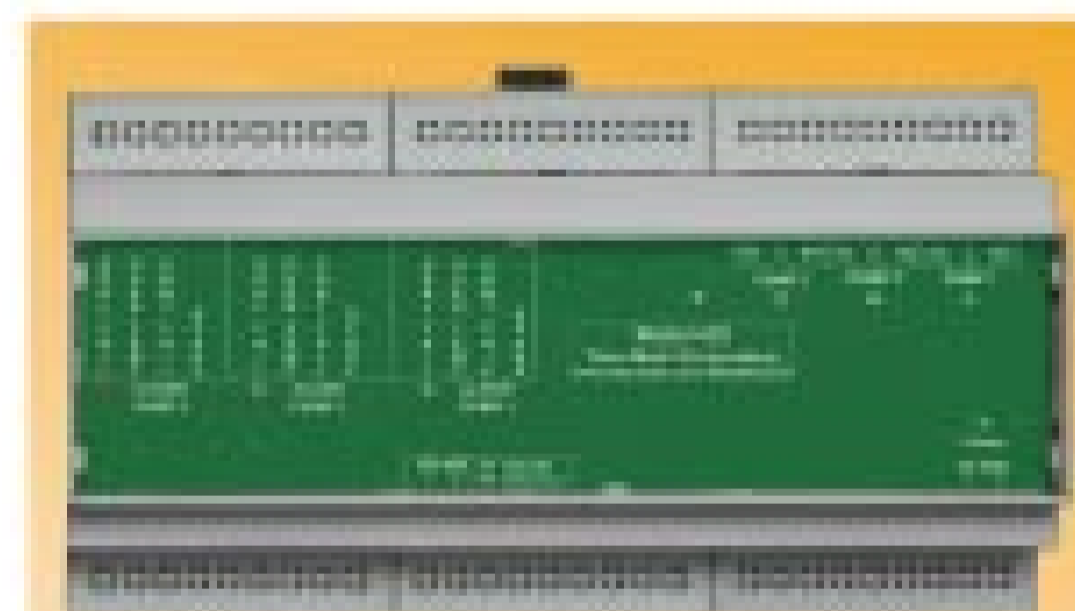
EDUR pumps from Shanley Pumps and Equipment Inc.

FLOTATION PUMPS

EDUR special-flotation pumps from Shanley Pumps and Equipment Inc. are available for 500 gpm flotation applications. The pumps achieve separation efficiencies greater than 95 percent with enhanced float solids concentration. Pumps also are available in 316 stainless steel and 329 SS (duplex) construction. **847/439-9200; www.shanleypump.com.**

PUMP EXPANSION UNIT

The Model 42X pump expansion unit from Time Mark Corp. is expandable up to six pumps when connected to the 42A pump controller. Four alarm inputs per pump are provided. **800/862-2875; www.time-mark.com.**



Model 42X pump expansion unit from Time Mark Corp.



DURO-LAST baseplate from Smith & Loveless Inc.

STAINLESS BASEPLATE

Smith & Loveless Inc. offers the DURO-LAST 316/Lean Duplex series 2100 stainless steel baseplate, available on all above-grade and recessed wet-well-mounted pump stations. The product eliminates baseplate painting and provides long pump station life and tough protection against the corrosive agents.

Existing wet-well-mounted pump stations can be retrofitted with these units to extend life for 25 more years plus. Through the DURO-LAST Model S Conversion program, an entire station structure can be upgraded without replacing the pumps, rotating assemblies and controls. It provides volutes, station piping, fiberglass hood with hood lift assist and hardware, wet well access entrance, control panel mounting struts with vacuum pump shelf, hood, blower and vents. **913/888-5201; www.smithandloveless.com.**

ROTARY LOBE PUMPS

Rotary lobe pumps from Boerger are self-priming, valveless positive displacement pumps for the wastewater industry. There are 16 models in six series with flow rates up to 4,400 gpm. The screw rotor enables pulsation-free and smooth flow patterns. Flow is reversible by switching the rotation direction.

The timing gear is separated from the wetted pump parts by a fluid-filled intermediate chamber that quenches the mechanical seal. The pumps have solid, non-product-wetted shafts. A variety of materials allow customizing to the application. **888/726-3743; www.boerger.com.**



Rotary lobe pumps from Boerger

PRE-PACKAGED CONTROLLER

Goulds Pumps offers the pre-packaged S-Drive simplex variable-speed pump controller with simple wiring, startup and programming.

The controller comes in an outdoor NEMA 3R enclosure and is cUL listed to meet Canadian CSA safety standards. The system is designed for submersible well and aboveground centrifugal pumps.

The variable-frequency control adjusts motor speed to match hydraulic needs and saves up to 70 percent on energy compared with fixed-speed pumps. The same drive can be used for single- or three-phase power. **315/568-2811; www.goulds.com.**



Pump controllers from Goulds Pumps

CHOPPER PUMPS

Vaughan Co. Inc. 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. The pumps cover a wide range of applications with flows up to 6,000 gpm. **888/249-2467; www.chopperpumps.com.**



Chopper pumps from Vaughan Co. Inc.

SOLIDS HANDLER

ITT Corp. offers Flygt A-C Series NSX Pumps with a Shearpeller designed to handle large solids in suspension, slurries, heavy viscous material, and gas-entrained liquids containing up to 25 percent air vapor. The cut-away inlet edge of the Shearpeller vanes permits air to enter unobstructed while the regeneration within the impeller inhibits



Flygt A-C Series NSX Pumps from ITT Corp.

vapor from collecting, thus preventing air binding. The pumps can be operated in vertical or horizontal configurations and will often fit existing systems without costly modifications. **203/712-8940; www.flygtus.com.**

METERING PUMP

EMEC Americas Inc. offers the microprocessor-controlled MF Series metering pump that automatically calculates the parts per million of required chemical concentration based on the flow rate received from an inline meter. Since the calculation is not static to flow, the pump increases accuracy in critical chemical injections by dynamically adjusting the dosing as the flow rate changes. The unit handles flows from 0.025 to 15.85 gph at pressures from 29 to 363 psi. It includes liquid end options in stainless steel, polypropylene, acrylic and PVDF. **800/998-3632; www.emecpumps.com. tpo**

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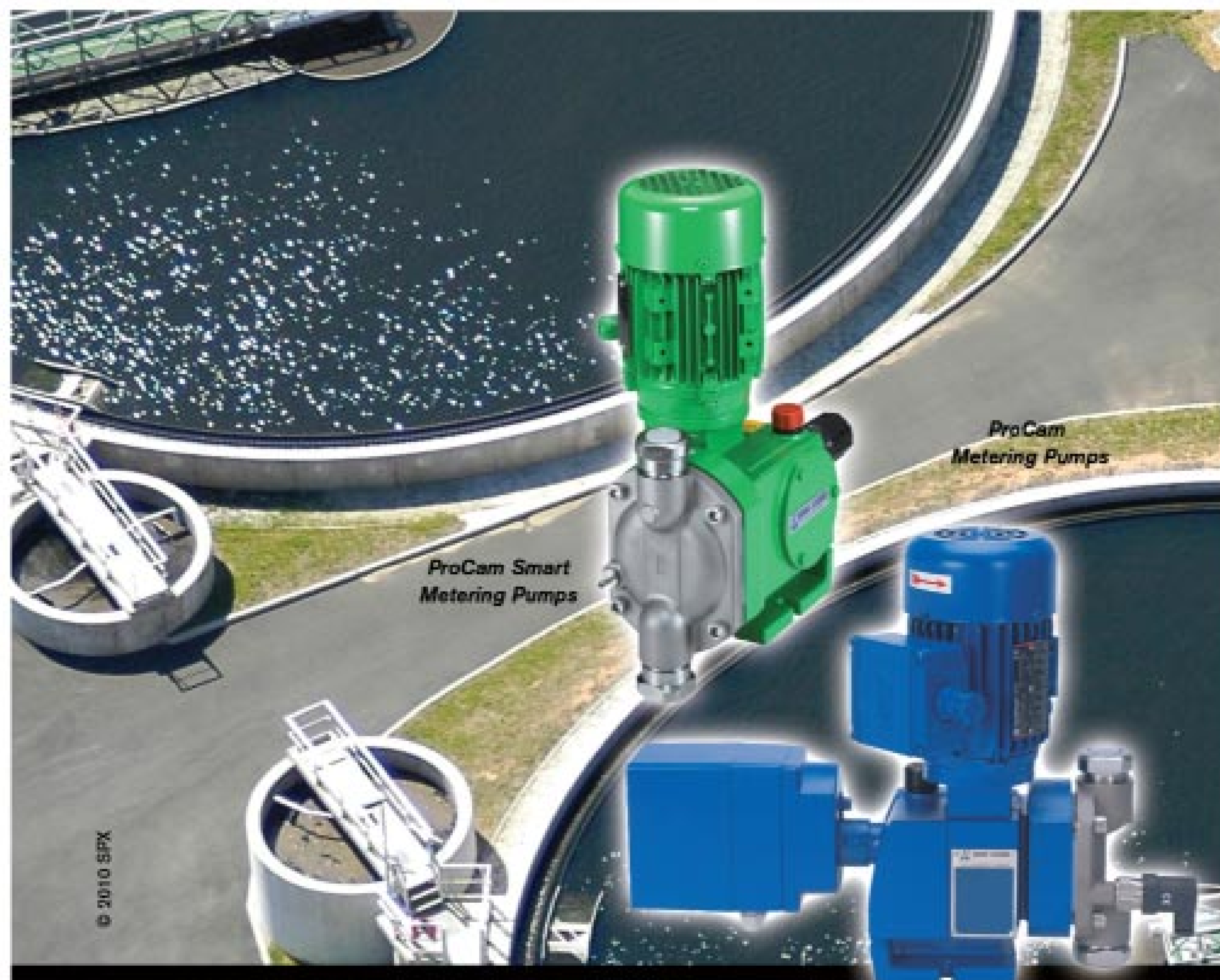


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The screenshot shows the homepage of the Treatment Plant Operator Magazine website. The navigation bar includes 'New Equipment', 'Used Equipment' (circled in red with an arrow pointing to the text 'Submit your classified ad now!'), 'Articles', 'Subscribe', 'Advertising', and 'Interact'. The main content area features a 'GO GREEN GET GREEN' banner, a 'BUSINESS FOR SALE' section with a listing for a Houston Texas Area Septic & Drain Business, and a 'Classified Ads' section with several listings. There is also an 'Editor's Blog' and a 'Featured Advertisers' section at the bottom.

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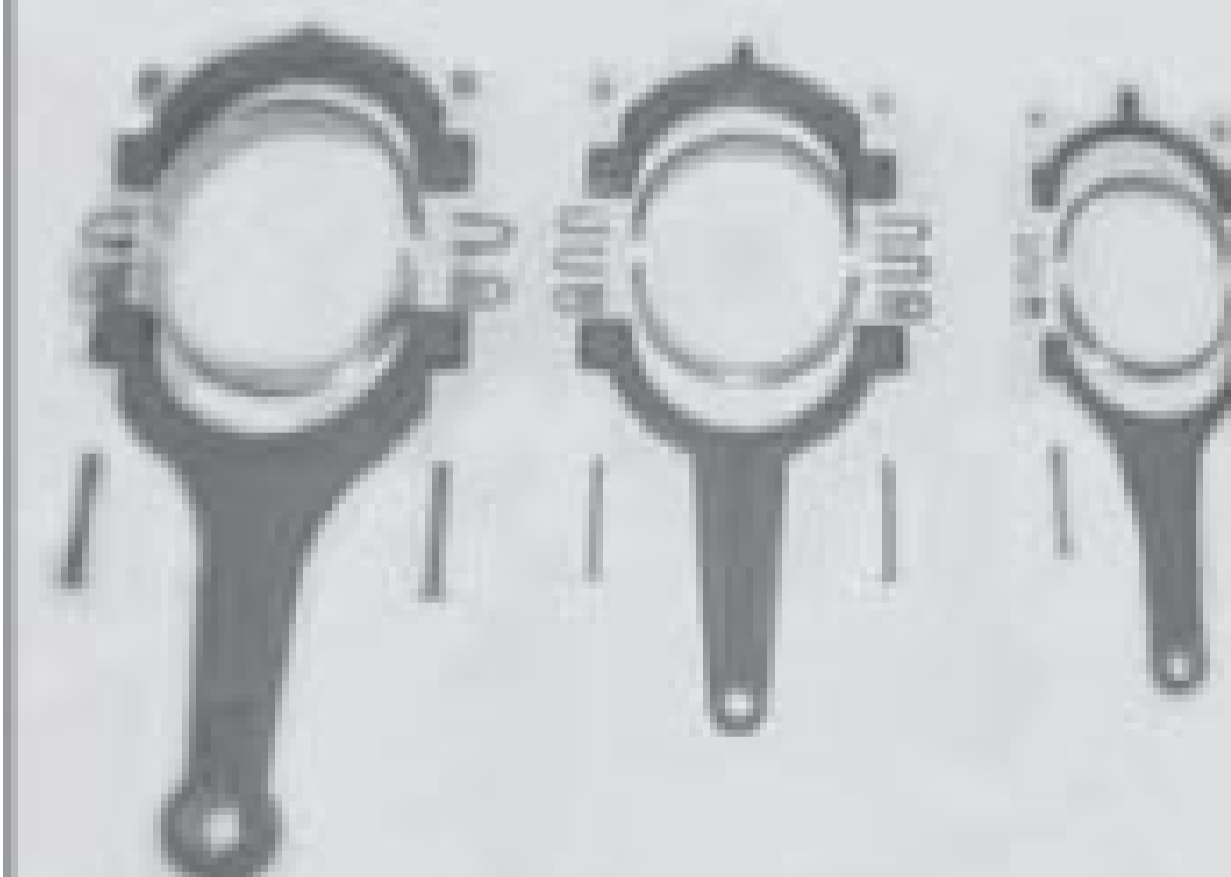
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people/awards

The **Newtown (Conn.) Wastewater Treatment Plant** received a Regional Wastewater Treatment Plant Excellence Award from the U.S. EPA.

The **Wind Cave National Park (S.D.) Wastewater Treatment System** received an Operation and Maintenance Excellence Award from the South Dakota Department of Environment and Natural Resources.

Larry N. Hughes (Peoria) received the Clarence W. Klassen Outstanding Service Award from the Illinois Association of Water Pollution Control Operators.

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

education

Central States

The Central States Water Environment Association has these courses:

- July 29 – Collection System Seminar, Marshfield, Wis.
- Aug. 5 – Management Seminar, Richfield, Wis.

Visit www.cswea.org.

Kansas

The Kansas Water Environment Association has these courses:

- July 6 – Wastewater Reclamation and Reuse, Dodge City
- July 8 – Natural Systems for Wastewater Treatment, Dodge City
- July 13 – Safety, Liberal
- July 15 – Wastewater Stabilization Ponds, Dodge City
- July 20 – Special Environmental Topics, Dodge City
- July 22 – Ethics, Dodge City
- Aug. 3-6 – Water and Wastewater School, Lawrence

Visit www.kwea.net.

North Carolina

The North Carolina Water

Environment Association has these courses:

- July 19-23 – Western Biological Wastewater Operators School, Morganton
- July 27 – Advanced Wastewater Processes/Emerging Technology, Raleigh
- July 27 – Industrial Wastewater, Raleigh
- Aug. 19 – Back to the Basics, Fayetteville

Visit www.ncsafewater.org.

Texas

The Texas Water Utilities Association has these courses:

- July 20 – Wastewater Lab, Greenville
- July 27 – Wastewater Treatment, Victoria
- Aug. 23 – Basic Wastewater, Corpus Christi
- Aug. 24 – Basic Wastewater, Victoria

Visit www.twua.org.

The Water Environment Association of Texas has a Capacity Management Operation and Maintenance Seminar on Aug. 30-31 in Austin. Visit www.weat.org.

WEF

The Water Environment Federation has released the fourth annual Journal of the U.S. SJWP. It shares the thoughts of today's young scientists and provides the students with experience in scientific writing and publication. The publication is available for download at www.wef.org.

Wisconsin

The Wisconsin Department of Natural Resources has a Northwoods Collection System Seminar on July 29 in Marshfield. Visit www.dnr.state.wi.us/org/es/science/opcert/training.htm. **tpo**



CALENDAR OF EVENTS

July 18-21

Georgia Association of Water Professionals Annual Conference and Expo, Savannah International Trade & Convention Center. Visit www.gawponline.org.

July 18-21

Kentucky Tennessee WPC Annual Conference, Nashville Convention Center and Renaissance Hotel. Visit www.kytnwea.org.

July 22-23

Nebraska Water Environment Association Heartland Operators Conference, Holiday Inn, Kearney. Call 402/228-5221 or visit www.ne-wea.org.

Aug. 10-13

Michigan Water Environment Association-Michigan Section American Water Works Association Joint Annual Conference, Soaring Eagle Resort and Conference Center, Mt. Pleasant. Call 517/641-7377 or visit www.mi-wea.org.

Aug. 15-18

Biofilm Reactor Technology Conference, Portland (Ore.) Marriott. Call 703/684-2441 or visit www.wef.org.

Aug. 15-18

American Public Works Association International Public Works Congress and Exposition, Boston Convention & Exhibition Center. Call 816/472-6100 or visit www.apwa.net.

Aug. 19

Fox Valley Operators Association 4th Annual Mini-Conference, Algonquin, Ill. The organization will also hold its 50th Anniversary Celebration Banquet on Oct. 15 at the Riverside Receptions & Conference Center, Geneva, Ill. Visit www.fvoa-illinois.org.

Aug. 31-Sept. 2

Kansas Water Environment Association-Kansas Section American Water Works Association Joint Annual Conference, Capitol Plaza Hotel, Topeka. Call 785/357-4780 or visit www.kwea.net.

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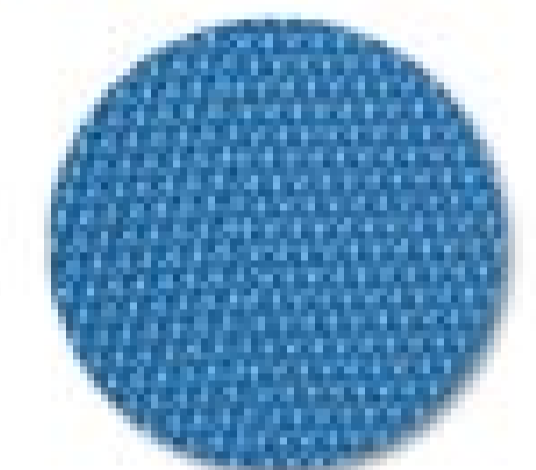
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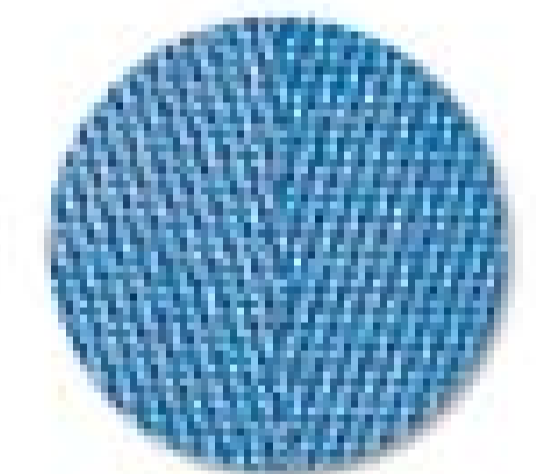
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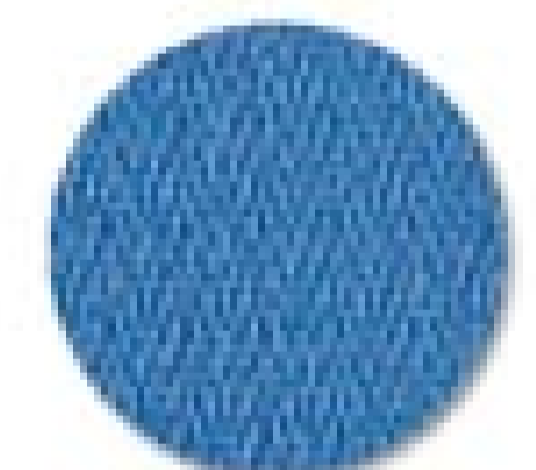
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