TREATMENT PLANT OPERATOR
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DEDICATED TO MUNICIPAL WASTEWATER PROFESSIONALS
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NOVEMBER 2012

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Plant manager
Glendale Heights, Ill.

# Ahead of the Curve

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### on the cover


Plant manager Chuck Fonte and his team at the Glendale Heights (Ill.) Water Pollution Control Facility apply planning and operator-based improvements to put the plant in a solid position — in terms of compliance, efficiency, and safety. In Fonte's words: "We want to stay up with or ahead of current legislation ... We're also constantly looking at budgeting for new technologies." (Photography by Rob Hart)

tpo

DEDICATED TO MUNICIPAL WASTEWATER PROFESSIONALS

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# Which Side of the Fence?

THE WATER PROFESSION HAS ITS WASTEWATER AND DRINKING WATER SIDES. HOW DO OPERATORS COMPARE THE TWO FOR CHALLENGES, REWARDS, RESPECT AND WORK CONDITIONS?

By Ted J. Rulseh, Editor

For the past year it has been my privilege to edit magazines for both wastewater treatment plant operators and drinking water system operators. I find quite a bit of similarity between people on both sides of the business.

In general, they're extremely proud of what they do. They're highly dedicated to the profession and to the services they deliver to the public. They're modest and team-oriented, always inclined to share the credit. They are far more schooled, intelligent and professional than their publics will ever understand.

Their work is similar in many ways, yet also quite different. Of course, a goodly number have crossed from one side to the other during their careers. Many hold dual licenses, and even work both sides on a regular and even daily basis.

## WHAT DRIVES THE CHOICE?

I wonder: What makes a person choose one side over the other? Wastewater or drinking water? Among those who have worked extensively on both sides, which side do they prefer and why? But rather than just wonder, I've decided to ask these questions of you – our readers.

I'm asking wastewater operators here in *TPO,* and I'll be asking the drinking water side for impressions in this month's issue of our sister publication *Water System Operator* (if you're not familiar, find out about it at www.wsomag.com).

From my observer's position (I have never run or worked in a wastewater or drinking water plant), I see attractions to both sides.

On the wastewater side, I see the challenge of blending art and science — of putting microorganisms, a workforce of who knows how many trillions, to the task of scrubbing wastes from water. I see the pride of knowing that one forms a critical line of defense in the pursuit of fishable, swimmable waters.

On the drinking water side, I see the pride in delivering a high-quality product to people's taps every day (whether or not the recipients fully appreciate it). I see the challenge of meeting extremely high standards of purity, not once in a while but always, and of maintaining immaculate plant conditions.

One side takes in filthy water and makes it clean. The other takes in (usually) pretty good water and makes it even better. One system flows (mostly) by gravity, the other under pressure. One takes water from homes and businesses, the other gives it. In that context, how do you see yourself and your career?

But I don't know firsthand how the participants on each side of the water profession see things.

### HERE'S YOUR CHANCE

So, one side takes in filthy water and makes it clean. The other takes in (usually) pretty good water and makes it even better. One system flows (mostly) by gravity, the other under pressure. One takes water from homes and businesses, the other gives it. In that context, how do you see yourself and your career?

- Which side is more mentally challenging and stimulating?
- Which feels more intrinsically rewarding?
- Does the public seem to understand and value one side more than the other?

Please share your impressions, especially if you have experiences on both sides of the fence on which to draw. Send a note with your comments to editor@tpomag.com. I promise to respond, and we'll publish a summary of the comments in future issues of *TPO* and *WSO*. I look forward to a lively interchange. **tpo**

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letters

## Thanks for PlantScapes

Each month, I look forward to receiving my copy of *TPO*. You have really put together one of the best trade magazines in the business. I like that you don't gear your articles to the average Joe or Jane operator, but instead leave enough meat on the bone that after 35 years in the business, I can still learn something and even be entertained.

The fact that COLE Publishing is located in the small town of Three Lakes, Wis., is fantastic. Being only 85 miles away in Ironwood, Mich., makes me feel like family.

By the way, I also wanted to let you know that I love the monthly PlantScapes feature stories. I'm always amazed by how beautiful the sites are and how artistic the operators are. The creativity of these people leaves me in awe, in the way they have turned plant sites into parks and recreational areas.

I now regret that I gave away some of my old *TPO* magazines and I'd love to make a scrapbook of all the PlantScapes you've put together. Anyway, you might consider putting a PlantScapes Calendar or Screen Saver together. Thank you and keep up the good work.

Sincerely,

**Mark Bowman, Manager**
**Gogebic-Iron Wastewater Treatment Facility**
**Ironwood, Mich.**

Muralist Bob Henry painted this scene on a concrete digester tank for the Academy Creek Wastewater Treatment Plant.

PHOTOS COURTESY OF THE ACADEMY CREEK WASTEWATER TREATMENT PLANT

# Best Face Forward

## MURALS PAINTED ON STRUCTURES HELP A GEORGIA TREATMENT PLANT ADD TO AN INVITING PICTURE FOR RESIDENTS AND ARRIVING TOURISTS

By Jeff Smith

When the Academy Creek Wastewater Treatment Plant in Brunswick, Ga., was built in the mid-1960s, it was located far from town and had a 100-foot buffer of tall pines between it and the nearest road — which was dirt.

Since then, population growth and infrastructure have transformed the 13.5 mgd design, 5.5 mgd average flow secondary treatment plant into a prominent structure next to a four-lane highway that serves as a gateway corridor into this popular tourist community.

"Along with population growth came the geographic expansion of the town," says Keith Morgan, director of the Brunswick-Glynn County Joint Water & Sewer Commission. "And that growth has led us to enlarge and upgrade the plant several times to where it now occupies an entire city block of frontage on U.S. Highway 341."

> "The designer wanted the surfaces to be as pristine as possible, so between three and six employees worked at different times to just stay ahead of the artist during the seven week project."
> **KEITH MORGAN**

Since then, it has become the community's aim to make its corridors more appealing to the tourists, who make up the largest single industry in Glynn County, in southeast Georgia. To be consistent with that civic goal, the plant team decided to enhance the facility's image by creating murals on the tanks and buildings that front the highway and upgrading the landscape.

### PITCHING RIGHT IN

The city solicited designs from local art colleges and other sources, but received no bids or proposals. The contract was awarded to Bob Henry of B an' K Graphics of Puyallup, Wash., who specializes in larger-than-life paintings. Henry's seacoast-themed design, covering 12,000 square feet on six concrete digester tanks, shows local landmarks, such as a crowded St. Simons Island Pier and the nearby lighthouse, the Sidney Lanier Bridge, and samplings of the local flavor with a life-size right whale, pelicans and dolphins, and shrimp boats.

To help keep the costs within the $40,000 budget, plant operations and maintenance staff helped with prep work. "The designer wanted the surfaces to be as pristine as possible, so between three and six employees worked at different times to just stay ahead of the artist during the seven-week project," says Morgan. "Prep work was primarily high-pressure power washing, spot chemical application, and minor structural concrete repair."

Plant superintendent Mark Ryals led the prep work team in cleaning the tanks and in painting the light blue sky and deep blue sea portions of the mural before Henry arrived. "The success of any paint job is doing a good job on the prep work," says Ryals, who had previous experience painting airplanes.

Henry's seacoast-themed design sketch shows whales, pelicans and dolphins.

Henry adds detail to a scene on one of the digester tanks at the Academy Creek plant.

## GROWING THINGS

To complement the mural, the team made major changes to the landscape. They planted nearly 40 maple and palmetto trees 8 to 15 feet tall, along with several birch, peach, lemon, chasteberry and crepe myrtle trees. Also planted were more than 600 shrubs, 200 azaleas, and nearly 4,000 one-gallon containers of sea oats and native grasses, including Eulalia (maiden grass) that grows to almost 6 feet tall. All are planted in strategic positions so that they either accentuate the mural or obscure plant structures.

The landscape design was the creation of Kevin Whitaker, an intern majoring in landscape design at the University of Georgia. "Landscaping the treatment facility has always been a goal, and incorporating it with the mural seemed a natural fit," says Morgan.

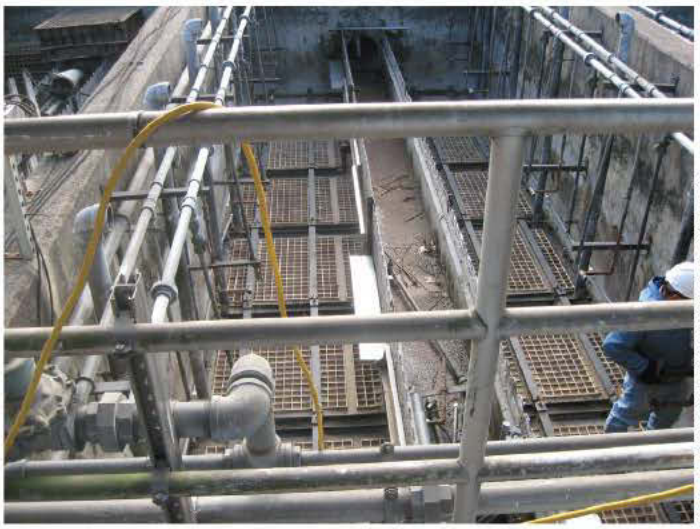
After several attempts to obtain grants for the project, the commission decided to cover the cost through its own budget and with the help of plant staff. Morgan is proud of the enhanced appearance of the plant and its contribution to the civic goal.

Morgan observes, "The project provided the utility an opportunity to do something as a community partner and demonstrate a willingness to support the initiative to improve the aesthetics of the gateways to the community." tpo

### 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.

This life-size right whale is part of the murals' seacoast theme.



PHOTOS COURTESY OF SIEMENS WATER TECHNOLOGIES

LEFT: The Forty-X filtration units were delivered assembled for easy installation into an existing tank. ABOVE: The old sand filter was demolished in preparation for installation of the new disc filters.

# Sands of Time

## A CINCINNATI TREATMENT PLANT SAVES MONEY AND IMPROVES TREATMENT BY REPLACING AGING SAND FILTERS WITH A NEW DISC FILTER SYSTEM

By Jason Grooms and Rachel Oscherwitz

In 1986, the Sycamore Creek Wastewater Treatment Plant in Symmes Township in southwest Ohio installed a coarse sand filtering system for the plant's secondary bypasses before disinfection. The eight 12- by 34-foot cells with 10 inches of filter media were rated for a hydraulic capacity of 12 mgd.

As part of a later upgrade, the filters were re-piped to receive secondary effluent and help meet a tough phosphorus limit to be imposed by the Ohio EPA. Even with a well-established preventive maintenance program, plant owners at the Metropolitan Sewer District of Greater Cincinnati began to see increased operation and maintenance costs, along with a decline in effluent quality, as the filters reached end of life.

In September 2009, after a complete filter system failure, city officials and plant personnel saw that fixing the old system would not be cost-effective. The plant staff began researching options for a modern tertiary treatment solution to deliver high performance, ease of operation and maintenance, and competitive life-cycle costs.

The district ultimately chose a Forty-X disc filter system from Siemens Water Technologies. The system was easily retrofitted to the existing filter tanks, saving significant installation cost, and it helped the plant meet its strict new permit limits.

### FITTING AN UPGRADE

During the sand filters' last three years of service, there were 155 component and subcomponent failures, resulting in maintenance costs averaging $50,000 per year. The plant maintenance supervisor contacted the filter manufacturer and received a bid of $1.6 million to $2 million to rehabilitate the system.

At the time, the plant was completing a capacity upgrade from 12 mgd to 18 mgd, but improving tertiary treatment was not part of it. Many factors drove the tertiary treatment selection process. First, the system had to accommodate the expansion plans already in place. Second, upper management had to make a business case to the city council and the Hamilton County Board of County Commissioners. Third, the units had to be installed by the summer 2011 NPDES permit season.

### EXPLORING OPTIONS

Two plant operations managers and two maintenance managers visited three area treatment plants, each using a different tertiary process. They collected data and did comparison studies to evaluate the performance and cost-efficiency of each, then presented the results to district management and city and county officials.

The Forty-X disc filter system finally chosen was easily retrofitted to the existing tanks, saving significant installation cost. The purchase included three units rated at 6 mgd each, plus one backup unit, increasing the plant's tertiary capacity from 12 mgd to 18 mgd. With the new system, the plant could treat more flow with fewer units and with minimal construction. All told, the system installation saved about $1 million as opposed to rehabilitating the old filters.

The engineering firm CH2M HILL designed the project, and PAE Construction and Lake Erie Electric managed the retrofit of the existing tanks and the installation of the new units.

### SIMPLE INSTALLATION

The disc filters are third generation chain-driven units with 10-micron pleated media, inside-out flow, and outside-in backwash. Everything needed to operate the filters is compact and easily accessible for maintenance, making the Sycamore Creek retrofit simple.

Unlike the other proposed systems, the disc filters did not

require construction of facilities to house pumps or other equipment. Once the plumbing and electricity for the filters were installed, the units themselves were hoisted into place and ready to run in minimal time.

The filters have proven valuable in meeting the plant's stringent effluent requirements. Although not a key component of the nutrient removal process, the filters aid in solids removal during wet-weather events. In addition to complying with the plant's stringent NPDES permit, lowered effluent turbidity levels help save money through lowered ultraviolet disinfection doses and cleaning frequencies.

## MEETING EXPECTATIONS

"We were close to the end of the four phases of our plant upgrade when our sand filter system failed," says Barb Browne, East Section treatment supervisor at Sycamore Creek. "Unfortunately, the replacement of this system was not included in the construction plans.

"Our solids output from the filters was higher than the influent to them. We were facing stricter limits in addition to a phosphorous limit that was to take effect in May 2010. We had no tertiary treatment. The Forty-X disc filter system ended up being the best fit for us because we could retrofit the units into the existing cells with minimal costs."

> "The Forty-X disc filter system ended up being the best fit for us because we could retrofit the units into the existing cells with minimal costs."
>
> **BARB BROWNE**

After a year of service, plant personnel say the system has met expectations in performance, ease of operation and maintenance, and price. In both performance testing and daily operation, it has been critical to helping the plant meet its permit limits and produce high-quality effluent.


ABOUT THE AUTHORS

*Jason Grooms (jason.grooms@cincinnati-oh.gov) and Rachel Oscherwitz (rachel.oscherwitz@cincinnati-oh.gov) hold positions as Operator II/III with the Metropolitan Sewer District of Greater Cincinnati.* **tpo**


**Share Your Idea**

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

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

# Flawless for Decades

## TWO EXEMPLARY TWIN CITIES TREATMENT PLANTS BENEFIT FROM TEAMWORK AND SHARED RESOURCES ACROSS THE METROPOLITAN COUNCIL ENVIRONMENTAL SERVICES ORGANIZATION

By Jim Force

Operator Gary Johnson tests a sample for total suspended solids. (Photography by Tomy O'Brien)

TEAMWORK IS THE KEY TO SUCCESS FOR THE SEVEN WASTEWATER TREATMENT plants serving the Twin Cities area of Minnesota and operated by Metropolitan Council Environmental Services (MCES). The violation-free performance of the Hastings and St. Croix Valley treatment facilities is an outstanding example.

The two plants haven't had a violation in more than 20 years. The Hastings plant, which discharges to the Mississippi River, serves about 20,000 residents of the City of Hastings and parts of surrounding Marshan Township. The St. Croix Valley plant serves 30,000 residents of Stillwater, Bayport and Oak Park Heights and discharges to the St. Croix River, a federally protected waterway. Both facilities provide secondary treatment, and both have received national and local awards.

Dennis Lindeke, assistant business unit manager whose responsibility for MCES includes the Hastings and St. Croix Valley plants, says both facilities benefit from shared services like training, operations, maintenance and quality control. Most recently, the regional approach has led to significant energy savings and reduced operational costs. "We are fortunate to be part of the larger organization," he says.

Observes Patricia Oates, business unit manager with MCES, the plants benefit from the internal expertise of the Metropolitan Council and its financial support, as well. "In the past, the Hastings plant staff would fill more than 1,500 sandbags to protect against flooding from the Mississippi River," she says. "In 2011, MCES funded the construction of a new flood wall, which would have been very difficult for a plant that size to pay for on its own."

### HASTINGS PLANT

The Hastings plant, which treats about 1.4 mgd (design flow is 2.34 mgd), is actually operating on borrowed time, and doing it very well. "There were plans to close this plant and move treatment to a location outside of town," says Lindeke. "But the economic recession stunted area growth, and we've delayed the relocation until around 2020."

Built in 1955, the Hastings facility was expanded and renovated in 1983-86 at a cost of just over $8 million. Additional odor control was added in 1989 to help the plant fit in with its downtown location.

Wastewater enters through a bar screen with 1/2-inch openings and passes to grit removal. Primary sedimentation occurs in clarifiers covered with domes for odor control. The overflow is then directed to aeration basins equipped with Sanitaire fine-bubble ceramic diffusers (Xylem). The aeration tanks are also covered for odor control. Odorous air is treated in an activated carbon scrubber system (Calgon Carbon).

The final clarifiers are not covered, and the clarified effluent flows to chlorination (bleach) and dechlorination with sodium bisulfate. The treated water discharges to the Mississippi through a submerged outfall, easily meeting effluent standards of 25 mg/L BOD and 30 mg/L TSS.

"Our secret? Trained, motivated, accountable operators. We don't micromanage. We give them the tools to do the job and then get out of the way."

**DENNIS LINDEKE**

Operators Steve Miggler, Michelle Forga and Gary Johnson take instrument readings at the St. Croix Valley plant. The control panel is for the plant's activated carbon odor control units (Calgon Carbon). The white vessel on the right is one of three dual-bed units.


Dennis Lindeke, assistant business unit manager, Metropolitan Council Environmental Services.

Primary and waste activated solids are co-thickened by gravity and hauled as slurry to MCES' 250 mgd Metro Treatment Plant in St. Paul for dewatering and incineration. In 2011, a total of 5.8 million gallons was transported.

Property for the relocation of the plant has already been purchased, but now that the plant will remain at its current site for the next eight years or so, the MCES engineering department is examining what is required to continue cost-effective operation. "The most immediate need is new variable-frequency drives for the pumps and blowers," says Lindeke. "The ones we have are 20 years old and we can no longer get parts."

"We like to stay in the nitrification mode even though we're not required to nitrify by permit at either plant. The process is very stable when we nitrify, and at the lower food-to-mass ratio there is better oxygen transfer."

**DENNIS LINDEKE**

## ST. CROIX VALLEY PLANT

The St. Croix Valley plant in the Village of Oak Park Heights is the only MCES facility discharging to the St. Croix River, a federally designated Wild and Scenic River. That's one reason the plant was the first MCES facility to install UV disinfection, in 1993.

The plant was built in 1959 and upgraded or expanded in 1970, 1973 and 1993. With a design capacity of 4.5 mgd, it handles an average of 3.2 mgd. Flow comes to the plant entirely by gravity, passing through a Vulcan climber bar screen on its way to a PISTA grit removal system (Smith & Loveless). Two open primary clarifiers provide sedimentation before fine-bubble aeration, secondary clarification and UV disinfection (Infilco Degrement). Alum is added for phosphorus removal.

Primary and secondary solids are handled the same as at Hastings. Last year, the plant transported 6.7 million gallons.

As at Hastings, odor control is a prime concern. "We're located near a boat marina and a very nice condominium development," says Lindeke. The pretreatment and sludge thickening facilities are covered, and odorous air is treated in carbon scrubbers — three large dual beds provided by Calgon. "We used to have complaints about our sludge truck area, as well," says Lindeke. "So we've covered the loading hatch on top of the trucks and take the air to the carbon scrubbers. It has worked like a charm."

Performance is consistently within the permit values of 24 mg/L for BOD and 20 mg/L for TSS. In fact, the plant won the U.S. EPA award for best mid-sized, advanced plant in the United States in 2001. The Hastings plant was nominated for the same award and was an EPA Region 5 award winner in

*(continued)*

The St. Croix Valley Plant is the only MCES facility located on the scenic St. Croix River, a nationally protected waterway.

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1989. Both facilities were instrumental in the MCES winning the 2012 George Burke Jr. Facility Safety Award from the Central States Water Environment Association.

## TEAMWORK FOR SAVINGS

These days, energy costs are a major concern in wastewater treatment operations across the country, and the regional approach is starting to pay significant dividends in energy savings at Hastings and St. Croix Valley. "As an organization, we set a 2006 baseline, with a 25 percent energy reduction goal for 2015, and a 50 percent reduction target for 2020," says Lindeke.

Between 2006 and 2012, the seven MCES treatment plants, including Hastings and St. Croix Valley, achieved energy cost reductions of about 15 percent, or $3 million a year. A big chunk of the savings came from improvements in the aeration system at the Metro Plant, and innovations like switching to fuel-efficient Toyota Prius vehicles throughout the MCES fleet.

However, energy savings measures at the smaller plants have contributed, as well. At Hastings, the adoption of fine-bubble aeration in 2001 produced about a 25 percent drop in energy usage. Installation of a Jones+Attwood screenings press (Ovivo), demonstrated at the 1992 WEFTEC Conference and Exhibition, reduced landfill costs from $25,000 to $15,000 a year and resulted in a 2.5 year payback.

At St. Croix Valley, a similar screenings press was installed in 1996. The staff also fine-tuned the odor-control system, monitoring the airflow and air speed and optimizing the number of air changes needed. "It was overdesigned for the current odor load, so we've reduced the number of air changes," says Lindeke. "Where we use to have three 125 hp odor-control vessels online, now we have two."

PHOTO COURTESY OF MCES

The Hastings treatment plant lies on the Mississippi River near the historic downtown Hastings Main Street (top of photo).

Operators also moved the alum application point to the head of the primary clarifiers, saving about $20,000 a year in chemical costs, while also reducing the BOD loading to the aeration process.

Years ago, a standby emergency generator was added in anticipation of Y2K because two separate electrical substations fed the plant, with no installed generator, a situation that wasn't considered reliable at the time. The generator now proves its worth by providing peak load control under contract with Xcel Energy, the local electric utility. "This effectively reduced our power bills by 10 percent," says Lindeke.

*(continued)*

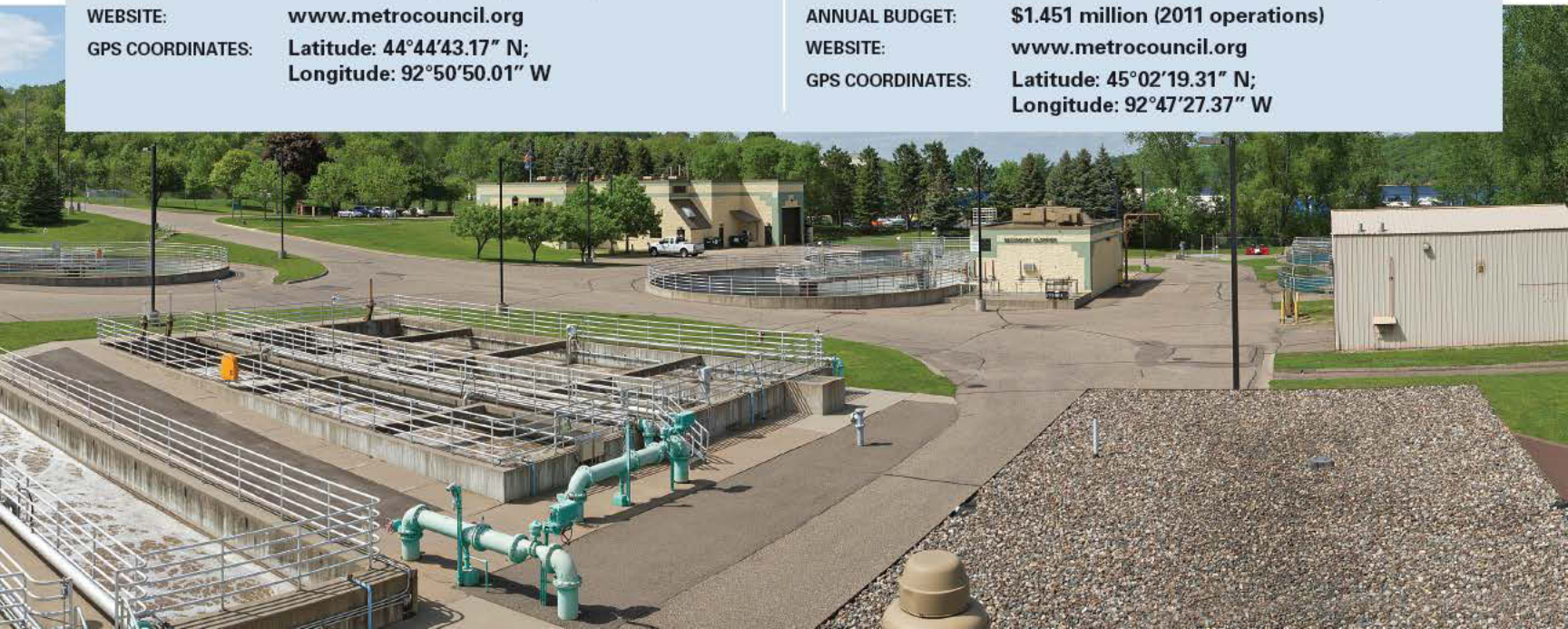
# profiles

## Hastings (Minn.) Wastewater Treatment Plant

| | |
|---|---|
| BUILT: | 1955 (expanded 1969, 1985) |
| POPULATION SERVED: | 20,000 |
| FLOWS: | 2.34 mgd design, 1.4 mgd average |
| TREATMENT LEVEL: | Secondary |
| TREATMENT PROCESS: | Activated sludge |
| BIOSOLIDS: | Thickened, incinerated |
| RECEIVING STREAM: | Mississippi River |
| STAFF: | Lead operator Bill Lynaugh, operators Paul Kurywchak, Tony Nasseff, Tom Sardeson |
| ANNUAL BUDGET: | $1.261 million (2011 operations) |
| WEBSITE: | www.metrocouncil.org |
| GPS COORDINATES: | Latitude: 44°44'43.17" N; Longitude: 92°50'50.01" W |

## St. Croix Valley Wastewater Treatment Plant, Oak Park Heights, Minn.

| | |
|---|---|
| BUILT: | 1959 (expanded 1970, 1973, 1993) |
| POPULATION SERVED: | 30,000 |
| FLOWS: | 4.5 mgd design, 3.2 mgd average |
| TREATMENT LEVEL: | Advanced secondary |
| TREATMENT PROCESS: | Activated sludge with phosphorus removal |
| BIOSOLIDS: | Thickened, incinerated |
| RECEIVING STREAM: | St. Croix River |
| STAFF: | Lead operator, Steve Miggler, operators Mike McDonald, Jim Bosse, Rod Ries, Gary Johnson |
| ANNUAL BUDGET: | $1.451 million (2011 operations) |
| WEBSITE: | www.metrocouncil.org |
| GPS COORDINATES: | Latitude: 45°02'19.31" N; Longitude: 92°47'27.37" W |



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The St. Croix Valley plant team includes, from left, operators Rod Ries and Mike McDonald, operator/trainee Michelle Forga, operator Gary Johnson, lead operator Steve Miggler, and business unit manager Patricia Oates.

PHOTO COURTESY OF MCES

Operators at the Hastings plant include, from left, Chuck Henkel (retired), Tony Nasseff, Bill Lynaugh (lead operator), and Paul Kurywchak.

Overall, the MCES plants have increased their combined ENERGY STAR rating from 53 to 62, an achievement that merited the Xcel Energy Gold Award for the highest electrical savings among large industrial and commercial clients in 2011. "It represented the equivalent of removing 1,200 homes from the grid," says Lindeke.

## STAFFING FOR SUCCESS

Both plants are staffed with a lead operator, who reports to Lindeke, and a team of plant operators — three at Hastings and four at St. Croix Valley. The plants are staffed from 6 a.m. to 4 p.m. weekdays, and one operator works on site during weekends and holidays. The ties to the larger MCES organization are important in operations, maintenance and training at each facility.

**Hastings Wastewater Treatment Plant PERMIT AND PERFORMANCE**

| | INFLUENT | EFFLUENT | PERMIT |
|---|---|---|---|
| **BOD** | 208 mg/L | 4 mg/L (CBOD) | 25 mg/L |
| **TSS** | 201 mg/L | 5 mg/L | 30 mg/L |
| **TKN** | 42.14 mg/L | 5.35 mg/L | Monitor |
| **NH3-N** | 30.37 mg/L | 2.94 mg/L | Monitor |

**St. Croix Valley Wastewater Treatment Plant PERMIT AND PERFORMANCE**

| | INFLUENT | EFFLUENT | PERMIT |
|---|---|---|---|
| **BOD** | 156 mg/L | 3 mg/L (CBOD) | 24 mg/L |
| **TSS** | 189 mg/L | 4 mg/L | 20 mg/L |
| **TKN** | 28.86 mg/L | 1.69 mg/L | Monitor |
| **NH3-N** | 21.35 mg/L | 0.08 mg/L | Monitor |
| **P** | 4.18 mg/L | 0.46 mg/L | 0.80 mg/L |

## A REGIONAL APPROACH

The Metropolitan Council was formed in 1967 to coordinate the planning and development of public services across a seven-county area that includes Minneapolis, St. Paul and 180 other Minnesota communities. The goal is to assure environmental stewardship, sustainability and energy efficiency.

At present, the council includes four main subgroups: administration, transportation, community development and environmental services. The council employs 3,700 people and has an annual budget of more than $730 million. The board of directors includes 17 members, all appointed by the governor and representing the various geographical districts.

Water treatment and distribution and wastewater collection and treatment are the primary functions of Metropolitan Council Environmental Services (MCES). While communities and townships are responsible for their individual sewer systems, MCES operates the interceptor sewers and seven wastewater plants.

Patricia Oates, business manager for the eastern unit that includes the Hastings and St. Croix Valley plants, along with plants at Empire, Rosemount and Eagles Point, says there were as many as 47 treatment plants in operation across the region before the council was formed. "Over time they have been centralized into seven plants within the MCES organization," she explains. The council serves 2.8 million people living within some 3,000 square miles.

The metro region maintains a new operator trainee program that assures a source of skilled operators to fill open positions. "We bring prospective operators into our program beginning with classroom training, followed by a probationary period where the new operator spends time out in the plants," says Lindeke. "It's a six-month training period."

The classroom work is designed around the Sacramento State University training program. The onsite experience involves shadowing veteran operators and doing everything from lab work and lubrication routes, to driving the sludge truck, to mowing the grass.

After their training, the trainees must complete a 90-day certification period at their eventual assigned plant. Prospective hires also need to become familiar with all of the operations manuals specific to a particular plant. At the end of the training period, the new operators bid, via seniority, for open positions

Operator/trainee Michelle Forga calibrates a dissolved oxygen probe and resets the DO meter.

"As an organization, we set a 2006 baseline, with a 25 percent energy reduction goal for 2015, and a 50 percent reduction target for 2020."

**DENNIS LINDEKE**

within MCES. The organization also conducts aggressive recruiting, which helps fill staffing voids across the region.

The regional affiliation helps with maintenance, too. Maintenance is centralized out of the Metro Plant and is provided either by the central staff or by outside contractors. "We have electricians and mechanics on staff," Lindeke says. "But if we don't have the expertise on staff, or it's not available, then we'll contract it out as needed.

"It's a nice marriage. We use a computerized asset management system (WAM by Oracle). It's a complete program that transmits work requests to our Maintenance Business Unit (MBU) and also provides procurement and timekeeping functions. The MBU then plans, schedules and assigns the work. It works well."

## PERFORMANCE COUNTS

Even with support from the region, it's the operators at the plant who make the everyday decisions that determine treatment performance. Lindeke, who started out at the Hastings plant as a summer intern in 1975, says the on-site staff uses Hach test kits and lab data to make key process decisions on the spot.

"At Hastings, we chlorinate the return sludge periodically to deal with filamentous growth," he says. "At St. Croix Valley, however, it seems that the alum inhibits the growth of filamentous bacteria." The key to success is the appropriate mixed liquor concentration and resulting food-to-mass ratio.

"We like to stay in the nitrification mode even though we're not required to nitrify by permit at either plant," Lindeke says. "The process is very stable when we nitrify, and at the lower food-to-mass ratio there is better oxygen transfer. Plus, the sludge settles nicely." Operators raise the mixed liquor solids levels in winter to stay in the nitrification mode in colder temperatures.

For microbiological monitoring, both plants use phase contrast microscopes. "They give a much better image of the bugs — protozoa — and mixed liquor," Lindeke says. "Our guys stay in tune with what the bugs should look like, how happy they are, and any early warning signs of changes that may need to be addressed. Your bugs are like the canary in the coal mine."

Lindeke fully credits the operators for the perfect records at both plants. He makes the rounds to the plants almost every day and maintains face-to-face contact with the plant staffs. "The lead operator at each plant is my primary contact," he says. "We see what's up and we talk about the process, maintenance and personnel needs.

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PHOTOS COURTESY OF REGION OF PEEL

Credit Valley Conservation Authority, a Peel Region partner, runs an activity where students learn about fish habitats.

# Reaching Open Minds

## WASTEWATER OPERATORS PLAY A KEY ROLE IN AN ANNUAL WATER FESTIVAL IN ONTARIO THAT OFFERS GRADE-SCHOOL STUDENTS HANDS-ON LEARNING EXPERIENCES

By Briana Jones

With more than 50 activities, there is a lot for kids to choose from at the annual weeklong Peel Children's Water Festival. The event educates students from the areas of Brampton, Caledon and Mississauga, Ontario, about the importance of water quality, quantity and sustainability. Tents set up around the Heart Lake Conservation Area in Brampton house activities that revolve around water, wastewater and other environmental matters.

"It's all based on the Ontario curriculum for grades 2-5," says Angela Partynski, technical analyst in environmental education with the Regional Municipality of Peel. "The idea is that what the students are learning in the classroom is tied in at the festival. It's hands-on activities relating to what they're already learning."

> "The idea is that what the students are learning in the classroom is tied in at the festival. It's hands-on activities relating to what they're already learning inside the classroom."
>
> **ANGELA PARTYNSKI**

### OUTSIDE HELP

Plant staff members at the region's G.E. Booth Lakeview Wastewater Treatment Facility and the Clarkson Wastewater Treatment Facility (180 mgd combined capacity serving 1.3 million people) provide information as a basis for the activities.

The operators make sure the information is accurate. They also help run the Sewer Detectives exercise. "Because there are expensive cameras involved, we want to ensure that proper operators are using them," says Kristina Hatton, festival coordinator.

"The operators have a model they created that they use in their own training with each other. It shows the piping coming from a home to the street. They put in objects that would become obstructions, such as tree roots or rags. Then they put the lateral push camera down, so students can look through the clear pipe and also see on a screen what the camera sees."

Wastewater operator Adam Wiltschek helps out at the festival. "I ran the Sewer Detectives activity," he says. "Another wastewater operator and I set up a PVC model of a lateral system similar to the ones used in private homes to demonstrate how the region staff would perform an inspection using a mini push camera.

"We added long grass and inserted it into the joints to resemble roots, which are a very common issue we come across. We explained what the protocol is when we find something of that nature. I think people enjoyed the visual aspect of our tutorial."

### What's Your Story?

***TPO* welcomes news** about your public education and community outreach efforts for future articles in the Hearts and Minds column. Send your ideas to editor@tpomag.com or call 877/953-3301.

*(continued)*

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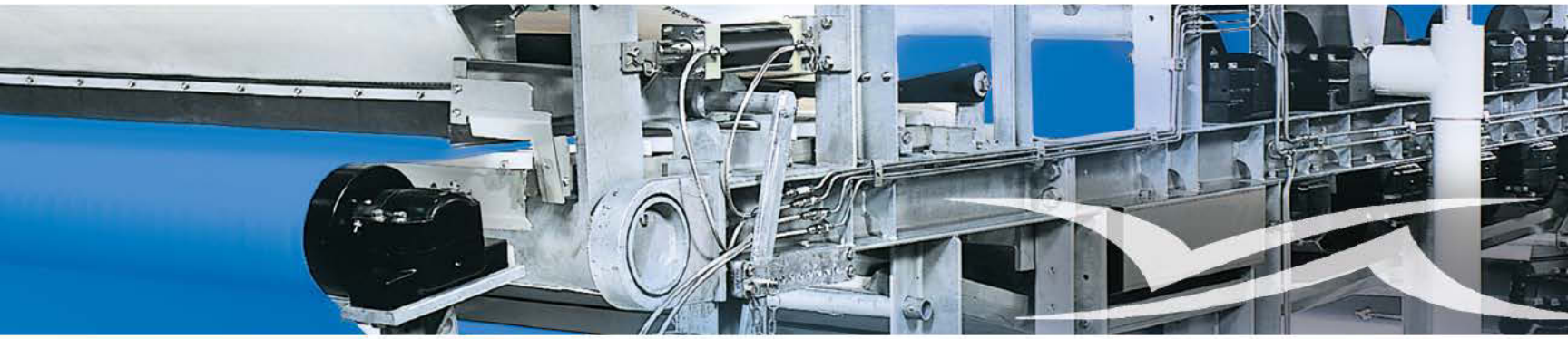

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An information booth at the festival highlights wastewater plant tours.

Local public high school students man the activity booths. "They are trained before the festival," says Hatton. "We conduct in-class presentations to prepare them."

Supervisor of environmental education Carol Chaput adds: "It's really great when we get involvement from high school kids who are part of the 'green' clubs at their schools. They tend to have a little more passion. We're looking to foster that environmental stewardship in high school students, as well."

At the water festival, students can take part in the Septic Sights activity, which teaches them how wastewater leaves their homes.


## WHAT TO DO?

Teachers bring their students to the end-of-the-year festival to wrap up what they learned in the classroom. "Each session runs from 10 a.m. to 2 p.m. every day," says Hatton. "We get about 1,000 elementary students each day. When the teachers pre-register, they choose which activities relate to their curriculum, depending on the grade they have."

Activities incorporate observation and hands-on learning. In Where Does It Go When You Go?, students view a wastewater treatment model to see what happens to their waste after it leaves their homes.

Septic Sights, staffed by City of Brampton employees, looks at where wastewater goes if the home is not connected to the municipal sewer system. Staff members put ping-pong-size colored plastic balls down a toilet so that students can watch them travel through the sewer pipes, into the septic tank, and then into the soil treatment system.

The work of setting up and staffing the festival is funded from government and private sources. "We have an operating fund of $250,000 through the Region of Peel," says Chaput. "We include arranging the buses to get the students to and from their classrooms, and the tents and equipment for the festival.

"We obtain about $30,000 annually in sponsorships. Sponsors, such as the Ontario Clean Water Agency and the Children's Water Education Council, are very supportive of the festival because it showcases water and wastewater treatment, and everything that is environmentally relevant these days."

## JOIN TOGETHER

Hatton sees the festival serving a valuable purpose with lasting benefits. "It's important, especially with the age group we're working with, to foster these ideas early on and create positive habits, so it's not something we have to battle with later when they are older," she says. "Their minds are really open to this kind of stuff right now. We hear stories about the kids going home and talking to their parents about what is the right thing to do, so they're educating their parents, as well."

Wiltschek agrees: "I believe that educating young people early on is always the best way to get certain messages across later in life. Our clean water supply and how we deal with our wastewater plays a significant role in keeping our environment safe and clean for other generations. These kids are learning something that my generation was not taught until much later on, so I hope that they will have a greater appreciation for the environment after spending the day with our staff." **tpo**

Freddy Fusion puts on a show at the Peel Children's Water Festival.



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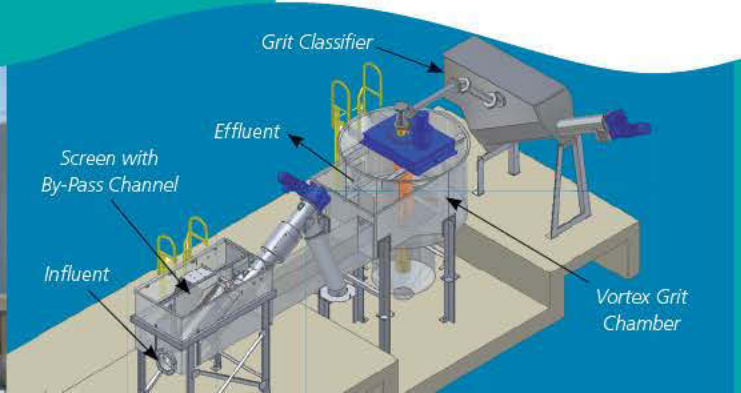


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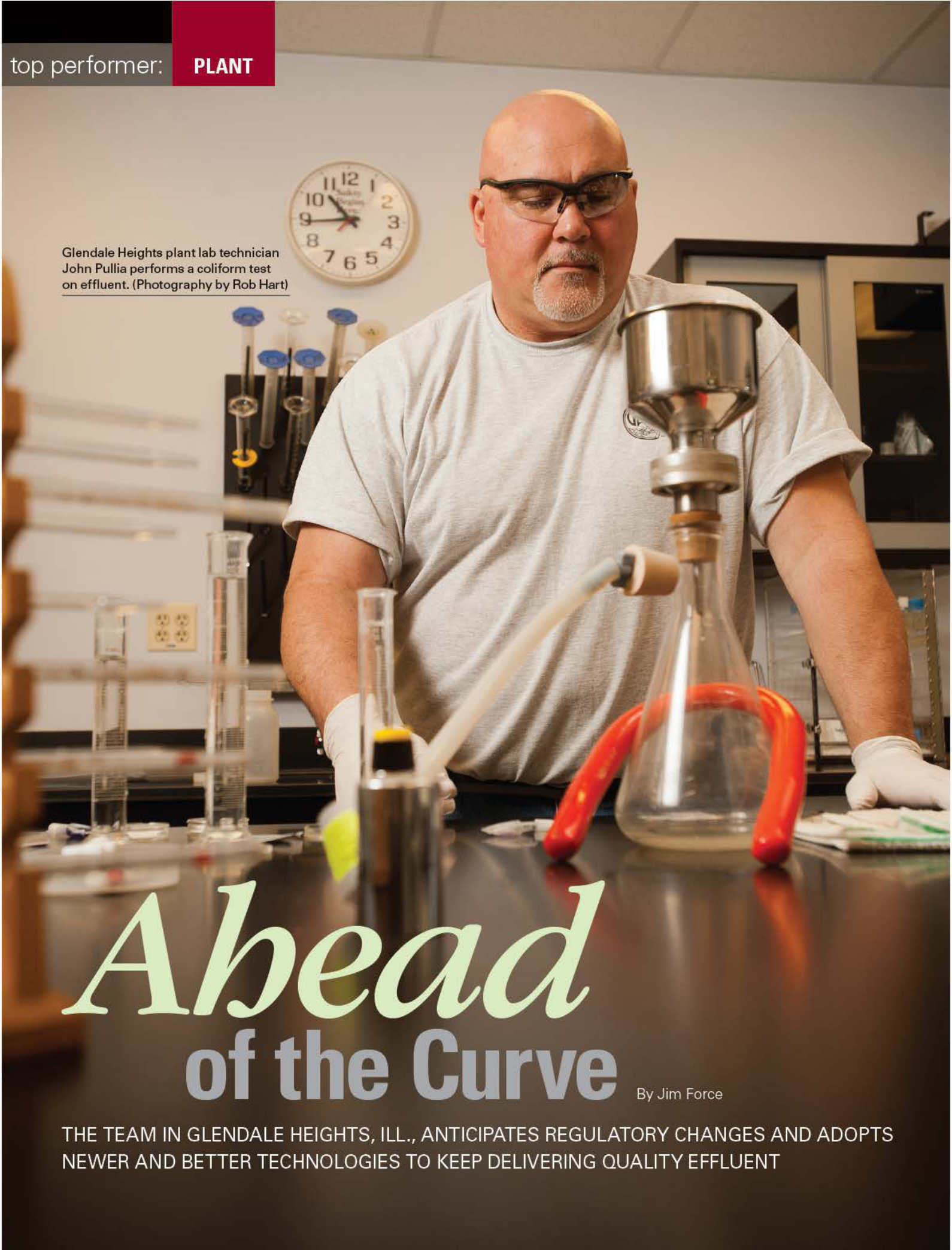

Glendale Heights plant lab technician John Pullia performs a coliform test on effluent. (Photography by Rob Hart)

# Ahead of the Curve

By Jim Force

THE TEAM IN GLENDALE HEIGHTS, ILL., ANTICIPATES REGULATORY CHANGES AND ADOPTS NEWER AND BETTER TECHNOLOGIES TO KEEP DELIVERING QUALITY EFFLUENT

"We try to be proactive. We want to anticipate regulations, take advantage of budgeting opportunities. And most of all, we want to make the jobs around here simpler and safer."

**CHUCK FONTE**

TREATMENT PLANTS PRIDE THEMSELVES ON HANDLING whatever comes down the pipe. At Glendale Heights, Ill., however, it's not just what's in the pipe — manager Chuck Fonte and his team are prepared for almost anything the future might hold.

Forward-looking planning and operator-based improvements have put the plant in an enviable position of readiness, especially when it comes to safety. "We try to be proactive," says Fonte. "We want to anticipate regulations, take advantage of budgeting opportunities. And most of all, we want to make the jobs around here simpler and safer."

The Glendale Heights Water Pollution Control Facility grew out of an old package plant commissioned in the 1960s, before the spread of suburbia. The existing facility was built in 1988 to serve the 34,000 residents of this community, just west of Chicago. The plant is designed for an average daily flow of 5.2 mgd; actual flow runs about 3.5 mgd. Wet-weather capacity is slightly more than 10 mgd.

## POSITIVE PERFORMANCE

Moved by five 60 hp Flygt pumps (Xylem), wastewater enters the facility through Aqua-Guard fine screens (Parkson) and moves on to a PISTA grit removal system (Smith & Loveless).

Three primary tanks provide initial settling, and the overflow passes to an extended air, plug-flow aeration system, equipped with Sanitaire fine-bubble diffusers (Xylem). Aeration basin capacity is 3.73 million gallons.

Two 95-foot-diameter, 14-foot side water depth final clarifiers settle the secondary effluent before it is pumped to a gas chlorination step, followed by disc filters (WesTech). Sodium bisulfate is added at the outfall for dechlorination.

Solids withdrawn from primary and secondary clarifiers are pumped to an aerobic digester, actually part of the old package plant. Coarse-bubble diffusers provide the air. Two belt presses (Komline-Sanderson) dewater the digested material to a 17 percent solids cake. Contractor Synagro hauls the cake to farms about 40 miles west and north of the plant.

The disc filters are the most recent technology addition to the plant. The rails on the old traveling bridge filters, dating to 1978, had corroded, and the filters were losing sand, which was being sucked back to the headworks, clogging the grit system.

The village's engineer chose the filters because they closely fit the existing filter bays and matched the plant's hydraulic profile. Each of the three new units has 20 rows of 8-foot rotating discs, each holding 10 removable filter cartridges wrapped in 10-micron polyester woven material. Wastewater enters the filter drum, passes through the filter fabric and is discharged.

Fonte reports excellent performance: TSS averaging about 2 mg/L as opposed to 4 mg/L with the traveling bridge units, and a measurable reduction in electricity consumption.

Operator Dale Lukowski does monthly maintenance on the plant's PISTA grit turntable (Smith & Loveless).

## OPERATOR INNOVATION

As with other treatment plants, none of the technology works without operator attention and innovation, and this is where the staff comes in. The team includes lead operator Al Fajardo, operators Kevin Kurtz, Dale Lukowski and Bruce Kerill, lab technician John Pullia, and office technician Judy Kupka.

Fajardo in particular has enhanced the plant with creative solutions: "He makes improvements and makes things simpler to operate," says Fonte. For example, the secondary clarifiers at Glendale Heights are not covered, and algae frequently accumulated in the weirs and then released downstream, clogging the new filter cloths.

Enter Fajardo with a self-designed screen that now catches the algae before it gets to the filters. The screens are easily cleaned periodi-

## profile Glendale Heights (Ill.) Water Pollution Control Facility

| | |
|---|---|
| BUILT: | 1988 |
| POPULATION SERVED: | 34,000 |
| FLOWS: | 5.2 mgd design, 3.5 mgd average |
| TREATMENT LEVEL: | Tertiary |
| TREATMENT PROCESS: | Activated sludge, disc filters |
| RECEIVING WATER: | East Branch, DuPage River |
| BIOSOLIDS: | Aerobic digestion, dewatering, land-application |
| ANNUAL BUDGET: | $1.3 million (operations) |
| WEBSITE: | www.glendaleheights.org |
| GPS COORDINATES: | Latitude: 41°54'36.89" N; Longitude: 88°03'11.46" W |

Chuck Fonte, manager of the Glendale Heights Water Pollution Control Facility, at the secondary clarifier.

**Glendale Heights Water Pollution Control Facility PERMIT AND PERFORMANCE**

| | INFLUENT | EFFLUENT | PERMIT |
|---|---|---|---|
| **BOD** | 224.7 mg/L | 3.61 mg/L | 20 mg/L |
| **TSS** | 208.6 mg/L | 1.2 mg/L | 24 mg/L |
| **Ammonia** | 24.1 mg/L | 0.0379 mg/L | 3.0 mg/L |
| **Fecal coliform** | N/A | 6 cfu/100 mL | 400 cfu/100 mL |

cally, a much simpler and less expensive process than having to disassemble the filter discs and clean the media. It's just the latest in a series of improvements Fajardo has made around the plant.

The secondary clarifier algae issue had generated another problem because operators were dragging firehoses out to the units and jetting the algae off surfaces with high-pressure water. To avoid the tangle and make the operation simpler and easier, Fajardo designed a 2-inch galvanized pipe arrangement that surrounds the clarifier.

The pipe has several connections so that an operator can run a single hose from the non-portable hydrant to the mechanism, then connect a second hose to one of the valves. Now hoses don't have to be dragged around, catching in the grating.

"It was a three-person job," says Fonte. "Someone had to climb down the stairway each time and turn the water on and off. But now one operator can use one length of hose and bring it to each different valve connection and turn the water on." The same arrangement is now being used around the excess flow and primary tanks.

Also modified was the plant's coarse-bubble aerobic digester, an artifact of the old package plant. The decanters had become badly rusted and wouldn't

> "Regulations are continually being renewed and updated. That's one of the things that has sparked us: We want to stay up with or ahead of current legislation. We need to be out in front of changes at both the federal and state EPA, not behind."
>
> **CHUCK FONTE**

lower anymore. To solve the problem, Fajardo designed a pump system that decants the digester. A 240-volt explosion-proof pump is slowly lowered into the basin to pump out the decant. Ultimately, the plant team plans to upgrade to an automatic decant system.

The most recent Fajardo invention is helping in the solids handling area. A shuttle used to convey the dewatered cake to roll-off boxes that emptied into the trucks hauling the biosolids to fields. The trouble was that the shuttle dumped everything in the middle of the boxes. Fajardo came up with a small screw conveyor that spreads the cake evenly in the boxes. Operators no longer have to distribute the cake manually. "It's much less labor intensive," says Fonte.

## AHEAD OF THE CURVE

While seemingly small steps, these improvements make an impact when taken together, and they exemplify the plant's philosophy of anticipating issues. "Regulations are continually being renewed and updated," says Fonte.

*(continued)*


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The Glendale Heights team includes, from left, operator Dale Lukowski, plant manager Chuck Fonte, operator Bruce Kerill, office technician Judy Kupka, lab technician John Pullia, lead operator Alfonso Fajardo, and operator Kevin Kurtz.

"That's one of the things that has sparked us: We want to stay up with or ahead of current legislation. We need to be out in front of changes at both the federal and state EPA, not behind. We want to be prepared. We're also constantly looking at budgeting for new technologies."

The recession has lowered prices: "The disc filters came in at about half what we budgeted, so we were able to use the savings to upgrade our digester and SCADA system."

This level of foresight often results in Glendale Heights being the first or among the first to install new types of equipment. The disc filters were the first of their kind in the Midwest, and the plant continues to host visitors and operator groups who want to see the technology.

Glendale Heights was also one of the first plants to install new turbo blowers (APG-Neuros) supplied by distributor Drydon Equipment, placing them in both the aeration tanks and the aerobic digester basin. "We had lots of trouble with our old positive displacement blowers," says Fonte. "They were constantly breaking down and used a lot of electricity. We could run them only on high or low. Even though we installed a SCADA system, we could never properly ramp them up or down and keep a steady dissolved oxygen. Plus, belts were burning up.

"Now, no more oil or greasing. We change filters every two months — it's like changing your furnace filter. We have two blowers for aeration and can usually get by with one. We have another for the digester and may add one more in the near future as a backup."

The blowers are controlled and monitored by a new iFIX SCADA system (GE Intelligent Platforms) that makes plant operation much easier. "I can monitor everything from home," says Fonte. "We have setpoints on all major pieces of equipment, with alarms to our cellphones." The lab data merges with the SCADA system, giving the staff up-to-the-minute calculations and helping to maintain operations with no excursions or odor issues.

## BETTER DIGESTERS

Fonte's team is just beginning to make upgrades and improvements to its digester operation, mostly for safety. "We've been working with our fire department and have identified 26 confined spaces where we've installed high-visibility signage," Fonte says.

"We made sure those areas are adequately lighted at night, we changed stairways to eliminate steep inclines, and we added new vent systems. An automated decant level sensor has eliminated the need to go into the digester and record the levels."

To further improve safety, the plant plans to move away from gaseous chlorine to liquid chlorine. "We anticipate having to remove phosphorus next," Fonte forecasts.

The Glendale Heights staff performs all maintenance, but with the improvements, maintenance chores have been reduced and simplified. As a result, the plant has been able to use minimal workforce. "We're constantly looking at our budget for new things to make the job easier," Fonte says. "Currently we have two 100 gpm sludge pumps on our belt press. We're bud-

## SAFETY EVERYWHERE

Rachael Kaplan, Glendale Heights public works director for the last two-and-a-half years, was raised and educated in Britain, where the emphasis on safety is strong. That's one reason she and her division stress the safety and well-being of village employees in the departments she manages: the treatment plant, water and sewer systems, fleet and streets. "It's vitally important that we adopt and implement comprehensive safety policies and procedures," she says. The confined-space program is a good example.

At the treatment plant, some 26 confined spaces have been identified and analyzed for safety. The review begins with photos and layouts of the spaces, followed by corrective action and extensive training, which involves the facility staff along with the two fire departments that serve the community. "Our training program is conducted by an outside professional and ensures that the fire departments are trained on our equipment at our facilities," Kaplan says. "That way, if there's an emergency, they are familiar with what we have at the site."

Confined-space safety is also a concern within the other departments. In the water and sewer group, the centrifugal pumps at lift stations are to be replaced with submersible pumps, some with grinders, that can be raised out of the well for maintenance. Controls are at ground level, eliminating the need for workers to go down into the well spaces.

Another safety program involves "hot works," which include grinding and welding — any activity that involves a risk of fire or sparks. "The safety and well-being of our public employees is of utmost importance," concludes Kaplan.

Lead operator Alfonso Fajardo checks the tertiary filter (WesTech). The plant was the first in the United States to use the system, which can process 7 mgd.

geting for one pump rated for 200 gallons. By spending a little now, we save money in the long term."

Recently, Glendale Heights was recognized with The Conservation Foundation's Clean Water Award by the DuPage River Salt Creek Workgroup. The award went to the village and one other community for excellence in sanitary water treatment (based on 2011 effluent data).

Twice, the Glendale Heights facility has been nominated for Illinois Plant of the Year by the IEPA and the Illinois Water Environment Association. It hasn't won yet, but it's a safe bet that it's only a matter of time. **tpo**

"I can monitor everything from home. We have setpoints on all major pieces of equipment, with alarms to our cellphones."

**CHUCK FONTE**

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# A 'WIDE-ANGLE' VIEW

## DICK CHAMPION LEARNED TO LEAD HIS UTILITY WITH A BROAD PERSPECTIVE THAT INCLUDES A WATERSHED APPROACH TO WASTEWATER, STORMWATER AND DRINKING WATER

By Jim Force

AS DICK CHAMPION'S JOB HAS EXPANDED OVER THE last 40 years, so has his vision of water.

From wastewater operator and plant manager, to responsibilities for collections, stormwater and watershed management in his current capacity as water pollution control director for the City of Independence, Mo., he has adopted what he calls a "wide-angle" view of the water environment.

At 62, he continues to work and advocate for a holistic approach to watersheds, "so we don't force the next generation to inherit more infrastructure repairs because we didn't invest."

Taking time out from his busy schedule of organizing the fifth annual EcoFest — a hugely popular community gathering that emphasizes sustainability of water and other environmental systems — Champion thinks back over a career that has allowed him to touch all phases of the water management profession.

Dick Champion directs the Water Pollution Control Department in Independence, Mo. (Photography by Denny Medley)

### EVER CHANGING

"I got started with a part-time job at the old Rock Creek Treatment Plant in Independence in 1969," Champion reflects. "At the time I was thinking about law school, but I was fascinated with wastewater treatment."

He took a leave of absence to finish his degree in political science and public administration at the University of Central Missouri in Warrensburg, then returned to Independence in 1978 and was involved in the startup of the Rock Creek plant. "It was neat stuff," he says. "I was promoted several times and in 1983 became director of the Water Pollution Control Department."

He has held that position ever since, but his job has changed dramatically as he has taken on new responsibilities, invested his time in public education, and served nationally as board member and president of the National Association of Clean Water Agencies (NACWA), and for the last four-and-a-half years as chairman of the Clean Water America Alliance (CWAA).

"In the beginning, I was focused on wastewater treatment," Champion says. But then he was given responsibilities for the more than 600 miles of collections system in Independence. In 1990, as federal regulations began to require stormwater permits for communities of 100,000 or more, stormwater management came under his direction. That "opened my eyes," as he puts it.

### LOOKING TO THE WATERSHED

"The short story is that I started looking at the watershed through a wide-angle lens," he says in his razor-sharp, no-nonsense voice. "The city had experienced heavy rains in 1998-99. Flooding had an impact on our sanitary system, in the same neighborhoods where the sewer system served. Eventually, we were able to get a stormwater sales tax through the city, doubled our stormwater crew, and got better equipment."

Rather than hold a myopic view of wastewater, he adopted a total watershed approach, with concerns for sustainability and water's role in the quality of life in his community. "It was a career change for me," he says. Today, his department oversees 16 regional stormwater detention basins and is looking toward a future of green infrastructure that will feature "soak basins," rain gardens, wetlands, swales, and a "grow not mow" philosophy toward grass and native plants.

"Our improvements include intercepting rainwater at the right location and conveying it slowly," he says. "We don't want to pass this problem

"It's intuitive on my part, but you have to say it over and over again before people start to get the message. People really do care about the environment. Whether they put it into practice is another issue, but they really do care."

**DICK CHAMPION**

Dick Champion (left) visits with Larry White of the Independence Water Pollution Control Department, shown checking the pH of water at Independence Waterfall Park. Once an operator himself, Champion now leads his city's watershed-based approach to water quality (Thermo Electron pH meter by Thermo Scientific).

Champion (back row left) is shown with members of the Independence EcoFest Steering Committee: back row, Dan Montgomery, Independence Water Department; James Helgason, Missouri Department of Natural Resources; and Larry O'Donnell, Little Blue River Watershed Coalition; front, Larry White, Christine Smith and Tamara Bennetzen, Independence Water Pollution Control Department; Jeff Umbreit, Independence Parks and Recreation Department; and Kathy Coffman, Independence Power and Light Department.

## profile

### Dick Champion Jr., City of Independence, Mo.

| | |
|---|---|
| POSITION: | Water Pollution Control Director |
| EXPERIENCE: | 42+ years |
| EDUCATION: | Bachelor's degree, political science and public administration, University of Central Missouri, 1973 |
| CERTIFICATION | Class A wastewater and collections licenses |
| GOALS: | Knock down the silos between water, wastewater and stormwater; help the public understand the watershed and invest in infrastructure; make sure the utility is staffed with the right people |
| GPS COORDINATES: | Latitude: 39°06'48.12" N; Longitude: 94°27'39.97" W |

Champion conducts a meeting of the EcoFest Steering Committee. This annual environmental fair typically draws 500 to 800 people.

downstream. Spread it out and let it infiltrate."

Obtaining approval for stormwater funds and getting citizens to understand green infrastructure requires a lot of public education, an area where Champion truly lives up to his name. "He has always been on the forefront in reaching out and telling our story," says Lorraine Loken, who has headed public education for the Water Environment Federation and the CWAA.

The city's progress on stormwater is a good example. There was a need for change in public attitudes toward rainwater and snow melt. "This is a paradigm shift," Champion says. "Normally, our homeowners want their lawns to look like golf courses, and they want to transfer their problems downstream."

## LISTEN AND ACT

To gain acceptance of new policies, Champion listens to ratepayers and responds. "When we build retention basins, we ask the neighbors what they'd like to see in the way of flowers," he says. "Then we plant these different species on the slopes — not at the bottom, which just gets soggy. We make sure the berm matches the neighborhood, so there's a transition."

> "Our improvements include intercepting rainwater at the right location and conveying it slowly. We don't want to pass this problem downstream. Spread it out and let it infiltrate."
>
> **DICK CHAMPION**

In addition to plantings, Champion's department creates pods — small wetlands areas — for butterflies and hummingbirds. "No two basins are alike," he says. "We make sure the city property blends in with the neighborhood. We're getting smarter."

To broadcast the watershed message more widely, the city publishes a monthly newsletter that accompanies the utility bills, and Champion and his team members give numerous talks and presentations. "People don't get environmental degrees overnight," he reminds anyone within earshot. "Maybe they don't fully understand the watershed, but they're getting the idea. Over the last 10 years, people are starting to use the same words. We're making a difference.

"It's intuitive on my part, but you have to say it over and over again before people start to get the message. People really do care about the environment. Whether they put it into practice is another issue, but they really do care."

## ECOFEST

Champion's faith in his ratepayers is no doubt reinforced every summer at the city's EcoFest environmental fair, held at beautiful Waterfall Park. He chairs the steering committee for the event, sponsored by his department, various non-governmental organizations, and the State of Missouri Departments of Natural Resources and Conservation.

"It's all about water," Champion says. "We'll get between 500 and 800 people, mostly families, participating. That's the vision. Sustainability and future generations." The event includes 20 or more exhibitors who provide interactive experiences on watersheds, stream bank erosion, aquifers, water quality, rain barrels, wetlands, energy and the water-energy nexus.

Attendees can visit each booth to fill out a passport that entitles them to an EcoFest T-shirt. Along the way, they are entertained by performers like the Green Spirit Band, which fills the air with environmental songs, or Eco Elvis, a character who looks like and sounds like Elvis Presley but teaches environmental lessons.

## GETTING RID OF NASTIES

One successful event Dick Champion promotes, and that his department sponsors, is the annual Household Hazardous Waste Collection Day, even bigger than the city's EcoFest. "It's the largest single event we have and the largest in the Kansas City metropolitan area," Champion says. "We close off Independence Square — an entire city block — and enable citizens to unload all their nasty stuff."

Other city departments cooperate to make the event a success: "The police department helps with traffic. We work with the Kansas City household hazardous waste coordinator and a contractor for proper disposal. The local bomb squad is on hand."

The event runs from 9 a.m. to 1 p.m. "Citizens love it," he says. "This year, we collected over a million pounds of toxic and hazardous waste and kept it out of the landfill." About 90 percent of the material is recycled, and the rest is incinerated. The event celebrated its 15th anniversary in 2012.

Area elementary and middle schools compete in an environmental art contest. "The park is a perfect place, with waterfalls, ducks, geese," Champion says. "We get lots of press. Every year, the event just keeps getting bigger."

## NATIONAL WORK

While Champion is Missouri through and through, he has taken his passion for clean water to the national stage. For 13 years, he has served on the board of directors of NACWA, and he served as president in 2006. He now chairs the CWAA board of directors. He's passionate about the organizations' missions: to bring the various agencies dealing with water together to form and implement a unified policy on water sustainability — One Water, as CWAA likes to phrase it.

Champion observes that various agencies involved with drinking water and wastewater tend to speak in different languages. "We need to be bilingual," he says. "If we're really going to make a difference, we need to knock down the silos, change the paradigm. We need to speak with one voice. It's a new sandbox."

He sees NACWA and CWAA as having an impact: "We're starting to see public works departments talking with water departments, land developers, academia and commercial interests. We're starting to take a different approach to rainwater, stormwater and waste."

He believes the organizations have fanned enthusiasm for the water environment, but he recognizes that one size does not fit all. "While we're starting to speak with one voice, we recognize there are differences between the Southwest and the Northeast, the Northwest and the Midwest. We've promoted regional dialogs, webcasts. It's been very successful."

Another lesson: public-private sector cooperation. "We learned early on that a bunch of utility people can't keep running the show," he says. "We need businesses sitting with us to deal with innovation and funding." He advocates business advisory councils that bring a different viewpoint to the discussion. "There's greatness in diversity," he says.

Ken Kirk, executive director of NACWA, has worked closely with Champion in leadership positions. "He's truly a team player and person who speaks with his heart," Kirk says. "He has done an incredible job, working with the organizations across the water spectrum, focusing on the changing water paradigm — for the good of the country. He's a true friend of the environment and a statesman in every sense of the word."

## WHAT'S NEXT?

While it's hard to imagine someone so passionate about water hanging it up, Champion says he's beginning to "smell retirement." One of his goals is to make sure he leaves his utility with talented, capable people in the right positions. Beyond that, he says, he will absolutely eschew the proverbial rocking chair on the front porch.

Chances are you'll find him continuing to serve on national boards, campaigning for a unified approach to water, and speaking his mind. And if you're at the Independence EcoFest sometime in the future, he'll probably be there handing out the T-shirts. tpo

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"He's truly a team player and person who speaks with his heart. He has done an incredible job, working with the organizations across the water spectrum, focusing on the changing water paradigm — for the good of the country.

**KEN KIRK**

# Eye-Opening

## STIMULUS FUNDS HELP THE SCOTTSDALE WATER RESOURCES DEPARTMENT SEE THE POTENTIAL FOR ENERGY EFFICIENCY FROM SAVINGS FROM MORE EFFICIENT AERATION

By Doug Day

When the American Recovery and Reinvestment Act passed in 2009, officials with the Scottsdale (Ariz.) Water Resources Department were drawn to it by the availability of grant funding.

Scottsdale secured a grant through the U.S. Department of Energy for turbo blowers to replace multi-stage centrifugal blowers at two wastewater reclamation plants. The $1 million grant covered nearly the entire $1.08 million project, which went online in early 2012 after three years of planning and design by Valentine Environmental Engineers and installation by MGC Contractors, both local firms.

There is the potential to see as much as a 40 percent reduction in electrical use for process air requirements with the implementation of the turbo blowers, selected through a public bidding process.

"Since then, we've started looking at opportunities that aren't tied to stimulus funds," says Art Nunez, director of Water Reclamation Services.

### TOWARD OPTIMIZATION

Nunez has worked in Scottsdale, a suburb of Phoenix, for 20 years, during which time the city has built about $500 million in treatment infrastructure for drinking water and wastewater. "That was largely due to the growth this area experienced in the 1990s and early 2000s," he says. "In the growing mode, it's a matter of 'get it in the ground and figure out how to make it work.'"

> "Operators are inquisitive. They like new technology, and they get to learn something new."
>
> **ART NUNEZ**

The explosive growth has ended, so now the department can take time to optimize the systems. "As we're doing that, we're seeing more opportunities to save money on our electric budget, which is about $16 million a year for the entire department," Nunez says.

Scottsdale's 20 mgd Water Campus includes water reclamation and advanced water treatment plants. Commissioned in 1998, the facilities are the largest and newest wastewater treatment systems in Scottsdale. The water reclamation plant uses microfiltration and reverse osmosis to provide irrigation for 23 golf courses and a city-owned sports complex, and replenishes groundwater through more than 50 recharging wells.

Two of its four 400 hp blowers were replaced by 300 hp APG-Neuros turbo blowers at a cost of $771,000. The old blowers provided a steady airflow of 5,400 scfm, while the turbo blowers are rated at 3,600 scfm and can be turned down to match the wastewater flow. If the air demand exceeds the capacity of the new blowers, one of the older blowers is placed in operation.

Two 300 hp APG-Neuros turbo blowers will save the Scottsdale Water Campus wastewater treatment plant about 47.5 million kWh over the next 10 years, a reduction of about 40 percent. The units can be adjusted to match wastewater flows. The $771,000 cost was covered by a U.S. DOE grant through the American Recovery and Reinvestment Act.

PHOTOS COURTESY OF SCOTTSDALE (ARIZ.) WATER RESOURCES DEPARTMENT

The old turbines used 5.3 million kWh annually and could not be turned down to meet airflow needs. The reduced power needs of the adjustable turbo blowers will have a substantial impact in reduced electrical use and will offer the potential for a significant dollar savings based on current electricity prices, according to Nunez. Over 10 years, the energy savings are estimated at 47.5 million kWh, reducing 34,000 metric tons of greenhouse gases.

### RENEWING THE OLD

The 1.7 mgd Gainey Ranch Reclamation Plant, online since 1984 for irrigating a nearby golf course, was one of the state's first wastewater reuse facilities. Its three 75 hp/1,050 scfm blowers, which used 1.1 million kWh a year, were replaced with 50 hp/1,050 scfm APG-Neuros turbo blowers at a cost of $324,000. The project will save about $50,000 a year in electricity, save 6.4 million kWh in 10 years, and reduce greenhouse emissions by 4,600 metric tons over the next decade.

There is much less maintenance expense, as well, and the turbo units are noticeably quieter. "Historically, you go into a blower building and you have your earmuffs on and you're yelling to the guy next to you," says Nunez. "Now it's like standing next to a washing machine."

*(continued)*

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But it's not just the noise reduction operators like. "Operators are inquisitive," Nunez says. "They like new technology, and they get to learn something new." The blowers are controlled by the plant's SCADA system, which was updated to handle the new equipment. "They need a certain amount of backpressure, so the control side is a little different," Nunez notes. "They give us a lot more flexibility."

### KNOWN FOR INNOVATION

The staff also replaced the original Gainey Ranch jet aeration system with a fine-bubble diffuser system, which was not part of the DOE grant. "We knew we wouldn't get full advantage of the blowers with the old aeration system," says Nunez.

Scottsdale uses more than 6 million gallons of reclaimed wastewater every day for irrigation and another 4 million gallons for recharging groundwater in the desert community. A portion of its wastewater is conveyed to the regional 91st Avenue Wastewater Plant in Phoenix, which sends reclaimed water 50 miles to the Palo Verde nuclear plant for use as cooling water, helping to conserve valuable water resources in the region. The nuclear plant uses 20 billion gallons of reclaimed wastewater every year.

"The city of Scottsdale is very innovative," adds Nunez. "It's nice working for an organization that supports that kind of philosophy." tpo

## GENERATION ON THE HORIZON

Experience in saving energy through efficient equipment has prompted more interest in energy technologies at Scottsdale wastewater reclamation plants. One possibility being studied by Valentine Engineers is adding inline turbines to generate electricity, using the pressure of water flowing through pipes.

"We're pretty confident that we have at least a couple of applications," says Art Nunez, Water Reclamation Services director. "We have so many pressure zones in our water production and distribution system. The reclaimed water distribution system alone consists of five pump stations moving water 14 miles at 150 psi through 36-inch lines, so we're looking at all of that."

Also on the list is a large solar installation. "We're negotiating for a 3 MW solar project on the 145-acre Water Campus site that has a lot of open space," Nunez says. "Things look good, and it's looking like it may very well make sense." Such a deal would include a long-term purchased power agreement for a company that would build the facility at no cost to the city.

Besides reducing the energy bill, more onsite generation might help Arizona Public Service, the local utility, reduce demand on its system. For the past three years, the city has participated in the APS load curtailment program, in which the plants reduce their use during times of high demand in exchange for incentive payments. In 2011, the water department received rebates in excess of $160,000. "We continue to expand our involvement in that program each year and are looking at breaking a quarter-million dollars in rebates," says Nunez.

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# Quietly Effective

## LARGE-DIAMETER, LOW-SPEED FANS CREATE SILENT, NONDISRUPTIVE AIRFLOW THAT CAN GREATLY ENHANCE COMFORT AND IMPROVE PRODUCTIVITY IN TREATMENT PLANT WORKSPACES

By Christian Taber and Erin Hsu

The City of Tampa (Fla.) Advanced Wastewater Treatment Plant is a belowground facility that treats more than 96 mgd. Not long ago, employees were drawing unflattering analogies between their underground work site and a shoebox. "Once you dropped below grade, it got hotter and there was no breeze," says plant team leader Eddy Drovie. "It was just real stagnant and nasty."

Research has shown that people do their best work within a surprisingly narrow range of thermal conditions: Uncomfortable work environments are shown to decrease employee morale and productivity. Large spaces, as in many wastewater treatment plants, present a challenge to efficiently maintaining air movement and comfortable, consistent conditions using traditional heating, ventilating and air conditioning (HVAC) systems.

However, there is a middle ground between surrendering to the expense of air conditioning and losing productivity to comfort-related problems.

### BIGGER IS BETTER

It's common knowledge that feeling too hot makes people less effective at doing their jobs, but researchers have put science behind the observation. They have shown that worker productivity steadily decreases as temperatures rise above 77 degrees F.

PHOTOS COURTESY OF BIG ASS FANS

A vertically configured large-diameter fan helps maintain comfort conditions at the City of Tampa (Fla.) Advanced Wastewater Treatment Plant.

OSHA considers temperatures of 100.4 degrees F and above to be dangerous for workers, while air temperatures that exceed 95 degrees F significantly increase the heat load on the body,[ii] decreasing the body's ability to cool itself. In this instance, nondisruptive and nonturbulent airflow can augment natural evaporative cooling to make people feel more comfortable, boosting productivity.

Like those seen on airplane wings, the winglets at the ends of the fans' airfoils reduce efficiency-robbing turbulence at the tips. The central Air-Fence fins on the airfoils capture air that would otherwise slip off the ends. These design elements help large-diameter fans move large air volumes with low energy usage.

Thus, when it comes to cooling workspaces, bigger low-speed fans are actually quite a bit better than small high-speed fans. Large-diameter, low-speed overhead fans use efficient motors to move massive amounts of air silently and gently. Their effect is somewhat similar to that of a traditional ceiling fan that moves air quietly to help cool occupants of an otherwise stuffy house on a summer day.

The key to the effectiveness of large-diameter, low-speed fans is the huge volume of air generated by their airfoils with winglets, which generate air movement at floor level. Upturned winglets and precision airfoils direct the flow of air up and over obstructions on the floor, providing elevated air speed throughout the space, including directly underneath the fan.

Because the fans' airfoil systems are engineered for maximum air movement with minimum resistance, large-diameter, low-speed fans create dramatic airflow with great efficiency. A facility's cooling costs are directly related to the energy consumption of the equipment used to provide comfort, where energy usage depends on the size and number of fans, the horsepower ratings of the motors, and the hours of operation per week.

For example, with typical summer hours of operation, a 20-foot-diameter low-speed fan uses, on average, 5 to 10 kWh of energy daily, which equates to an energy cost of about 48 to 96 cents — a fraction of what air conditioners can require.

### BETTER QUALITY

As with many other products, the quality of today's large-diameter, low-speed fans bears little resemblance to predecessors. Recent innovations have led to simpler installation, quieter operation and longer life. Advancements have led to fans with on-board controls that significantly reduce the cabling required between the motor and the variable-frequency drive (VFD). This means minimal electrical noise and feedback.

Because the fans' airfoil systems are engineered for maximum airflow with minimum resistance, large-diameter, low-speed fans create dramatic airflow using extremely energy-efficient motors.

As the distance between the motor and the VFD increases, so does the likelihood that electrical noise will be a problem. Placing the motor and VFD close to each other greatly reduces electromagnetic interference (EMI) and radio frequency interference (RFI). In addition, precision gearing provided through advanced gearboxes reduces friction and noise, allowing for cooler operation and longer service.

## CAUTION: LOW CLEARANCE

These very large overhead fans are excellent air movers in large spaces, but what about smaller spaces or areas with numerous overhead obstructions, such as the City of Tampa Advanced Wastewater Treatment Plant?

For such cases, large-diameter fans are available in vertical, mobile packages. Mobility allows for flexibility in any environment, from open-air treatment plants to accompanying storage and maintenance facilities.

"We tried several small fans, and they were just not good enough," says Tampa's Drovie. The fans either took up too much space, were too noisy, or simply fell apart. The 6,900-square-foot Tampa facility now uses an 8-foot-diameter mobile vertical fan that workers can easily roll into different bays to provide large volumes of quiet, nondisruptive air movement in any direction, delivering extremely efficient cooling.

"The fact that you can move those fans around is a plus," said Drovie. "I think that's a big part of the reason why we chose this, along with its ability to cool."

## COLD CLIMATES, TOO

The usefulness of large-diameter, low-speed fans isn't limited to summer: Many large facilities in cooler climates install fans specifically for winter. Large-diameter, low-speed ceiling fans can destratify heat by moving large volumes of air without creating a draft. The steady mixing of air creates a uniform temperature throughout the space, including near the thermostat.

The thermostat setpoint remains the same, and the heating system simply works less hard to maintain that temperature. The energy saving achieved by reducing the heat escaping through the roof is similar to turning the thermostat down three to five degrees, and that can translate to significantly lower operating costs.

People recognized the cooling potential of air movement as early as the second century B.C. With electricity came the first electric ceiling fan in the 1880s. Fast forward 130 years, and precisely engineered large-diameter, low-speed fans have improved the science of air movement to bring year-round, energy-efficient comfort to wastewater treatment facilities and indoor workspaces of any size and type.


ABOUT THE AUTHORS

*Christian Taber leads the applications engineering team at Big Ass Fans, a manufacturer of large-diameter, low-speed fans based in Lexington, Ky. Erin Hsu is a copywriter for Big Ass Fans.*



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# Clear Improvement

## CLARIFIER EVALUATIONS HELP OPERATORS UNDERSTAND SOLIDS PROFILES AND FLOW PATTERNS AND MAKE PHYSICAL OR OPERATION ADJUSTMENTS TO IMPROVE CAPACITY

By Ted J. Rulseh

Clarifiers are often the limiting factor in a wastewater treatment plant's capacity, says John Esler, president of Clarifier Performance Evaluations in Enfield, N.H.

Esler and colleagues perform tests on clarifiers using tools from advanced measurement technologies to garage-built devices to create solids profiles and assess flow patterns and currents. Then they give plant operators recommendations on how they can improve clarifier performance by making structural or operational changes.

Esler talked about assessing and improving clarifier performance in an interview with *Treatment Plant Operator*. He was accompanied by Ron Wood, central regional manager with Xylem's analytics businesses, which include Royce Technologies, maker of a suspended solids analyzer used in clarifier evaluations to measure the sludge blanket and create complete clarifier solids profiles.

**tpo: What's the basic concept behind clarifier evaluations? What is the need in the market for such a service?**

**Esler:** A car has a carburetor that you can tune up to make the car go faster. That's what we do with clarifiers. Clarifiers are most often the limiting factor in a treatment plant. We evaluate those clarifiers. We do hydraulic evaluations, and we evaluate the solids to see how the clarifiers are working under different loadings.

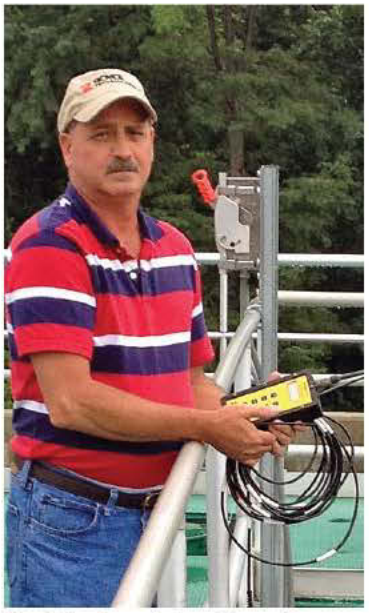
When we find out how they're working, we can address the weakest part of it, strengthen it, and get more gallons through. We look at how they're performing, and make whatever adjustments we can.

> "A car has a carburetor that you can tune up to make the car go faster. That's what we do with clarifiers."
>
> **JOHN ESLER**

**tpo: What exactly makes clarifiers a limiting factor?**

**Esler:** The major issue is hydraulics, and that's true in both circular and rectangular clarifiers. In either case, there's a current, like a current in a stream. It carries solids that you would like to see settle, but instead they get transported to the effluent. There's a density current from the weight of the mixed liquor settling, but there's also current that's created by the way the inlet is configured.

For example, the way the flow comes in the inlet of a circular clarifier, it can blow out the center of the clarifier. Operators never look there. They're trained to look with their core samplers at the mid-radius of the clarifier. Because of the way we sample with the Royce technology, we can see that the blanket is actually going down in the center.



Ron Wood, central region sales manager, Xylem Analytics (with Model 711 MLSS/ILA meter from Royce Technologies – a Xylem Brand).

John Esler, president, Clarifier Performance Evaluations.

**tpo: What exactly is the Royce technology and what are its benefits?**

**Esler:** It's a Royce Model 711 handheld, portable suspended solids/interface level analyzer. Some operators use it just to measure the blanket level. We use it to assess at every foot of depth at all sections across the clarifier. We create what we call vertical solids profiles. We read the milligrams per liter of TSS at every foot of depth all the way down to the bottom, so we can see how concentrated the solids are. But the main thing we can see is how the solids move as we stress the clarifier.

We do vertical solids profiles inside the center well and all across the clarifier. We start at seven o'clock in the morning, we do it again at nine, and we do it again at 11, while cranking flow to the clarifier. We stress the clarifier, pushing it to its limits, so we can see what its limiting factors are.

**tpo: From a technology perspective, how does this instrument work?**

**Wood:** The technology is based on light absorption. You have a sensor with a gap in it. Liquid flows through the gap, which has a light emitter on one side and a light detector on the other. A light beam is passed across the gap, and any solids present in the water will absorb light.

The sensor is on a cable marked in one-foot increments. You lower the sensor into the clarifier, and once you find the heaviest concentration of sol-

*(continued)*

"Nowadays, the question often is how to increase plant capacity because of storm flows and I&I. They own the concrete shape, and they want to get as many gallons as possible through it."

**JOHN ESLER**

ids, you know that's where the main blanket is. Then you pull the sensor up and count the cable markings.

**tpo: What kind of information can you get with this method that operators couldn't get with a core sampler?**

**Esler:** With this technology, we can actually quantify the solids in the clarifier. We can tell how many pounds are in there at 7 a.m., at 9 a.m., at 11 a.m. We can tell how much is in clarifiers 1, 2 and 3, and how the solids have shifted.

**tpo: Why would an operator have an evaluation done if the plant seems to be working fine and is meeting its permit?**

**Esler:** Maybe they want to try something different. They may want to compare Clarifier 1 to Clarifier 2. They may want to get more flow through the plant. In that event, how is it running now? What's the weak link? Nowadays, the question often is how to increase plant capacity because of storm flows and I&I. They own the concrete shape, and they want to get as many gallons as possible through it. That's where these evaluations come in. Once they've run an analysis, they know which direction to go.

**tpo: Is there more to an evaluation than solids profiling?**

**Esler:** Yes. We do dye studies so they can see how the flow picture is moving through the clarifier. We also do current measurements using a simple device called a drogue. Once we see how the solids are moving, how the currents are moving, and how the overall hydraulics are working, we write our conclusions and recommendations.

**tpo: How do the dye studies work?**

**Esler:** We put a slug of fluorescent dye into the mixed liquor channel and test effluent samples every five minutes with a fluorometer to see how the dye has progressed through the clarifiers. We use the data to create a flow curve showing the dye concentrations versus time.

"We would rather see a plant improve its four clarifiers to get 25 percent more capacity out of them than build a new one for $2 million."

**JOHN ESLER**

**tpo: What is a drogue and what is its function?**

**Esler:** You can make a drogue by getting a 2- by 3-foot sheet of aluminum from a hardware store, cutting it into four pieces, and putting two pieces together to make an X-vane. Then you go to a party store and buy a Styrofoam float and attach the two items together with a line with one-foot links in it. If you want to see what the flow is five feet down in the clarifier, you put five feet of links on it and monitor the flow as the device moves through the clarifier.

**tpo: What would be an example of an operational change a treatment plant might make as a result of your recommendations?**

**Esler:** Take draft tube clarifiers for example. After measuring the solids concentration coming out of the draft tubes, we may be able to tell the operators: On this arm, shut off tubes 1, 3 and 5; on the opposite arm, shut off tubes 2 and 4. In some cases we've actually reduced the volume of return activated sludge flow by 40 percent while increasing the pounds of solids returned by 40 percent, just by running thick tubes and not running thin tubes.

**tpo: Can you describe a specific case where a clarifier evaluation helped lead to a major improvement in plant capacity?**

**Esler:** The Hyperion treatment plant in Los Angeles had 150 mgd worth of secondary clarifiers and 450 mgd worth of primary clarifiers. The 450 mgd would go through the primaries, and 150 mgd would go through the secondaries. The balance would go around secondaries, and then they'd blend the flow and send it to the ocean.

The EPA then ordered them to provide secondary treatment for the entire flow. The upgrade was to include 36 round clarifiers. They built the first 16, and they weren't working as well as expected under wet-weather conditions — they were not meeting their effluent requirements. We were called in by an engineering firm to evaluate the clarifiers.

We tested a battery of four clarifiers. We were able to identify the mode of failure: As the flow increased, the clarifier's sludge blanket left the center and migrated to the outside, causing the return sludge concentration to decrease and the effluent solids concentration to increase to the point of failure. Without the Royce analyzer, we would not have been able to conduct as many tests and acquire the data necessary to identify the conditions inside the clarifier at the point of failure.

Once we classified the cause, we helped design a novel energy-dissipating inlet that drastically improved the clarifiers' performance and helped increase capacity by 10 mgd per clarifier. They implemented that solution on all 36 new clarifiers, delaying the need for an expansion of the secondary treatment system for the foreseeable future.

**tpo: Can clarifier improvements help reduce usage of treatment chemicals?**

**Esler:** We try to eliminate a "drug habit" if we can. Particularly these days in a biological nutrient removal plant, they have to reduce phosphorus loading, and that really means reducing TSS. You can crank a lot of "drugs" through to get the solids to settle, or you can get the clarifier to settle better and use less "drugs."

**tpo: At the most basic level, what would you say are the key benefits of these clarifier evaluations?**

**Wood:** I would say the key benefit is process improvement, and probably energy savings. In the studies John does, plants typically end up pumping heavier sludge and less water, and therefore pump less volume.

**Esler:** We show them a way to look at their clarifiers so that they can operate them better. They come away with a much better understanding of their clarifiers, and given that understanding they should be able to make improvements to their operations to get more gallons through the clarifiers. We would rather see a plant improve its four clarifiers to get 25 percent more capacity out of them than build a new one for $2 million. **tpo**

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# Wastewater Treatment Systems

By Briana Jones

## TURBO AERATOR

Turbo X-Treme aerator from Airmaster Aerator

The Turbo X-Treme aerator from Airmaster Aerator is a high-efficiency, floating/surface unit powered by an energy-saving 25 hp motor. It incorporates a turbo blower to achieve high-capacity water movement with maximum aeration and mixing in a discharge manifold.

The aerator raises the dissolved oxygen level in ponds or lagoons in varied applications. Made of stainless steel, the unit is built for reliable, long-term operation. **888/813-3680; www.airmasteraerator.com.**

Utility Service Barge from American Pleasure Products

## WORK BARGE

The Utility Service Barge from American Pleasure Products provides a safe work environment on water. The 8- by 12-foot platform offers high stability and flotation from two pontoons. The barge, designed for servicing wastewater treatment ponds and lagoons, has an aluminum frame construction with stainless steel hardware, a non-slip deck with nickel-plate vinyl for stability and easy cleaning, and a heavy-duty handrail.

Users maneuver the barge with a small gasoline or electric motor. Options include a 1,000-pound-capacity lifting crane, galvanized float-on trailer with tongue jack, life rings, and pivot arms used to secure the barge to aerator tubes when service is being performed on diffuser drop tubes. **989/685-2697; www.aquacycleusa.com.**

## MEMBRANE SYSTEM

Aqua UltraFiltration Membrane Systems from Aqua-Aerobic Systems

Aqua UltraFiltration Membrane Systems from Aqua-Aerobic Systems offer a compact, T-rack design, zero-break fibers, and no air scouring. The fibers are made of polyethersulphone (PES) with seven capillaries per fiber for high strength and a 0.02 micron pore size. The alternating top and bottom feed and inside-out filtration flow provide uniform filtrate and backwash flows to minimize plugging, chemical usage and cleaning frequency.

The membranes can be cleaned with acid instead of chlorine. Small, uniform pores provide high virus removal. The systems are designed for wastewater reuse and reverse osmosis pretreatment, drinking water applications, and other purposes. **800/940-5008; www.aqua-aerobic.com.**

## MEMBRANE BIOREACTOR

PuraM membrane bioreactor from Anua

The PuraM membrane bioreactor from Anua is available in a range of mobile prefabricated carbon steel or stainless steel tank configurations and treats flows from 7,000 to 125,000 gpd. Concrete tanks suit flows above 1 mgd. The unit uses an enhanced air scour flat-plate design.

The system uses ultrafiltration to achieve high-quality effluent that meets water reuse and total nitrogen standards in a compact footprint. The pre-engineered unit is designed for applications that require reliability, and low operational input through long periods between chemical cleaning, ease of maintenance, and simplicity. The unit uses no back pulsing, on-site chemicals or permeate pumps. Systems can operate aboveground or in-ground with a range of screening and pumping packages. Add-ons for phosphorus and enhanced nitrogen removal are available. **336/547-9338; www.anua-us.com.**

MACH bar screen from Fairfield Service Company

## RETURN BAR SCREEN

The MACH front raked, front/back return bar screen from Fairfield Service Company is offered in several designs to fit most applications requiring low headloss and high flow rates. The unit protects wastewater processing equipment by removing oversize debris. Chain-operated cleaning rakes intermesh with the bar rack and elevates debris to a discharge point where each rake is wiped off before descending on the return side.

The unit has involuntary squeeze protection that enables automatic obstruction clearing. When an obstruction is detected, the sensor causes the rake to change direction to dislodge it. If after a set number of directional changes the obstruction isn't cleared, the machine shuts down. With a stainless steel design and above-water drive mechanism, the unit offers high reliability and low maintenance. It can be coupled with the company's screw washer/compactor to maximize debris capture while minimizing the amount of debris for disposal. **219/872-3000; www.fairfieldservice.com.**

## AEROBIC/ANOXIC CYCLING

Phased Reactor technology from Kruger USA

Phased Reactor technology from Kruger USA provides biological nutrient removal performance. A flexible and simple operating strategy provides aerobic/anoxic cycling of the entire process volume in a continuous flow with no need for MLSS recycle pumping. The BIO-DENITRO process meets stringent total nitrogen limits efficiently and reliably. With the Block and Hong anaerobic selector, the system provides fully optimized biological phosphorus removal.

Time- and nutrient-based control allow operators to customize the phasing to meet specific needs and optimize the system to incoming flow and load in real time. Traditional configurations using oxidation ditches provide mechanical simplicity. Advanced systems with diffused aeration in deep rectangular tanks provide energy efficiency and a minimized footprint. **919/677-8310; www.krugerusa.com.**

## MASS FLOWMETER

Model ST51 mass flowmeter from FCI – Fluid Component International

The Model ST51 mass flowmeter from FCI – Fluid Component International measures biogas and all methane composition gases including natural gas. It uses a thermal mass, insertion-style flow element with flow accuracy to ± 1 percent of reading over a flow range from 0.3 to 400 SFPS, and repeatability of ± 0.5 percent of reading. The flow element can be used in 2- to 24-inch lines and operates over a wide turndown range.

The unit has no moving parts and a non-clogging design and operates over a wide flow range with low-flow sensitivity. Calibration is matched to the user's actual gas composition and installation conditions. **800/854-1993; www.fluidcomponents.com.**

## PROPELLER PUMPS

Flygt submersible propeller pumps from Xylem

Flygt submersible propeller pumps from Xylem move large volumes within low- to medium-head applications. The motor and hydraulics are integrated in one compact unit, enabling smaller, less complex and more cost-effective pumping stations. Operating submerged, they save space and avoid noise and motor cooling problems. With pump capacities from 4,000 to 120,000 gpm, the units fit applications including stormwater, raw water, and wastewater treatment plant effluent. Most units can be equipped with self-cleaning N-hydraulics that prevent clogging, reducing energy costs and downtime. **704/409-9700; www.flygtus.com.**

## MBBR PROCESS

ActiveCell Moving Bed Biofilm Reactor (MBBR) process from Headworks

The ActiveCell Moving Bed Biofilm Reactor (MBBR) process from Headworks uses thousands of polyethylene biofilm carriers in mixed motion in an aerated wastewater treatment basin. Each piece of media increases productivity by providing protected surface area to support the growth of heterotrophic and autotrophic bacteria. The high-density population achieves high-rate biodegradation in a package that is reliable and easy to operate. **877/647-6667; www.headworksusa.com.**

## COMPLETE MIX PROCESS

The Closed Loop Reactor (CLR) process from Lakeside Equipment Corporation is a modified form of the extended aeration complete mix process and provides biological nutrient removal using nonproprietary designs. Removal efficiencies meet and exceed those of advanced tertiary treatment processes. BNR configurations are available with in-basin designs for nitrification and denitrification, as well as an external selector configuration for Bio-P and total N removal.

Closed Loop Reactor (CLR) process from Lakeside Equipment Corporation

Controls can be provided to continuously monitor and adjust reactor operations to optimize performance and reduce power costs. A Magna Rotor Aerator provides oxygen and mixing to the basin reliably and efficiently. The system provides complete mixing for the aeration basins and highly efficient oxygen transfer. **630/837-5640; www.lakeside-equipment.com.**

## SUBMERGED MEMBRANE MODULE

PURON submerged membrane modules for MBR applications from Koch Membrane Systems

PURON submerged membrane modules for MBR applications from Koch Membrane Systems are available in models PSH1800, PSH600 and PSH300. PURON PLUS systems are comprehensive, packaged MBR systems for flow rates up to 200,000 gpd. Modular MBR systems are available for flow rates up to 1.8 mgd per train and fit almost any plant layout or required flow rate. The systems offer efficient design, high productivity and small footprints. New fiber chemistry improves solids rejection, increases sustainable permeability, increases flux and reduces fouling. **888/677-5624; www.kochmembrane.com.**

## THREE-STAGE BLOWERS

TT blowers from FPZ

Three-stage TT blowers from FPZ are quiet and capable of pressures over 12 psig. The direct-drive blowers require no maintenance and are oil-free. With airflows over 1,500 cfm and pressures over 12 psi, the units fit most aeration applications. Optional silencer locations maximize installation flexibility. The units are available in ratings from 1/3 to 50 hp. **262/268-0180; www.fpz.com.**

## BLOWER UNITS


BBC and FBC blowers from the Com-paK Plus line from Kaeser Compressors

BBC and FBC blowers from the Com-paK Plus line from Kaeser Compressors cover 3 to 150 hp and are available in STC (wye-delta start) and OFC (variable-frequency drive) versions. Units arrive ready for use and include all necessary sensors, starters and drives and an on-board controller. The units meet international and domestic performance and safety standards. The Omega Control 2, with an Ethernet port and built-in Web server, enables remote access and seamless integration into plant control/monitoring systems such as the company's Sigma Air Manager (SAM). **877/596-7138; www. kaeser.com.**

Fuchs self-aspirating aerators from Kusters Water

## SELF-ASPIRATING AERATORS

Fuchs self-aspirating aerators from Kusters Water can be used in lagoons, aeration basins and oxidation ditches. The shaft design uses tight tolerances and eliminates a lower guide or bearings, resulting in a lubrication-free system with low maintenance. The aerator can be installed on steel walkways, concrete walls or lagoon shores or provided with pontoons. The mounting design allows easy retrieval for maintenance and inspection. **800/264-7005; www.kusterswater.com.**

*(continued)*

## INJECTORS AND NOZZLES

Aeration at Work high-efficiency injectors and mixing nozzles from Mazzei Injector Company

Aeration at Work high-efficiency injectors and mixing nozzles from Mazzei Injector Company efficiently transfer oxygen from ambient air to a recirculating flow from an activated sludge digester. The two-phase flow is mixed with the bulk stream by MTM nozzles at the bottom of the basin or oxidation ditch. **661/363-6500; www.mazzei.net.**

## GAS TRANSFER DEVICES

Liqui-Cel Membrane Contactors from Membrana-Charlotte

Liqui-Cel Membrane Contactors from Membrana-Charlotte are modular gas transfer devices that use thousands of microporous hollow fibers to add or remove oxygen, carbon dioxide, nitrogen and other gases to or from different liquids. They are capable of $O_2$ removal to <1 ppb and $CO_2$ removal to <1 ppm. TOC/VOC and THM removal are also possible.

The units are used in the power and industrial markets, microelectronics, in municipal applications, and the beverage industry. The contactors are used to add gases to liquids, such as enhancing megasonic cleaning. **704/587-8888; www.liquicel.com.**

## MBR TECHNOLOGY

microBLOX membrane bioreactor (MBR) from Ovivo

The microBLOX membrane bioreactor (MBR) from Ovivo is simple to operate and optimize. The single-stage process uses one set of blowers to provide mixing, air scouring and process oxygen. For higher-strength waste, concentrated oxygen can be added to the process. Each system meets stringent nutrient limits. Online monitoring is available for ammonia, nitrates and phosphorus. The ready-to-operate system offers a small footprint with gravity or suction filtration. **512/834-6000; www.ovivowater.com.**

## MEMBRANE CLEANING

MeurerMBR MCP from Meurer Research

MeurerMBR MCP (mechanical cleaning process) from Meurer Research mechanically removes deposits on membranes. When small granules (beads) bounce back and forth throughout the membranes, removing the fouling layer, they are forced up along the sides of the membranes by the air-induced crossflow and settle back down by gravity. This nonchemical removal creates high-quality permeate, constant uptime and increased flux. **303/279-8431; www.meurermbr.com.**

## DENITRIFICATION SYSTEM

Xylem's Leopold elimi-NITE 2.0 denitrification system is a gravity-flow, deep-bed mono-media sand filter for removing nitrate and phosphorus without increasing TSS and BOD. A gas-release cycle automatically determines the optimum time to release the nitrogen gas from the filter. At the same time phosphorus, in solid form, is removed along with other solids. The unit can achieve filter effluent nitrate <0.5 mg/L, phosphorus <0.2 mg/L and TSS <5.0 mg/L with no increase in BOD at design loading rates. **704/409-9700; www.fbleopold.com.**

## SERVICE PROGRAM

Total Quality Service Packages for Premier Tech Aqua's Ecoprocess MBRs

Total Quality Service Packages for Premier Tech Aqua's Ecoprocess MBRs include fixed-free service, pre-scheduled visits or as-required service calls. The program includes four monthly maintenance visits after startup and comprehensive training for operations and maintenance personnel. The company also provides an operator-friendly control that adapts to flow changes in real time. Maintenance and sample services are customized to each customer's needs, and full inspection reports are provided after each visit. **800/632-6356; www.premiertechaqua.com.**

## BIOCHEMICAL OXIDATION

BIO ENERGIZER micro carbon complex from Probiotic Solutions

The BIO ENERGIZER micro carbon complex from Probiotic Solutions reduces sludge, odor, BOD/COD and FOG in wastewater treatment plants and lagoons. The formula biochemically oxidizes sludge and reduces the sludge blanket without draining, drying, dredging, handling or hauling. When used in activated sludge plants, the formula increases volatile solids destruction and improves decant volume and settleability. The formula uses the Micro Carbon Technology for maximum microbial stimulation to increase the production efficiency of treatment plants. **800/961-1220; www.probiotic.com.**

## OXIDATION DITCH

Xylem's Sanitaire BioLoop oxidation ditch

Xylem's Sanitaire BioLoop oxidation ditch provides energy-efficient aeration and mixing to maintain healthy biomass for oxidation and nitrogen and phosphorus removal. The fine-bubble diffused aeration delivers 6.0 to 8.0 lb $O_2$/hp-hr. The process typically includes aeration, submersible mixers, blowers, monitoring and process control with sludge age control, providing a flexible and simple design. It can accommodate stringent nitrogen and phosphorus removal regulations. **704/409-9700; www.sanitaire.com.**

## RAGLESS IMPELLER

Clean Edge ragless impeller from SPX Flow Technology, Lightnin brand

The Clean Edge ragless impeller from SPX Flow Technology, Lightnin brand, remains free of fibrous debris while delivering high blending performance. The unit does not foul, prevents rag accumulation, and keeps the mixer operating smoothly at design power and without vibration or tripping out from overload. It achieves steady and stable operation in difficult conditions. **888/649-2378; www.spxft.com.**

## COMPACT FAN PRESS

Rotary Fan Press from Prime Solution

The Rotary Fan Press from Prime Solution simplifies sludge dewatering with continuous pressure differential technology. Features include slow rotational speed (less than 1 rpm), semi-automated operation, self-cleaning, low maintenance, long service life, energy efficiency, portability, compact footprint and expandability. Few mechanical parts and slow revolution reduce noise and vibration, increase functionality, minimize maintenance and improve life-cycle costs. The simple, compact design allows easy installation. Skid-mounted systems include a central operator control panel, feed pump, polymer system and inline mixing. The unit is available as a trailer-mounted system. **269/694-6666; www.psirotary.com.**

Fuzzy Filter from Schreiber

## ALTERABLE FILTER

The Fuzzy Filter from Schreiber operates at a very high flux (40 gpm per square foot), is compact and modular, and fits many water and wastewater applications. The filter uses a 30-inch-deep media bed of 1.25-inch compressible fiber spheres and removes solids down to 4 microns. The porosity of the filter bed can be altered with the push of a button to suit influent characteristics by mechanically compressing the media. Media porosity and solids removal can be optimized to maximize effluent quality and run time.

The filter uses influent water to wash the media. Using violent air scouring in concert with wash water injection, the media is cleaned easily with 1 to 2 percent wash water with no media loss. The filter is available in flows from 0.13 to 3.68 mgd at a loading rate of 40 gpm per square foot. Applications include tertiary wastewater, prefiltration to RO systems and water reuse. **205/655-7466; www.schreiberwater.com.**

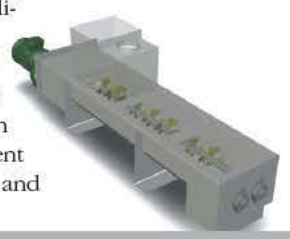
## MBR SYSTEM

TITAN MBR from Smith & Loveless

The pre-engineered TITAN MBR from Smith & Loveless delivers high-quality effluent for flows up to 3 mgd per tank. The unit combines wastewater treatment engineering with robust flat-plate membranes. Submerged in the aeration section of the unit, the flat-plate membrane maintains high permeability and flux rates even at peak-day rates. The system uses air scouring to prevent fouling. The membranes can easily be cleaned in place. The compact systems come in standard and custom designs and in flow capacities from 5,000 gpd to 3 mgd and larger. The system delivers effluent with less than 3 mg/L BOD, 1 mg/L TSS, 2 mg/L TKN and 1 mg/L NH3. **800/898-9122; www.smithandloveless.com.**

## LIME/SLUDGE MIXER

The MBV lime/sludge mixer from Sodimate has orientable paddle blades that efficiently mix lime and dewatered sludge. The mixer can be combined with sludge conveyors, sludge pumps and lime feed systems for an effective sludge stabilization process (Class B). Stainless steel construction makes it versatile for harsh municipal applications. Units can mix 0.5 to 15 tons/hr of dewatered sludge and can be trailer-mounted for remote treatment areas. The product is a homogenized and stabilized sludge with up to 30 percent dry solids. **773/665-8800; www.sodimate-inc.com.** tpo



MBV lime/sludge mixer from Sodimate

By Scottie Dayton

## Bioaugmentation enhances methane conversion

### Problem

Methane gas production was poor at a 29 mgd (design) water pollution control plant in northern Ontario, providing primary treatment, phosphorus removal, and anaerobic digestion for 100,000 residents. The plant uses the gas to mix biosolids in four digesters and to fuel four boilers that heat the tanks and plant buildings.

### Solution

Operators tested additive **BCP12 from Bionetix International** in Digesters 1 and 2 to boost conversion to methane-forming bacteria. The free-flowing granular powder has 5 billion microorganisms per gram along with biological nutrients and stimulants.

**RESULT**

The product increased gas production. Adding it to the four digesters during the heating season cost $25 per day, and the higher biogas volume saved the plant $200 per day in natural gas. **514/457-2914; www.bionetix-international.com.**

## Dewatering system controls solids

### Problem

When Max Conlin became general manager of the Liberty City (Texas) Water Supply Corp., the 15,000 gpd (design) activated sludge plant had not been upgraded since 1991. Treatment included a racetrack style aeration zone, an outside feed clarifier, and two 50- by 30-foot sand drying beds. Conlin tried for years to control the solids, but could not find an economic approach.

### Solution

The corporation purchased a 7-cubic-yard trailer-mounted **Sludge Mate dewatering container and a Poly-Mate polymer make-down system from Flo Trend Systems.** The unit dewaters 7,000 gallons at a time and produces biosolids cake at 14 to 17 percent solid.

**RESULT**

The cake is hauled to the landfill, enabling Conlin to control solids production economically. **800/762-9893; www.flotrend.com.**

## Emergency aeration eliminates sludge mat

### Problem

The 0.65-acre lagoon at the Lakewood Treatment Facility in Lake Odessa, Mich., received 0.9 mgd of influent with 730 mg/L BOD and 321 mg/L TSS. Two 50 hp aspirating surface aerators failed to oxygenate the lagoon sufficiently, and it became septic. A sludge mat surfaced and became so dense that it plugged the aerators and lifted them out of the water. Operators and the plant environmental consultant searched for ways to oxygenate the lagoon and control the strong odors.

### Solution

The plant purchased 12 **MARS aeration systems from Triplepoint Water Technologies** and installed them in two days. Each unit produces 5 to 7 pounds of oxygen per horsepower hour (lb/hp-hr) and mixes 6,585 gpm at 25 to 75 cfm airflow.

The diffusers have a central coarse-bubble tube surrounded by ten 750 mm fine-bubble tubes 12 inches above the lagoon floor. The units, installed from the surface, each sit on four weighted legs. A 50 hp Aerzen blower, throttled to 50 percent with a variable-frequency drive, supplies air.

**RESULT**

The aerators immediately began breaking apart the sludge mat and eliminated it after one day. The system uses only 25 brake hp (18.6 kW), amounting to energy savings of more than $34,000 annually. **630/208-0720; www.triplepointwater.com.** tpo

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## DSI offers webinar on benefits of eddy current drives

Drives manufacturer DSI Dynamatic will hold a webinar, "True Pump System Efficiency: The major cost advantages of electromagnetic eddy current drives," on Thursday, Nov. 29 at 3 p.m. Eastern time.

Presenters will be company representatives Anthony Anniballi and Gary Patterson. The webinar will demonstrate the technology comparisons and overall cost advantages of electromagnetic eddy current drives versus variable-frequency drives (VFDs), notably for medium-voltage water and wastewater adjustable-speed pumping and centrifugal blower applications. To register, visit http://www.tpomag.com/dsi.

## Kaeser opens factory-direct facilities, names manager

Matt McCorkle

Kaeser Compressors Inc. opened two factory-direct facilities. The branch offices in Wisconsin and Minnesota supply and support the company's product offerings. Matt McCorkle is manager of the new locations.

## Pasteurization Technology forms sales partnership

Pasteurization Technology Group signed a sales partnership with Cortech Engineering to act as a representative in Southern California and Nevada. Cortech will offer PTG's line of chemical-free and energy-efficient wastewater disinfection systems.

## Envirogen Technologies forms venture with Israeli company

Envirogen Technologies formed a venture with Israel-based Shikun & Binui Water. Shikun & Binui received exclusive rights to market portions of Envirogen's technology portfolio in Israel, including its bioreactors and biofilters. The companies will work together to develop projects in both industrial and municipal markets for drinking water treatment, groundwater treatment and remediation, wastewater treatment, industrial process improvement and vapor phase (air) treatment applications.

## Cummins supplies Tier 4 engines for Doosan generators

Cummins Power Generation will provide diesel engines for Doosan Infracore Portable Power's line of portable generators. The engines will enable Doosan to comply with the Tier 4 emission regulations of the U.S. Environmental Protection Agency.

## Fluid Imaging offers remote operation for analysis system

Fluid Imaging Technologies offers remote operation for its line of portable, benchtop, submersible and PV series FlowCAM imaging particle analysis system. Remote desktop operation enables lab managers, water/wastewater engineers, research scientists, process engineers and others to start running a sample, monitor its progress, adjust measurement parameters and analyze images and data in real time.

## ABB offers white paper on controlling water and wastewater flow

The ABB white paper *Controlling Water and Wastewater Flow* describes how low voltage AC drives can save up to 30 percent on energy costs and reduce harmonics, increase pump efficiencies, offer greater accuracy control and reduce maintenance. The white paper can be accessed at http://drives answers.com/68.

## Vac-Con launches municipal, contractor website

Vac-Con launched a website (www.vac-con.com) for the municipal and contractor markets. The site includes product demonstrations, equipment photos and product information as well as dealer information pages.

## Eurus Blower closes offices, relocates to Illinois

Effective Aug. 1, Eurus Blower closed its offices and warehousing in Suffolk, Va., and relocated to Wheaton, Ill. The company's new address is P.O. Box 4588, Wheaton, IL 60189. Its phone number is 630/221-8282 and fax number is 630/221-1002.

## CSE-Semaphore receives Class 1, Division 2 approval

CSE-Semaphore received Class 1, Division 2 approval of its TBox LP SCADA RTU for operation in hazardous areas, including natural gas installations and digesters or sewer lines in the wastewater treatment industry.

## Altra Holdings acquires Brazilian manufacturer, brands achieve ISO certification

Altra Holdings's subsidiary, Altra Industrial Motion Netherlands BV, acquired Lamiflex do Brasil Equipamentos Industrais Ltda. Headquartered in Sao Paulo, Brazil, the company manufactures high-speed disc couplings for oil, gas and mining. Lamiflex joins Altra's TB Wood's, Ameridrives, Bibby Turboflex, Ameridrives Power Transmissions and Huco Dynatork brands. TB Wood's and Ameridrives also received ISO 9001:2008 certification for quality management at their facilities in Erie, Pa., and San Marcos, Texas.

## UV Pure Technologies names directors of sales

Steve Buckley

Grant Thornley

UV Pure Technologies named Steve Buckley director of sales, engineered solutions for northern U.S. markets and Grant Thornley director of sales, engineered solutions for southern U.S. markets. Buckley is experienced in engineering, building and operating wastewater and water remediation applications. Thornley has 20 years experience in sales, marketing and business development in water treatment technology and UV disinfection technology.

## Koch Membrane names commercial director

Koch Membrane Systems, a division of Koch Chemical Technology Group, named Jack Noble commercial director, water and wastewater, for Europe, the Middle East and Africa.

## Moyno offers Annihilator series brochure

Moyno Inc. offers a brochure that describes its Annihilator Series 3 C3A channel grinder. The brochure provides detailed descriptions, key performance benefits, technical information and photos of the grinder.

## GSE Environmental featured on *World's Greatest!...*

GSE Environmental, manufacturer and provider of geosynthetic lining products and services, was featured on the *World's Greatest!...* television show on the ION Television Network. The show focuses on how the company provides environmental solutions to its customers. The episode aired in June and can be viewed at www.gseworld.com. **tpo**









## 1. ABB 600 HP PANEL DRIVES

The DCS800-EP panel drive from ABB is rated at 400, 500 and 600 hp at 460 VAC. The unit includes a drive module mounted on a multi-level subpanel, along with AC contactor, fuses and control transformer as standard and optional components. The drive is UL 508A listed and has a 65 kA short-circuit rating. It is pre-wired and pre-tested for smooth startups. **800/752-0696; www.abb.com.**

## 2. CUMMINS MOBILE GENERATORS

C150D6R and C200D6R mobile generator sets from Cummins Power Generation are certified to EPA nonroad Tier 4 interim (Tier 4i) emissions levels. Rated at 150 and 200 kW capacity, the generators feature sound-attenuated enclosures, camlock distribution panel for quicker cable connections, auxiliary fuel valves for external tank connection and three-position lockable voltage selector switch. **763/574-5000; www.cummins.com.**

## 3. ACCUSONIC TRANSIT-TIME FLOWMETER

The Model 8510 multiple-path, transit-time, backward compatible flowmeter from Accusonic Technologies is designed for challenging installations and measurement requirements associated with large pipes and channels. Measurable pipe and channel sizes range from 8 inches to 600 feet. **508/273-9600; www.accusonic.com.**

## 4. WILDEN HIGH-PRESSURE AODD PUMP

The HX400S high-pressure air-operated double-diaphragm (AODD) pump from Wilden is designed for the transfer of viscous, solid-laden slurries at high-discharge pressures. The pump can achieve a discharge fluid pressure of up to 250 psig and is available with a 1 1/2-inch inlet and discharge connections. Features include the EMS efficiency management system that enables the operator to dial in the actual operational parameters of the application demands. Other features include 62 gpm maximum flow rate and 125 psig maximum air inlet pressure. **909/422-1730; www.wildenpump.com.**

## 5. AIR SCIENCE DUCTLESS FILTRATION SYSTEM

The Vent-Box ductless filtration system from Air Science USA is designed to protect laboratory personnel from chemical vapors found inside stand-alone chemical safety cabinets. Fumes are pulled via a flexible hose connected to the cabinet and clean, filtered air is returned to the laboratory, eliminating the need for external ducting and minimizing loss of treated, conditioned air from the facility. **239/489-0024; www.airscience.com.**

## 6. HEMCO UNIFLOW SE FUME HOODS

UniFlow SE Aire-Stream fume hoods from HEMCO are UL 1805 certified and offered in 48-, 60-, 72- and 96-inch widths in either constant air volume or restricted bypass models. **800/779-4362; www.hemcocorp.com.**

## 7. CHEMINEER MIXER WITH RAGLESS IMPELLER

The Model 20 HT/GT mixer with RL-3 impeller from Chemineer work together to eliminate downtime and maintenance costs while increasing performance and extending the service life of the agitator. The ragless impeller is designed to prevent fibrous material buildup on the rotating impeller of the agitator and retrofits to existing agitators. **937/454-3200; www.chemineer.com.**

## 8. ENECON POLYMER COMPOSITE RUBBER REPAIR

FLEXICLAD ER is a two-component, 100-percent solids, trowelable polymer composite from ENECON. It is formulated to repair damaged flexible components such as conveyor belts, hoses, off-road tire sidewalls and expansion bellows. The material requires no primer, bonds to most rubber/flexible materials and cures at ambient temperatures. **888/436-3266; www.enecon.com.**

## 9. DIALIGHT ULTRA HIGH-EFFICIENCY LED LIGHT

The ultra high-efficiency SafeSite LED High Bay light from Dialight delivers 17,500 lumens at 172 watts. Made for use in hazardous and rugged locations, the light is designed as a replacement for up to 400-watt

conventional HID lighting fixtures and features a universal voltage range of 100-277 VAC, 50/60 Hz to 347-480 VAC, 50/60 Hz and T5 temperature rating. **732/919-3119; www.dialight.com.**

## 10. PENTAIR DIRECT AIR COOLING SYSTEM

The McLean direct air cooling system from Pentair Technical Products is designed for cooling electronics in diverse outdoor applications. An alternative to closed-loop cooling, the system features quiet, fan-based technology. Filtered ambient air is drawn into the enclosure to dissipate heat. The system is available in four models, ranging in size from 29 to 56 inches high, and available in aluminum, stainless steel and diverse paint options. Power options include 24, 48, 115 and 230 volts. **763/421-2240; www.hoffmanonline.com.**

## 11. NK TECHNOLOGIES CURRENT SENSING SWITCH

The TS current sensing switch and transducer from NK Technologies combines a limit alarm with an analog output signal transducer to monitor produced or consumed AC current up to 1,200 amps, while magnetically isolating outputs and input to maximize safety. A rotary switch enables users to set the trip point. DIN rail mounting simplifies installation and provides a secure mount that is resistant to conductor movement. **800/959-4014; www.nktechnologies.com**.

## 12. ULTRA ELECTRONICS MULTI-CHANNEL CONTACT CLOSURES

EOTec 2000 series multi-channel contact closures from Ultra Electronics-NSPI are designed to convert up to 10 contact closure inputs (switches, relays) into fiber optic signals for transmission over a single fiber optic link. Each module includes two inputs. An integrated backplane allows for communications between modules with no external intermodular connection. Power to all modules is derived from any standard EOTec 2000 power supply module through the integrated BUS connector, or from an external 24 VDC source supplied directly to the transceiver module. **512/434-2850; www.ultra-nspi.com.**

*(continued)*

# product spotlight

Energy self-sufficient stormwater holding tank from Festo

## Holding System Uses Renewable Energy for Remote Operation

By Ed Wodalski

Solar-powered module

The **energy self-sufficient stormwater holding tank from Festo** uses solar and wind energy to power a control unit and operate pneumatic actuators, controlling excess water from the sewer system during heavy rains and relieving pressure on treatment plants. When treatment capacity returns, gate valves on the tank can be remotely opened to drain the water. The pneumatic drives are corrosion resistant and can be used in explosive atmospheres.

The use of sustainable energy enables collection tanks to be located in areas without utility power supply and saves on the cost of grid connection. The system also stores energy. Should the power supply from one or both sources fail, a battery ensures operation for a defined period. Compressed air storage adds a failsafe function in case of total power supply failure.

Holding systems are site-specific and can be designed to fit local conditions, says company spokesperson Marc Roos. Using a remote access unit (mobile data network), systems can be controlled and monitored from a central location. Communication to the control unit is via a virtual private network (VPN).

Operators use a laptop computer to open and close the gate valves and monitor the system or integrate it to an existing control system. State values given by the charge controller are transmitted to the control unit every minute, including current in, current out, current load, current photovoltaic, system voltage, state of charge, pressure, temperature, compressor on/off and valve position.

The charge controller protects the battery from overcharging or depth discharging. Compressed air production times also are monitored. Data is transmitted to the control center, enabling leaks, power supply problems and other faults to be detected and rectified. The system requires minimal maintenance. Filters and the air dryer should be checked or replaced each year, and the compressor checked every 500 hours of operating time, Roos says. **631/435-0800; www.festo.com.**


## 13. RIDGID 600 SERIES TUBE BENDERS

The 600 Series bender from RIDGID can bend tubes 3/16 to 1/2 inch in diameter with bend radiuses from 5/8 inch to 38 mm. The two-stage handle system enables bends from 90 to 180 degrees without crossing handles, keeping bends in-plane and accurate. Features include visible gain marks to ensure properly aligned bending angles, extra-long handles for increased leverage, vise clamp block for extra stability and cushioned handle grips. **800/769-7743; www.ridgid.com.**

## 14. ALL-FLO DIAPHRAGM PUMP SENSOR

The All-Safe DRM (diaphragm rupture management) pump sensor from All-Flo Pump Co. instantly alerts pump operators in the event of a diaphragm rupture. The system has an early warning sensor installed between the PTFE overlay and backup diaphragm that detects a leak if the PTFE overlay becomes compromised and before fluid enters the air section. A second sensor is installed in the air section. Should both diaphragms become compromised, the sensor will detect fluid in the air section. The sensors can be configured to turn on a warning light, sound an audible alarm or trigger a pump shutoff. The sensor system is powered by 120 VAC. **440/354-1700; www.all-flo.com.**

## 15. HACH DR 6000 SPECTROPHOTOMETER

The DR 6000 UV-Vis spectrophotometer from Hach Co. features RFID technology, integrated QA software, 250 testing methods and guided procedures. RFID technology enables the unit to update the program's calibration factors automatically when the TNTplus reagent box is placed near the instrument. Results are analyzed and outliers – caused by scratched, flawed or dirty glassware — are eliminated. Other testing errors are eliminated by following the on-screen guided procedures, available for the most common 250 pre-programmed methods. Optional accessories include high-volume testing and integrated QA software for scheduling, documenting and interpreting quality control measurements. **800/227-4224; www.hach.com.**

## 16. SUBARU RGV INDUSTRIAL GENERATORS

RGV12100 and RGV13100T industrial generators from Subaru Industrial Products feature V-Twin Subaru engines with 11.4-gallon fuel tanks and offer 8.2 hours of continuous operation. The RGV12100 is powered by a 22 hp EH65 engine and delivers a maximum output of 12,000 watts. The RGV13100T is powered by an 18 hp EH63 engine and delivers 13,000 watts. **800/277-6246; www.subarupower.com.**

## 17. ENDRESS+HAUSER MULTICHANNEL TRANSMITTERS

Liquiline CM444 and CM448 multi-channel transmitters from Endress+Hauser are designed for monitoring and controlling processes in water and wastewater industries. The transmitters accept inputs from up to eight Endress+Hauser Memosens digital sensors, including nitrate, special absorption coefficient (SAC), pH, ORP, conductivity, dissolved oxygen, turbidity, free-chlorine and ion selective sensors. The device recognizes any combination of Memosens sensors and starts operating immediately. The sensors can be field upgraded at any time to accept additional inputs by plugging in additional modules. **888/363-7377; www.us.endress.com.**

## 18. FIBRELITE COMPOSITE TRENCH PANELS

A15 load rated 50 mm depth trench panels from Fibrelite are available in sizes from 800 to 1,600 mm long. Made of recycled glass fibers, the covers are a lightweight alternative to metal, offering access to sewage systems, underground pipework, drainage networks, electrical junction boxes, wastewater treatment plants and commercial fuel storage. The panels will not corrode and are not electrically conductive. **860/599-6081; www.fibrelite.com.**

## 19. WATSON-MARLOW CHEMICAL METERING PUMP

Qdos 30 chemical metering pump from Watson-Marlow delivers 5,000:1 flow from 0.002 to 8.0 gph at 100 psi while integrating through IP66 manual, analog and Profibus control options. There are no seals or valves in the flow path to clog, leak or corrode. Fully sealed, the chemical meter can handle caustic, abrasive, viscous, shear-sensitive, gaseous fluids or slurries containing suspended solids. Control features include fluid level monitoring, fluid recovery, line priming and intuitive flow calibrations. **800/282-8823; www.wmpg.com.**








## 20. PARKSON AQUA GUARD ULTRACLEAN SCREEN

The Aqua Guard UltraClean screen from Parkson is designed to reduce downstream clogging by up to 50 percent over previous models. Features include an independent brush drive, second spray bar and hybrid brush design. The new brush is wider and includes longer bristles to penetrate deep into screen elements, along with rubber strips that prevent long rags and hair from twisting around the brush. **888/727-5766; www.parkson.com.**

## 21. INTEGRA 24X24X10 NEMA ENCLOSURE

The 24x24x10 NEMA 4X, UL-rated enclosure, part of the Genesis line of non-metallic units from Integra Enclosures, is made of high-impact, UV-resistant polycarbonate and features an adjustable swing panel system for flexible interior mounting. **440/269-4966; www.integraenclosures.com.**

## 22. WESTFALL MODEL 3000 FLOW CONDITIONER

The Model 3000 flow conditioner from Westfall Mfg. features two sets of tapered and curved vanes with precise geometrics and positioning to eliminate swirl and turbulence. The unit mounts directly into a pipeline and produces a fully developed velocity profile within six diameters downstream. The flow meter is available in sizes from 1/2 to 120 inches in diameter and is two diameters long. The unit can be fabricated from PVC, FRP, 316 stainless steel or with or without a Teflon coating and other engineering materials. **888/928-3747; www.westfallmfg.com**.

## 23. KSB SUBMERSIBLE PUMPS

The Amarex N submersible pump from KSB is available in eight models. Applications include wastewater treatment, sludge treatment and wastewater transport, including fluids containing long fibers and solids, fluids containing gas/air, raw, activated or digested sludge, drainage or water extraction and drainage of rooms subject to flooding. Grinder pumps with 2-inch discharge feature an S-type impeller to macerate and grind solids, carrying them through the pump for discharge. Vortex pumps feature an F-type impeller with discharge sizes from 2 to 4 inches. The KRT series has a closed-loop cooling jacket that does not use pumped media for cooling the motor. It avoids clogging, while providing lubrication to a double mechanical seal system for extended service life. It also dissipates heat, even if the submersible motors are completely exposed to the air, enabling the pump to work continuously at low water levels. **804/222-1818; www.ksbusa.com.**

## 24. HAYWARD SPRING RETURN MANUAL LIMIT SWITCH

Spring Return "dead man handle design" LHB Series manual limit switches from Hayward Flow Control are designed for critical applications requiring compliance to safety standards or plant specifications where the valve must return to a closed position after operation. The spring return ensures the handle will always return to its original starting position. The spring return fits all sizes of Hayward TB Series ball valves and up to 8-inch BY Series butterfly valves. **888/429-4635; www.haywardflowcontrol.com.**

## 25. LARSON ELECTRONICS CORROSION-RESISTANT LED LIGHT FIXTURE

The HAL-48-2L hazardous location LED light from Larson Electronics is designed to replace or upgrade lamps for higher output and longer fixture life. Made of copper-free aluminum with corrosion-resistant high-gloss aluminum reflector assembly, the fixture is designed for environments where wetness and corrosion are present. Class 1, Division 2 approved, the light also is suitable for environments where flammable chemicals and vapors may be present. **800/369-6671; www.magnalight.com.**

## 26. BLACOH HIGH-PRESSURE PULSATION DAMPENERS

Sentry XPA high-pressure pulsation dampeners in 316L wetted stainless steel from BLACOH Fluid Control feature a threaded end cap that replaces retaining rings on original XP models. Larger multiple threads enable the grip area and shear allowance to withstand allowable working pressures up to 7,500 psi. The dampeners are available in 8, 12 and 24 cubic inches and a variety of pressure ratings. **800/603-7867; www.blacoh.com.** tpo

# people/awards

A wastewater treatment design by **Timmons Group Inc.** (Richmond, Va.) was awarded the System of the Year by the Virginia Rural Water Association.

The Water Environment Federation announced the following award recipients at the WEF Awards and Presidential Celebration Reception:

- Collection Systems Award, **John Larson**
- Emerson Distinguished Service Award, **Albert (Al) B. Pincince, Ph.D., P.E., BCEE**
- Engelbrecht International Achievement Award, **Brian Evans**
- Fair Distinguished Engineering Educator Medal, **Prof. Perry L. McCarty**
- Gascoigne Wastewater Treatment Plant Operational Improvement Medal, **Justin deMello**
- Innovative Technology Award, SL-RAT, **InfoSense, Inc.**; Bio-Dome (aka Poo-Gloos), **Wastewater Compliance Systems, Inc.**; Model 4100 Liquid Vacuum Doser, **JCS Industries, Inc.**
- Member Association Safety Award, **California Water Environment Association**
- Morgan Operational Solutions Award, **Robert James Baur**
- Outstanding Member Association Award, **Georgia Association of Water Professionals**
- Public Education Award, **Andrew Sullivan** (individual category), **Indiana Water Environment Association** (member association category)
- Public Officials Award, **James A. Hanlon, Roy Rogers**
- Rudolfs Industrial Waste Management Medal, **Kar Munirathinam, Rangesh Srinivasan, Jeff J. Tudini, Tom A. Sandy** and **Tim D. Harrison**
- Schlenz Public Education Award, **Dr. Samuel Lee Hancock**
- WEF Canham Graduate Studies Scholarship, **Matthew Seib**

The City of Westminster, Md., announced the following:

- **Joe Appel** of the Wastewater Treatment Plant received his Class 5 Wastewater Treatment License.
- **Zac Amoss** of the Utility Maintenance Department received his Water Distribution License.
- **Ryan Gladhill** of the Utility Maintenance Department received his Wastewater Collection License.
- **Matt Knox** of the Utility Maintenance Department received his Five Year Service Award.


Joe Appel


Zac Amoss


Ryan Gladhill


Matt Knox

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

## Canada

The Atlantic Canada Water & Wastewater Association has a Wastewater Collection Seminar from Nov. 13-16 in Halifax, Nova Scotia. Visit www.acwwa.ca.

## Florida

The University of Florida Center for Training, Research and Education for Environmental Occupations has an Activated Sludge Process Control and Troubleshooting Seminar from Oct. 30-Nov. 1 in Gainesville. Visit www.treeo.ufl.edu/water.

## CALENDAR OF EVENTS

**Oct. 29-Nov. 1**
Alaska Rural Water Association Annual Training Conference, Sheraton Hotel & Spa, Anchorage. Visit www.arwa.org.

**Nov. 1**
Missouri Water Environment Association Fall Conference, Columbia. Visit www.mwea.org.

**Nov. 11-14**
North Carolina-American Water Works Association WEA Annual Conference, Raleigh, N.C. Call 919/784-9030 or visit www.ncsafewater.org.

**Nov. 13-14**
Georgia Association of Water Professionals Fall Conference & Expo and Laboratory Symposium, Northwest Georgia Trade and Convention Center, Dalton. Visit www.gawponline.org.

**Nov. 13-14**
Kentucky-Tennessee Water Environment Association Wastewater Technology and Collections Conference, Bowling Green, Ky. Visit www.kytnwea.org.

**Nov. 14-16**
Indiana Water Environment Association Annual Conference, Westin Hotel, Indianapolis. Visit www.indianawea.org.

**Feb. 4-6**
New York Water Environment Association Annual Meeting and Exposition, New York Marriott Marquis. Visit www.nywea.org.

## Kansas

The Kansas Water Environment Association is offering the following courses:

- Nov. 1 – Applied Math for Wastewater Operators, Dodge City
- Nov. 6 – Intro to Water and Wastewater Operators, Liberal
- Nov. 7-8 – Advanced Wastewater Treatment, Ft. Scott
- Nov. 7-8 – Basic Electrical Maintenance and Troubleshooting, Junction City
- Nov. 8 – Special Topics-Ultrasound and Ultraviolet, Dodge City
- Nov. 13 – Intro to Water and Wastewater Conveyance, Syracuse
- Nov. 16 – Small Wastewater Systems, Phillipsburg
- Nov. 28-29 – Math for Operators, Kansas City
- Nov. 30 – Wastewater Treatment, Dodge City
- Dec. 4 – An Examination of Your Ethics, Hays
- Dec. 5-6 – Advanced Electrical Maintenance and Troubleshooting, Lawrence
- Dec. 5-6 – Wastewater Concepts, Olathe
- Dec. 6 – An Examination of Your Safety, Hays
- Dec. 11 – Special Topics-Ultrasound and Ultraviolet, Garden City
- Dec. 12-13 – Wastewater District School, Emporia
- Dec. 20 – Small Wastewater Systems, Scott City
- Dec. 27 – Special Topics-Corrosion, Dodge City

Visit www.kwea.net.

## Michigan

The Michigan Water Environment Association has a Process Seminar on Nov. 7 in East Lansing. Visit www.mi-wea.org.

## Nebraska

The Nebraska Water Environment Association has a Wastewater Certification Training Session Nov. 13-15 in Lincoln. Visit www.ne-wea.org.

## New York

The New York Water Environment Association is offering the following courses:

- Nov. 7 – Nutrient Removal Technology and Process Optimization, Lyons
- Nov. 28 – Pump Hydraulics, Selection, Sizing and Controls, Hazen and Sawyer
- Nov. 29 – Sustainability, Williamsville

- Dec. 5 – Fundamentals of Wastewater Asset Management, Hazen and Sawyer
- Dec. 12 – Sustainability, Hazen and Sawyer

Visit www.nywea.org.

## Ohio

The Ohio Water Environment Association is offering the following courses:

- Nov. 1 – Biosolids, webinar
- Nov. 15 – Plant Operations, Cincinnati
- Dec. 6 – Biosolids Workshop, Lewis Center

Visit www.ohiowea.org.

## Wisconsin

The Wisconsin Department of Natural Resources is offering the following courses:

- Nov. 6 – Personal Protective Equipment, Baraboo
- Dec. 4 – Permit-Required Confined Space Entry, Plover
- Feb. 18-22 – General Wastewater Treatment Intro and Advanced, Chippewa Falls

Visit dnr.wi.gov.

The University of Wisconsin Department of Engineering-Professional Development is offering a Sanitary Sewer and Collection System Engineering Seminar Dec. 4-6 in Madison.

Visit http://epdweb.engr.wisc.edu. **tpo**

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

# tpo Marketplace Advertising



# tpo CLASSIFIED ADVERTISING

NOVEMBER

## BUSINESSES

Neighborhood Waste Water is looking for acquisitions! Massachusetts preferred but will consider all New England. Contact Todd at mcmahon@arrayfs.com, or leave message at 781-829-0014. (P11)

## DEWATERING

Seriously!! Are you still trying to dewater using a "box, bed or belt"? I have a better way. Check out ITRDewatering.com then call, or better yet, come watch it work!!! Also works great on straight grease! 317-539-7304, IN. (P12)

## DRAINFIELD RESTORATION

Soil Shaker 2000. Universal skid steer attachment for drainfield restoration. Buy factory direct. $6,250. www.soilshaker.com or call 320-293-6644. (P1-12)

2008 Terralift: Like new, only 29 hours, 3-6' probes, newer model body style, used for compacted septic drainfields. $20,000/OBO. 269-838-1145, MI. (P01)

## EDUCATION

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

## MISCELLANEOUS

UV DISINFECTION EQUIPMENT: Attention small wastewater treatment plant owners and operators. Very easy installation. Brand new product. US patent pending. callagher@sbcglobal.net, www.thefecalfighter.com. (oBM)

## POSITIONS AVAILABLE

City of St. Petersburg, Florida, Water Reclamation Plant Operator III (IRC25073): $41,368-$62,915 DOQ, open until filled, Florida Wastewater Operator "B" or "A" license and valid Florida DL required. www.stpete.org/jobs. See detailed requirements and apply online or mail resume to Employment Office, PO Box 2842, St Petersburg, FL 33731, EOE/DFWP/Veterans' Preference. (o11)

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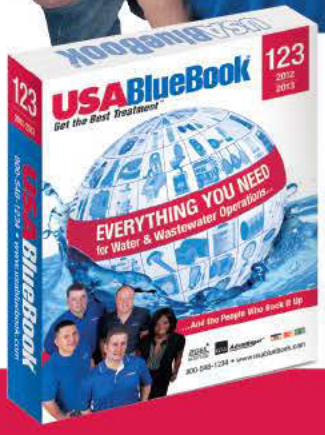


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