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on the cover

Steve Fiepke, chief plant operator of the Village of Algonquin (Ill.) Wastewater Treatment Facility, leads an ingenious team that has achieved substantial nutrient reduction, cut chemical usage, and much more. Fiepke is shown near the plant's enhanced biological phosphorus removal process.

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let's be clear

The Dear Departing

HERE'S A WORD OF THANKS AND RECOGNITION TO THE CLEAN-WATER PROFESSIONALS WHO ARE RETIRING IN LARGE NUMBERS. THEY DESERVE A LITTLE BIT OF FANFARE.

By Ted J. Rulseh, Editor

It's been estimated that some 1,200 World War II veterans die every day. It makes me wonder how many clean-water operators now retire daily, since so many are nearing that point in their work lives.

In a way it's not appropriate to make a correlation between soldiers and wastewater professionals. But in another way it's fair to question why so many in clean-water careers will retire with little notice beyond their professional circles. In their own way, they are heroes.

This commentary is inspired by a story in this issue of *Treatment Plant Operator* about Bill Nester, a 45-year professional, retiring as executive superintendent of the Upper Montgomery Joint Authority in Pennsylvania. He and the facilities he has operated and managed have won a list of awards too long for us to publish. Yet how many people in his community know him, let alone know all he has done?

JUST ONE OF MANY

And the thing is, Bill Nester is not unique. I'm guessing he would be the first to say that many others in the profession are just as dedicated and just as accomplished as he is. Yet, when they leave the scene, the world will (to borrow a phrase from Abe Lincoln) "little note nor long remember."

What we're about to see in the next several years is the departure of an entire generation of clean-water operators, many of whom started in the business after passage of the original Clean Water Act.

Look at all that has happened in the last four decades because of the treatment plants they ran. Rivers and streams reborn. Smallmouth bass where there had been only carp and bullheads. An entire Great Lake rejuvenated in an incredibly short time. Year by year, more water bodies fishable and swimmable. And more progress still being made.

It's not all the operators' doing, of course. The impetus for all this progress came from citizens who rallied around Earth Day, from enlightened legislators who passed the laws,

Many operators are probably content just to ride quietly off into the sunset when they retire. But it would be good for them, and good for the industry, to see them get a little pat on the back on the way.

and from government agencies that created and enforced the regulations.

Engineers designed the treatment facilities. Contractors built them. Manufacturers produced the equipment and kept offering new and more cost-effective technologies. Taxpayers and ratepayers supplied the funds to make it all happen.

ON THE FRONT LINES

And yet it was the operators who kept watch, making it all work. They purposely turned away from more glamorous careers to dedicate themselves to clean water. Or they went to work at a treatment plant "because they needed a job," and in so doing found a lifelong calling.

To borrow another phrase from a time of warfare (in this case from Winston Churchill), seldom has so much been "owed by so many to so few."

Today, the Honor Flight program is recognizing World War II veterans — much belatedly — by taking thousands of them to visit that war's memorial in Washington, D.C. Clean-water operators don't want or expect to be honored on anything like that scale. But as they retire, don't they deserve some note of thanks?

RECOGNIZE THEM

And with that, here's an offer. Send us news of people retiring from your organization. It doesn't have to be the executive director, plant manager, or chief operator. It can be anyone who has been a major contributor.

Send us a picture of the person, along with a short note describing his or her background and accomplishments, and stating why he or she deserves appreciation. We would love to publish one or more of these items in every issue.

And while you're sending the information to us, send it also to your local newspaper and radio or TV station. You might be surprised at how receptive they are to publishing it. In some cases they may even follow up with a feature story.

Many operators are probably content just to ride quietly off into the sunset when they retire. But it would be good for them, and good for the industry, to see them get a little pat on the back on the way.

Send your notes to me at editor@tpomag.com. I promise to respond to each one, and we pledge to publish as many of them as we can. Let's work together on this little task to give some credit where it's due. **tpo**

Going Global, Staying Local

A COLORADO TREATMENT PLANT USES WORLD WATER MONITORING DAY TO TEACH STUDENTS AND THE PUBLIC THE IMPORTANCE OF KEEPING WATER CLEAN

By Diane Gow McDilda

World Water Monitoring Day (WWMD), an educational event held in the fall, lets students take a scientific look at water quality in their own neighborhoods. It's a global look at local concerns.

The City of Englewood, Colo., just south of Denver, brings the message home in a big way. "World Water Monitoring Day is our primary outreach program," says Jim Tallent, operations division manager for the Littleton/Englewood Wastewater Treatment Plant.

"We've been doing it here since 2004. In conjunction with World Water Monitoring Day, we have Water Expo. We have exhibitors from the U.S. Geological Service, Water for People, representatives from other water districts, and people from our treatment plant. The presenters focus on water impacts, from industrial contributors to stormwater, urban drainage and other watershed impacts."

HANDS-ON PRACTICE

As participants in WWMD (officially celebrated worldwide on Sept. 18), students collect samples from the South Platte River and measure temperature, pH, dissolved oxygen and turbidity. They get a taste of collecting and tabulating scientific data, noting conditions like weather and temperature, performing tests and reading results. It keeps their hands busy and minds engaged, so much so that even inclement weather hasn't deterred them.

"We used to do the event in October, but we moved it back to September because of snow," says Tallent. "The kids would come back from the river all wet. They didn't seem to mind, but we did."

Attendance is high, so careful scheduling is needed to make sure everyone gets through and the event runs smoothly. "We can't have 300 people all show up at the door at once," says Tallent. "We rotate everybody through. Some groups come earlier, some later. And then we split up, half at the river and half at the Expo."

St. Mary's Academy Middle School students sample water with Jon Bridges, industrial pretreatment specialist.

MIXING IT UP

Because ages span fourth grade to high school, Tallent and his group are comfortable modifying their presentation as needed. "High school students used to see this as a day to get out of class, but now they have to do reports on what they learn here," says Tallent.

"The older students grasp more technical stuff than the younger kids do. When we're out there sampling in the river, we will quiz them, asking them what will happen if the oxygen is low or the pH is high. That way, the data we are collecting means something."

PHOTOS COURTESY OF LITTLETON/ENGLEWOOD WASTEWATER TREATMENT PLANT

Girl scouts take river water samples during World Water Monitoring Day.

And younger students appreciate the characters added to the program last year. Caleb Vannice, industrial pretreatment technician, and Natalie Plegge, industrial pretreatment specialist, play the part of River Rangers. Wearing special ranger hats, they accompany groups down to the river and answer questions from students or their chaperones.

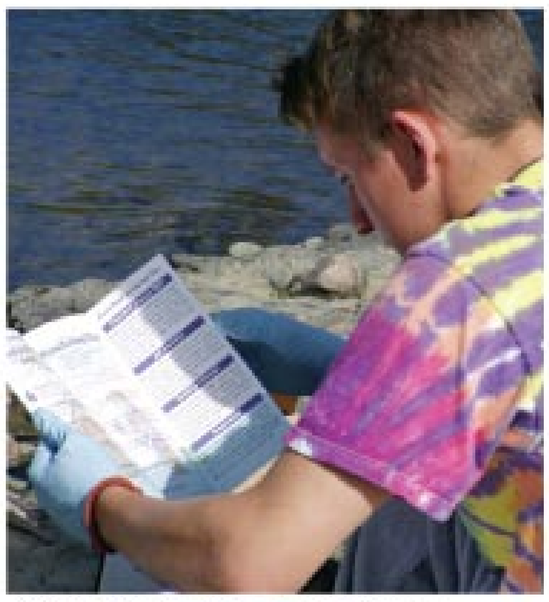
Then there is Dr. H_2O, played by Phil Russell, the plant's environ-

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.**

mental analyst. Wearing a white lab coat and Einstein-like wig, he takes on the persona of a mad but happy scientist. He works at the treatment plant booth and gives the microbial section of the presentation, where microorganisms found at the treatment plant project onto a large screen. "Dr. H_2O answers questions about the protozoa and bacteria that really do the work here at the plant," says Tallent.

And no event geared toward students would be complete without a movie and popcorn. "You've got to have food," jokes Tallent. "We have a home theater set up. We show a video and PowerPoint presentation so the students can see firsthand what happens in a wastewater treatment plant."



A St. Mary's Academy Middle School student conducts a dissolved oxygen test.

A LITTLE SLEUTHING

Another learning experience requires a bit of detective work. The pretreatment exhibit asks students to investigate pollution that's showing up at the treatment plant, find the source, and figure out how to eliminate it.

Water districts from around the region test the students, not on their knowledge, but their taste buds. They set up a blind study and ask the kids to rank different water samples, comparing municipal water from the tap to bottled water.

Casey Davenhill of Cherry Creek Stewardship Partners shows kids the EnviroScape.

Even with other organizations coming in, it's a big day for the treatment plant and its employees. "We pull in a lot of plant staff, from administration, the lab, pretreatment," Tallent says. "About a third to half of the staff is involved." TV stations and newspapers cover the event.

A run of successful Expos keep people coming back, but Tallent still reaches out to teachers. "After we did about three Expos, we put together a DVD to hand out to teachers," he says. "It shows what we've done and where to get more information. We also send e-mails and make phone calls."

PREPPING FOR VISITS

Tallent also has a PowerPoint presentation he can take to schools that acts as a primer for treatment plant tours. "About three years ago, we had a new school coming in," he says. "I visited the school, gave a 45-minute presentation, and brought in samples from the plant. That way, when they came to the plant, they were already of aware of what they were seeing."

The presentation is adaptable to any school: All Talent needs to do is make some quick changes and he's out the door, on to another classroom. Even with the Water Expo, about 50 groups — from school classes to professionals from other facilities — tour the plant every year.

When speaking with high school students, Tallent is sure to mention career opportunities. "I tell them engineers have to design this equipment, manufacturers have to make it and sell it, and operators have to run it," he says. "It's not just a pencil and paper job."

Phil Russell, environmental analyst, as Dr. H_2O.

> "I tell them, engineers have to design this equipment, manufacturers have to make it and sell it, and operators have to run it. It's not just a pencil and paper job."
> **JIM TALLENT**

And out of concern for an industry that's expected to face a shortage of operators, he drives home the message: "I tell them they're our future." **tpo**

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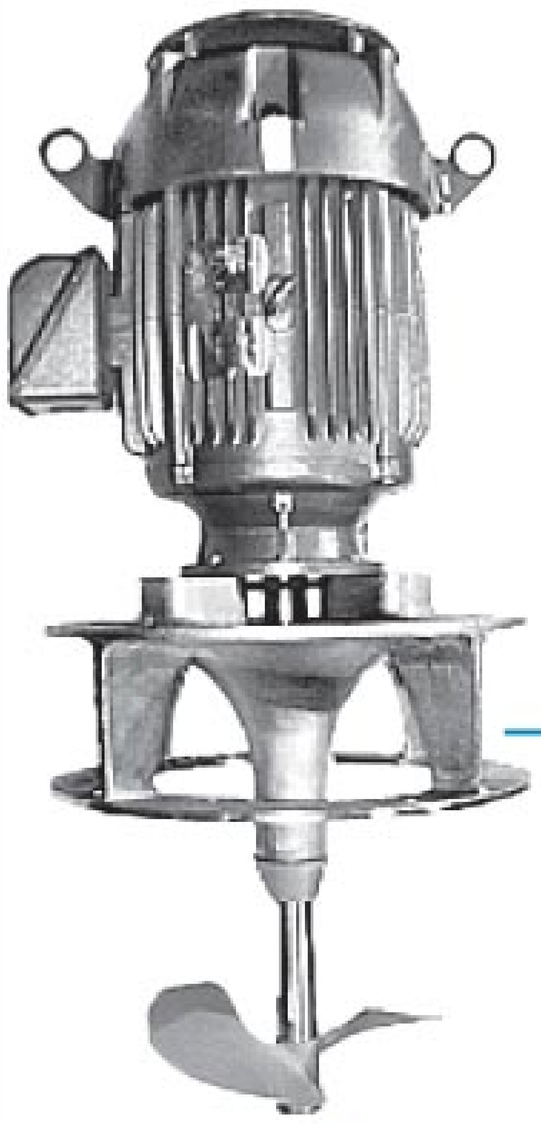

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Homegrown *Innovation*

THE STAFF AT THE ALGONQUIN (ILL.) WASTEWATER TREATMENT FACILITY TAKES AN EXCELLENT DESIGN AND MAKES IT BETTER WITH INGENIOUS THINKING

By Jim Force

The team at the Village of Algonquin Wastewater Treatment Facility includes, from left, maintenance worker Dalton Wall, utilities superintendent Andy Warmus, chief plant operator Steve Fiepke, lab technician Rahat Quader, environmental compliance coordinator Cathy White, and wastewater operator Randall Frake. (Photography by Catalin Abagiu)

profile

Algonquin (Ill.) Wastewater Treatment Facility

BUILT:	1970s; major upgrade 2006-2008
POPULATION SERVED:	30,500
FLOWS:	5 mgd design, 3.5 mgd average
TREATMENT LEVEL:	Secondary
PROCESS:	5-stage Bardenpho
BIOSOLIDS:	Anaerobic and aerobic digestion, land application
ANNUAL BUDGET:	$2.4 million (includes collection system maintenance)
WEB SITE:	www.algonquin.org

THE EXPANDED BIOLOGICAL NUTRIENT REMOVAL PROCESS AT THE ALGONQUIN (ILL.) WASTEWATER

Treatment Facility is as chemical-free as possible. Credit goes to the design of the plant and to the innovative efforts of the staff.

"We're a biological operation," says Andrew Warmus, utilities superintendent. "The only chemical we use is ferric chloride for phosphorus control, and we've been able to reduce the use of ferric to less than 10 percent of the original engineering estimates."

That, plus UV disinfection instead of chlorine, has just about eliminated chemicals, reducing operating costs, producing less sludge, and assuring production of biosolids suitable for land application.

A FAST GROWER

The Village of Algonquin is located along the Fox River, about 45 miles northwest of downtown Chicago. It's an attractive suburb, and the population has increased rapidly to its present 30,500. By the mid-2000s, growth had outpaced the capacity of the previous 3 mgd (design) activated sludge treatment plant.

The facility, built in the 1970s, had been upgraded and expanded in phases since 1975. "The old plant simply couldn't keep up," says Warmus. "We were running at 110 percent of design. We needed more hydraulic and organic capacity."

Fortunately, the village and its engineering consultant, Trotter and Associates of St. Charles, Ill., had prepared for future requirements for nitrogen and phosphorus removal in an earlier facilities plan. Contractors broke ground for the new facility in 2006. At $16 million, it was the largest public works project in village history, and it increased capacity to 5 mgd. The facility went into operation in February 2008.

REDUCING NUTRIENTS

"It's an outstanding design," Warmus says. Treatment is centered around a five-stage Bardenpho process. Wastewater is collected in 134 miles of sanitary sewer lines and 10 lift stations, then passes through Envirex (Siemens) bar screens at the headworks. A force main carries the flow into four Envirex rectangular primary clarifiers. Settled solids are anaerobically digested.

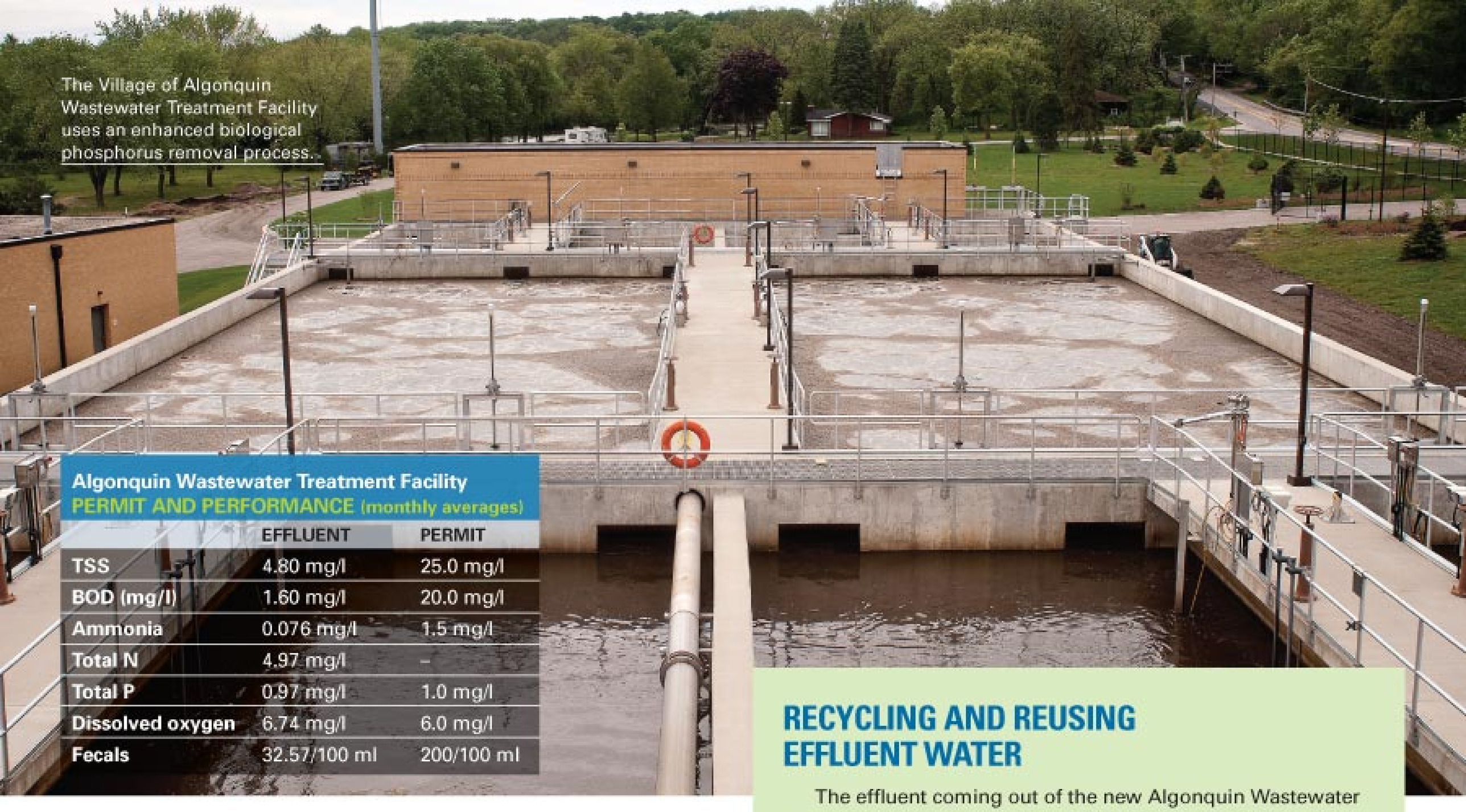
Primary effluent and return activated sludge from the final clarifiers merge in the first stage of the Bardenpho process — an anaerobic basin. The flow then passes to the second-stage anoxic zone, an aerobic zone, another anoxic zone, and then to a final aerobic zone.

The aerobic zones facilitate nitrification, while denitrification occurs in the anoxic zones. The anaerobic zone is an addition to the conventional four-stage Bardenpho process and is included for biological phosphorus removal. A chemical precipitation system using ferric chloride is available for enhanced phosphorus removal as needed.

A pair of Envirex Tow-Bro circular clarifiers receive the treated effluent, and a TrojanUV3000 system disinfects the water before discharge to the Fox River. Alternatively, effluent can be recycled and reused by area contractors for dust control and irrigation (see sidebar). The new process can reduce total effluent nitrogen to less than 5.0 mg/l and phosphorus to less than 1.0 mg/l.

Pumps move waste activated sludge to a serpentine, three-basin aerobic digester. Both primary and secondary biosolids streams are conditioned with polymer and de-

Lab technician Rahat Quader checks water samples for BOD.



The Village of Algonquin Wastewater Treatment Facility uses an enhanced biological phosphorus removal process..

Algonquin Wastewater Treatment Facility
PERMIT AND PERFORMANCE (monthly averages)

	EFFLUENT	PERMIT
TSS	4.80 mg/l	25.0 mg/l
BOD (mg/l)	1.60 mg/l	20.0 mg/l
Ammonia	0.076 mg/l	1.5 mg/l
Total N	4.97 mg/l	–
Total P	0.97 mg/l	1.0 mg/l
Dissolved oxygen	6.74 mg/l	6.0 mg/l
Fecals	32.57/100 ml	200/100 ml

watered separately on Ashbrook belt filter presses. A private contractor applies dewatered cake to area farm fields.

The plant's SCADA system, which includes Allen-Bradley (a division of Rockwell Automation) PLCs and Intellution software, provides monitoring and control at five locations within the plant as well as on staff laptops. It was developed by Tri-R Systems, which acted as electrician and system integrator in what Warmus calls a "good marriage."

Six people manage and operate the plant from 7 a.m. to 3 p.m. on weekdays. An alarm system is available to alert operators during off hours. An on-call person responds to alarms after hours and spends a couple of hours on Saturday and Sunday to check plant operation.

"We're a biological operation. The only chemical we use is ferric chloride for phosphorus control, and we've been able to reduce the use of ferric to less than 10 percent of the original engineering estimates."

ANDREW WARMUS

The operations team includes Steve Fiepke, chief operator; Tom Hall and Randall Frake, operators; Rahat Quader, laboratory technician; Dalton Wall, maintenance; and Cathy White, environmental compliance coordinator.

FERRIC BE GONE

"Understanding and improving the process has been a collaborative effort, drawing upon operating staff experience, plant data and observations, and a desire to produce the highest-quality effluent possible," Warmus says. "Staff took an excellent design and improved upon it."

For example, original estimates put ferric addition for enhanced phosphorus removal at 300 gpd, but the Algonquin staff reduced consumption to just 30 to 50 gpd.

White notes that the team approach has made a significant impact. "In our biological process, we've focused on allowing our phosphate accumulating organisms (PAOs) to do their job by creating a good environment for them and supplying them with enough food source (volatile fatty acids)," she says.

That results in an increased population of PAOs and more phosphorus accumulation, or uptake. In the anaerobic zone, the PAOs convert the carbon

RECYCLING AND REUSING EFFLUENT WATER

The effluent coming out of the new Algonquin Wastewater Treatment Facility is good enough for recycling and reuse, so that's what the plant managers are promoting. A dry hydrant, positioned near the effluent channel to the Fox River, is available for area contractors to withdraw water into their tankers and truck it to reuse points within the community.

Several private parties use the water at no charge for dust control, irrigation of parkways and boulevards, jetting of sewers, directional boring processes, street sweeping and more. So far, about 5 percent of the 3.5 mgd is being reused, and chief operator Steve Fiepke would like to see that increase.

"We're looking for more users, trying to get the word out to the public that this water source is available," he says. One possibility is a local forest preserve, which might use the water for irrigation of new plantings and reforestation. Fiepke is negotiating with that entity.

Another possibility is snow-making at a nearby ski area. "That's kind of a pipedream of ours," he says. "We might have some issues with public perception." On the other hand, the village's effluent could be a reliable source of quality water for snow-making all winter long.

ABOVE: One of the two final Envirex Tow-Bro circular clarifiers. BELOW: The plant's SCADA system, which includes PLCs from Allen-Bradley (a division of Rockwell Automation) and Intellution software. The system provides monitoring and control at five locations within the plant as well as on staff laptops.

Wastewater operator Randall Frake adjusts the sludge feed on an Ashbrook belt filter press.

"We've been pleasantly surprised. Normally it might take five to six years to see this level of phosphorus removal, but we're seeing it in only a couple of years. We're making headway."

CATHY WHITE

source to carbon compounds, which then fuel even more phosphorus uptake by the PAOs in the aerobic zone (luxury uptake).

"We've been pleasantly surprised," White says. "Normally it might take five to six years to see this level of phosphorus removal, but we're seeing it in only a couple of years. We're making headway."

White points out that filamentous growth has historically been an issue at Algonquin, and those organisms tend to compete with the PAOs for volatile fatty acids. To offset that, the plant staff controls the amount of time biological sludge stays in the system in an effort to prevent the long sludge ages that filamentous organisms prefer.

FURTHER TWEAKS

The Algonquin crew has made other adjustments to reduce phosphorus further. "All our basins except Basin 1 contain mixers," says Fiepke. "We've experimented in anaerobic Basin 1, running the mixers in an on-and-off mode. That enables us to achieve a negative ORP (oxidation reduction potential) in that basin, and improves phosphorus removal."

In another tweak, operators observed a high return rate from Basin 3 to Basin 2. "We were getting some backwash into Basin 1, and the nitrates were interfering with phosphorus removal," says Fiepke. "It was simply a design issue, and we've reduced the return rate."

High flows can also affect phosphorus removal. "In some winters, we have a lot of snow melt, and that can increase the hydraulic flow through the plant," explains Fiepke. "The PAOs need sufficient time to cycle, and high flows can reduce their ability to uptake phosphorus."

The staff has countered by turning off the mixers in the anaerobic zone for a longer time so that the organisms don't get washed out. Warmus adds that the village's underground crew is making progress tightening up the sewer system to prevent inflow in the future.

GO, TEAM

It's a team approach to problem solving that makes a success out of a treatment plant that is quite different from the one that used to serve Algonquin. "We have a good crew here, with good ideas," says Fiepke. "They're dedicated and knowledgeable, and that's the reason for our good performance."

An example is a staff-driven solution to an odor issue. "Our aerobic sludge digesters are covered so that we can control temperatures during the winter months," says Warmus. "The covers have vents to allow air to circulate, but odor issues were developing at those vents." Fiepke and operators Hall and Frake came up with a solution.

"They took 55-gallon drums, cut the ends off, and placed them over the vents," Warmus says. "Then they placed cedar woodchips and other granular odor control media in the drums." The result: a homegrown biofilter that's effective and didn't cost very much.

It's just another way in which the team at Algonquin is steadily improving the treatment process and delivering quality service to the community. tpo

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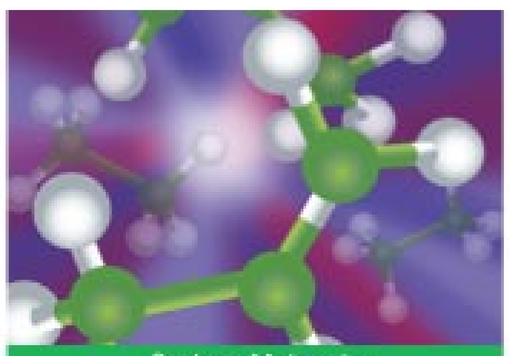

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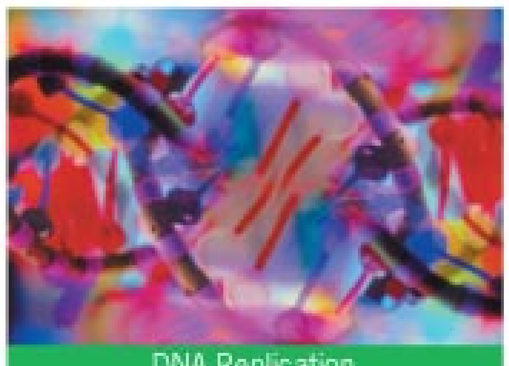

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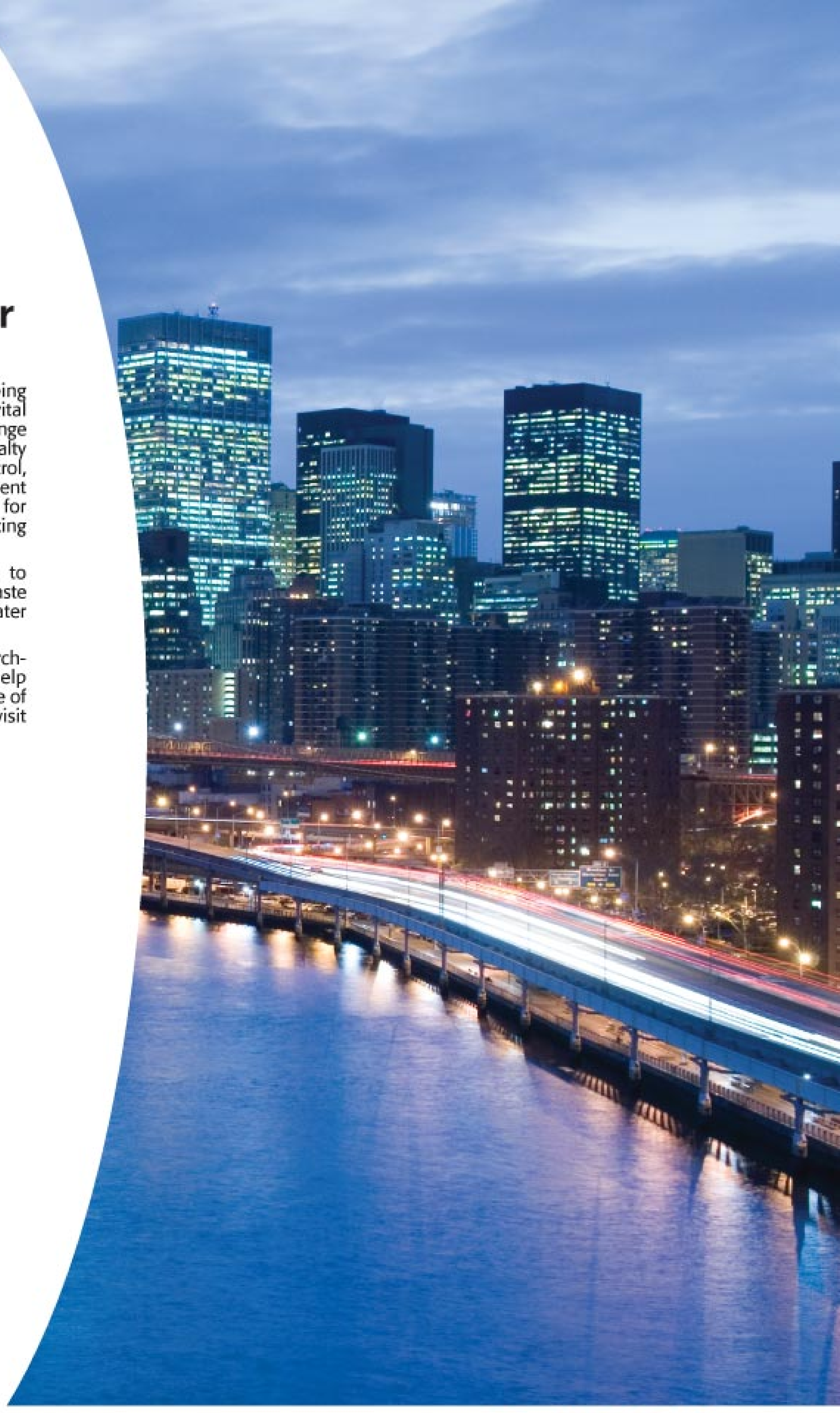

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A Cleaner Way

GOVERNMENT INCENTIVES HELP A CALIFORNIA TREATMENT PLANT GO GREEN WITH DIGESTER-GAS-DRIVEN FUEL CELLS, A RELIABLE SOURCE OF RENEWABLE ENERGY

By Doug Day

PHOTOS COURTESY OF LEW NELSON

Three 900 kW fuel cells are probably just a start for clean energy at the Tulare Water Pollution Control Facility. More could be added to take advantage of available digester methane from the existing plant and a possible expansion.

What's Your Story?

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

The San Joaquin Valley is known for its stagnant air. Pollution gets trapped between California's Coastal Range and the Sierra Nevada Mountains, giving the valley the second-worst air quality in the nation, behind only Los Angeles.

In the City of Tulare, schools display air-quality flags, farmers are being paid to switch from diesel to electric pumps, and the Tulare Water Pollution Control Facility has turned to fuel cells to produce electricity.

Director of Public Works Lew Nelson has plenty of biogas available at the city's two wastewater treatment plants. A 6 mgd biofilter/activated sludge plant treats domestic wastewater from 60,000 residents. Next door is a new 12 mgd sequencing batch reactor following a 4 mgd bulk volume fermenter anaerobic reactor put online in 1995. It treats high-strength wastewater from the dairy processing industry and produces most of the facility's methane.

The fuel cells provide about 40 percent of the domestic plant's electricity while also running thirty 60 hp aeration mixers for equalization basins at the industrial plant.

> "Fuel cells do not require air-pollution permits because they are so clean in NOx, VOCs and particulate emissions. We've probably reduced those air emissions by 90 percent or more."
>
> **LEW NELSON**

CLEAN AND EFFICIENT

Tulare has three 300 kW DFC300 stationary fuel cell units from FuelCell Energy in Danbury, Conn. The 900 kW cogeneration project became operational in September 2007, though fuel cells weren't in the original plan.

"We asked for internal combustion engines or turbine generator sets," says Nelson. "We were approached to see if we would accept proposals for fuel cells." He found plenty of reason to do so. California's self-generation program provided incentives for fuel cells that were four times that for turbines or engines. "Today there is no incentive for turbines or engines, only for fuel cells or wind," Nelson says.

With an incentive of $4.50 per watt (up to a megawatt), fuel cells were about $10,000 cheaper than an engine, he says. The $7.1 million project received $4.1 million in incentive payments for a final cost of $3 million. A fourth 300 kW fuel cell being installed this fall will get the same incentive for the first 100 kW and $2.25 per watt for the rest — more than $900,000 toward the $2 million cost.

"Fuel cells do not require air pollution permits because they are so clean in NOx, VOCs and particulate emissions," says Nelson. "We've probably reduced those air emissions by 90 percent or more." That's because there is no combustion — the electricity is produced through a chemical reaction. Recovered heat is used to preheat sludge for the anaerobic digester, saving even more energy.

The project's environmental impact will be measured this year so that the plant can get renewable energy credits, a future revenue source. The project has already earned a Clean Air Excellence Award from the U.S. EPA, and the city was named to the EPA Green Power Partnership Top 20 list for its use of onsite power.

LESSONS LEARNED

Fuel cells require treatment of the methane to avoid damage to the equipment. At first, the plant's gas processing system experienced trouble, reducing fuel cell availability to about 80 percent. "The gas system was down a lot for little recurring problems, like with a small condensate pump," says Nelson.

The situation revealed what Nelson admits was his error, and a lesson for others. "I made an erroneous decision that the fuel cells would only be run with biogas instead of using natural gas as a backup," he says. "The fuel cells have to make electricity to make the investment work."

The air in California's San Joaquin Valley is a little cleaner since the Tulare treatment plant began generating about 40 percent of it's electricity with fuel cells.

In 2008, that decision came back to haunt him again. The fuel cells generated just over 8 million kWh, but then a 15-year-old anaerobic digester had performance problems and had to be taken out of service for seven weeks in early 2009. Two fuel cell stacks also developed internal cracks. "They were caused by the frequent unscheduled cool-downs from failure of the gas processing system, and my decision to not have natural gas backup," he admits.

LOOKING AHEAD

Despite the learning curve, the fuel cells provided a savings of $138,000 on the electric bill in 2008. A backup natural gas supply has been added, and the system's 2010 performance bears out Nelson's optimism about fuel cell technology.

"I'm going to save $840,000 on my electric bill this year, minus $500,000 for the maintenance agreements," he says. "So I'll save $340,000 this year, which is roughly what we projected originally." Even though the expected payback is now six years rather than four, Nelson considers the technology a good investment.

He's even planning to add more fuel cells. "We're in talks to build a 1-million-gallon anaerobic high-rate pretreatment device that will produce a lot of additional gas," Nelson says. There is also biogas available from the new industrial plant's anaerobic sludge digesters that is still being flared off.

This time, Nelson plans to add the natural gas capability from the start: "The whole key is to generate electricity, and keep generating." tpo

more info:

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203/825-6000
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City of Tulare Water Pollution Control Facility
FUEL CELL AVAILABILITY AT THE START OF 2010

UNIT	JANUARY AVAILABILITY	FEBRUARY AVAILABILITY	MARCH AVAILABILITY	TOTAL AVAILABILITY
Unit 1	95%	100%	99%	98.0%
Unit 2	98%	100%	95%	97.7%
Unit 3	100%	100%	96%	98.7%
System Total	97.7%	100%	96.7%	98.1%

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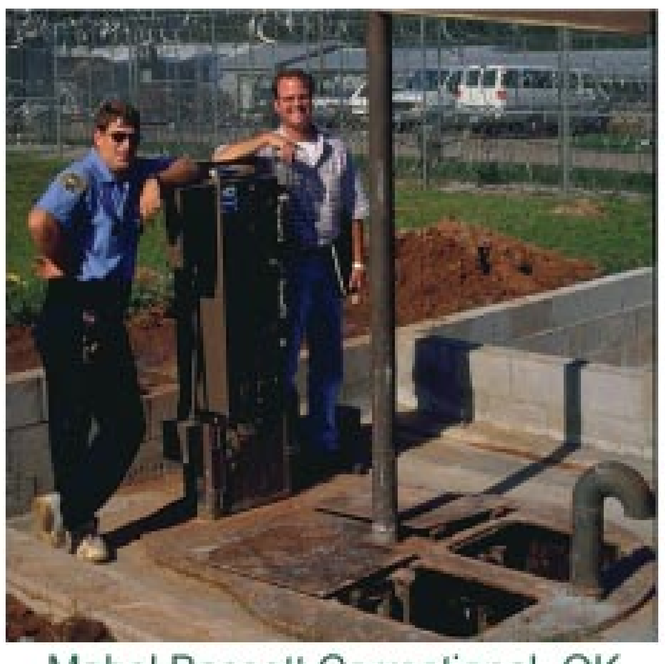
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THE CITY OF PHILADELPHIA BIOSOLIDS PROGRAM WORKS WITH A CONTRACTOR TO MAKE THE LEAP FROM COMPOSTING TO CLASS A PELLETIZED MATERIAL

By Diane Gow McDilda

From Point B to *Point A*

Synagro operates the composting facility that handles biosolids from the City of Philadelphia. (Photography by Jack Ramsdale)

AS HOME TO THE LIBERTY BELL AND THE COUNTRY'S MOST REVERED CHEESE STEAK SANDWICHES, Philadelphia continues to blend historical relevance with modern life. When it comes to wastewater, the city is progressing toward a more sustainable biosolids program.

At one time, biosolids from the city's three wastewater treatment plants, (Southwest, Southeast and Northeast) were dewatered with centrifuges, mixed with wood chips, and composted in a windrow process. Today, the composting facilities are being demolished. Class B cake is temporarily being land-applied on farms and mine reclamation sites, and by the end of next year, material will be dried and pelletized to create a Class A/EQ (exceptional quality) product.

The composting operations were expensive and had caused some odor problems. City Water Department staff also wanted a more sustainable way to manage the biosolids. In need of technical support, they decided to delegate the work to a contractor.

"The city ended up composting in 2007, in order to reduce costs and stockpiles of material while the Synagro contract was being negotiated," says Mary Ellen Senss, Water Department manager. "We were also looking to move toward being green and getting back to a Class A product without expending the city's capital funds. Synagro would have the expertise to run the pelletizer and then be responsible for the product's end-use."

Senss's office is located adjacent to Synagro's facility to ease communication and oversight. "By contract, we are required to hold monthly meetings," says Senss. "And I visit the site several times per week. I walk through the facility to observe the operation and any equipment upgrades as well as the construction progress of the Class A facility."

Moving from composting to pelletizing has been exciting for everyone involved. "The whole transition, the interim, the timeliness, it's exciting, for Synagro, and for the City of Philadelphia," says Owen Sheehan, plant manager, Synagro Central LLC.

BY LAND OR BY RIVER

The city's wastewater treatment plants are designed to process a combined 522 mgd, all using activated sludge. The Northeast plant (210 mgd) was built in 1923 and the Southwest (200 mgd) and Southeast plants (112 mgd) were built in the 1950s. All three plants discharge to the Delaware River.

Solids from all three are managed at the former Public Works Department Biosolids Recycling Center (now the Synagro facility) next to the Southwest plant. Primary and secondary solids from the Southeast plant are pumped five miles through two parallel pipelines. Once they arrive at the Southwest plant, primary and secondary solids from both plants are combined, generally at 60 percent primary to 40 percent secondary. After mixing, the solids are anaerobically digested and pumped to one of two 1.25-million-gallon storage tanks at the Synagro facility.

"Our local community got behind us. Once we came in, we began hiring and sponsoring interns. We're trying to be good neighbors."
OWEN SHEEHAN

Joe Marchesani, maintenance lead (left), and Gary Conver, maintenance technician, check for leaks in the hydraulic system o-rings on a centrifuge.

"The city ended up composting in 2007, in order to reduce costs and stockpiles of material while the Synagro contract was being negotiated. We were also looking to move toward being green and getting back to a Class A product without expending the city's capital funds."

MARY ELLEN SENSS

Biosolids from the Northeast plant are anaerobically digested on site and transferred to the Synagro facility via barge. The barge has a nominal capacity of 930,000 gallons and averages six loads per week. It unloads at one of two piers, pumping material to another 1.25-million-gallon storage tank at the Synagro facility.

"K-Sea's tankerman deals directly with the operators," says Sheehan. "He announces that they have arrived and asks if our tank is ready. The barges can come at any time during a shift. The tankerman handles everything: the barge valves, pier pump, and valves at our end during loading. We monitor the process as they fill tank number three. As soon as the barge is empty and it leaves, we dewater the storage tank so it's ready when the barge comes back."

Here responsibilities change hands. "Responsibility is transferred right after digestion, at the storage tanks," says Sheehan. "The city is responsible for supplying Synagro with anaerobically digested Class B material at 2.0 to 2.5 percent solids at 60,000 dry tons a year."

Synagro then dewaters the material and uses subcontract truckers to move the biosolids to land application sites and spread it. "We have a goal of using 50 percent minority companies on this contract, but as of April 1st we are at 71 percent," says Sheehan.

ON THE ROAD AGAIN

Synagro operates the plant's 10 centrifuges. As solids are pumped to the centrifuges, Ciba ZETAG (part of BASF Corporation) liquid polymer emulsion is injected. "We have found a good polymer with Ciba and have been using it since we took over operations," Sheehan says. The recycling center uses four 500 gpm Humboldt centrifuges (Andritz) and six 400 gpm Bird centrifuges (Andritz). It takes about four hours to dewater one 1.25-million-gallon tank using six or seven centrifuges.

"As solids are scrolled through the centrifuge, the liquid that's separated, called centrate, drains to two wet wells," says Sheehan. "Ultimately it's pumped to the head of the Southwest plant. I am pleased with what our centrifuge operators have been able to accomplish."

At 30 percent solids, material drops from the centrifuges onto a screw conveyor and then onto a belt conveyor. Solids fall from the belt conveyor into 25-ton shuttle trucks that transfer the material to an on-site covered storage area that can hold up to 10,000 wet tons. Material is stored in two rows, one for the combined Southeast and Southwest solids and one for Northeast.

"We usually take it as we make it and clear out the storage every day, but in the winter or during bad weather, we have to wait for a window," says Sheehan. Another contractor does the hauling, and travel distances to land application sites range from 50 to 225 miles.

Most of the biosolids cake goes to sites in Pennsylvania and Maryland for spreading and tilling into row crops like corn and soybean, and in Virginia for surface application on hayfields and pasture. "Because the program is permitted in three states, we have flexibility of different planting seasons, depending on the time of year," says Sheehan. "We don't have a lot of farm storage, so it's delivered and applied the same day. Synagro handles all permitting and oversees all application and reporting to permitting agencies."

ACCEPTANCE TESTING

Before the dryer at Philadelphia's biosolids recycling center can fully come online, it must pass performance criteria agreed upon by Synagro and the City Water Department. John Goodwin, Synagro project manager, is responsible for meeting these criteria:

- Processing a minimum of 225 dry tons per day.
- Delivering product at a minimum of 90 percent dry solids and meeting U.S. EPA 503 regulations for pathogen reduction.
- Maintaining natural gas and electricity consumption below performance guarantee levels, based on dry tons processed.
- Keeping the facilities in compliance with all permits and applicable laws.

Dewatering operator Dana Vollmerhausen monitors the control panel.

The team at the Synagro facility serving Philadelphia includes, from left, Dana Vollmerhausen, dewatering operator; Mike Williams, dewatering operator; Mike Oliver, operations manager; Owen Sheehan, plant manager; and Joe Marchesani, maintenance lead.

About 17 percent of the solids are delivered to mine reclamation sites to build up organic matter in the soil. "The biosolids are combined with a long-term seed mixture, like clover mix," says Sheehan. "This is usually done during winter and summer."

Under its agreement with the city, Synagro must beneficially use 50 percent of the biosolids, but the company has achieved over 90 percent. When weather prevents land application, the material is landfilled. "It's a matter of timeliness," says Sheehan. "Last winter was stressful. Once Christmas hit, we didn't have a lot of opportunities for land application. And having the landfill gives us some flexibility."

TOWARD PELLETIZING

To help reduce the city's carbon footprint, Synagro's contract includes modifying the biosolids process to produce Class A material. Their proposal to incorporate a thermal dryer and pelletizer aims to do just that.

Construction of the dryer system is expected to be completed in October 2011. Biosolids will still be processed through the centrifuges, but then will be routed to two Andritz dryers (Model DDS-110).

The dryers consist of three concentric drums that rotate. The solids will be conveyed pneumatically from the inner drum to the outermost drum. As the cylinders roll and warm air is forced through, biosolids will roll around, forming pellets that eventually will be blown from the cylinder. Pellets will be sorted by size and the larger and smaller ones will be fed back to the dryer. The pellets will contain a minimum of 90 percent solids.

While both the city and Synagro are excited about the pelletizer, they are still thinking about the farmers. "The farmers are very happy with the biosolids we produce," says Lisa Williams, division director of technical services for Synagro. "That's why we're working to make sure we have a comparable product to replace the biosolids after the pelletizer comes online."

A primary advantage of pelletizing will be volume reduction, which will significantly lower transportation costs. Another advantage is that biogas can be used to operate the furnace for the thermal dryer. Staff expects all excess methane from the 12 anaerobic digesters that is not utilized at the Southwest plant to be used for drying biosolids. If need be, fuel oil can be used, but natural gas and digester gas will be the primary fuels.

Rainwater from all roof areas of the drying facility will be captured in a 62,000-gallon cistern, filtered, and used as cooling water for the dryers, reducing demand for potable water.

Dried pellets will be stored on site in three silos. From there, pellets will be trucked or shipped via rail for use as a renewable fuel at cogeneration plants or at nearby cement kilns. The minimum use of 120,000 decatherms of digester gas from Southwest will be used per contract year to fuel the thermal dryers.

> "Because the program is permitted in three states, we have flexibility of different planting seasons, depending on the time of year. We don't have a lot of farm storage, so it's delivered and applied the same day."
>
> **OWEN SHEEHAN**

"There are roughly 20 of these dryers operating in the United States, and eight of them are run by Synagro," says Sheehan. "We clearly have in-house experience and we have a great working relationship with the City of Philadelphia."

The company is working to fit in well with the neighborhood. Besides eliminating odors and reducing truck traffic, the project will help support the local economy. "Our local community got behind us," says Sheehan. "Once we came in, we began hiring and even sponsoring interns. We're trying to be good neighbors." tpo

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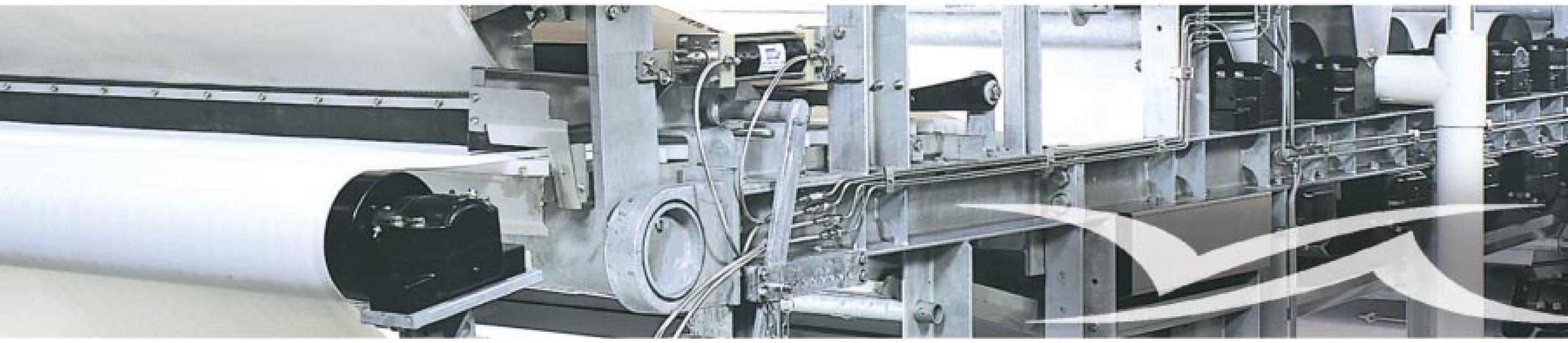

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SPX Offers Wastewater Treatment Brochure

SPX Flow Technology offers a water and wastewater brochure with information on SPX filters, mixers, pumps, analyzers, metering instruments, heat exchangers and air treatment equipment for water and wastewater applications, including chemical makeup and storage. The brochure can be downloaded at www.spxflowtechnology.com/literature/index.asp.

Woodard & Curran Names Shea Senior VP

Woodard & Curran has named Joseph Shea senior vice president of the Dedham, Mass. environmental consulting firm. Shea has worked on the planning, design and construction of projects, from large-scale treatment facilities to smaller infrastructure.

Fluid Metering Releases Product Catalog

Fluid Metering Inc.'s latest catalog features 32 pages of fluid handling solutions, including ChloritrolT, a valveless metering system for maintenance-free injection of liquid sodium and calcium hypochlorite. Other products include the CTS chemical treatment system for metering water and wastewater treatment chemicals and the PDS-100 programmable dispensing system that uses stepper motors to control delivery from 500 nanoliters per dispense up to 2 liters per minute continuous flow. For a copy, call 800/223-3388; e-mail pumps@fmipump.com; or visit www.fmipump.com.

US Peroxide Integrates Technologies Under PRI-TECH

US Peroxide has integrated several technologies under its full-service PRI-TECH Peroxide Regeneration Iron Technology portfolio for applications in municipal wastewater. Treatment applications include using iron salts with hydrogen peroxide in a synergistic fashion to achieve cost savings and plant-wide treatment enhancements within municipal collection systems and wastewater treatment plants.

ITT Purchases Godwin Pumps

ITT Corp., White Plains, N.Y., has agreed to purchase privately held Godwin Pumps, supplier of automatic and self-priming portable pumps, for $585 million. The transaction is expected to close in the third quarter of 2010. Godwin Pumps, founded in 1976, is based in Bridgeport, N.J., and has approximately 800 employees throughout the U.S. and at its manufacturing facility in Gloucestershire, England.

Control Microsystems Offers Paper on Improving SCADA Operations

Control Microsystems has published a paper, "Improving SCADA Operations Using Wireless Instrumentation," that describes how integrating wireless instrumentation with SCADA systems can drive operational efficiency and reduce deployment costs. To download the paper, go to www.controlmicrosystems.com/info/media/edm-files/fy-2010/entelec/Improving%20SCADA%20Operation%20using%20Wireless%20Instrumentation%20V05.pdf.

Merged Water Technology Companies Renamed Ovivo

Eimco Water Technologies of Montreal, including its America subsidiary Enviroquip, and Christ Water Technology of New Britain, Conn., have renamed their merged companies Ovivo, or Water for Life. The global municipal and industrial water and wastewater company, www.ovivowater.com, serves markets in Asia, Europe, the Middle East, Africa and the Americas. The new name along with a realignment of vision and values provides the new company with a sustainable platform for future growth. tpo

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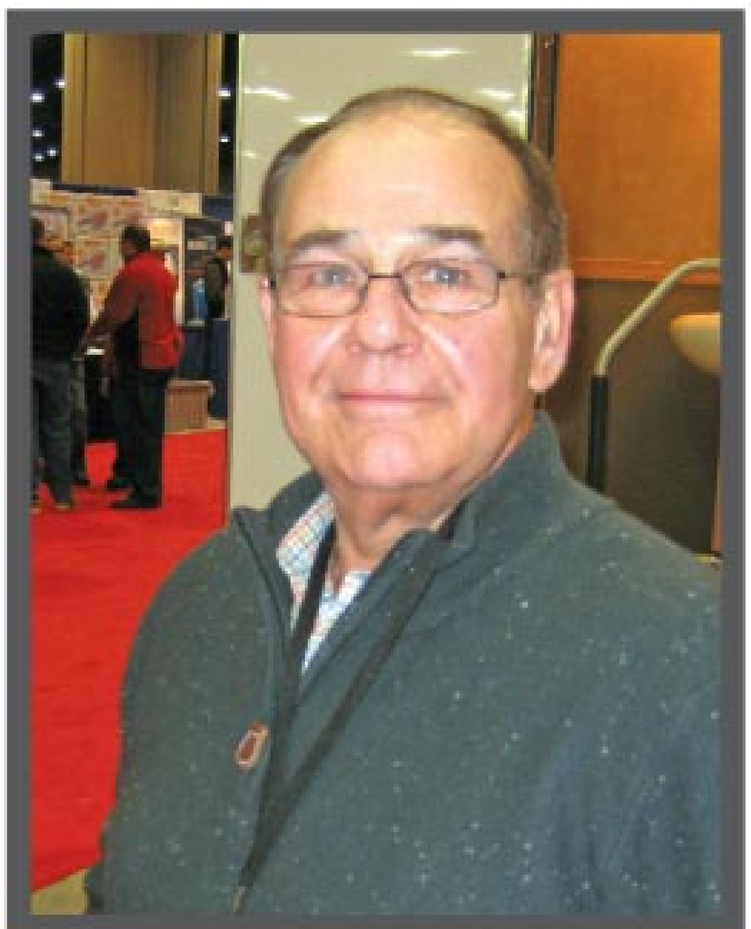

JACK BAILEY

Wind River Environmental
Hudson, Mass.

Jack Bailey loves networking with other business owners at the Expo. "It's an opportunity to see everything you need to see and meet everyone you need to meet," he says. "We've seen new technologies that might improve our business. It's good to come here and deal directly with vendors. It's the best way to get two or three different quotes. The Expo helps us create business deals, buy new equipment, and get the best prices."

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On the Band-Wagon

A CALIFORNIA UTILITY DISTRICT USES A BAND SCREEN TO REMOVE BITS OF PLASTIC THAT HAD BEEN CAUSING ISSUES FOR RECIPIENTS OF RECYCLED WASTEWATER

By Scottie Dayton

PHOTOS COURTESY OF JUDY ZAVADIL

Rows of rotating stainless steel sieves with 2 mm holes on the Eliminator band screen from Headworks capture plastic bits, grease balls, and the occasional feather.

Neutrally buoyant produce labels and other floating bits of plastic were passing through the Dublin San Ramon (Calif.) Services District Recycled Water Treatment Facility and entering the distribution system, plugging meters, irrigation strainers and sprinkler heads.

The facility had continuous-backwash upflow sand filters that kept the plastics suspended, allowing them to pass out with the effluent. Judy Zavadil, district senior civil engineer, could not locate another facility with a similar problem. "We had to find our own cure," she says.

After evaluating bar and drum screens and step and articulating rake screens, the district considered and decided on a band screen. Many treatment plants, especially those with membrane bioreactors, install band screens at the headworks. Zavadil assumed that if the filters worked in that harsh environment, they certainly should work at the tail end of the treatment process where the water is clean.

After researching band screens, she put out a request for a proposal with precise specifications. The district ultimately accepted the bid from Headworks for the Eliminator screen. Rather than bid the installation, at a cost nearly equal to that of the equipment, Zavadil entered a contract with Headworks, then assigned it to a contractor installing a bar screen in the treatment plant. "It was a creative move on our part," she says. "We just gave him a change order."

The facility became the first of its kind to install a band screen after the wastewater treatment process but ahead of the recycled water process. No one was certain that it would work — but in the end, with a little creativity, it did.

A sampling of screenings caught by the band screen.

RESERVATIONS

The Eliminator band screen has perforated stainless steel sieves mounted on a self-lubricating roller chain drive. The upper portion of the 5-foot-wide, 15-foot-tall continuous rotating band is fully enclosed, while the lower half sits parallel in the 9-foot-deep influent channel, covered by a grating.

To eliminate carryover, the unit's center-feed design turns the flow 90 degrees, forcing it out the sides through 2-mm holes in the sieves. The screenings, carried up to the discharge point, are removed by a Dual-Surge spray header system. The resulting slurry — water with little grease balls and plastics — is discharged out an 8-inch pipe.

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Wayne McCauley, senior projects and special projects manager at Headworks, evaluated where Zavadil intended to install the screen. "I had reservations because the flow, around 5 mgd, was very turbulent at that point," he says. "Turbulence and approach velocity increase impact on the screen and increase headloss. If we exceeded 12 inches of headloss, the water would overflow a bypass around the screen, which eventually had to handle 17 mgd."

> "We put a 90-degree elbow on the discharge pipe so it angled down toward the channel, placed the wastebasket under it on the grate, and had the perfect solution for less than five dollars."
>
> **JUDY ZAVADIL**

A consultant for the district recommended installing a baffle to direct and calm the flow before it entered the band, but Zavadil decided to forego the baffle and watch how the screen performed. "Because there isn't much hydraulic data on losses through perforated plates, nobody knew what the exact headloss would be," she says. "It turned out to be around four inches at current flows, so everything was fine."

KEEPING IT SIMPLE

Normally, a screw extracts the screenings from the slurry and com-

The upper portion of the band screen is enclosed. A 90-degree elbow is bolted to the 8-inch discharge pipe and the mesh wire wastebasket is shown in the foreground.

presses them into little pellets, while the rinse water falls through the grating and into the channel. However, the area was too small for the screw mechanism.

The district consultant then recommended installing a filter vessel with removable nylon mesh bags. "The contractor plumbed the discharge pipe to a 2-inch inlet on the filter vessel, but sticks and duck feathers from the influent holding basin clogged the plumbing," says Zavadil.

Operations staff, the contractor, and Zavadil then tried different alternatives to the filter vessel. They drilled holes in the sides and bottom of a 5-gallon pail and inserted a burlap bag. The water didn't drain fast enough. Zavadil bought window screen material and sewed a bag to it, with identical results. She bought sample filter bags to test, but none of them worked.

While searching for mesh material in a hardware store, Zavadil stumbled upon a mesh wire wastebasket. "We bolted a 90-degree elbow on the discharge pipe so it angled down toward the channel," she says. "We placed the wastebasket under it on the grate, and we had the perfect solution for less than five dollars. The slurry goes in, the water runs out and through the grate, and the screenings stay behind. We empty the basket once a day depending on flow."

The band screen provides excellent capture rates with minimal maintenance, enabling the district to deliver particle-free recycled water to its 270 irrigation customers, which include parks, schools, golf courses, businesses, greenbelts and roadways. **tpo**

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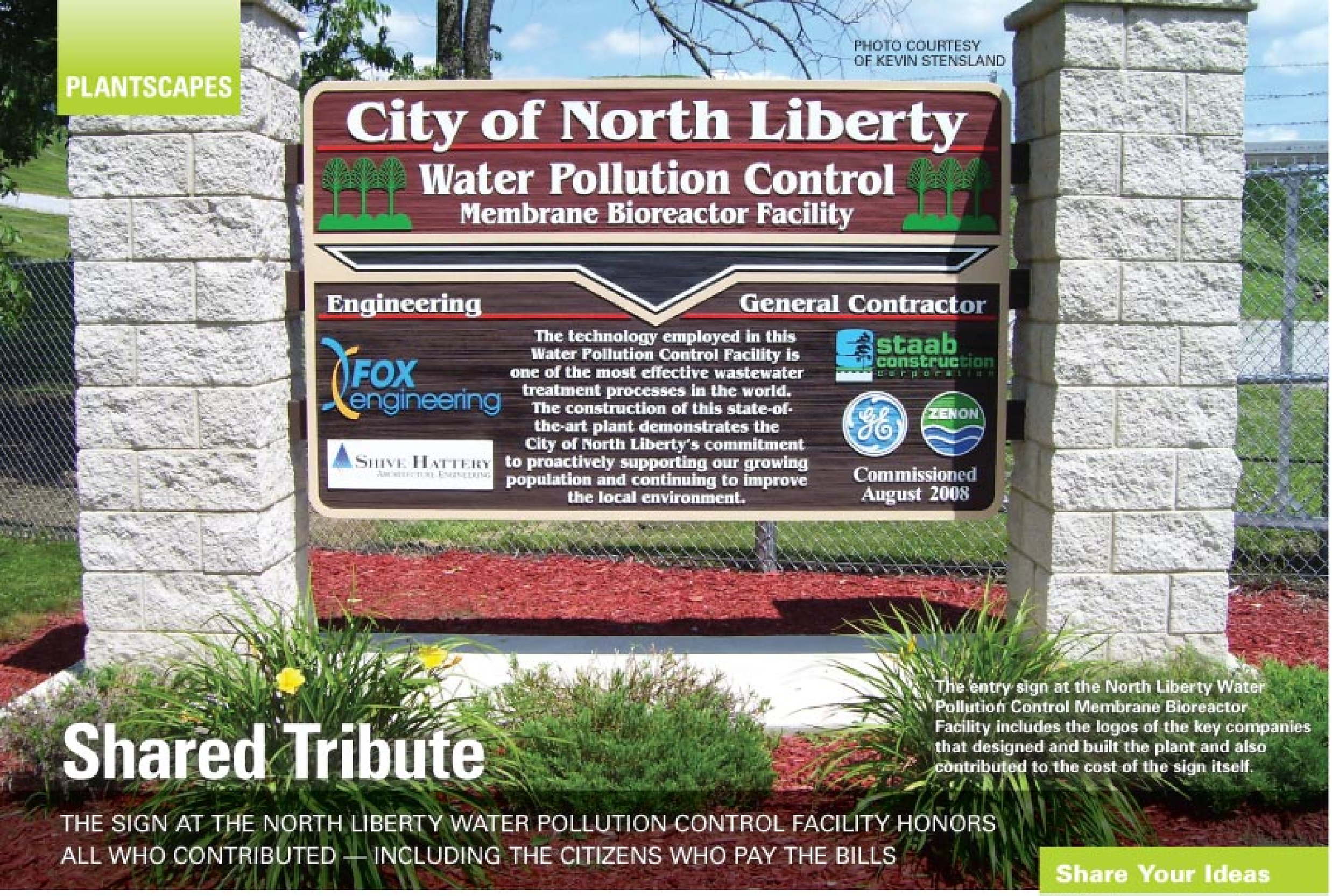

PHOTO COURTESY OF KEVIN STENSLAND

The entry sign at the North Liberty Water Pollution Control Membrane Bioreactor Facility includes the logos of the key companies that designed and built the plant and also contributed to the cost of the sign itself.

Shared Tribute

THE SIGN AT THE NORTH LIBERTY WATER POLLUTION CONTROL FACILITY HONORS ALL WHO CONTRIBUTED — INCLUDING THE CITIZENS WHO PAY THE BILLS

By Ted J. Rulseh

After the City of North Liberty, Iowa, invested $8.4 million in a new water pollution control facility, plant manager Dave Ramsey thought a nice entrance sign would properly express the community's pride.

"I came up with the idea and passed it along to the city manager," says Ramsey. "He jumped at it and said 'Go with it.' Then I told him what the cost was. He didn't like that." Nonetheless, Ramsey went ahead, cutting down the cost to the city by asking the main players in the plant's design and construction to kick in. They did.

MORE THAN PRETTY

And as a result, the sign, embellished with mulch, flowers and other plantings, now stands just outside the plant gate. The plant itself lies down a dead-end road that runs past a school. People driving by on the main road can't see the sign, but parents dropping kids off at the school can.

> "We split the cost five ways. I asked the suppliers. It wasn't mandatory. They all said, 'Sure, no problem.'"
>
> **DAVE RAMSEY**

The sign, which cost about $6,000 in all, is more than just a decoration. It's a tribute to everyone involved in building and running the plant, and to the residents who pay for it. "The construction of this state-of-the-art plant demonstrates the City of North Liberty's commitment to proactively supporting our growing population and continuing to improve the local environment," reads part of the message at the sign's center.

Logos represent the companies that helped bring the plant to fruition: design and consulting firms Fox Engineering and Shive-Hattery; GE Water & Process Technologies – Zenon, supplier of the membrane bioreactor treatment technology; and Staub Construction, general contractor. "We split the cost five ways," says Ramsey. "I asked the suppliers. It wasn't mandatory. They all said, 'Sure, no problem.'"

IN-HOUSE ASSIST

Ramsey and assistant plant superintendent Kevin Stensland sketched out the sign and the message. The city manager and council weighed in with ideas and signed off on the final wording. Stensland and other plant personnel poured the concrete base, built the pillars, and hung the sign.

A local sign company built the sign itself, delivering in one piece with features not painted on but engraved into the wood. "For this city, $8.4 million is a lot of money," says Ramsey. "It was the largest capital project we've ever done. An attractive sign just seemed appropriate." 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.

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A LIFETIME OF EXCELLENCE

EXECUTIVE SUPERINTENDENT BILL NESTER DEDICATED HIS CAREER TO WASTEWATER OPERATION AND MANAGEMENT, AND FOUND SUCCESS IN HARD WORK AND A CAN-DO ATTITUDE

By Trude Witham

WHEN BILL NESTER RETIRES AFTER 45 YEARS AT THE UPPER Montgomery Joint Authority Wastewater Treatment Plant in Pennsburg, Pa., he will leave a legacy of excellence. With 13 plant awards and eight personal awards to his credit, Nester has accomplished a great deal, yet he credits his team for making that happen.

He began his career at 19 when the wastewater treatment plant near his home was looking for an operator. Although he worked as an auto mechanic at a local service station before graduation, he always felt a pull to the water treatment field.

"My parents had a dairy farm until I was 13, and I remember in fifth grade, we took a field trip to a local water treatment plant," he says. "I was so impressed by the plant because it looked so clean and nicely painted."

His first day on the job at the trickling filter wastewater plant was daunting. It was a two-man operation: his supervisor handled the billing, and Nester was expected to do everything else. "My supervisor took me around the plant and said, 'It's yours,' and I thought, 'Oh boy,'" Nester recalls. "I pored over blueprints and manuals, took all the courses I could get my hands on, and just talked to a lot of people."

Bill Nester, shown in front of the biosolids dryer at Montgomery Joint Authority Wastewater Treatment Plant, can look back on a satisfying career that includes many awards for excellence. (Photography by Tim Miller)

DOING IT ALL

He took one course at a time and attended numerous training classes and seminars sponsored by state agencies. His first class was a basic water and wastewater plant operation course, which he completed in October 1965.

By the late 1960s, each plant in the state had to have licensed operators. When the law was passed, everyone in charge of operating a treatment plant automatically received a license. "The license required for UMJA was Class E Type III, which I received," Nester says.

"Wanting to prove myself, I took the certification test in the early 1970s and passed for a Class B Type III, which was the highest you could receive for a trickling filter plant. I was issued a Class C Type III license because the law stated you could only be issued a license two classes higher than the plant you were working at."

In 2004, the State Board for Certification of Water and Wastewater Systems Operators issued new certificates to all certified operators, and Nester received a Class A, E Subclass 2, 3, 4.

Nester did everything at the plant, including equipment repairs, which he managed to learn by reading the manuals and doing what needed to be done. When his supervisor passed away in 1977, the board made him office manager and hired someone else to run the plant. He did the quarterly billing, accounts receivable, general ledger, bank deposits, payroll and taxes while keeping a hand in the operation side.

"I worked 6 a.m. to 3 p.m., so after I finished the office tasks, I went outside to check on the plant operation," he says. After one year, the plant operator quit, Nester went back into plant operations, and the Board hired someone else to do the billing and accounts receivable. In 1988, Nester was promoted to executive superintendent.

OVERSEEING EXPANSION

In that role, Nester oversaw the plant's expansion and upgrade from early 1988 to June 1990, and the hiring of more staff. The original plant was designed to handle 120,000 gpd and consisted of a comminutor and bar screen, a primary clarifier, two trickling filters, a secondary clarifier, a chlorine contact tank, two anaerobic digesters, and glass-covered sand drying beds.

The plant expansion increased capacity to 2.5 mgd and 2.0 mgd annual average. The upgrade included a larger comminutor and bar screen, an aer-

Bill Nester worked his way up through the clean-water profession, often learning mostly by his own initiative.

LOTS OF RECOGNITION

Bill Nester has won many awards in his career — enough to fill a large share of a magazine page if all were listed.

Among his most significant honors is the 2002 William D. Hatfield Award from the Water Environment Federation for outstanding performance and professionalism in operating a wastewater treatment facility.

He also won the Ted Moses High Hat Award in 2004 from the Pennsylvania Water Environment Association (PWEA), for members who distinguished themselves while working to promote the association and its program. Each year, recipients' names are lettered upon the hat, which is displayed at the annual awards banquet.

The Upper Montgomery Joint Authority treatment plant has won 13 awards, including the EPA Region III Operations and Maintenance Excellence Award in 2001 for medium-sized advanced treatment plants in the Mid-Atlantic Region.

The plant was given the 2010 Beneficial Use of Biosolids Award from the PWEA at the annual PennTec conference in June 2010 at Penn State University. Nester refers to this award as his "last hurrah" before retiring.

Since 1973, Nester has been active in professional organizations. He now serves on the EPWPCOA board of directors, on the Safety, Nominating, Directory and Awards committees, and as chair of the Membership Committee. He served for many years on the Safety Committee of the PWEA, and, since 1999, on the Membership Committee. Nester and the plant have won awards from this organization, from operator of the year and a life membership award, to excellence in plant operation and maintenance and plant safety.

profile

Bill Nester, Upper Montgomery Joint Authority, Pennsburg, Pa.

POSITION:	Executive superintendent
EXPERIENCE:	45 years
EDUCATION:	Professional training from Penn State University, State of Pennsylvania, Pennsylvania Municipal Authorities Association, Pennsylvania WEA, EPWPCOA, WEF
CERTIFICATION:	Pennsylvania Class A, E Subclass 2, 3, 4
GOALS:	Retire once a successor is found; stay active in EPWPCOA

"My supervisor took me around the plant and said, 'It's yours,' and I thought, 'Oh boy.' I pored over blueprints and manuals, took all the courses I could get my hands on, and just talked to a lot of people."

BILL NESTER

ated grit chamber, an additional primary clarifier, plastic trickling filter media, a solids contact tank, two new secondary clarifiers, a new chlorine contact tank, post aeration, a Parshall flume meter chamber, and a liquid sludge loading area.

The anaerobic digesters were converted to aerobic and the sand drying beds were changed to vacuum-assisted drying beds. The original secondary clarifier became the storm retention basin. The plant also added a 6,000-gallon tank truck to haul liquid biosolids to permitted farmland, a farm tractor, and a 2,600-gallon tanker to spray or inject the biosolids into the soil.

Equipment for the collection system included a Harben flusher truck to clean the 34 miles of sewer lines, and a CUES CCTV inspection and chemical grouting truck.

Today, the plant serves 8,700 people in the boroughs of East Greenville, Pennsburg and Red Hill and Upper Hanover Township. Nester's team includes chief operator Steve Torma; operator Greg Young; lab technician Dennis Schoenly; collection systems mechanic Tom Grigas; laborer/operator trainee Matt Hinkle; billing secretary Carole Nester; and bookkeeper Brenda Bower.

BACK TO THE LAND

On Nov. 2, 1990, UMJA received a permit for agricultural use of its aerobically digested biosolids. "From 1990 to 2003, we did the whole land-applied operation, and even trucked the dewatered material to the farms ourselves and land-applied it," Nester says. "We started looking around at other methods to manage our biosolids. I wanted to end up with a Class A biosolids, but was not sure how to get there."

In 2001, Nester looked at a variety of equipment, including:

- Egg-shaped digesters in Kutztown, Pa.
- Digesters and aeration equipment in Nelsonville and Uhrichsville, Ohio.
- Autothermal Thermophilic Aerobic Digestion (ATAD) and belt press in Ephrata, Pa.
- Centrifuges in Abington, West Mifflin and Doylestown, Pa.
- Lime stabilization in Lower Township, N.J.
- Filter press with vacuum and heat cycle in White Haven, Pa., and Mountain City, Tenn.
- Thermal dryers in Phillipsburg, Pa., Mount Holly, N.J. and Stuttgart, Ariz.

The plant ended up getting a Fenton indirect thermal dryer that dries the biosolids to a minimum of 90 percent solids. The project was completed in 2006, and the plant began producing Class A material.

Nester and his team were instrumental in implementing the biosolids program. "Since we implemented this, we haven't sent anything to the landfill, but are giving it away to two farmers and the general public," Nester says. "We purchased Ziploc bags and filled them with 7.5 pounds of fertilizer to give to the public when they came in to pay their sewer bills. We encouraged them to come back with buckets or pickup trucks for more. Now, we can't keep up with the demand for it."

Although UMJA had no intention of selling the fertilizer, the agency applied for a permit to do so. Nester says that was a way to demonstrate to the public that the fertilizer is safe to use.

A HUGE JOB

Nester's job as executive superintendent includes payroll administration, hiring and promotions, personnel training, development of operating budget and expenditure projections, development of service contracts, oversight of contractors' work, plant maintenance, parts procurement, equipment selection and modifications and preparation of regulatory reports.

By all accounts, he has done the job exceptionally well. The plant has consistently met or exceeded its permit requirements for CBOD, TSS, ammonia and phosphorus. He says his team deserves the credit.

"I have a real good team of fairly young people, although turnover has been common as people have had a chance to move on to other facilities," he says. "What makes the plant work well is its good design and a lot of dedication and common sense from the employees."

Nester believes in managing by stepping out of his office and taking a walk around to talk to employees about their ideas. They meet every morning at 7:30 in his office and hold a safety meeting once a month. He also schedules hands-on reviews and shows tapes on safety procedures, such as for chlorine handling and equipment lifting. That has paid off in a good safety record over the years.

In retirement, Bill Nester looks forward to fishing and assorted projects, but he admits he will miss the treatment business.

The staff does most of the plant maintenance and upkeep and smaller equipment repair. Employees attend seminars on lab procedures, maintenance, pump repair, and collection systems — seminars they are required to take to keep their licenses.

MANY CHALLENGES

Nester has had his share of challenges, and one of the biggest has been dealing with alarm conditions from heavy rains that cause infiltration to the main sewer line.

"I have a real good team of fairly young people ... What makes the plant work well is its good design and a lot of dedication and common sense from the employees."

BILL NESTER

"Since 1990, we have had our own CCTV truck so we can televise the mainline and check for leaking joints and then chemically seal them," Nester says. "During drought conditions, the water table drops, the grout shrinks and falls out, and this causes the joints to leak again."

In late 2008, the plant hired a company to repair 6,000 feet of sewer mains using cured-in-place lining material. That eliminated all the joints. "In 2008, 20 million gallons of stormwater was put through the storm basin, and in 2009, with almost the same amount of rainfall, the flow was reduced to 10 million gallons," Nester says.

In April 2010, the authority lined 19,185 feet of sewer mains, lined 700 feet of sewer laterals, and rehabilitated 93 manholes. More such work is in the plan.

With the sewer line issue all but solved, Nester has another issue that concerns him: cutbacks on certification testing because of the state budget. "There are people waiting to be certified who can't get certified," he says. "Plus, people are leaving the industry because of the liability placed on operators.

"When I began as chair of the Eastern Pennsylvania Water Pollution Control Operators' Association (EPWPCOA) membership committee, there were 1,500 members, and now there are 1,350."

NOT GOING AWAY

Nester's immediate plan is to stay on the job until a successor is found and trained. "My feelings about retiring are bittersweet," he says. "I'm looking forward to it, but I've worked too hard and don't want the plant to go downhill."

Nester plans to stay active in the EPWPCOA on the membership and safety committees. He and his wife have a seasonal home and plan to spend more time there. "I want to get back into fishing, and there are a lot of projects I would like to finish," he says. "Plus, I have a lot of land to mow."

He also has some advice for his successor: The plant comes first. "As executive superintendent, you're the first on the list to respond to the SCADA system alarms," he says. "You are responsible, and you have to take care of it. Stay on top of everything, get outside and talk to your employees, and you'll do fine."

He also says the superintendent must make sure the plant looks good at all times, because chances are, "If it looks good, it will operate well." The NPDES permit expires the end of July, and Nester wants to make sure that is taken care of before he retires. "The regulatory people know I run a good plant, and I have a good working relationship with the regulators," he says. "I'm always up front with them if I have a problem."

The written job description of the person who will fill Nester's shoes is four pages long, but it only begins to describe the contributions he and his team have made over 45 years. It's quite a record for someone who started as a 19-year-old kid. tpo

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A New Approach

A CALIFORNIA DISTRICT USES AN EFFLUENT ACIDIFICATION PROCESS TO REDUCE PERCOLATION POND MAINTENANCE AND OPEN OPPORTUNITIES FOR WATER REUSE

By Ted J. Rulseh

Soil aquifer treatment is a practical solution for small wastewater treatment plants where effluent characteristics or other factors rule out discharge to a stream.

The Montalvo Municipal Improvement District, on the coast of California between Santa Barbara and Los Angeles, serves a residential and agricultural area with a 1,500 population. Its sequencing batch reactor treatment plant produces advanced secondary effluent at 360,000 gpd.

The district uses soil aquifer treatment for its effluent, but found the process limited because alkaline soil causes a buildup of bicarbonate and carbonates beneath its percolation ponds that limited downward water movement.

The district worked with Earth Renaissance Technologies of Bakersfield, Calif., to develop a process for acidifying the effluent, thus improving soil penetration and reducing maintenance on the percolation pond bottoms.

Tests also demonstrated that the process would enable the district to use its water for irrigation, even on salt-sensitive crops such as lemons and avocados, despite a relatively high effluent salt content. Kelly Polk, manager of the district, sees great potential for the effluent acidification technology to help other small treatment plants where salinity and soil alkalinity are concerns.

"The difference the acidity makes is amazing. The acidification markedly improves water penetration. It has reduced the amount of percolation pond surface required by half, and it has reduced the frequency of the ripping cycle by half, as well."

KELLY POLK

Polk, and Terry Gong, managing partner with Earth Renaissance, which provided the acidification system, talked about the process and its results in an interview with *Treatment Plant Operator.*

tpo: Historically, how has the district managed its effluent?

Polk: We have five percolation ponds that cover a little over six acres. Over time, natural alkalinity causes binding of the soil that reduces percolation rate. Therefore, the ponds need maintenance. Normal maintenance was to remove the water from a pond, use a bulldozer to rip the bottom to loosen the soil, and then rest the pond. Resting allows the nematodes, bacteria and other soil organisms to do their magic and reopen the soil pores.

Kelly Polk (left), district manager of the Montalvo Municipal Improvement District, with Stan Rusk, chief operator of the district's wastewater reclamation plant.

tpo: What are the specific challenges your district faces in making secondary-treated effluent available for irrigation?

Polk: We are producing reuse-quality water. Our BOD discharge is less than 20 mg/l, TSS less than 20 mg/l, and total nitrogen is less than 10 mg/l. The problem is that we have a salt issue. We initially found that in order to provide the water for irrigation, we would have to remove the salt. The only way we knew to do that was with reverse osmosis (RO), which is very expensive.

Using RO, we would have to charge more than $450 per acre-foot for irrigation water, whereas local farmers are now paying $100 to $150 per acre-foot for purveyed water. We asked how could we use our reclaimed water for irrigation without having to remove the salt. But salt is not the only problem. Soil alkalinity also restricts percolation of water through the root zone.

tpo: What is the source of the salt in the effluent?

Polk: Municipal purveyed water in our area usually contains greater than 40 ppm of salt. By the time it is used in the household for bathing and washing and is discharged to the sewer system, at least 60 ppm of salt has been added. We are then receiving wastewater at the treatment plant at perhaps 120 ppm or greater.

tpo: Can you describe the treatment you're using to address the salt and soil alkalinity issues?

Gong: We acidify the effluent using a Harmon Systems SO_2 sulfurous acid generator. We oxidize raw elemental sulfur by burning, and then wet-scrub the SO_2 that's produced with a sidestream of the water that is to be treated. The resulting sulfurous acid solution has a pH of about 3.0. We then blend that water back into the wastewater stream. As a result, the pH of the effluent going into the percolation ponds is usually about 6.5.

tpo: What exactly happens in the soil as a result of applying the mildly acidified effluent?

Gong: In Wisconsin, where you live, you receive a lot more rainfall that we do in the West and Southwest. Rainwater is naturally acidic, and so your soils tend to be more acidic, as well. The ecosystem has lost its natural buffering. Out here, we receive about 16 inches of rainfall a year, and some areas receive less than two inches. So the soils tend to be alkaline.

In essence, the acidity in the effluent neutralizes some of the alkalinity in the soil. It dissolves some of the otherwise insoluble soil carbonates, allowing the water to penetrate, and also allowing the salts in the effluent to leach through.

tpo: What has been the impact of this treatment on the efficiency of the percolation ponds?

Polk: Without this treatment, effluent pH would be about 7.5. The difference the acidity makes is amazing. The acidification markedly improves water penetration. It has reduced the amount of pond surface required by half, and it has reduced the frequency of the ripping cycle by half, as well. That saves an awful lot of cost.

> "In essence, the acidity in the effluent neutralizes some of the alkalinity in the soil. It dissolves some of the otherwise insoluble soil carbonates, allowing the water to penetrate, and also allowing the salts in the effluent to leach through."
> **TERRY GONG**

tpo: What were the results when the acidified effluent was tested on salt-sensitive crops grown in the area?

Gong: The acidification allows deeper percolation of the water and the salt through and out of the root zone. Therefore, we found that with the sulfur treatment balanced with calcium addition, we can use the plant effluent to irrigate even the most salt-sensitive crop, which is avocados, without having to remove the salt.

And we found that there was no negative effect on the growth of the trees as compared to irrigation with purveyed potable water. We simply had to add a little more nitrogen to the wastewater. In the test, we only lost two trees out of the 150 trees we measured. One of those was ruined by wind damage, and the other was sickly anyway. The two groups of trees were grown side by side and were irrigated with wastewater and purveyed water.

We have found that we could use our effluent to irrigate fruit trees, landscaping, and other crops, especially the grass crops and alfalfa, which accounts for more acreage locally than we have reclaimed water for. The nutrients in the wastewater are such that we only have to add a very small supplemental amount of nitrogen to get the growth farmers would expect by using well water and nitrogen fertilizer.

tpo: What would be the price of this reclaimed water if sold for irrigation?

Polk: We've already borne the cost of acidification as part of the cost of treatment, so the sale of the water would be a bonus. We would just set the price the market would accept and create an added revenue stream for the plant. The price would be competitive with what the farmers are paying now, and it would have the added value of the nutrients, eliminating some of their cost for fertilizers.

tpo: Does the Montalvo district plan to begin marketing its effluent for use in irrigation?

Polk: Not at this time. If we had a user right next to the plant, it would be easy, but the user who really wants the water is a mile and a half away. That would require conveyance costs that would be prohibitive for our plant.

And selling the water for irrigation would not eliminate our percolation ponds. Our growing season is about 10 months, so for two months we would be unable to sell the water and would need to put it into the ground. While there is potential in the future for us to sell the water for irrigation purposes, right now the benefits to us are in lower costs for soil aquifer treatment and the maintenance of our percolation ponds.

tpo: Do you see potential for other smaller treatment facilities to benefit from effluent acidification?

Polk: Yes. For smaller plants that can't meet open stream discharge requirements, this could become an important technology. Soil aquifer treatment is a common practice for smaller communities in Southwestern states like Arizona, New Mexico and Nevada. Many of them could use this acidification technology — wherever there are soil alkalinity issues and low water percolation.

Ammonia nitrogen added to the waterways is causing great havoc to ecosystems. To remove that ammonia nitrogen mechanically is very expensive. If we can create approaches where we can use effluent by applying it to the land in such a way that it will not cause an accumulation of salinity in the soil over time, that is a winner.

We alleviate water shortage issues and allow more water to flow naturally through the ecosystem, and we let the crops, whether they be food and fiber or biofuels, harvest the nutrients out of that water. It's a very green approach. **tpo**

more info:

Earth Renaissance Technologies LLC
925/250-4559
www.earthrenaissancetechnologies.com

Engineering, Consulting and Contracted Services

By Benjamin Wideman

PLANNING, DESIGN, CONSTRUCTION MANAGEMENT

Carollo Engineers provides planning, design and construction management services for municipal clients. Services include solids handling facilities from new plant inception to rehabilitation, and reconstruction of existing facilities. **800/523-5826; www.carollo.com.**

AN ALL-NATURAL METABOLIC STIMULANT

Natural Resource Protection Inc. provides NRP10-1000 all-natural metabolic stimulant to control the production of hydrogen sulfide and corrosion in wastewater collection systems and treatment plants. The product stimulates aerobic microorganisms so that they reduce the organic electron donor molecules available to the anaerobic sulfide-reducing microorganisms.

Elimination of hydrogen sulfide means no sulfuric acid is formed from the gas mixing with water. Absence of sulfuric acid in the system means the pH is not acidic and corrosion from the acid is reduced dramatically. **800/448-0499; www.nrp-inc.com.**

IMPROVED DIGESTER PERFORMANCE

Biogas utilization service from **Symbiont** helps wastewater treatment plants reduce operating costs and decrease utility needs through improved performance of anaerobic digesters. Symbiont projects have used biogas for heat generation, power generation, combined heat and power systems, and building climate control. **414/291-8840; www.symbiontonline.com.**

OPTIMIZING PERFORMANCE

The Asset Management group for **Orenco Systems** helps wastewater operators optimize the operational, environmental and financial performance of their systems. The group can assist with budgeting for equipment repair and replacement, provide technical and product support, or assess energy efficiency.

Annual training workshops and a free Operator News newsletter keep operators updated on best practices and the latest product offerings. The Asset Management group also administers an online Operator Forum so that operators can share their knowledge and get help with troubleshooting. **800/348-9843; www.orenco.com/systems/services.cfm.**

COST-EFFECTIVE SOLUTIONS

WSI International is a multidisciplinary engineering firm providing cost-effective solutions to complex environmental problems. The firm provides varied product offerings for wastewater treatment and solids management including equipment design, engineering and operations. Depending on project requirements, WSI can create custom packages pre-built or installed on site, retrofit existing facilities, perform installation and startup services, provide operational training or staffing, and develop residual waste management solutions. **303/985-0885; www.wsi-llc.com.**

REDUCE ELECTRICITY COSTS

Solon Corporation can help reduce electricity costs by up to 30 percent with solar energy. Energy costs associated with operating a wastewater treatment plant account for up to 40 percent of facility expenses. Using Velocity MW, a modular solar power plant, Solon helps maximize performance output. The company can provide financing with a Power Purchase Agreement (PPA) and assume responsibility for the entire plant management over the life of the system. **520/807-1300; www.solon.com.**

REMOVES SAND AND GRIT

Settled Solids Management removes the sand and grit from wastewater treatment facilities while the plant remains online and without removing the water or biomass. Sand and grit are removed through a hydroshovel with extension handles and special hydraulic pumps to a Vertical Grit Separator, where the material is separated from the water and biomass. The water and biomass are returned to the facility, and the sand and grit are deposited through screw conveyors into trucks for disposal. **407/322-0330; www.settledsolids.net.**

AFTERMARKET SERVICES

Ashbrook Simon-Hartley provides aftermarket services for dewatering services around the clock. The company also carries a multimillion-dollar inventory of spare parts and ancillary equipment for quick, on-time delivery. Additional services include mobile dewatering units, on-site equipment evaluations, equipment refurbishment, retrofits and upgrades, on-site classroom and hands-on training, and optimization services. **800/362-9041; www.as-h.com.**

RESTORING DIGESTER CAPACITY

Carylon Corporation has more than 50 years of experience in bringing sluggish, overloaded and even inoperable digester tanks back to full operating capacity. Overloading, lack of adequate oxidation time and loss of gas recovery can cause a digester to function at only a small percentage of design capacity.

Carylon personnel are deployed with the necessary flushing, pumping, venting and safety equipment to quickly and safely remove all organic and inorganic materials that interfere with digester operation. They remove solids with pressurized water and transport and dispose of the material. **312/666-7700; www.caryloncorp.com.**

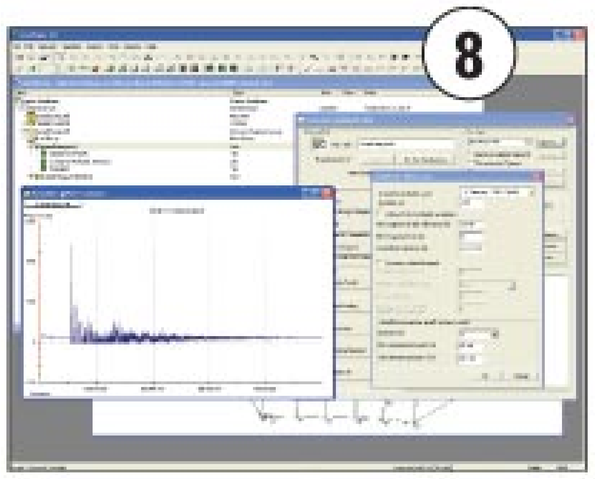
STARTUP SERVICE

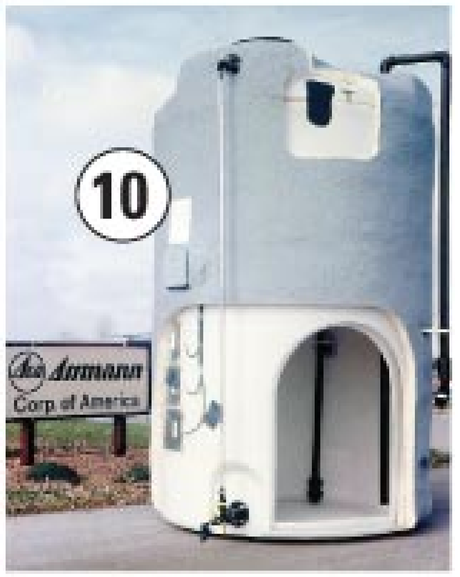
JDV Equipment Corporation ensures that installation of its equipment complies with all manufacturer specifications and requirements. The Startup Service is provided once the installation is complete and the system is ready to operate.

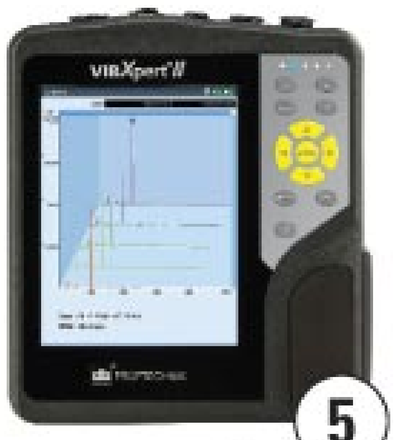
Trained and certified field service technicians operate the system in all modes and perform a basic end-user training that includes an overview of the system and operational procedures including safety, startup, modes of operation and shutdown. End users are apprised of basic maintenance requirements and how to obtain service and contact customer support. **973/366-6556; www.jdvequipment.com.**

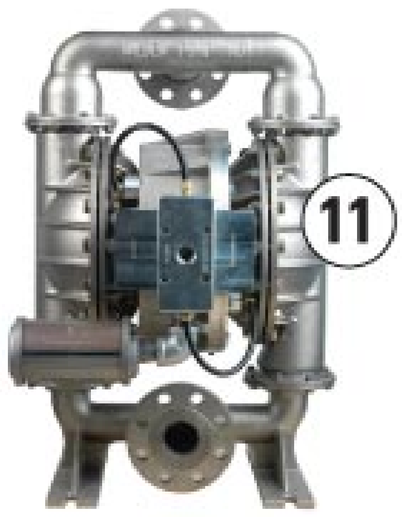
WASTEWATER TRANSPORTATION

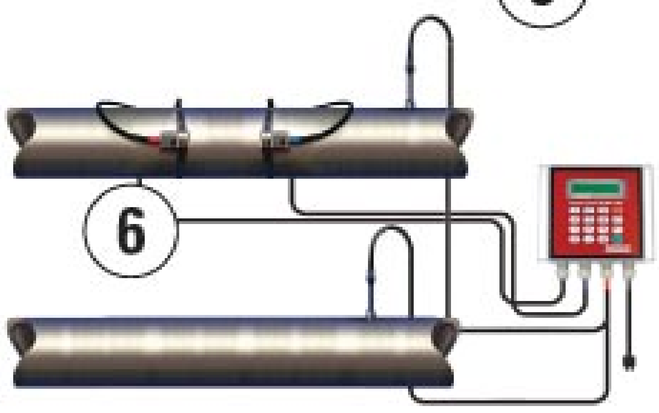
A full fleet of specialized equipment enables **Magna-Flow Environmental** to offer a turnkey service for all wastewater transportation needs. The company's aluminum tanker trailers allow more volume of product to be transported with less weight. **281/448-8585; www.magna-flow.com.** tpo











1. NEPTUNE OFFERS PZ SERIES AR METERING PUMPS

PZ Series electronic metering pumps from Neptune Chemical Pump Co. feature an automatic air release valve for chemicals that off-gas at room temperature (such as sodium hypochlorite). The pump has an acrylic head with Teflon diaphragm, ceramic checks and EDPM O-rings and seals. The pumps operate at the same flow rate and accuracy on any single-phase voltage from 94 to 264 VAC. **215/699-8700; www.neptune1.com.**

2. AXCESS INTRODUCES AUTOMATED SECURITY CHECKS

Dot MicroWireless Credentials from Axcess International Inc. automatically determines in real-time if a person is carrying a proper ID and is authorized to be in a given place. Applications include asset loss prevention, visitor tracking, emergency evacuation accounting and intrusion detection. **800/588-6080; www.axcessinc.com.**

3. WEG INTRODUCES ENERGY-SAVING MOTORS

The Quattro line-start permanent magnet hybrid motor from WEG Electric Corp. features three-phase distributed winding in the stator, while the W22 Super Premium motor offers maximum efficiency and exceeds NEMA Premium levels with 20 percent fewer losses. The Quattro operates at synchronous speed regardless of the load and requires no special protection relays. The low-noise, high-torque W22 has a 1.25 service factor through the 447T frame size. When paired with an electronic soft starter, the motor is even more efficient and reliable. **800/275-4934; www.weg.net.**

4. GREYLINE INTRODUCES OPEN CHANNEL FLOW MONITOR

The OCF 4.0 open channel flow monitor from Greyline Instruments uses a non-contacting ultrasonic sensor to measure wastewater flow through flumes or weirs. It features a built-in data logger with onscreen flow reports and software that retrieves, displays and graphs flow reports in customizable formats. Other features include isolated 4-20 mA, 0-5 V, USB and RS232 outputs, three control relays and 10-digit totalizer. Calibration and selection of flume or weir are made through the built-in, three-button keypad and menu system. Calibration is password protected and data totals are stored during power interruptions. Temperature compensation is automatic and accuracy is ± 0.25 percent. **888/473-9546; www.greyline.com.**

5. LUDECA OFFERS PORTABLE VIBRATION ANALYZER

The Vibxpert II portable vibration analyzer from Ludeca features a full-color display, data acquisition and vibration diagnostic tools. Machine vibrations, bearing conditions, process data and visual information can be collected and stored on the expandable Compact Flash Card (up to 8 gigabytes) for report generation or transfer to OMNITREND software for further analysis, reporting and archiving. **305/591-8935; www.ludeca.com.**

6. SIERRA INTRODUCES ULTRASONIC THERMAL ENERGY FLOW METER

The Innova-Sonic Model 205 thermal energy/Btu meter from Sierra Instruments is designed to measure the thermal energy flow rate and

totalized energy consumption in liquid heating and cooling applications. The clamp-on meter has an accuracy reading of ± 0.5 percent. **800/866-0200; www.sierrainstruments.com/products/205e.html.**

7. FAIRMOUNT INTRODUCES MACROLITE CERAMIC MEDIA

Macrolite engineered ceramic media from Fairmount Water Solutions offers high surface area, uniform composition, shape, size and density. Designed to filter down to 3 microns, the media enables users to minimize bed size and reduce equipment footprint. **800/237-4986; www.fmwater.com.**

8. MWH SOFT UNVEILS INFOWORKS TS

InfoWorks TS software for advanced hydraulic transient analysis from MWH Soft is designed to assess the effects of pump station power failures, pump startup, valve closures, rapid demand and pump speed changes. The program also simulates transient cavitation and water column separation, evaluates intensity and estimates the potential effects on the system. **626/568-6868; www.mwhsoft.com.**

9. CROWCON ADDS AMMONIA SENSOR TO GAS DETECTOR

The Tetra:3 personal multi-gas detector from Crowcon has been expanded to include a sensor for ammonia. The existing sensor range includes flammable gases, oxygen, hydrogen sulfide, carbon dioxide, ozone, sulfur dioxide and carbon monoxide. The unit has a top-mount display and can detect up to four gases at once. **800/527-6926; www.crowcon.us.**

10 ASSMANN OFFERS LARGE DOUBLE-WALL TANKS

Double-wall tanks from Assmann Corp. are designed to eliminate spills without lined concrete containment. The tanks feature uniform walls with a heavier top sidewall and dome for chemical and corrosion resistance, while the primary inner tank and secondary locked-on outer containment ensure against spills. Made of molded high-density crosslinked polyethylene or FDA-compliant linear polyethylene, the tanks range in size from 20 to 6,550 gallons. **888/357-3181; www.assmann-usa.com.**

11. WILDEN OFFERS H800 HIGH-PRESSURE PUMP

The H800 high-pressure pump from Wilden is designed to transfer viscous, solid-laden slurries at high-discharge pressures by utilizing a 3:1 pressure ratio of inlet air supply to discharge fluid. Available in stainless steel and ductile iron bolted construction, the pump can achieve discharge fluid pressures up to 250 psig. The pump also has a ringed air valve piston for added on/off reliability along with DIN or ANSI compatible flanges. Maximum flow rate is 95 gpm with a maximum inlet air pressure of 85 psig. **909/422-1700; www.pumpsg.com.**

(continued)

product spotlight

Automated Screenings Washer Designed for Optimum Discharge

By Ed Wodalski

SWM-XE Screenings Washer Monster from JWC Environmental

The SWM-XE Screenings Washer Monster from JWC Environmental includes a Smart Controller, low-profile stainless steel tank, and triple zone washing. The system can be directly fed from the screening device or through a conveyor or a sluice, and is designed to grind, wash, compact and dewater debris. It is available as part of the Monster Separation System fine screens or for cleaning solids from an existing screen installation.

The Smart Controller automatically monitors power demand on the compaction screw and selects the optimum run cycle via three programmable stages to provide the proper level of washing for a clean, dry discharge.

"It's like having an engineer on site," says Rob Sabol, director of research and development. "One thing we have learned is that each facility has many variables that require adjustments to run times and wash water duration. The controller takes the knowledge we've acquired and allows each site to draw upon and use it."

An initial wash zone in the hopper sprays incoming solids, providing better processing through the grinder. A second zone, just beneath the grinder and above the auger screw, provides thorough washing. Shredding of the solids with the grinder exposes more surface area, making washing more effective.

"It makes it much easier for the washing and compacting of the solids," Sabol says. It also results in a safer, more compacted discharge. "Syringes that may contain liquids that can be dangerous to plant personnel are now destroyed or broken, and the shredded material compacts easier than whole solids," Sabol says.

The third wash zone under the screen ensures that the liquid discharge from the tank remains clear and clean, maintaining the capacity of the system. Solids content can be up to 50 percent dry. "At most sites where we put the systems in, you're looking at 85 percent or higher volume reduction," Sabol says. "This means fewer trips to the landfill."

The system can process 150 cubic feet per hour and has a wash water capacity of 330 gpm. Options include discharge bagger, roller base, custom hoppers and custom discharge lengths. **800/331-2277; www.jwce.com.**

12. OMEGA INTRODUCES DOB21 BENCHTOP OXYGEN METER

The DOB21 benchtop dissolved oxygen meter from Omega has an amperometric dissolved oxygen probe with automatic temperature compensation for field or laboratory applications. It features RS232 output, auto calibration for all parameters, salinity and barometric pressure compensation and data logging up to 99 points. Programming is done via a three-button keypad. **203/359-1660; www.omega.com.**

13. VYCOM INTRODUCES CHEMICAL-RESISTANT CORRTEC LINE

Corrosion- and chemical-resistant Corrtec products from Vycom are available in several polymer options, including PVC (Type I and II), CPVC, HDPE, PP and CoPP. Both Hitec HDPE and Protec PP and CoPP are compliant with FDA, USDA, NSF (natural only) and RoHS requirements. **800/235-8320; www.vycomplastics.com.**

14. ELECTRO STATIC OFFERS AEGIS SGR BEARING PROTECTION

The Split Ring Aegis shaft grounding ring with conductive mounting kit from Electro Static Technology is designed for easy field installation without detaching coupled equipment. The kit-contained conductive epoxy and activator take approximately 10 minutes to apply and set. **866/738-1857; www.est-aegis.com.**

15. PENN STAINLESS INTRODUCES WELDED PIPE, TUBE LINE

Nonstandard welded tubular items in stainless, duplex, nickel, 6-moly and chrome-moly materials are available from Penn Stainless Products through its Specialty Pipe and Tube Division. Welded and tube products are available in a variety of grades and ASTM specifications. Made-to-order sizes range from 1/8- through 96-inch diameter. Stock sizes range from 1/8- through 24-inch diameters. Available in lengths up to 42 feet, pipe and tube can be specified with wall thickness from 0.008 through 3 inches and rectangular sections through 24 inches. **800/222-6144; www.pipeandtubes.com.**

16. MARKLAND INTRODUCES SLUDGE GUN

The handheld Sludge Gun from Markland Specialty Engineering can be used to determine sludge levels in lagoons, ponds, clarifiers and septic tanks. Sensitivity is adjustable for thick or thin sludges. The sludge layer is indicated by an audible tone that varies in volume and pitch. **905/873-7791; www.sludgecontrols.com.**

17. THERMO SCIENTIFIC OFFERS DATASTICK MEASUREMENT SYSTEM

The AquaSensors DataStick measurement system from Thermo Scientific features pre-calibrated plug-in sensor heads that provide 24-bit data. It can be calibrated, configured or diagnosed directly from a PLC or computer system. No immediate analyzer boxes are needed. Measurement parameters include pH, ORP, conductivity, resistivity, free chlorine, dissolved oxygen, dissolved ozone, drinking water turbidity and suspended solids. DataStick supports Modbus, DeviceNet, Profibus, USB, RS232, RS485 communications and advanced Ethernet connectivity. **800/225-1480; www.thermo.com.**

18. FCI OFFERS OEM LEVEL SENSORS

The OEM series of level sensors from Fluid Components International feature thermal dispersion technology with solid-state or relay contact outputs in a range of materials independent of conductivity. Designs include two-wire loop powered, insertion type with pigtail, level and temperature, mass level with two-wire loop powered, integral type, high temperature and wet/dry. **800/854-1993; www.fluidcomponents.com.**

19. SEL INTRODUCES INTEGRATED COMMUNICATIONS OPTICAL NETWORK

The Integrated Communications Optical Network from Schweitzer Engineering Laboratories can operate as an OC-48 SONET multiplexer and/or a gigabit-fast Ethernet switch. An ICON can be managed from one or several locations, either through SEL management software or generic SNMP manager. The ICON is available in a 19-inch, shelf-mount package and an 8-inch, DIN-rail or panel-mount package. It meets IEEE 1613 and IEC 61850-3 standards for communications networking devices in electric power substations. **509/336-7946; www.selinc.com.**

20. ECCENTRIC PUMPS OFFERS CHEMICAL DELIVERY SYSTEM

Peristaltic hose pumps from Eccentric Pumps are designed to deliver Thioguard and magnesium hydroxide slurry from Premier Chemicals to wastewater, collection and water treatment facilities to reduce odor and corrosion, adjust pH, improve treatment processes, increase effluent quality, enhance digester performance and improve biosolids quality within the treatment system. The pumps feature a single oversized roller that compresses the low-friction hose through 360 degrees of rotation for longer hose life and greater reliability. Multiple hose options are available, offering maximum flexibility and adaptability. **404/816-4760; www.eccentricpumps.com.**

21. VAL-MATIC OFFERS QUICK SIZING CALCULATOR

The pocket-size Air Valve Quick Sizing Calculator from Val-Matic Valve & Mfg. is made to assist in the correct sizing of air valves for use on water pipelines, sewage force mains, pump stations and treatment plants. **630/941-7600; www.valmatic.com.**

22. MSA OFFERS PERSONAL FALL LIMITER

The Workman personal fall limiter from MSA features a 400-pound working capacity, no annual recertification and integral load indicator. The PFL has a durable thermoplastic housing, impact-absorbing bumpers and choice of cable or web lifeline. **800/672-2222; www.msanet.com.** tpo

Off the Snails

A PILOT STUDY SHOWS THAT AN AUTOMATED SPRAY SYSTEM HAS STRONG PROMISE FOR CONTROLLING BIOLOGICAL GROWTH IN UV DISINFECTION CHAMBERS

By David Drobiak, Joseph Nestico and Shawna Gill

PHOTOS COURTESY OF SHAWNA GILL

ABOVE: The original brush-type cleaning system did not effectively clear algae growth from the secondary clarifiers at the Jewett City Wastewater Treatment Plant. BELOW: An automated spray arm now keeps the surfaces free of unwanted biological growth.

In Connecticut, with the changeover from chlorination to UV for disinfection at some of the water pollution control facilities, operators have seen an increase in attached algal growth and dense populations of tiny pouch snails in the UV chambers.

The result appears to be an artificial increase in suspended solids in the final effluent. Some of these facilities that recycle effluent for use in the plant find that they need to filter it to avoid maintenance problems.

To address the issue, the state Department of Environmental Protection and GillTrading.com conducted a pilot study with the Jewett City Wastewater Treatment Plant. The study found that an automated washing system was effective in keeping UV chambers clear of unwanted biological growth.

FEEDING ON ALGAE

The Jewett City plant, built in 2005, treats 1.1 mgd of wastewater. Plant processes consist of pretreatment, carousel-type nitrification/denitrification, clarification and UV disinfection.

In 2006, the plant staff documented increased suspended solids from snail shells in final effluent because a snail population had proliferated in the UV chambers. Plant superintendent David Drobiak asked for assistance from the DEP.

The rotational spray acts as a lance, cutting away at the algae growth or debris attached to the tank surfaces. A programmable timer fully automates the process.

DEP biologist Joe Nestico had suggested that the high snail population appeared to result from an available food source: algae growing in the UV chamber. He suggested regular cleaning of the algal growth on the clarifier launders and weirs and washing of the UV chambers to minimize or eliminate the snails.

The plant's original design made allowance for algae control, and a conventional brush-type system was installed for the two secondary clarifiers. However, Jewett City found that despite the brush system, algae grew on the scum baffles, weirs, brackets and other areas of the launder walls. This algae sloughed off and settled in the UV chamber.

The sloughed algae appeared to enable the tiny snails to flourish and multiply, while also seeding the UV chamber and promoting colonization of attached algae on the chamber walls.

FROM BRUSH TO SPRAY

The pilot study involved replacing the brush system with a spray system to control the attached algae and reduce the snail infestation. Nestico had been contacted by GillTrading.com about an automated cleaning system as a potential solution to the snail and algae problems.

The automated cleaning system is a non-contact cleaning approach using non-potable plant water to form a rotational spray. The water-jet action allows uneven and porous surfaces to be cleaned while minimizing the amount of water used.

The rotational spray acts as a lance, cutting away at the algae growth or debris attached to the tank surfaces. A programmable timer fully automates the process. Nestico wanted to test whether the spray system would control the attached algal growth in the secondary clarifiers and so reduce or prevent UV tube fouling and snail proliferation. The parties also expected the spray to minimize or eliminate regular manual cleaning.

TESTING THE CONCEPT

In fall of 2006, a spare secondary clarifier was retrofitted with the spray system and configured so that only that tank would feed clarified effluent to the UV chamber. Nestico, GillTrading.com, Mechanical Solutions (local representative from South Windsor, Conn.), Jewett

City WPCF, and several local water pollution control facilities donated staff for the removal of the brush system and installation of the spray system.

During the first year of operation, the plant water system that provides the 30 gpm/65 psi flow to the washer system was found to have a cracked pipe that for some time before and after its discovery limited cleaning effectiveness.

However, even with flow and pressure below specification, the spray system delivered better cleaning, less attached algal fouling in the UV chamber, and an observable reduction in the snail population. In addition, manual cleaning was required only once per quarter instead of twice per month.

During the pilot study, a few mechanical issues developed with the spray system, but GillTrading.com corrected them, and the company used what it learned to improve the system design.

Although the washer removed the majority of attached algal growth and regrowth, a residual black growth remained in some cases. This was found to be dead coccoid green algae — it was a cosmetic issue and did not appear to be a food source for the snails.

The parties determined that the best way to address the remaining debris was to add a booster pump to increase the spray system pressure to 120 psi. Testing showed that the booster pump would provide the desired result.

EFFECTIVE CONTROL

Pilot study results to date show that the facility has seen a significant reduction of snails in the UV chamber, and elevated effluent suspended solids from snail shells is no longer a concern. Facility staff members no longer manually clean the clarifier or UV chamber on a regular basis, and the black residual from the dead coccoid green attached algae is significantly reduced.

Although additional time is needed to document the sustainability of the system, it appears to date that the spray cleaning is a viable and effective process to control or eliminate attached algal growth in secondary clarifiers. It also appears to be effective in snail population control in UV disinfection chambers, and in greatly reducing staff maintenance time in facilities with UV disinfection. **tpo**

ABOUT THE AUTHOR

David Drobiak is superintendent of the Jewett City (Conn.) Wastewater Treatment Plant, Joseph Nestico is a senior environmental analyst with the Connecticut Department of Environmental Protection, and Shauna Gill is CEO of GillTrading.com Inc., a manufacturer of automated cleaning systems for wastewater treatment plants based in Beaverton, Ore.

more info:

GillTrading.com
866/447-2496
www.gilltrading.com

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Listings

North Carolina Septic Business. Grossing in excess of $125,000 annually. Includes 2,000 gallon service truck, backhoe, jetters and more. **$110,000.**

Northern Minnesota Septic & Drain Cleaning Business For Sale. Established in 1965, owner is retiring. 3,500 customers including some contracted. Well-established name for 45+ years. Real estate available for additional fee that adjoins municipal dump site. Hunt, fish, snowmobile right out your back door. **Affordably priced at $50,000.**

Texas Septic and Sewer Business. Grossing in excess of $1,000,000 annually. Includes 2007 2500 gallon septic truck, 1995 2500 gallon septic truck, 2007 and 2008 Chevy service trucks, portable restrooms and more. 430 contracted customers. **$799,000.**

Green Bay, Wisconsin Area Septic & Drain Business. Solid and steady revenue history and nearly 20 years established. Excellent opportunity to expand or start your own business. Includes very well-maintained 3,800 gallon septic service truck, fully outfitted 2002 Chevy drain service van, drain & sewer equipment, all office equipment and computers, 2,700+ customer list, and more - a true turn-key or easy expansion opportunity. Very meticulously maintained equipment all kept inside a heated shop. Current owner is retiring. Large shop and real estate is also available if desired at additional cost. **Asking $249,000.**

Chicago-Area Biosolids, Land Application, Dredging and Industrial Services Business. Established in 1985, owner is retiring. Reputable business includes real estate servicing the entire Chicagoland area with sludge and biosolids disposal and treatment services. Real estate and shop included with sale valued at $750,000, business grosses in excess of $3 million annually, $6.3 million in equipment and assets including several TerraGators, Vac Trailers, dump trailers, loaders and much more. **$4,900,000.** Huge potential, good profit and priced right. Non-Disclosure Agreement required, all P&L statements, list of assets, and financials available to qualified buyers.

South Florida Commercial Real Estate, Plumbing & Sewer Business For Sale. Established in 1969, owner is moving on. Nearly 8,000 customers in database including some contracted. Established name with real estate on turnpike. Real estate appraised in excess of $2 million, business grosses in excess of $1 million, close to $1 million in equipment including Vactor, Guzzler and Safe Jet trucks. Equipment has been featured in Cleaner magazine. Assumable SBA loan for bulk of selling price. **$2,799,000 for the entire package.**

New Jersey VIP Restroom/ Portable Toilet Business. Servicing Metro Philadelphia and Southwest New Jersey with VIP restroom trailers and portables. Many late model assets including 2 nice service trucks, 1 back-up service truck, pick-up truck, 4 VIP restroom trailers, nearly 300 restrooms, sinks, holding tanks, slide-in unit, 2 forklifts, and more. Assets worth over $300,000 - priced to sell at **$399,000.**

Allentown, Pennsylvania Area Sewer Business. Specializing in collection systems, video inspection, jetting, municipal work. Includes CUES TV & grout truck, Sewer Equipment Corporation jetter truck, Vactor 2100, RIDGID camera, confined space equipment and more! Good revenue history. Great opportunity to expand or start your own business. Current owner wants to retire. **$330,000.**

Massachusetts Sewer & Drain Franchise For Sale. Confidential listing, Non Disclosure Agreement required. Turn-key business, good revenue. **Asking $165,000.**

Dallas/Fort Worth Texas Area Sewer/Rehab Business For Sale. Drain Cleaning, TV inspection, Pipeline & Manhole Rehab/Relining, Municipal Cleaning and Maintenance business for sale. Excellent opportunity to expand or start your own business. Good revenue history and priced to sell. Includes all equipment to get started. **Asking $150,000.**

Wanted. Very serious and well qualified buyer looking for sewer, septic or industrial business in Dallas, Texas area. Must be grossing between $500,000-$1,000,000. All inquiries are kept confidential.

people/awards

John Giachino of Orlando, Fla., was named the Florida Water Environment Association president.

The **King County Wastewater Treatment Division's South Treatment Plant** in Renton (Wash.) and the **West Point Treatment Plant** in Seattle (Wash.) received Platinum Peak Performance awards from the National Association of Clean Water Agencies.

The Alabama Water Environment Association (AWEA) elected its board of directors: Sabra Sutton, of CH2M Hill in Montgomery, president; Matt Dunn of the City of Auburn, vice president; Daphne Smart of ADEM in Montgomery, secretary; Lennette Sheffield of TTL Inc. in Tuscaloosa, treasurer; Jonathan Childs of CH2M Hill in Montgomery, delegate to the Water Environment Federation.

The AWEA also announced its recipients:

- Thorsby, Lagoon Systems
- Jefferson County, <1.0 mgd Wastewater Treatment Plant Design
- Daphne Water Reclamation Facility, 1-10 mgd Wastewater Treatment Plant Design
- Catoma Wastewater Treatment Plant, >10.0 mgd Wastewater Treatment Plant Design

The British Columbia Water and Waste Association announced its award recipients:

- Mike Nolan, Stanley S. Copp Award
- Rob Mellander, Rick Hayhurst, Dave Forgie and Carolyn Stewart, Personal Recognition
- Denny Ross-Smith and Kim Stephens, Bridge Building Award
- Wetlands Pacific Corporation and Regional District of Bulkley-Nechako, Decentralized Wastewater Management Award
- Mike Firlotte, Victor M. Terry Award
- Alex Wood, George Warren Fuller Award
- Chris Johnston, Arthur Sidney Bedell Award

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

California

The California Water Environment Association has Safety Training Day on Oct. 27 in Woodland and on Nov. 10 in Carlsbad. Visit www.cwea.org.

Canada

The Atlantic Canada Water & Wastewater Association has Wastewater Treatment Level 1 and 2 courses on Oct. 5-8 in Fredericton, N.B., and on Nov. 16-19 in Halifax, N.S. Visit www.acwwa.ca.

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

Illinois

The Illinois Water Environment Association has a Collection Systems Seminar course on Nov. 4 in Lisle. Visit www.iweasite.org.

Michigan

The Michigan Water Environment Association will hold a Health and Safety Seminar on Nov. 2 in East Lansing. Visit www.mi-wea.org.

Nevada

The Nevada Water Environment Association will hold an Innovative Energy Management Workshop on Oct. 5 in Las Vegas. Visit www.nvwea.org.

North Carolina

The North Carolina Water Environment Association has these courses:

- Oct. 19 – Planning for the Future, Asheville
- Oct. 19 – Safety, Asheville

Visit www.ncsafewater.org.

Ohio

The Ohio Water Environment Association will have an Operator Education Day on Oct. 21 at the Montgomery County Environmental Services office. Visit www.ohiowea.org.

South Carolina

The South Carolina Section-American Water Works Association has an Information Technology course on Oct. 21 at a location to be announced. Visit www.scawwa.org.

Texas

The Texas Water Utilities Association has these courses:

- Oct. 12 – Wastewater Collection, Victoria
- Oct. 18 – Utilities Management, El Paso
- Nov. 9-11 – Wastewater Lab, Kingsville

Visit www.twua.org.

Wisconsin

The Wisconsin Department of Natural Resources has these courses:

- Oct. 5-7 – Lab – Introduction, Chippewa Falls
- Oct. 11-12 – Lab – Advanced, Chippewa Falls
- Oct. 13-14 – Trickling Filters and RBCs – Intro and Advanced, Green Bay
- Oct. 25 – Health and Safety Compliance Professional Development Course, Pewaukee
- Oct. 25 – Activated Sludge – Intro, Stevens Point
- Oct. 27-28 – Activated Sludge – Advanced, Stevens Point
- Nov. 9 – Basic Math, Madison
- Nov. 9 – Microscopy, Green Bay
- Nov. 10 – Security and Emergency Planning for Utilities, Madison
- Nov. 11 – Water Supply Safety, Fond du Lac
- Nov. 16 – Microscopy, Madison

Visit www.dnr.state.wi.us/org/es/science/opcert/training.htm. **tpo**

CALENDAR OF EVENTS

Oct. 2-6
Water Environment Federation Technical Exhibition and Conference, Ernest N. Morial Convention Center, New Orleans, La. Visit www.wef.org.

Oct. 19-22
Wisconsin Wastewater Operators Association Conference, Kalahari Resort & Convention Center, Wisconsin Dells. Visit www.wwoa.org.

Oct. 24-27
Pacific Northwest Clean Water Association Annual Conference, Bend, Ore. Call 208/455-8381 or visit www.pncwa.org.

Nov. 3-5
Nebraska Water Environment Association Fall Conference, Holiday Inn, Kearney. Call 402/399-1329 or visit www.ne-wea.org.

Nov. 9-10
Georgia Association of Water Professionals Fall Conference & Expo and Laboratory Symposium, Dalton. Visit www.gawponline.org.

Nov. 14-18
AWWA Water Quality Technology Conference & Exposition, Savannah, Ga. Visit www.awwa.org.

Nov. 16-18
Indiana Water Environment Association Annual Conference, Indianapolis. Call 317/686-2664 or visit www.indianawea.org.

Nov. 18-19
HWEA/AWWA Hawaii Section Water Reuse Biennial Conference, Maui. Visit www.awwa-hi.org.

tpo CLASSIFIED ADVERTISING

OCTOBER

BLOWERS

VFC200P-5T, FUJI Pumps, Regenerative Blowers, Ring Compressors. All models, accessories. Authorized distributor. Authorized parts and repair center. Call 888-227-9822. www.carymfg.com. (PBM)

DRAIN/SEWER CLEANING EQUIPMENT

www.draincleaningsupply.com. New cables, blades and other drain cleaning equipment. Shop for household and business replacement parts and equipment, often at special pricing at: **www.replacethepart.com.** (C11)

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)

POSITIONS AVAILABLE

Industrial Supervisor needed for the N GA & SE TN area. Vacuuming & waterblasting experience needed, familiarity with paper & steel industries a plus! Applicants can call 800-588-3236 or apply with qualifications and salary requirements to indussuper@gmail.com. (C10)

Sewer Evaluation Company in the Washington DC-Maryland area seeks Certified PACP and/or MACP CCTV Operators, Jet Cleaner Operators, and Operation's Manager. Good base salary, health care, vacation and bonus potential. Fax resumes to 301-805-9798. (C10)

PRESSURE WASHERS

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Joni Emrick
An Original Environmentalist
WATER RESOURCE MANAGER
Kalispell (Mont.) Wastewater Treatment Plant

Read about original environmentalists like Joni each month in *Treatment Plant Operator.*

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