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NOVEMBER 2011

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in Los Angeles

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Ralph Martini  
Public Works Director  
Heyburn, Idaho

## Public *Servant*

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in Wisconsin

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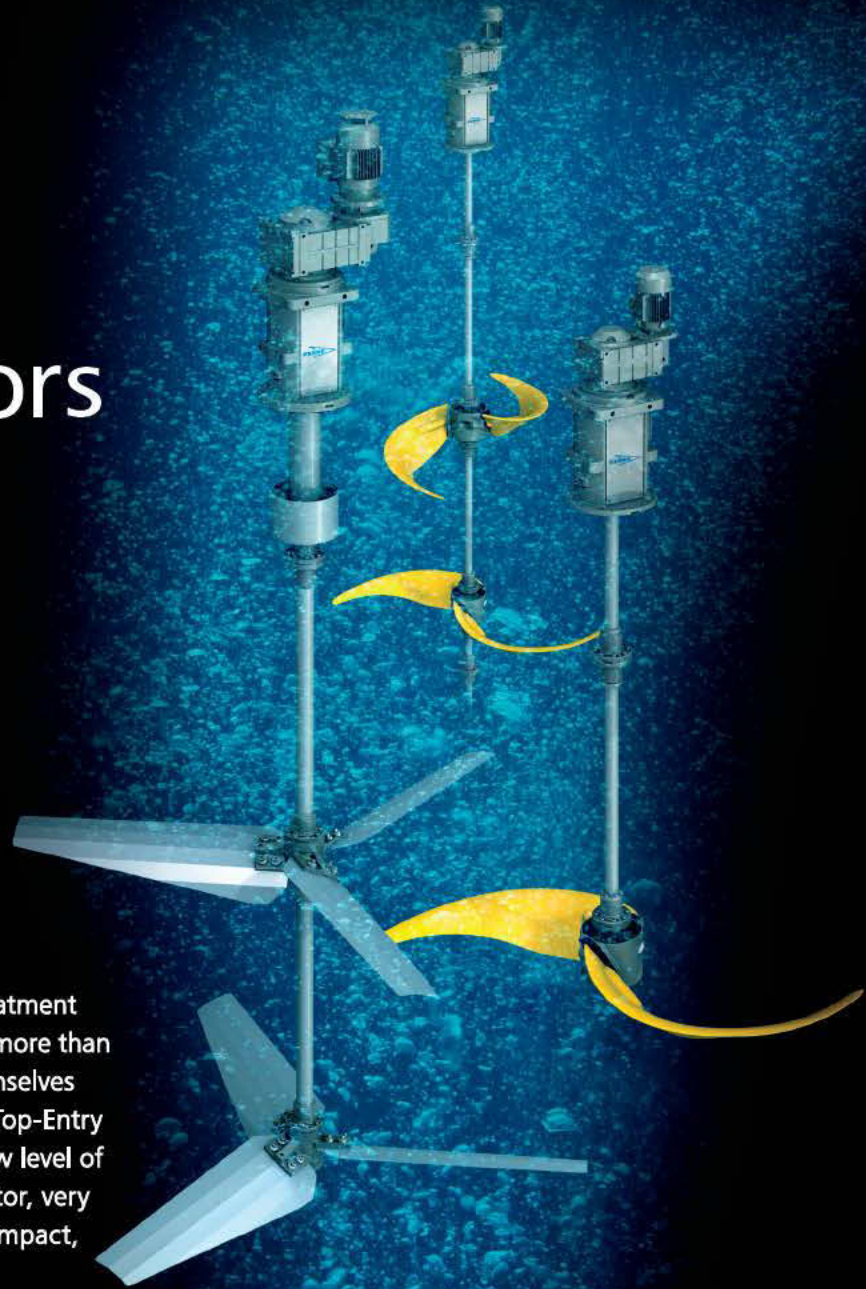


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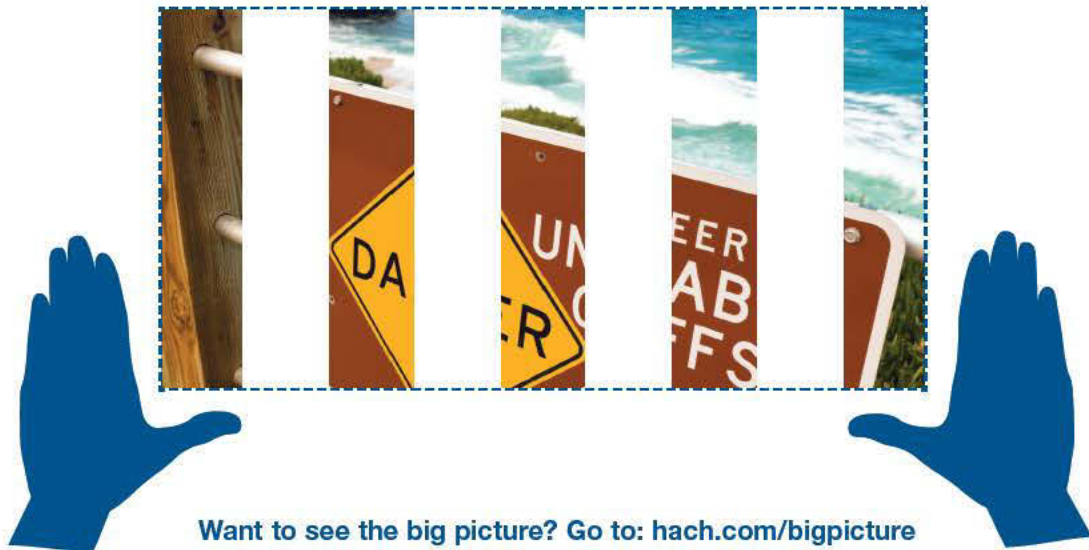
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When the City of Heyburn, Idaho, needed a large sewer rate increase, Ralph Martini went door-to-door to explain why. In the end, the citizens accepted the reasons and approved a treatment plant upgrade plan that nearly doubled their bills. It's just one example of how Martini, city public works director, goes the extra mile for the treatment system. (Photography by Ashley Smith)





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let's be clear

## Getting Serious

### WISCONSIN BLAZES A TRAIL WITH A WASTEWATER TREATMENT OPERATOR APPRENTICESHIP PROGRAM THAT MIMICS LONG-STANDING PRACTICES IN A VARIETY OF SKILLED TRADES

By Ted J. Rulseh, Editor



The handwriting on the wall is clear: Many experienced wastewater operators will retire soon, and there aren't enough new people coming up to replace them.

The industry is responding in a variety of ways. The Water Environment Federation and the American Water Works Association have created the Work for Water program to encourage young people and career changers to look at the water professions.

Cities and utilities have launched operator-in-training and internship programs. One excellent example of such programs is in the City of Fort Worth, Texas, and is featured

in this month's "Hearts and Minds" article.

Now, Wisconsin has upped the ante with a full-blown apprenticeship program for operators. There is a great deal to like about this offering, which is the subject of this month's "In My Words" interview, featuring Owen Smith of the Wisconsin Bureau of Apprenticeship Standards.

### TRUE RESPECT

Lots of treatment agencies give aspiring operators a hand up with paid internships and paid on-the-job and classroom training. Wisconsin's program goes several big steps farther. It's a three-year program that involves about 90 percent on-the-job training and 10 percent academic study. The classroom training requirement makes it unique among wastewater operator apprenticeships in the nation.

Perhaps the best feature of the program is that in a not-so-subtle way it confers true professional stature on wastewater operators. Consider that formal apprenticeships exist for a host of occupations:

**Construction trades** like carpenter, electrician, painter and decorator, plasterer, plumber, roofer, steamfitter.

**Industrial occupations** like maintenance electrician, machinist, metal fabricator, mold maker, pattern maker, tool and die maker.

**Service occupations** like barber/cosmetologist, cook and chef, correctional officer, funeral director and metering technician.



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Why shouldn't wastewater operators enjoy the same level of professional status? The mere fact of a true apprenticeship helps lift the perception of the wastewater operator as the guy in dirty overalls down at the sewage plant.

### EVERYONE WINS

Apprenticeships benefit both the trainees and the employers who ultimately hire them. The apprentices earn while they learn, receiving a living wage with health insurance, retirement and other benefits. As their skills increase, their wages also grow.

After the apprenticeship program, they earn journey-level status, which is recognized nationally. As such, journey-

A key challenge to attracting bright young people to wastewater careers has been the profession's lack of prestige. Maybe the industry looks more appealing to prospects if a position comes with the offer of a true apprenticeship.

workers typically can receive excellent wages and benefits anywhere in the country, as their qualifications are recognized and respected.

From the employer's side, apprenticeships attract better-quality, more committed applicants. During the long training relationship, the employer can instill values such as loyalty, good work practices, and positive work attitudes.

When training is complete and apprentices become fully qualified journey-level employees, they tend to fit in well with the organization because they already grasp its values and work requirements. With the promise of a future, they become valuable, committed employees able to advance to more responsible positions.

### MAKING IT ATTRACTIVE

A key challenge to attracting bright young people to wastewater careers has been the profession's lack of prestige. Maybe the industry looks more appealing to prospects if a position comes with the offer of a true apprenticeship.

Suddenly, wastewater operator becomes more than a job. It's a career that confers a recognized title on par with other professions and includes a defined and built-in career track. In this respect alone, apprenticeship is a significant step forward.

It's hard in this context to resist making a plug for my home state. Wisconsin has been a leader in developing registered apprenticeship programs. With the passage of its apprenticeship law in June 1911, Wisconsin became the first state in the U.S. to have a regulated apprenticeship program. The Bureau of Apprenticeship Standards last June celebrated the program's 100-year anniversary.

It does appear that where wastewater treatment is concerned, Wisconsin is once again blazing a good trail. **tpo**

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# One of a Kind

A UNIQUE PROCESS AND AN EXCEPTIONAL STAFF MAKE SURE THE TOWN OF VERNON TREATMENT PLANT SENDS EXCELLENT-QUALITY WATER INTO TROUT HABITAT DOWNRIVER

By Jim Force



The Vernon plant's PACT aeration tanks, in the foreground, use EDI tubular membrane diffusers with a Dresser Roots aeration control system. Air is provided by three 400 hp 6,000 scfm Roots blowers. Immediately behind the aeration tanks are three of the five Siemens-Envirex circular clarifiers. (Photography by Steve Laschever)



THESE DAYS, ARNIE BEVINS IS EVEN MORE FOCUSED on ensuring the future well-being of the treatment works and its staff than on making the monthly permit at his Town of Vernon (Conn.) Water Pollution Control Facility.

He makes sure that extensive Standard Operating Procedures are up to date and readily available, and that new people are brought on board and trained on the innovative and complex processes that make Vernon unique among treatment plants in New England and across the United States. Furthermore, the Vernon staff has been “hands-on” throughout the many improvements and upgrades to the plant.

“We were the first full-scale powdered activated carbon treatment and wet-air carbon regeneration system on planet earth,” says Bevins, assistant director of the Vernon utility and superintendent of the plant. “A lot of us grew up with this plant and the process. We want to make sure we leave it in good hands.”

It’s in good hands now, discharging pristine effluent to the Hockanum River, which includes a state-designated wild trout management area not far downstream.

The operational excellence, budget controls, customer satisfaction and employee retention exhibited by Bevins and his staff recently earned the Vernon utility the New England Water Environment Association’s outstanding wastewater utility award earlier this year. “There were six finalists,” says Bevins. “It’s great to be recognized.”

#### HOW IT WORKS

While Bevins is known for his wry sense of humor, he wasn’t kidding about his plant being the first of a kind. The facility serves the towns of Vernon, Ellington, Tolland and small parts of South Windsor



Arnie Bevins, assistant director and superintendent, Town of Vernon Water Pollution Control Facility.

and Manchester, taking in wastewater from 122 miles of sewers and seven pump stations.

At its heart is a powdered activated carbon treatment (PACT) system from Siemens Water Technologies — Zimpro that incorporates powdered activated carbon with biomass in the aeration basin to achieve biophysical treatment.

The process removes color and nutrients and produces near-drinking-water-quality effluent. Powdered carbon, with substantially more surface area than granular carbon, adsorbs pollutants and acts as a site for the microorganisms to enhance their uptake. Vernon operates the aeration basins at about 12,000 mg/l mixed liquor suspended solids, and the return activated sludge content ranges from 20,000 mg/l mlss to 25,000 mg/l mlss.

The Zimpro wet-air regeneration system recovers the carbon and essentially eliminates the need for secondary sludge removal, reducing costs by about \$400,000 a year. Recovered carbon is recycled to the aeration basins through a



## profile **Town of Vernon (Conn.) Water Pollution Control Facility**

<b>BUILT:</b>	<b>1970s; upgrades 1995 and 2008</b>	
<b>POPULATION SERVED:</b>	<b>66,000</b>	
<b>TREATMENT LEVEL:</b>	<b>Tertiary</b>	
<b>FLOW:</b>	<b>7 mgd design, 4 mgd average</b>	
<b>TREATMENT PROCESS:</b>	<b>Powdered activated carbon treatment (PACT); gravity sand filtration</b>	
<b>RECEIVING WATER:</b>	<b>Hockanum River</b>	
<b>BIOSOLIDS:</b>	<b>Incinerated off-site</b>	
<b>STAFF:</b>	<b>20</b>	
<b>ANNUAL BUDGET:</b>	<b>\$5.5 million (operations)</b>	
<b>WEBSITE:</b>	<b>www.vernon-ct.gov</b>	
<b>GPS COORDINATES:</b>	<b>Latitude: 41°51'50.87"N; Longitude: 72°29'6.08"W</b>	



**Town of Vernon Water Pollution Control Facility  
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<b>TSS</b>	369 mg/l	9 mg/l	20 mg/l
<b>Phosphorus</b>	N/A	N/A	0.14 mg/l (proposed)
<b>Ammonia</b>	25.8 mg/l	0.17 mg/l	Seasonal



Operator Steve Dombek checks the Siemens-Zimpro PACT regeneration system. To the left is a control panel for a Vapor Power Modulatic steam generator. The tall, cylindrical tube is the reactor vessel and the rectangular structures on the right are the heat exchangers for the carbon regeneration process.

metering system. Makeup carbon is stored in a carbon silo and added as needed.

Installed in 1979, the PACT process was the first of a number of similar systems that have been used to treat municipal wastewater as well as industrial wastes and landfill leachate over the past 30 years.

**TO THE RIVER**

Ahead of the PACT system, a 10,000-square-foot building houses the preliminary treatment system, which includes a coarse screen followed by automatic fine screens (FMC Technologies), and a Waste Tech (A Division of

“Our lab people do the bulk of the sampling and analysis, with the exception of metals. They handle all of our process control testing. We have good consistency in our data. Our staff represents a real value to us.”

**ARNIE BEVINS**

Kusters Zima) and Jones & Attwood (Ovivo) Jeta cyclonic grit removal chamber. Removed solids are classified, washed, and compacted before being landfilled. The equipment is enclosed because the plant is next door to a large apartment complex. A 25,000 scfm scrubber (Xerxes and Heil Process Equipment) collects and treats odorous air.

The wastewater is then lifted by screw pumps (Siemens – CPC) to the primary clarifiers, and the overflow moves on to the PACT system. Effluent from the secondary clarifiers (Siemens – Envirex) passes through four Leopold (ITT Water & Wastewater) dual-media sand filters and is chlorinated-dechlorinated (Pulsafeeder) during warm months.

Effluent is aerated year-round to maintain a dissolved oxygen level of 7 mg/l. “Based upon Department of Environmental Protection calculations,



Lab analyst Michelle Sonski uses a Hach multiparameter meter to measure pH and dissolved oxygen.

about 85 percent of the river’s flow below our plant is treated effluent,” says Bevins. That and the downstream trout habitat explain the plant’s strict effluent requirements.

Primary sludge is thickened in a pair of 35-foot-diameter thickeners (AMWELL), then trucked to an off-site merchant incinerator. About half a million gallons of primary sludge is handled that way each year.

The regeneration process uses heat and pressure generated by Ingersoll Rand compressors and Zimpro high-pressure pumps to oxidize secondary solids amassed on the carbon and produce a reusable carbon and a small amount of ash, which is periodically blown down and landfilled with the plant’s grit and debris.

**KEEPING CONTROL**

A 2,700-point PLC-based SCADA system (GE Intelligent Platform fed by 28 Allen-Bradley PLCs from Rockwell Automation) provides automatic control of the entire plant operation. The treatment process also handles outside high-strength wastes that haulers bring to the plant under a state waste acceptance permit. “This is wastewater that’s difficult to treat in conventional systems,” says Bevins. “We have 10,000 to 15,000 gallons a month. It more than pays for itself, plus we know where this stuff is going.”

The plant also maintains its own laboratory, and Bevins credits his lab staff with accurate sampling and analysis. “Our lab people do the bulk of the sampling and analysis, with the exception of metals,” he says. “They handle all of our process control testing. We have good consistency in our

data. Our staff represents a real value to us. They know in an instant when something is not right.”

Operations funding comes from an Enterprise Fund administered by the Vernon Water Pollution Control Authority, matching rates to expenses. Bevins likes that approach, because “It takes the politics out of it. We bill against water consumption.” He says the rates are “normal” for his area at about \$5.60 per thousand gallons.

**MAKING THINGS BETTER**

As with all newer processes, the treatment train at Vernon has undergone a number of modifications and improvements in the 30-plus years since its initial operation, with substantial help from the plant’s 20 employees.

*(continued)*





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The Vernon plant team includes, from left, back row, Ron DaRos, mechanic; Peter Dureiko, collection system foreman; Gary Watkins, operator II; Steven Boske, lab manager; Nicole Margelony, administrative assistant; Gary DeRobertis, mechanic; Steve Dombek, operator II; Arnie Bevins, assistant director and plant superintendent; and Dan Stachowiak, plant foreman. Front row, Tim Foley, plant foreman; Tony Manfre, operator I; Mike Manfre, operator I; Michelle Sonski, lab analyst; D.J. Lapacchino, operator I; David Ignatowicz, director of the Vernon Water Pollution Control Department.

## BEST IN NEW ENGLAND

Town of Vernon utility director David Ignatowicz and assistant director Arnie Bevins are rightfully proud of the award the utility received recently from the New England Water Environment Association.

NEWEA named Vernon the wastewater utility of the year for 2010, honoring the performance and management of the water pollution control facility as well as excellence throughout utility operations. The award annually recognizes a regional utility for outstanding performance, maintenance and management based on a review of 18 criteria.

"The Vernon Facility, an operationally sophisticated water pollution control facility, had positive ratings on all points including progress on short- and long-term strategic goals, and demonstrated operational and performance excellence, customer satisfaction, budget control, and employee retention," NEWEA said in its evaluation.

"It's really kind of humbling and gratifying at the same time to be recognized," says Bevins. NEWEA was founded in 1929 and has more than 2,100 professional members representing wastewater treatment agencies across six Northeastern states. The Town of Vernon Water Pollution Control Department staff, in addition to Bevins and Ignatowicz, includes:

Laboratory manager Steven Boske; lab technician Michelle Sonski; collections system foreman Peter Dureiko; plant foremen Tim Foley and Dan Stachowiak; operators II Jon Austin, Steve Crowley, Steve Dombek, Gary Miller and Gary Watkins; operators I D.J. Lapacchino, Tony Manfre and Mike Manfre; mechanics Ron DaRos and Gary DeRobertis; administrative assistant Nikki Margelony; business manager George Rostkowski; accountant Sharon Gamer; and secretary Lisa Yost.

"All the other PACT systems out there use coarse-bubble diffusers in the aeration basin," says Bevins. "We were spending about half our yearly energy budget on the aeration system."

To reduce costs, Vernon investigated fine-bubble diffusers with automated controls and decided on Environmental Dynamics International fine-bubble tubular membrane diffusers with controls from Dresser Roots.

"Tom Jenkins is their main controls guy, and he helped us implement three zones in the aeration tanks," says Bevins. "The header in each zone was upgraded with an automatic control valve and airflow meter." The system automatically moves air around based on both DO levels and mixing air requirements, and reduces air when it's not needed. "The control system alone is saving us \$50,000 a year," says Bevins.

The diffusers also save energy and money, since Connecticut Power and Light has a program that reimburses customers for 50 percent of the cost of energy-saving projects. "That was a big deal for us because they paid us \$365,000 based on our project cost (for new diffusers and controls) of \$730,000," says Bevins. "As a result we trimmed our overall energy expense by about \$200,000 per year."

In addition, fine-bubble aeration has reduced turbidity to negligible levels. "We always had some turbidity here, but two days after going to fine-bubble, our turbidity dropped to as low as 0.5 NTU," Bevins reports.

Foaming was another challenge. A 1992 design included a chlorinated spray system to beat down foam, but after analyzing the process dynamics relative to the plant's nitrification requirement, the Vernon crew put more

*(continued)*





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*Melinda S. Ward  
Wastewater Plant  
Superintendent  
City of Eden, NC*

The reactor basin at Eden's wastewater treatment plant is 14 feet deep. Brush aerators ran constantly to try and mix it all, but they could only mix and aerate the top half. The results were a high, wasteful level of dissolved oxygen at the top of the basin, and a mass of sludge at the bottom that wasn't impacted by the treatment process. Superintendent Melinda Ward sought a “green” solution for these problems, and she found exactly what she needed in SolarBee® mixers.

In 2009 Ms. Ward installed Eden's first SolarBee SB10000 unit, and big improvements were immediate. “We could actually see the solids moving,” she said. “It's amazing how the SolarBee brings them to the top of the basin!” The SolarBee provided improved mixing of the entire basin for better oxygen utilization, and the ability to maintain high suspended solids throughout the basin while reducing the aeration run time to the minimum needed for a healthy DO. An unexpected but welcome benefit was better sludge settling at the clarifier, leading to reduced effluent BOD and TSS.

Superintendent Ward was so impressed, she ordered two more SolarBees to achieve even better results and more energy savings. These solar-powered units work 24/7 virtually for free. And now, because the costly aerators are operated less, the facility's electric bill has been cut nearly in half!

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tankage online and gradually ramped up sludge age, taking the plant through the point where filamentous proliferate — 23 to 24 days sludge age. As a result, the plant no longer experiences foaming.

“We don’t make sudden changes, so this was a major leap of faith,” Bevins recalls. “It’s not for every PACT plant, but it certainly worked for us.”

Other important changes implemented by Team Vernon include modifying the original two-stage aeration setup to a single-stage plug flow operation and raising the walls in the lower tank so that all tank contents are on the same level. “By making all our surface elevations consistent, we get better distribution and it’s more cost effective,” says Bevins.

The plant has also eliminated chlorine gas, converting the disinfection step to liquid hypochlorite, followed by dechlorination and post-aeration.

## REGENERATING THE REGEN UNIT

The wet-air regeneration unit is critical to treatment at Vernon because the process regenerates the spent powdered carbon while oxidizing the secondary sludge. Without it, the plant would pay much more for fresh carbon and secondary solids handling.

Bevins and the team have taken special care of the system over its 30-plus years of hard work. “When we rebuilt the unit, we sole-sourced the manufacturer and worked with the same technical specialists who helped us install the system in the first place,” he explains.

Operational experience indicated that the original system did not have enough heat exchanger area, and that prevented autothermal operation, which requires no ongoing fuel source. The manufacturer (Siemens) supplied a new heat exchanger bundle, essentially doubling heat exchanger capacity, and worked with Vernon to rebuild the high-pressure pumping sys-

“When we began design on our last \$38 million upgrade, we took our guys and effectively locked them in a room with pizza and soda and had them write down what they felt was wrong on sheets of paper.”

### ARNIE BEVINS

tem with new balls and seats along with significant improvements to the process controls.

In another modification, Vernon uses an equalization tank to hold the recycle stream from the regeneration step, which is high in BOD and ammonia. The recovered carbon is metered from the tank back to the PACT system, and the distribution of the liquid back to the head of the treatment works can be controlled.

## LOOKING AHEAD

The managers at Vernon have worked hard to get the treatment plant performing at an outstanding level, and they want to make sure the next generation of operators and managers does the same. Bevins is constantly on the lookout for potential operators who can be recruited and trained to run the plant.

Newly hired operators-in-training are required to take the Sacramento State University wastewater courses, volumes I and II, and earn their Connecticut certification within their first year on the job, an approach Bevins says is working out well. “It gets them up to speed,” he says. “Basically, we’re replacing ourselves.”

The staff members also get plenty of practical experience and intimate knowledge of the plant because they’ve been heavily involved in the process improvements. “When we make changes, we don’t rely solely on consultants to make our decisions for us,” says Bevins.

“When we began design on our last \$38 million upgrade, we took our guys and effectively locked them in a room with pizza and soda and had them write down what they felt was wrong on sheets of paper. These were labeled by unit processes, and we worked with them to determine the things that they felt needed to be changed. Then we would look at their ideas and proposals and decide whether to address them and incorporate them into the new plan.”

It’s an approach that helps Bevins feel confident about the future of wastewater treatment in his town. He recalls one of the early process improvement projects that went to a low bidder and didn’t turn out so well. “You have to fight for what you believe you need,” he tells his new team of operators. “You’re left with what you’re left with, and you’ve got to make it work. Make sure you get the equipment that you have to have.” **tpo**

LEFT: Lab manager Steven Boske measure effluent quality. RIGHT: Plant foreman Dan Stachowiak monitors effluent levels on the Allen-Bradley (Rockwell Automation) control panel.



**WATCH THEM  
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To learn more about the Town of Vernon Water Pollution Control Facility, view the video at [www.tpomag.com](http://www.tpomag.com).

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# Talent for the Future

FORT WORTH'S VILLAGE CREEK WATER RECLAMATION FACILITY WORKS WITH STUDENT INTERNS TO PREPARE THEM FOR CLEAN-WATER CAREERS

By Pete Litterski

Several years ago, managers at the City of Fort Worth's Village Creek Water Reclamation Facility saw a looming challenge: Many employees were nearing retirement.

As part of the solution, they worked with the local school district to develop an internship program that in its third year has already produced one new treatment operator.

"Our workforce was aging and at the same time when we had vacancies, we felt we weren't getting applicants that would give us a good pool to choose from," recalls Sebastian Fichera, assistant water director and the top executive at Village Creek.

Many job seekers lacked the math, science and communications skills needed to be effective operators. The managers started brain-

storming. Because of new technology and more advanced treatment processes at Village Creek, they saw an opportunity to prepare for the future.

## EAGER TO HELP

The 166 mgd (design)

Village Creek facility serves 23 north Texas communities with a combined population of about one million. It discharges into the West Fork of the Trinity River, and during dry months its effluent can account for up to 95 percent of the stream's flow.

"We thought we could start replacing some retiring operators with applicants who were more technologically oriented, better prepared for the changes in our processes," Fichera says.

The Fort Worth Independent School District welcomed the interest in an internship program and put the utility in touch with educators at Diamond Hill Jarvis High School. There, assistant principal Daniel Goodner and career and technology instructor Rebecca McDonald are now gearing up for the third year of the program. The first year, five interns worked for one semester. In 2010-11, the program expanded to a full academic year.

Seventeen students took a plant tour in mid-May as the first step in the application process for 2011-12. They returned to school in early June for interviews, after which two interns were to be named. "Normally, we'll accept four, but next year we need to keep it to just two because we will have a lot of construction going on," Fichera says. "Hopefully in the future, we'll be able to expand this concept to the water side and eventually to field operations, too."

## EARNING RESPECT

Fichera is impressed with the students: "The kids they are bringing us are sharp, they're real sharp." Jerry Pressley, superintendent of maintenance and operations at Village Creek, agrees. Some employees were apprehensive about having students tagging along, but the students quickly earned the operators' respect. Students do some job shadowing but also have assigned duties and are expected to perform professionally.

"I think we've given these kids some good real-world experience,"



## 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@tpo.com](mailto:editor@tpo.com) or call 877/953-3301.

PHOTOS COURTESY OF FORT WORTH WATER DEPARTMENT



Student intern Salvador Cisneros takes part in supervised lab sessions.



Pressley says. "I think we're doing ourselves a real favor by showing them what's involved in keeping a city going."

Goodner says the internship is a good fit for students who excel at problem solving but sometimes falter under the traditional classroom approach. "If you give them a real task, they have the intelligence to study it and find a solution," he says. "These kids are overlooked a lot, but they are great. If you put a challenge to them, they rise to the top."

The program has already produced one full-time employee. Edgar

"Our workforce was aging and at the same time when we had vacancies, we felt we weren't getting applicants that would give us a good pool to choose from. We thought we could start replacing some retiring operators with applicants who were more technologically oriented, better prepared for the changes in our processes."

#### SEBASTIAN FICHERA

Tavera, a 2009 intern, has earned his Texas Class D wastewater treatment operator license and is preparing to take the test for his Class C license.

Students take the state's 20-hour basic wastewater operations class in two-hour blocks during the first semester and the 20-hour wastewater treatment class the second semester. "Several months after they graduate, they will be eligible to take a test for the Class D license because the time they spend in the internship counts toward the practical experience the state requires," says Ginger Laird, a trainer at Village Creek.

Tavera's decision to stay at Village Creek was great news to Fichera: "That was one of our goals — that at least one of the students would stay."

Mary Gugliuzza, media relations and communications coordinator for the Fort Worth Water Department, says former interns who continue their education could still become recruits. "The other students from the first class all went on to college, but this could affect their long-term career decisions," she says. "There are a whole lot of careers in this industry for college graduates — engineers, biologists, chemists."

#### ATTRACTIVE PAY

As they neared the end of their 2010-11 internships, Katina Booker and Salvador Cisneros said their favorite tasks involved the collection of samples. "I like taking samples at the aeration basins," says Booker, who is headed to college. "I don't like to sit around. Taking the samples keeps me busy."

Cisneros, who has applied for a full-time job at Village Creek, prefers taking samples at the aerobic digesters, "because you can go underground and it's interesting down there." He says the internship put his education to a practical test, as it involved extensive use of science.

Both students say classmates sometimes kidded them about their work at a treatment plant, but that changed as those students learned more about what the jobs involved.

Cisneros says that's especially true when friends learn the pay rates. "They'll be working at fast-food places with awful hours, and they're not making near

as much as we do," he says.

The interns finish traditional classes by 1 p.m. and are required to be at work from 2 to 6 p.m. each school day. In addition to a paycheck, they get three academic credits for the combination of classroom work and practical experience.

Because of the practical application of scholastic skills, McDonald says, "Our goal would be to have a science credit directly tied to this in the future." **tpo**

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# Cold-Water Nitrification

A BIO-DOME MOBILE AMMONIA REMOVAL SYSTEM PROVES ITSELF IN TESTING THROUGH A MIDWESTERN WINTER

By Scottie Dayton

The wastewater treatment lagoon at Gresham (Wis.) Municipal Utilities needed a \$350,000 upgrade to comply with the state Department of Natural Resources' new ammonia-nitrogen daily maximum limit of 1.8 mg/l. The utilities considered installing a carbon dioxide bubbling system to reach the limit.

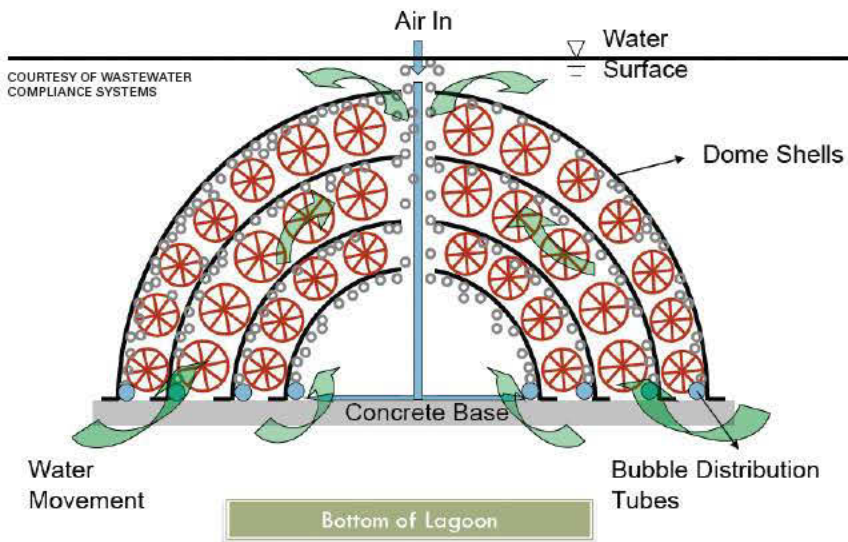
Then Jason Metz of Marshall-Bond Pumps proposed a pilot project to manager Art Bahr. Wastewater Compliance Systems (WCS) wanted to document the performance of the Bio-Dome ammonia removal system to see how well the submerged bioreactor functioned in cold weather. If it worked, it could save the village thousands of dollars per year in maintenance costs.

Gresham was the first Midwest utility to test the technology. Operators, working closely with Metz and Kraig Johnson and Taylor Reynolds of WCS sampled the influent and effluent weekly from October 2010 through April 2011. The mobile unit nitrified ammonia even in water at 34.6 degrees F to levels below 1 mg/l.

## PLUG-AND-PLAY

The utilities, operated under the village of Gresham, have 280 sewer and water customers with wastewater flows of 60,000 gpd. The 12-foot-deep, two-cell, two-acre facultative lagoon was installed in 1982. In 2008, effluent ammonia averaged 14 mg/l, twice the permit level.

"The plug-and-play unit arrived in an insulated and heated



A diagram of the submersible Bio-Dome shows water flow from bottom to top and the plastic media.



Low-pressure air optimizes the growth of microorganisms colonizing plastic media inside the Bio-Dome.

20-foot cargo container," says Bahr. "All we did was run a new 120-volt power line on a 20-amp breaker."

Inside the container was a 1,500-gallon tank with Bio-Dome 2800, an air compressor with flowmeter, influent pump, and four-channel temperature data logger. A WCS representative helped in placement, installation, startup and training.

Village workers set the container on the north side of the western lagoon and anchored the pump to an old surface aerator pontoon, 40 feet from shore but close to the effluent side. "At this point, wastewater has already flowed over the coarse-bubble aerators, removing a significant amount of BOD and TSS," says Bahr.

The crew wrapped the 1-inch influent and effluent lines in heat tape, then insulated and covered them with a protective shell to prevent freezing. The influent line was anchored to the pontoon. Flow from the air compressor optimized microbial growth on the plastic media. Installation took three days.

"The dome, which normally sits on the lagoon floor, is 6 feet in diameter and 5 feet high and weighs 850 pounds," says Bahr.

## Share Your Idea

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

Send your ideas to [editor@tpomag.com](mailto:editor@tpomag.com) or call 877/953-3301.



The Bio-Dome mobile unit sits on the north side of the Gresham Municipal Utilities western lagoon.

"Inside are four concentrically nested domes filled with media providing 2,800 square feet of surface area." The unit secures to a concrete base.

### BIOREACTOR BASICS

Wastewater enters the bottom of the nested domes and flows to the top. Air injected at the bottom is distributed by bubble tubes on both sides of each dome. Besides providing oxygen for the microorganisms, bubbles flowing out of the unit agitate the water, delaying sludge buildup in the lagoon.

To achieve greater process control, the pump time-dosed the bioreactor every three hours. Measuring the flow enabled WCS to adjust the pump-on time to create different hydraulic retention times (HRT). "Sampling began with a 10-day HRT and was reduced four times," says Bahr. "We drew the final sample with a one-day HRT."

The unit ran for two weeks before sampling. Operators checked it three times a week, drawing

"When compared with other technologies for cold-weather nitrification, Bio-Domes are an affordable, simple green solution to a long-term problem. They will help us meet and exceed our regulatory requirements, while minimizing chemical use and maintenance."

### ART BAHR

influent and effluent samples on Wednesdays. A certified lab analyzed them for BOD, TSS, ammonia, nitrates and nitrites, TKN, TN, pH and, once a month, alkalinity. Tank water temperature, pH, and dissolved oxygen also were measured.

### TRIAL CONDITIONS

Operating conditions changed during the trial. WCS installed an inlet drop pipe to keep wastewater from short-circuiting between the tank inlet and outlet, and an overflow sensor. In February, operators installed a solenoid valve to cycle air for denitrification.

"With the air cycled off for two hours per day, we reduced the effective HRT from 96 to 88 hours," says Bahr. "Later that month, we dropped it to 44 hours, then 22 hours in March."

The overflow sensor tripped twice that month as ice slush clogged the discharge line, preventing the tank from draining fast enough to keep up with the influent. A one-day spike in influent BOD in February produced a more robust biofilm, enabling ammonia effluent levels to drop below 1 mg/l in March. Alkalinity levels for influent averaged 235 mg/l and effluent 124 mg/l.



COURTESY OF GRESHAM MUNICIPAL UTILITIES



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**METTLER TOLEDO**



Utility manager Art Bahr draws a sample from the Bio-Dome mobile unit.

“Our BOD and TSS levels suffered because the lowest test resolution used by the laboratory was 2 mg/l,” says Bahr. “Consequently, many samples were reported simply as less than 2 mg/l. TSS was consistently less than 4 mg/l, well below the expected limit for the village.”

The average reduction in TN was 2.23 mg/l with a high of 7.5 mg/l, indicating the anoxic microclimates within the bioreactor. “Adding the solenoid valve on the air line didn’t improve the denitrification rate, probably because of very low BOD levels and DO levels at 10 mg/l,” says Bahr. “Reducing DO levels through shorter HRTs or longer air-off periods and increasing the carbon source by adding more fresh influent should induce more denitrification.”



COURTESY OF GRESHAM MUNICIPAL UTILITIES

WSC recommended 17 bioreactors in each lagoon cell. The cost was similar to that of the carbon dioxide system, but required less operation and maintenance.

“When compared with other technologies for cold-weather nitrification, Bio-Domes are an affordable, simple green solution to a long-term problem,” says Bahr. “They will help us meet and exceed our regulatory requirements, while minimizing chemical use and maintenance.” **tpo**

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# Sun-Dried Success

The Natchez team includes, from left, lab technician Terrance Logan, plant manager Michael Stewart, operator Larry Young, maintenance technician October Fulton, and operator James Williams. (Photography by Mark Coffey)

## profile **Natchez (Miss.) Wastewater Treatment Facility**

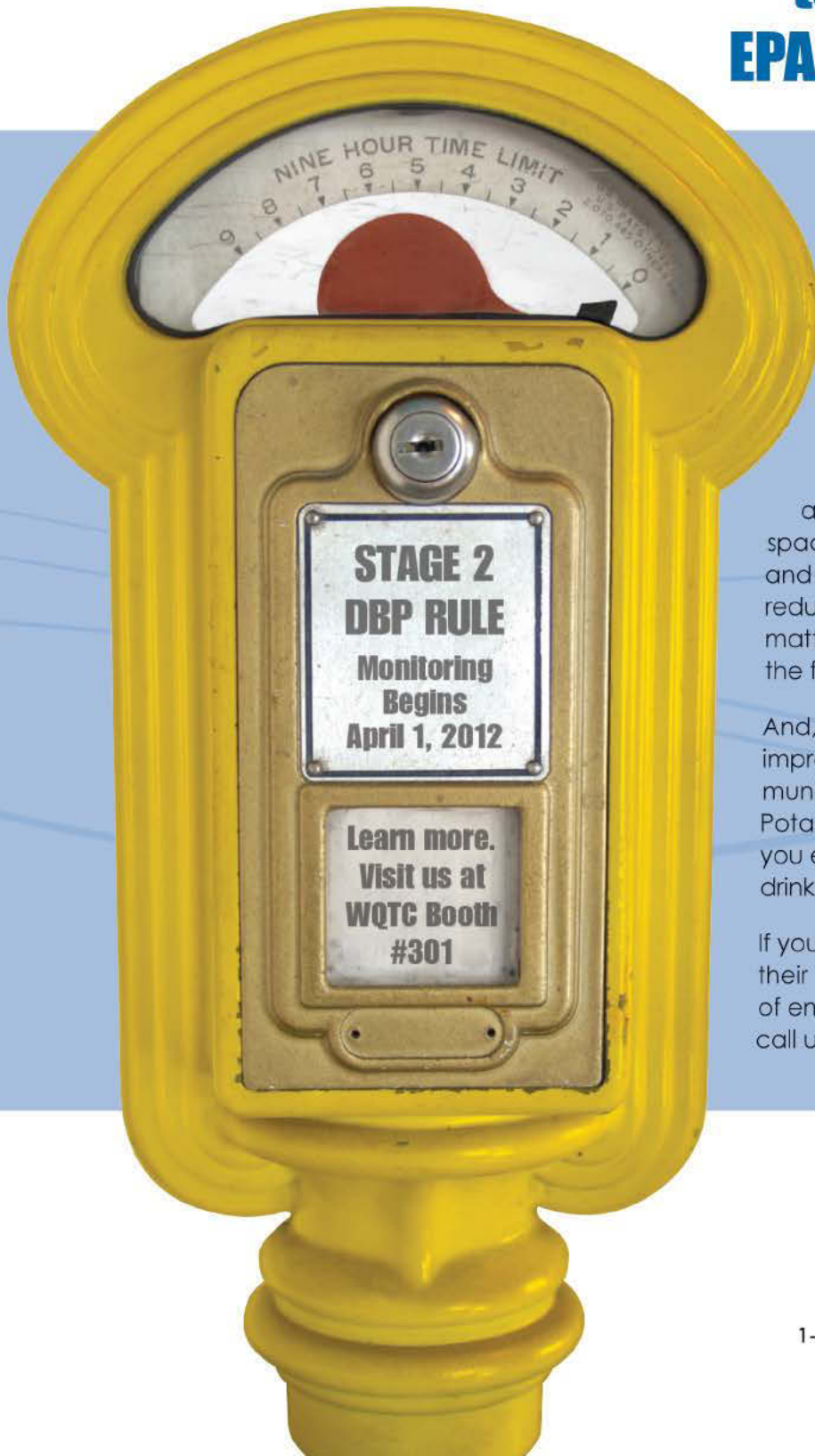


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<b>BIOSOLIDS USE:</b>	Land spreading, agriculture
<b>STAFF:</b>	Michael Stewart, plant manager; Terrence Logan, lab technician; James Williams and Larry Young, operators; Clyde Batteaste and October Fulton, maintenance
<b>WEBSITE:</b>	<a href="http://www.cityofnatchez.net">www.cityofnatchez.net</a>
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## A SOLAR DRYING SYSTEM HELPS A MISSISSIPPI TREATMENT PLANT SAVE ON BIOSOLIDS MANAGEMENT AND PROGRESS TOWARD CLASS A STATUS

By Jim Force

WHEN THE SUN SHINES ON NATCHEZ, MISS., IT DOES more than just brighten the day. It saves the Natchez Wastewater Treatment Facility tens of thousands of dollars in biosolids handling costs. Natchez is the site of a new “greenhouse” solar biosolids drying system. Operational for about one year, it is only the second such drying system in Mississippi.

“We used to have to haul our biosolids to a site near the Natchez airport for liquid injection,” explains plant manager Michael Stewart. “It was very expensive, because our solids content was only around 10 percent.”

Now most of that water is evaporated in the Thermo-System active solar drying system from Parkson Corp., and he feels the cake will be popular with farmers and gardeners when it comes time to begin distribution of the solids. “We’re not doing this to make money, but to save money,” Stewart says. “Even if we have to still haul some biosolids off site it will be a lot less expensive than it was. We don’t intend to ever need to haul wet sludge off site again.”

### BETTER PROCESS

The Natchez facility serves about 7,400 customers in a historic city on the east bank of the Mississippi River. About 2.5 mgd (more during rainy periods) flows into the plant through a manual bar screen. Three 25 hp Fairbanks Morse submersible pumps move the flow through a Parshall flume with a metering device and then to an aerated grit chamber.

A Parkson automatic bar screen removes remaining debris before the flow passes to two aeration basins, each with four Ovivo Process surface aerators. Treated wastewater is clarified, chlorinated, and dechlorinated with sulfur dioxide before flowing by gravity to the Mississippi. An alarm system notifies operators of high levels in the influent wet well or of any leaks in the chlorination system. Natchez has an operations and maintenance staff of six, who work 10-hour shifts.

The biosolids process has changed significantly. In the past, aerobic digesters stabilized the bio-

solids, which then were pumped to a pair of 3-acre, 8-foot-deep lagoons on the plant site. About every 10 years, the lagoons were cleaned, and the largely liquid biosolids were trucked to fields near the airport, where a private contractor injected the material into the ground as fertilizer. The treatment facility produces about 575 dry tons of biosolids per year.

Even though the lagoon cleanings were infrequent, they were expensive. “It cost us more than \$300,000 a year ago when we emptied just one-half of one of the lagoons,” Stewart says. “Ninety percent of what we removed and



The Thermo-System active solar biosolids drying “greenhouses” from Parkson Corp.

“We can get as much as 90 percent dry solids in as little as 10 days in the summer. In the winter, it may take a week longer.”

### MICHAEL STEWART

hauled away was water. And that still left 17,000 dry tons of solids in the two lagoons combined.”

Like many small cities, Natchez has been losing industry and population, especially during the recession. Reducing operating costs is critical. That’s why superintendent and city engineer David Gardner, the engineering firm of Williford, Gearhart and Knight Engineering, and Stewart’s team got together with the drying specialists at Parkson to investigate a new way to manage biosolids.

Gardner had read an article about Parkson’s solar sludge drying system, which draws 95 percent of its drying energy from the sun and is in use at more than 150 sites around the world. Parkson says that due to low operating costs, the system can achieve significant savings compared to alternatives like hauling and wet biosolids.

The solar drying system, built by a contractor, cost \$5 million. The American Recovery and Reinvestment Act (federal stimulus program) provided \$4.3 million, and Natchez borrowed the remainder with a 20-year, low-interest loan.

### EFFECTIVE PROCESS

At Natchez, biosolids are pumped from the existing lagoons into a 65,000-gallon tank using a FLUMP dredge manufactured by SRS Crisafulli. From there, the material is pumped to a belt press (supplied by BDP Industries) and conditioned with a Sedifloc 680CL polymer from 3F Chimica Americas. The biosolids are delivered to the press at 2 to 2.5 percent solids and leave the press at about 22 percent solids. Filtrate from the press is directed to the head of the treatment plant.



Operator Larry Young adjusts belt tension on the BDP Industries belt press.



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Biosolids are pumped from the lagoons into a 65,000-gallon tank using a dredge manufactured by SRS Crisafulli.



In the sludge drying “greenhouse,” lab technician Terrance Logan takes biosolids samples to be tested in the lab. A computer-operated “mole” vehicle that is part of Parkson’s Thermo-System constantly tills and levels the material to aid drying.

“The press does a real good job,” says Stewart. He credits proper polymer type and belt tension for the high performance. “We tested five different polymers, working with suppliers, before we settled on the Sedifloc 680,” he says. “The ratio between the solids feed rate and polymer feed is critical, and we worked with polymer manufacturers’ experts to achieve this.”

The dewatered cake falls onto a conveyor belt that moves it into a hauling trailer. Manufactured by Henderson Products Inc.,

“The solar drying system uses the cheapest energy source available — the sun. If it’s approved as a Class A biosolids by the Mississippi Department of Environmental Quality, it will be a marketable product.”

#### MICHAEL STEWART

the trailer takes the cake to one of two 8,500-square-foot, 24-foot-high “greenhouse” structures, which are the heart of the solar drying system. The cake is spread onto the concrete floor until it reaches a depth of about six inches.

Each greenhouse is equipped with a “mole” — a computer-operated machine that moves randomly about the surface, tilling and leveling the cake throughout the greenhouse. The mole looks like a small Volkswagen car, about four feet long by four feet high. “It covers the entire area, corner to corner, and turns and aerates the cake pile as it goes,” he says.

The mole starts up automatically, according to the moisture content of the solids. The wetter the material, the more it runs, and as the solids dry, it runs less. “That’s one of the great features of the system,” says Stewart. “Like a smartphone, we have a smart mole.”

Panels in the greenhouse roof are made of polycarbonate to withstand wind, and function just like the roof panels in a flower or plant greenhouse, letting in sunlight and concentrating heat. Exhaust fans come on automatically to control heat and humidity

in each greenhouse.

The drying process is closely monitored by PLCs in monitoring sheds near each greenhouse. Terrence Logan, Natchez laboratory technician, takes samples twice each week, analyzes them in the onsite laboratory, and then inputs the data to the solar drying system PLC. The PLC instructs the operator to “start new batch” if the biosolids have reached the desired level of dryness (at least 75 percent solids) and meet Class A standards.

“We can get as much as 90 percent dry solids in as little as 10 days in the summer,” says Stewart. “In the winter, it may take a week longer.”

#### HEADING TO MARKET

Construction on the new system commenced in March 2010 and wrapped up in December. Except for the interruption caused by this spring’s floods it has run continuously since. Sometime soon, Stewart and his team will start planning to market the material to area farmers and others as an agricultural or horticultural amendment.

Stewart has received quite a bit of interest and also points out that the dried material might also serve as a fuel, since it has the same heating value as brown coal. He’s optimistic that Natchez has found a cost-effective way to manage biosolids. “The solar drying system uses the cheapest energy source available — the sun,” he says. “If it’s approved as a Class A biosolids by the Mississippi Department of Environmental Quality, it will be a marketable product.”

He notes that the solar drying system keeps human interface with biosolids to a minimum and that the system is safe to operate. “The process is doing exactly what we envisioned,” he says. “We’re excited about it.”

He expects to see more solar drying systems installed in his state and around the country: “It’s going to be more and more difficult for treatment plants to manage biosolids by land spreading because of stricter regulations or lack of space. We think this is the way to go.” **tpo**





LEFT PHOTO: Plant manager Michael Stewart at the biosolids tank.



**WATCH THEM IN ACTION**  
 To learn more about the Natchez Wastewater Treatment Facility, view the video at [www.tpomag.com](http://www.tpomag.com).

RIGHT PHOTO: Maintenance technician October Fulton checks the level of biosolids cake in the Henderson hauling trailer.

## HIGH-WATER MARK

Flooding in the Mississippi River basin last spring and summer put a crimp in the operation of the Natchez Wastewater Treatment Facility and its new biosolids solar drying system. Normal operations had to be suspended when the river reached 60 feet above flood stage. It maxed out at 62 feet, a level plant manager Michael Stewart had never seen.

"Since our effluent flows by gravity to the outfall in the river, we couldn't discharge our treated wastewater because the river was so high," he says. The high water essentially forced the effluent back into the plant.

It took a team effort to overcome Mother Nature. "Like a good football team, we worked with superintendent David Gardner, the city's engineering group, and the DEQ (state Department of Environmental Quality) and devised a plan that pumped our effluent into St. Catherine's Creek," Stewart says. The detour was in effect for about a month.

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# Efficient Feeding

A NEW POLYMER BLENDING AND ACTIVATION SYSTEM HELPS AN ILLINOIS TREATMENT PLANT REDUCE CHEMICAL COSTS AND IMPROVE THE SOLIDS PROCESS

By Greg Kriebel

**I**n fall 2007, operators at the Marengo (Ill.) Wastewater Treatment Plant were experiencing challenges with the liquid-polymer feed system, a key part of the biosolids process.

The 0.9 mgd Marengo plant, serving a growing municipality of 8,000 about 60 miles northwest of Chicago, uses an oxidation ditch secondary treatment process and discharges to the Kishwaukee River. In solids processing, the material is run through a thickening centrifuge, where liquid polymer is introduced. The thickened material is then transferred to an anaerobic digester before dewatering, storage and land application.

The solids process was beginning to be compromised by the unreliability of the polymer feed system. "It was an old liquid-polymer system that was failing a lot and didn't really function very dependably, and we were afraid that it would fail completely at some point," said Steve Fiepke, then plant superintendent. "We knew we needed to look into getting a new system and upgrading the operation."

The plant solved the problem with a dynaBLEND liquid polymer blending technology supplied by Fluid Dynamics, a division of Neptune Chemical Pump Co.

"I was not familiar with the system when I got here, but it has been operating great. It delivers the polymer at either a low-flow rate or high-flow rate. It is pretty much maintenance free, it's easy to operate and troubleshoot, and, perhaps best of all, it's a workhorse."

JAY BERMAN

## THE SOLUTION

In seeking a solution, Fiepke turned to LAI Ltd. of Rolling Meadows, Ill., a manufacturers' representative serving the water, wastewater and stormwater industry in parts of Illinois, Indiana and Wisconsin. The company offered to let the Marengo plant test the dynaBLEND system.

The system is designed to handle all types of liquid polymer. A nonmechanical mixing chamber provides high reliability, and the system's injection check valve allows easy disassembly and inspection.

The system has a small footprint (24 inches deep, 24 inches wide



ABOVE: Operator Tim Mack, left, and Jay Berman, superintendent of the City of Marengo Wastewater Treatment Facility, use the dynaBLEND liquid-polymer activation and blending system from Fluid Dynamics, a division of Neptune Chemical Pump Co. RIGHT: The processed biosolids material is eventually used as fertilizer.



PHOTOS COURTESY OF FLUID DYNAMICS

and 68 inches tall), conserving space in usually crowded solids processing areas. Liquid polymer can be pumped directly into the system as needed from a storage vessel such as a 55-gallon drum, helping to reduce the risk of polymer spills.

The nonmechanical activation and blending system uses Hydro-Action technology for high-energy mixing. It operates in three stages. First, a pressure drop across a variable-orifice water-control valve produces a high-velocity waterjet (70 feet per second) that impinges on the polymer as it enters the mixing chamber. Here, the only point where high energy exists in the mixing chamber, the polymer is coiled up and is not susceptible to damage.

Second, in the concentric mixing chambers, the blended polymer recirculates multiple times for additional exposure to non-damaging turbulence, completing the blending process. The recirculation ensures that the polymer solution is present directly after the point of neat, concentrated polymer injection for a favorable activation and blending environment.

## Share Your Idea

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

Send your ideas to [editor@tpomag.com](mailto:editor@tpomag.com) or call 877/953-3301.



Finally, the mixing energy naturally diminishes in the concentric chambers, while the flow path through the chambers further ensures optimum polymer performance by preventing polymer from short-circuiting the process. The three-stage process helps prevent polymer damage and gelling, reducing polymer use.

#### SIMPLER PROCESS

“The dynaBLEND process operated very well when we tested it,” said Fiepke. “It was much easier to set the dials for the feed rates for the dewatering or thickening processes. We also noticed a reduction in the amount of polymer we were using, so there was a monetary savings. Anytime you can save money on a chemical, that’s a plus. After a couple months of testing it, we decided to purchase it.”

That was one of Fiepke’s last major decisions at Marengo, as he left in May 2008 for a new leadership position at the nearby village of Algonquin’s 35 mgd treatment plant, which uses two dynaBLEND systems for solids dewatering and thickening.

His successor at Marengo, Jay Berman, observed, “I was not familiar with the system when I got here, but it has been operating great. It delivers the polymer at either a low-flow rate or a high-flow rate. It is pretty much maintenance free, it’s easy to operate and troubleshoot, and, perhaps best of all, it’s a workhorse.

“The condition of the sludge we’re trying to thicken or dewater makes a difference in polymer usage. There are times where we save a lot on polymer, but the dynaBLEND does the job no matter what type of sludge we’re handling.”

#### ABOUT THE AUTHOR

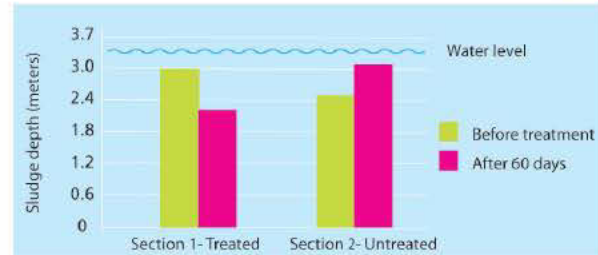
*Greg Kriebel is national sales manager with Fluid Dynamics, a division of Neptune Chemical Pump Co. in North Wales, Pa. He can be reached at [greg.kriebel@dynablend.com](mailto:greg.kriebel@dynablend.com). tpo*

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# A Win All Around

A DEMAND RESPONSE PROGRAM HELPS A LOS ANGELES TREATMENT PLANT SAVE MONEY WHILE REDUCING ENVIRONMENTAL IMPACT AND STRESS ON THE POWER GRID

By Doug Day

**W**hen the weather heats up, electric utilities face pressure to meet the demand on their systems. Utilities can only make or buy so much energy, so most have programs that reward customers who agree to reduce their use during times of high demand.

The Sanitation Districts of Los Angeles County have taken advantage of such rewards for more than two years at one of the 11 wastewater plants serving 78 cities. The program has proven to be a low-risk way to save energy and benefit financially.

The Districts provide solid waste and wastewater services for 5.7 million people, handling an average of 460 million gallons per day (mgd) in Los Angeles county. The 100 mgd San Jose Creek Water Reclamation Plant provides primary, secondary, and tertiary treatment and reclaims about 35 mgd for groundwater recharge and irrigation.

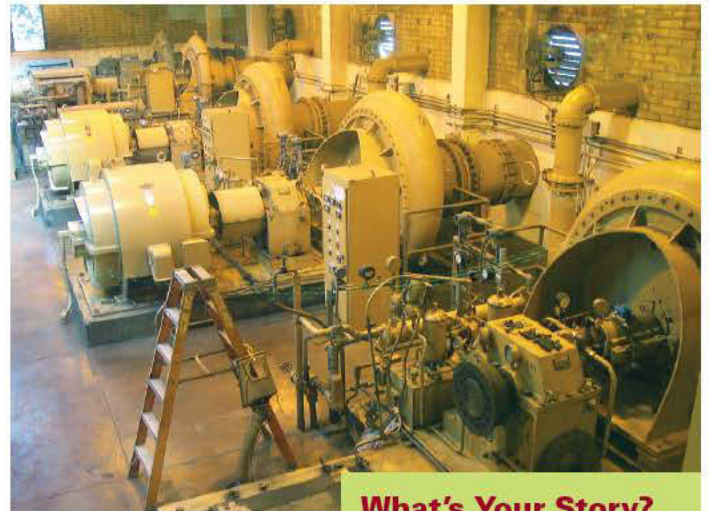
Constellation Energy, a national energy company and electricity wholesaler in California, started its Demand Response Program in 2001. The San Jose Creek plant enrolled in 2009. “We wanted to gain the financial benefits, obviously,” says Andre Schmidt, senior engineer with the Districts. “And we’re a public agency, so we wanted to be a good citizen and provide a public service.”

“We wanted to gain the financial benefits, obviously. And we’re a public agency, so we wanted to be a good citizen and provide a public service.”

ANDRE SCHMIDT



PHOTOS COURTESY OF SANITATION DISTRICTS OF LOS ANGELES COUNTY



Shutting down a 900 hp air compressor (rear) reduced San Jose Creek’s electrical demand by 600 kW.

## What’s Your Story?

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## UPPING THE ANTE

The plant used to take voluntary measures during hot weather, like turning off lights in office buildings, and was looking for a more significant way to contribute to energy reliability and environmental protection.

“Our weather can get extremely hot, so there is high risk of brownouts and blackouts,” explains Aimee Riley, account manager for commercial and industrial customers for Constellation Energy. “We contract with a lot of businesses we can call on to balance the electrical grid.”

Supply emergencies don’t happen often, but utilities and wholesale providers still see such programs as valuable insurance to maintain an adequate power supply. Riley says the Demand Response Program is typically used once or twice in a normal summer. San Jose Creek was called upon to reduce its use only once in 2010. “There are other demand response programs that have been used more often,” Riley says.

The rarity of such events makes enrollment attractive for businesses that can reduce load without too much impact on operations.

The San Jose Creek Water Reclamation Plant is one of 11 wastewater treatment plants in the Sanitation Districts of Los Angeles County. It earns money every year by agreeing to reduce its electrical use during times of high demand on the utility grid.



The programs offer a monthly incentive, either through discounted rates or direct payments, and may include further discounts or payments when customers reduce their use. Load curtailments usually last about two hours, according to Riley, and Constellation's program restricts them to four hours per event.

### WHAT HAPPENS

If the Demand Response Program is activated, the plant is notified by an automated dialing and email system at Constellation Energy. Plant personnel then take manual steps to reduce the load. Riley says other customers may curtail their loads automatically.

"Since we're able to bypass some of our flow, we can turn down our influent pumps during curtailments. That allows us to turn off one of our large 900 hp air compressors, which is one of the largest types of equipment in the plant. That alone saves more than 600 kilowatts."

### BOB SHIMOKOCHI

Load control may not be an option for some wastewater treatment plants. San Jose Creek has more flexibility than most because it can bypass part of its flow through the sewer system to another treatment plant about 25 miles away in Carson. It takes at least eight hours for the wastewater to get to Carson, so that plant has ample time to prepare for the added flow.

"Since we're able to bypass some of our flow, we can turn down our influent pumps during curtailments," says Bob Shimokochi, operations superintendent. "That allows us to turn off one of our large 900 hp air compressors, which is one of the largest types of equipment in the plant. That alone saves more than 600 kilowatts. Other pumps and motors in the plant might automatically shut off due to the lower flow — the same thing that happens as flows fluctuate during the day — but that's not guaranteed."

It doesn't take long for operators to take the actions. The influent pump is controlled from the control room. An operator does have to go to the air compressor to shut it off. Once the load curtailment ends, the operator turns the compressor back on, and the influent pump is returned to normal. If wastewater flows happen to be low at the time, operators may elect to leave those devices off until flows increase.

### PEAKS DON'T COINCIDE

Wastewater plants are potential candidates for load control because their peak demand times don't usually coincide with peak demand on the electrical grid. That is the case at the San Jose Creek plant. "Our peak load is during the morning after people shower and get ready for work, about 9 a.m. to 11 a.m.," says Schmidt. "It would be difficult to shut down the compressor during our peak."

Typically, electrical demand peaks from mid-afternoon to early evening. In Constellation's case, its load curtailment program requires curtailments to begin no earlier than 11 a.m. San Jose Creek's agreement restricts load reduction to after 2 p.m. "Typically," says Riley, "it's going to happen after 2 o'clock anyway."

Constellation's program requires that curtailments end by 7 p.m. and that's before the plant's evening peak, which runs from about 8 to 11 p.m. Other wastewater plants may have different peak times, depending on how far they are from their customer base.

## THE LANGUAGE OF SUPPLY AND DEMAND

If demand for electricity outstrips a utility's supply, consequences can be severe. The electrical grid could collapse and cause a blackout lasting for several hours. Utilities that are running short of power can initiate rolling blackouts — planned outages that rotate through certain areas.

Power shortages can also cause brownouts — temporary voltage reductions that can damage motors, computers and other equipment or cause them to operate erratically.

Constellation Energy's Demand Response Program and others like it are designed to reduce demand at peak times to make sure there is always enough energy to prevent blackouts and brownouts. They normally give power users a lower monthly rate or incentive payment in exchange for curtailing a certain amount of load when needed.

Such programs are often called interruptible rates because they give the utility the authority to interrupt the power supply in exchange for lower rates. Utilities may use other terms for such programs, including load curtailment, load shedding, capacity assurance, load management, or something similar.

Some utilities may also offer capacity programs in which they pay for the right to use a customer's backup power sources, such as emergency diesel generators, during times of high demand. Plants with flow equalization capabilities that can delay processing wastewater may be able to enroll in "time of use" programs that offer lower rates during utilities' off-peak hours. Contact your local utility or wholesale provider for information about programs that apply to your needs.

### HOW IT WORKS

Under the Demand Response Program, Constellation makes a monthly payment to San Jose Creek, plus an additional amount based on how much the plant reduces its load if the program is activated. Usually, a customer designates monthly how much power it will save when called upon. San Jose Creek has agreed to reduce its load by 500 kW in most months. That amount doesn't create much risk for the plant, which has a peak electrical load of 7 MW.

Constellation pays about \$35,000 a year to San Jose Creek. While only about 1 percent of the plant's annual electricity bill, it is still a revenue stream that also helps ensure an adequate supply of electricity for the entire community.

Schmidt says the plant could enroll in other programs, but Constellation's Demand Response Program provides the flexibility the plant needs to make sure it can adequately treat its wastewater. "Our contract is set up so that if we're not able to respond, we don't receive any penalties," he says. "We may not be able to respond if there is some unforeseen event going on in the plant or our flows are high."

Riley says the lack of penalty is unusual, but Constellation recognizes the special circumstance at San Jose Creek. Other customers may have their own special situations, so Constellation negotiates individual contracts with each customer. "Compliance has been good," says Riley.

Such programs at California utilities and wholesalers have prevented brownouts or blackouts in California over the last several years. **tpo**



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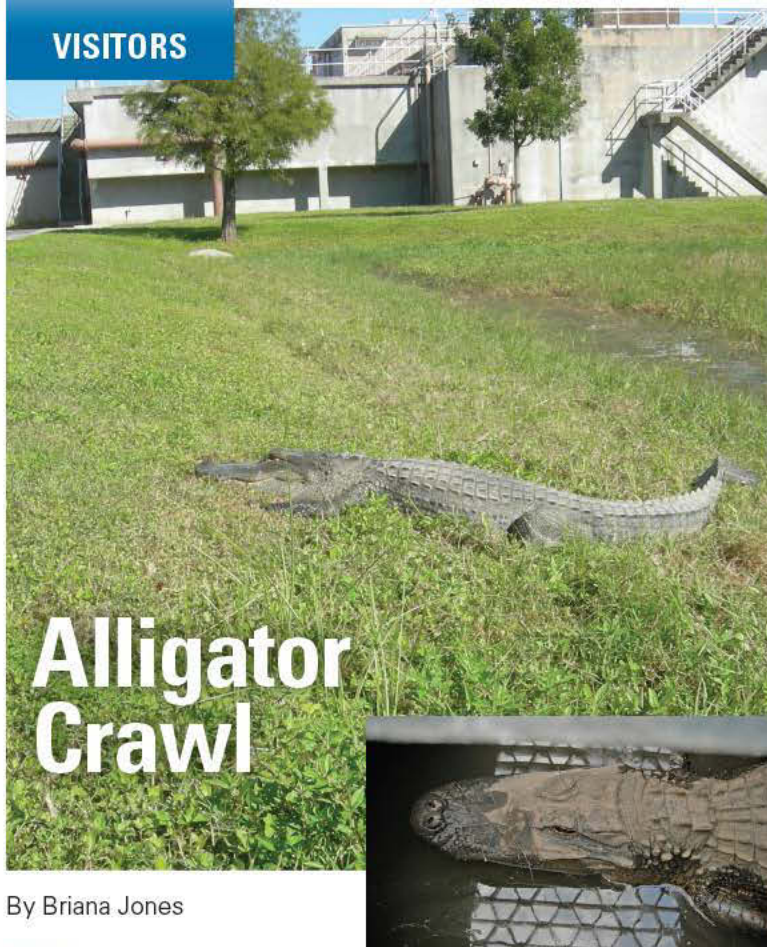
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## VISITORS



# Alligator Crawl

By Briana Jones

Even though the City of Fort Myers (Fla.) Central Advanced Wastewater Facility is in a well-developed area, several alligators have shown up over the years. This 8-foot gator was one of those guests on the grounds.

The alligator spent weeks in and around the stormwater catch basins and retention pond. “He would hiss and make a fuss when you got too close. Eventually he went away on his own,” says plant superintendent Kevin Wagner. In addition to alligators, “We’ve had regular visits from hawks and wading birds of all types. Recently a bald eagle hung around for a few days.”

It sounds as if the plant is not missing out on any of nature’s beauty ... or beasts. **tpo**

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## Increasing hydraulic capacity

### Problem

The traveling bridge sand filters at the 80 mgd Donald C. Tillman Water Reclamation Plant in Van Nuys, Calif., had mechanical, structural, and performance degradation. Operators used chemicals and shock chlorination to maintain filter performance.

### Solution

The plant retrofitted the sand filters with eight **AquaDiamond filters from Aqua-Aerobic Systems**. The units combine traveling bridge and cloth media filtration to achieve three times the flow capacity in the same footprint. Diamond laterals on the bed of the units are covered with 10 micron OptiFiber PES-13 cloth filtration media to handle 12.5 to 24 mgd. The filters run without continuous backwashing.

#### RESULT

The filters increased hydraulic capacity by 240 percent and produced reuse-quality effluent. Performance data includes effluent turbidity of 0.5 to 1.4 NTU and effluent TSS less than 2.0 mg/l. **815/654-2501; [www.aqua-aerobic.com](http://www.aqua-aerobic.com)**.



## Core pneumatic-mixing technology

### Problem

Submersible mechanical mixers rated at 15 hp stressed the operating budget of the 70 mgd (design) Mauldin Road Wastewater Treatment Plant in Greenville, S.C.

### Solution

Renewable Water Resources (ReWa), a special purpose district, operates the Mauldin biological nutrient removal facility. Its engineers selected a 5 hp **BioMix compressed pneumatic large-bubble mixing system from EnviroMix** and installed it in an anoxic cell opposite a mechanical mixer in a parallel treatment train.

An air compressor fires short bursts of large bubbles through nozzles attached to the bottom of the process tank to agitate the mixed liquor without supplying significant oxygen. Components are housed in NEMA 4X enclosures or are non-clogging and self-cleaning within the tank. One compressor can mix more than 20 tanks. Programmable logic controllers in the control unit enable operators to optimize mixing to reduce air and power consumption.

#### RESULT

A study showed average effluent nitrate concentration for the gas-mixing system at 2.19 mg/l versus 2.39 mg/l for the mechanical mixer. Test data for TSS, DO, ORP and orthophosphate found no difference between the technologies. The gas system performs the same mixing function as the mechanical mixer with one-third the energy. **843/573-7510; [www.enviro-mix.com](http://www.enviro-mix.com)**.



## Effective grit removal

### Problem

The Soledad (Calif.) Wastewater Plant had aerated ponds, secondary ponds, and a polishing pond. An upgrade and expansion from 3.1 to 5.5 mgd included headworks, tertiary treatment, and residuals treatment. Plant solids would flow to stabilization basins for thickening, then to a screw press before the drying beds. Removing grit at the headworks was crucial.

### Solution

Erin Brosnan, P.E., from Black & Veatch, specified the **MectanV variable-angle grit removal system from John Meunier Inc.**, a subsidiary of Veolia Water Solutions & Technologies. Similar to a centrifuge, the circular chamber uses inflow velocity to swirl water, allowing heavier materials to collect in a well. A pump or airlift transfers grit to the clarifiers. The low-maintenance, compact unit operates with low head loss and is energy efficient.

#### RESULT

Field tests showed that the system removed more grit for each grit size analyzed than specifications required, especially in the finer particle size. **888/638-6437; [www.johnmeunier.com](http://www.johnmeunier.com)**.





## Total treatment system

### Problem

The Decatur (Ark.) Wastewater Treatment Plant could not meet total nitrogen and phosphorous limits with its activated sludge process, and high-strength wastewater from a poultry processor caused organic and hydraulic issues.

### Solution

The city installed a three-train **integrated surge anoxic mix (ISAM) unit from Fluidyne Corp.** to treat 3 mgd, remove nutrients, and minimize sludge. Wastewater enters a covered anaerobic reactor for pretreatment and sludge thickening and destruction. Solids undergo hydrolysis to simpler soluble organics that pass to the surge anoxic mix tank. Besides regulating flow, the tank's environment denitrifies recycled nitrates while stabilizing soluble organics.

The conditioned mixed liquor passes to the final aerobic tank for completion of BOD, nitrogen, and phosphorous removal and solids separation. A proprietary system controls the pace to provide tertiary-level water quality. The automated system also monitors dissolved oxygen and adjusts power usage. Jet aeration/mixing equipment provides high oxygen transfer and complete mixing to handle swings in organic loading.

#### RESULT

Effluent has less than 5 mg/l BOD and TSS, less than 8 mg/l TN, and less than 0.3 mg/l P. **319/266-9967; [www.fluidynecorp.com](http://www.fluidynecorp.com).**



## Two-in-one reactor

### Problem

The Yucaipa Valley (Calif.) Water District activated sludge treatment plant struggled to handle an increase in hydraulic loading and meet a new 6 mg/l total inorganic nitrogen limit. The District turned to Kruger engineers to design an upgrade.

### Solution

The engineers selected the **AnoxKaldnes hybrid biofilm with activated sludge (Hybas) process from Kruger.** They retrofitted the first two aerobic reactors with the aeration system, K3 biofilm carrier elements, and wedge wire screens. After Hybas reactors nitrify the wastewater, a portion of the mixed liquor suspended solids is recycled to the circular anoxic reactors for denitrification. The process uses activated sludge biomass and fixed film in the same reactor.

#### RESULT

The upgrade increased the plant's capacity from 4.5 to 8 mgd and reduced TIN levels to less than 5 mg/l. **919/677-8310; [www.krugerusa.com](http://www.krugerusa.com).**



## Long-distance circulation technology

### Problem

The 13.5 mgd Mebane Bridge treatment plant in Eden, N.C., ran 12 20-hp horizontal brush aerators in two aeration basins to meet 30 mg/l TSS requirements. Dissolved oxygen (DO) at 8 to 10 mg/l was higher than necessary, but reducing aeration would affect TSS. "We also had a mass of sludge on the bottom of the 13.5-foot-deep basins," says superintendent Melinda Ward. Each basin has 1.74 surface acres.

### Solution

Ward then installed one **SB 10000v18 solar-powered circulation unit from SolarBee** in the south basin and shut off the three closest aerators. "After activating the unit, solids rose to the top of the basin," she says. "Later, we also saw better settling in the 90-foot-diameter clarifier, leading to reduced effluent TSS." As the numbers improved, Ward deactivated three more brush aerators.

The unit's long-distance circulation technology creates a near-laminar flow that completely mixes the water column, transporting 10,000 gpm to the surface. About 3,000 gpm rises through the intake hose; another 7,000 gpm rises around the hose. Water departs radially above and below the distribution dish, mixing with other surface currents across the treatment area. Sulfides convert to sulfate as they pass through the oxygenated layer, preventing the escape of odors.

#### RESULT

In one year, the plant's electrical use declined by 1.7 million kWh, or 42 percent. Even with rising electric rates, the power bill decreased by \$61,000 or 31 percent, providing an 11-month payback. **866/437-8076; [www.solarbee.com](http://www.solarbee.com).**



(continued)



## Nutrient recovery

### Problem

Stricter regulations required the York (Pa.) Wastewater Treatment Plant to reduce phosphorus levels to 0.8 mg/l. The biological nutrient removal facility also battled the buildup of struvite on pipes and valves, reducing flows, hurting efficiency, and requiring costly maintenance. Traditional solutions for removing struvite, such as chemical dosing, were cost-prohibitive.

### Solution

The city installed the **Pearl nutrient recovery process from Ostara** to remove nitrogen, phosphorus, and other nutrients. The fluidized bed reactor uses a chemical reaction to reduce the phosphorus load returning to the liquid treatment train by 90 percent and the ammonia load by 20 percent. The recovered nutrient then mixes with magnesium chloride and caustic to form struvite pellets, which Ostara makes into Crystal Green slow-release commercial fertilizer, which provides revenue for the city.



### RESULT

Ostara designed, built, and financed the facility for a monthly fee, less than what the city was spending on traditional nutrient removal methods. The plant is meeting permit limits and alleviating struvite. 604/408-6697; [www.ostara.com](http://www.ostara.com).

## Pulsating mixing

### Problem

A shallow pump station in Darien, Conn., used a transducer to turn the pumps on and off and floats to back up the transducer. Grease caps sometimes more than 12 inches thick and hard enough to stand on fouled the equipment. Operators failed to remove it using chemicals and mechanical mixers. Pumping the grease cost \$1,800 per episode.

### Solution

The city installed a **Hydro-Pulse PHi one-valve mixer from Pulsed Hydraulics**, and an air compressor with receiver tank. The mixing technology pulses pressurized air through stainless steel plates on the bottom of the wet well. Beach-ball-size bubble masses rise to the surface, dragging tank contents along. The material rolls horizontally into a structural wall, or the next bubble mass forms a virtual wall. Either wall sends material down to the tank bottom, where it moves sideways, sweeping up settling solids. Pulsations use minimal energy to keep solids in suspension.



### RESULT

The control system pulses the well once every minute, preventing the formation of grease caps. 800/641-1726; [www.phewater.com](http://www.phewater.com).

## Aeration lagoon process

### Problem

The three-cell aerated lagoon at the 792,000 gpd (design) Fayette (Mo.) Wastewater Treatment Facility could not meet new effluent ammonia permit limits of less than 4 mg/l in winter and 2 mg/l in summer.

### Solution

The city selected the **LemTec biological treatment process from Lemna Technologies**. The system uses hydraulic baffles to divide the lagoon into four treatment cells to reduce short-circuiting. The cells are followed by an anaerobic settling zone and polishing reactor. A modular insulated cover over the lagoon enhances system kinetics, retains heat, controls odors, promotes solids digestion, and prevents algae growth. To meet permit requirements, the reactor provides tertiary treatment using fixed media for submerged attached-growth bacteria.



### RESULT

During the past two winters, effluent levels were less than 10 mg/l BOD and TSS and less than 1 mg/l ammonia. 612/253-2000; [www.lemnatech.com](http://www.lemnatech.com).



## Dual regenerative blowers

### Problem

The three-cell, 6-foot-deep treatment lagoon at Concordia, Mo., struggled to meet 45 mg/l BOD and TSS limits. No matter the environmental conditions, dissolved oxygen never went higher than 7 ppm. In summer, a heavy, waxy algal cap emitted odors. In 2009, the state Department of Natural Resources told city administrators that the 28-acre system must meet 30 mg/l limits by the end of 2010.

### Solution

The city hired an engineering firm that recommended installing four model **WQA aerators from Reliant Water Technologies** in the primary 18-acre cell and spreading more than 700 pounds of Sewper Rx in the three cells. Treatment began in June 2010.

The aeration system uses two 2 hp regenerative blowers. The first blower runs continuously, pushing water to eliminate the zero DO zone on the lagoon bottom. The second blower runs continually or automatically to provide additional DO. One 8-foot unit handles up to five acres of surface water. The Model WQA moves more than 9 mgd and adds up to 20 pounds of DO per hour.

Sewper Rx, a polymicrobial blend of enteric bacteria, reduces organic solids. When added to the 5.6-acre secondary and 3.2-acre final cells, it reduced BOD and TSS.



### RESULT

In December 2010, the city met its permit with 12 mg/l BOD, 27 mg/l TSS, and DO often exceeding 20 ppm. **504/400-1239; www.reliantwater.us.com.**

## Coarse- and fine-bubble system

### Problem

The 316,000 gpd Wasco (Ill.) Sanitary District treatment plant installed a pretzel-type aerator in two 24-foot-deep treatment lagoons. The fine-bubble system had high standard oxygen transfer efficiency, but insufficient turbulence to mix the liquid. Five feet of sludge accumulated in five years, causing 38 of 73 diffusers to clog and fail, and dissolved oxygen (DO) to drop below 1 mg/l. Clogging also created backpressure on the blower, raising the pressure by 3 psi. As effluent numbers exceeded permit levels and the lagoon turned septic, residents complained about the odor.

### Solution

Plant engineers replaced the diffusers with the **MARS 3000 aeration system from Triplepoint Water Technologies**. The 47 diffusers with Double Bubble technology produce 5 to 7 pounds of oxygen per horsepower hour (lb/hp-hr). Each diffuser has a flow range



of 10 to 25 cfm and mixes 6,585 gpm. The diffusers have a central coarse-bubble tube surrounded by eight 9-inch fine-membrane bubble disc diffusers 16 inches above the lagoon floor. The 29-inch-high units have four weighted legs and clear the lagoon bottom by 10 inches.

Air enters the diffusers' central static tube, creating a Venturi that circulates the water and liquefies sludge. Anticlogging technology prevents backflow. With coarse-bubble diffusion, 3- to 25-mm bubbles rise through the water column at 2 to 3 feet per second, causing turbulence and mixing. While suspended in the water column, the liquid mixes with fine bubbles — 1 to 2 mm in size and rising at less than 1 foot per second — from the self-cleaning membrane diffusers. The high surface-area-to-volume ratio of degraded debris and fine bubbles maximizes contact time and reduces BOD5.

### RESULT

After one day of operation, the system was mixing solids, blower pressure dropped by 3 psi, DO levels rose to 4 mg/l, and odors subsided. Within days, the 2-foot-deep floating sludge mat disappeared, and effluent met permit levels. Over time, maintenance costs decreased by \$12,000 annually. **630/208-0720; www.triplepointwater.com. tpo**

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# Professional Stature

WISCONSIN'S NEW WASTEWATER OPERATOR APPRENTICE PROGRAM AIMS TO ADD TO THE INDUSTRY TALENT POOL WITH A THREE-YEAR HANDS-ON TRAINING REGIMEN

By Ted J. Rulseh

Perhaps no issue is more important in the clean-water profession than replacing experienced operators who will soon retire. Cities and agencies are trying a range of remedies, from high school and technical college outreach to formal internship programs, some with potential to lead directly into careers.

Now the State of Wisconsin is offering a full-blown apprenticeship program for wastewater treatment operators under the auspices of the Wisconsin Bureau of Apprenticeship Standards (BAS) and the state Department of Natural Resources.

The three-year apprenticeships consist of 90 percent on-the-job training under the supervision of an experienced operator, along with 10 percent related classroom instruction. The program covers core topics needed by all wastewater operators, and additional topics unique to the employer. The program opened to applicants in August.

Apprentices are paid to learn on the job and to attend related classes. Wages increase progressively. Upon completing the program, the apprentice receives a recognized, portable credential as a journey-level (highly skilled) worker, according to Owen Smith, SAGE outreach coordinator with the BAS.

The wastewater treatment operator apprenticeship is funded by a \$6 million grant given by the U.S. Department of Labor and administered by the state. The program was driven by the impending retirement of many wastewater operators and the lack of new operators entering the profession. Smith talked about the program with *TPO*.

“An apprenticeship is unique in that it is first and foremost a job. The apprentice learns directly under the supervision of experienced operators, 90 percent of the time on the job. They are also paid to attend related instruction in a classroom setting.”

## OWEN SMITH

**tpo:** Is Wisconsin the first state to offer a program like this?

**Smith:** We are not the first to offer an apprenticeship program for this trade, but our program is the first of its kind nationally. That's because it follows a hybrid model in which the apprentice learns each duty and task for a required minimum number of hours and then must demonstrate competency to an experienced operator before continuing.

Traditional apprenticeship programs are time-based, meaning an apprentice operator would learn a specific duty at the plant for a larger quantity of hours, say, 500 hours, after which he or she would be considered to know the skill and could continue in the program.

**tpo:** How does this apprenticeship differ from some of the formal internship programs we see around the industry?

**Smith:** An apprenticeship is unique in that it is first and fore-

most a job. Apprentices learn directly under the supervision of experienced operators, 90 percent of the time on the job. They are also paid to attend related instruction in a classroom setting. Our program covers 6,000 hours, or about three years, and it is designed to incorporate operator certifications in subclasses.

**tpo:** Who and what drove the creation of this program, and how long has it been in development?

**Smith:** Industry drives apprenticeships in terms of what programs are offered and what content is included. Leaders of wastewater treatment plants and representatives of the DNR approached our bureau about two years ago, concerned with the impending retirements of operators and the lack of trained replacements in the pipeline. The bureau of course was happy to lend assistance.

About a year later, we solicited the SAGE (Sector Alliance for the Green Economy) grant, which is a State Energy Sector Partnership grant. It's focused on meeting the labor needs of the energy sector. Our proposal included developing new apprenticeship programs for occupations that we considered inherently green, and that is certainly true of wastewater treatment operations.

**tpo:** What input did the wastewater profession and the DNR have in developing the internship program?

**Smith:** The program content was developed by skilled operators with consultation from the DNR.

The industry's input was very extensive. The program design and content were developed by the bureau and an industry focus group that includes representatives from eight treatment plants, two independent trainers, staff from Moraine Park Technical College and the Wisconsin Technical College System, and the Wisconsin Wastewater Operators Association (WWOA). The design process was facilitated by a third-party organization, Worldwide Instructional Design System.

We began in October of last year with the rather involved process of defining the occupation of wastewater treatment operator in terms of its key duties and key tasks. That involved skilled operators discussing exactly what an operator does.

Once our focus group came to consensus on the occupation description, we had a much larger sample of operators validate that. The next step was to determine what duties and tasks would be best learned by an apprentice on the job and which would be best learned



Owen Smith, SAGE outreach coordinator with the Wisconsin Bureau of Apprenticeship Standards (BAS).



in classroom instruction. We also discussed fundamentals an apprentice should be required to learn, such as basic chemistry.

**tpo:** Who will actually provide the classroom instruction?

**Smith:** The instruction will be provided by Moraine Park Technical College. They helped us determine which existing courses would be appropriate for the apprentices and whether new courses needed to be developed. It turned out that no new courses were needed. We'll use programs within the school's existing associate degree program. And, even better, they'll be offered online and so easily accessible to plants throughout the state, especially plants in remote areas.

**tpo:** Is the on-the-job training highly structured, or is it largely at the discretion of the host facility?

**OWEN SMITH**

**Smith:** For the on-the-job portion, the focus group determined a core set of duties and tasks that are applicable to the target plants, which are facilities with flows of 1 mgd or less. We chose to target facilities of that size because they represent about 85 percent of the facilities in the state and were determined by our industry representatives to have the greatest need for new operators. However, because the duties taught are central to the wastewater operator occupation, those skills will meet the needs of mid-sized and large plants, as well.

**tpo:** What do you feel a formal apprenticeship program does for the stature of the clean-water profession?

**Smith:** We feel it gives the industry a very strong, recognized journeyworker credential, in addition to providing a very high-quality pipeline for future operators. The availability of the recognized, portable credential is one of the biggest benefits of an apprenticeship program.

**tpo:** Will the journeyworker credential specifically in wastewater treatment be recognized across state borders in the same manner as, say, a tool and die maker or machinist journeyworker status?

**Smith:** We are very confident that this credential will be recognized and portable within Wisconsin and beyond because our program is approved by the national Office of Apprenticeship within the U.S. Department of Labor. That means the journeyworker card an apprentice will receive upon completing the program is a recognized credential in other states, whether or not they have similar programs.

That aside, a prospective employer would certainly see value in an apprentice who has completed three years of progressive on-the-job training in addition to related classroom instruction, all developed by the industry.

**tpo:** How will apprentices' pay compare with that of established operators?

**Smith:** Apprentices earn a percentage of what the bureau calls the skilled wage rate, which is the rate paid to the greatest number of skilled operators at the host facility or the rate specified in a bargaining agreement. Generally apprentices begin by earn-

ing at least 50 percent of a skilled operator's wage, and then that wage increases throughout the apprenticeship. However, the apprentice wage scale must average 60 percent of the skilled wage rate over the term of the apprentice contract. Upon completion of the program, the apprentice earns the wage of a skilled operator, according to the plant's compensation schedule or bargaining agreement.

**tpo:** What have you seen so far in terms of response to this program from clean-water agencies and from prospective apprentices?

**Smith:** Our first indication of interest in this program was the

"The program content was developed by a focus group of skilled operators with consultation from the DNR. The industry's input was very extensive."

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“Several plants in our focus group are already very interested in hiring apprentices. One plant actually postponed hiring until the apprentice program began. We have been doing a statewide outreach effort and survey of interest to all plants in the state.”

**OWEN SMITH**

number of plants that were represented in our focus group, and the range of plants. We also had several well-known industry trainers involved. Several plants in our focus group are already very interested in hiring apprentices. One plant actually postponed hiring until the apprentice program began. We have been doing a statewide outreach effort and survey of interest to all plants in the state.

**tpo:** How will the apprentice program dovetail with state treatment operator certification and licensing requirements?

**Smith:** At the same time our bureau was designing the program, the DNR was proposing changes to the regulations that govern operator certification. As part of the program design, they advised us and our focus group about how the program could incorporate testing and the granting of certifications in certain subclasses.

A subclass is a unit process at a treatment plant — such as activated sludge and disinfection. The DNR issues certifications in the various subclasses, and the operator in charge of a plant must be certified in the subclasses relevant to that plant.

Certifications for a group of core subclasses common to most if not all plants will be incorporated into the apprenticeship program. Therefore, apprentices will be well positioned to attain the level of operator in charge, especially at smaller plants.

**tpo:** How will you be promoting this offering, especially to young people graduating from high school and technical college, or to career changers?

**Smith:** The bureau has an apprenticeship training representative in each region of the state who will be engaged in outreach to the industry. The training will be overseen by an industry advisory committee, and that committee will also conduct outreach. The individual treatment plants will also conduct their own recruiting.

**tpo:** What is the structure and role of the industry advisory committee?

**Smith:** Most apprenticeships have an industry advisory committee to oversee the operations of the program. They're also involved in tracking the program's progress and suggesting changes in the training. This committee consists of members of our focus group. So on the committee we will have a number of skilled operators from plants of various sizes as well as representatives of WWOA.

**tpo:** What will the actual apprentice hiring process look like?

**Smith:** The first step will be for the apprentice applicant to get hired by a plant, because apprenticeship is first and foremost a job. Then the bureau will help the plant and the apprentice execute the actual contract.

**tpo:** Do you have targets for the number of apprentices you would like to see brought in over a certain period of time?

**Smith:** We have training goals for the first two years of the program. We project 35 apprentices in both the first and second years. We would be very excited to hit that. **tpo**

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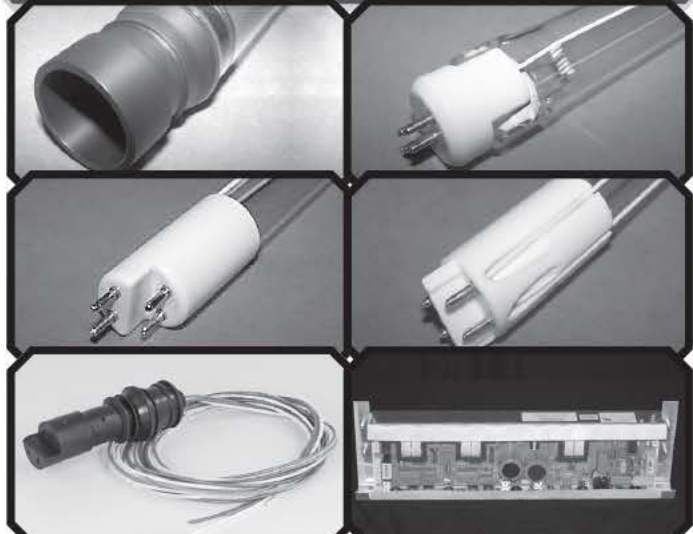



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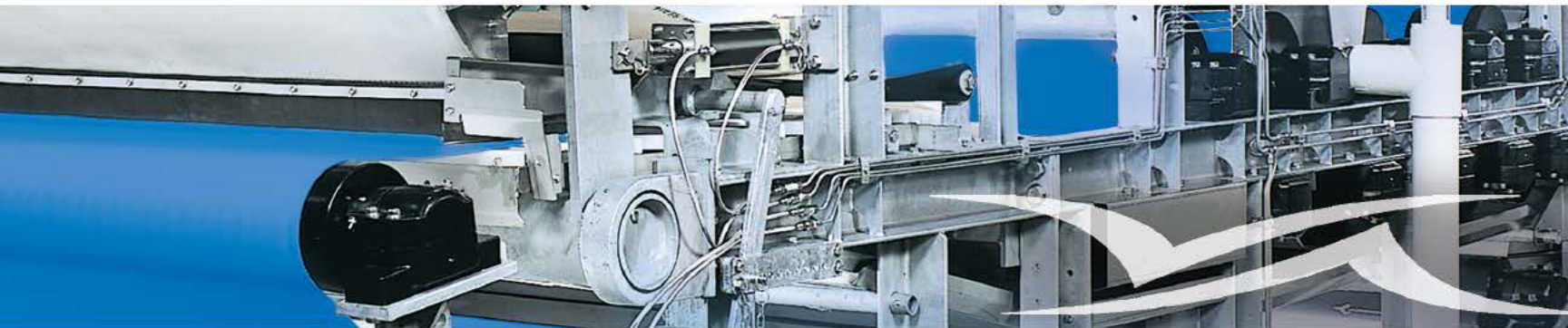


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# PUBLIC SERVANT

RALPH MARTINI DOES WHATEVER IT TAKES FOR HIS COMMUNITY'S  
WASTEWATER TREATMENT SYSTEM — EVEN DOOR-TO-DOOR SELLING WHEN NEEDED

By Doug Day

WHEN HEYBURN, IDAHO, NEEDED A LARGE SEWER RATE INCREASE, Ralph Martini went door-to-door in the city of 2,900 people to explain why. In the end, the citizens accepted the reasons and approved a treatment plant upgrade plan that nearly doubled their bills.

"I'm a public servant," says Martini, who has been with the city's wastewater treatment plant since 1993. He also sees himself as a servant of the environment. "The public and the city have been very, very supportive of what we do here, including training and conferences, and learning new ways of doing things," he reports.

He needs that support in a small city. As public works director, he has a staff of just three people for wastewater and drinking water. "Any of us could be called in to mow lawn, read a meter, plow snow, change a stop sign," he says. "There aren't enough hours in the day. We all pitch in and do what needs to be done."

There are three full-time operators at the wastewater treatment plant, which runs unmanned overnight: Andy Schaner (wastewater operator 1), Eric Christensen (wastewater operator 3) and Brenton Holt (operator in training).

## VALUE OF WATER

Water is a valuable commodity in the region. The leading local industries are agriculture and several fish farms that help make Idaho the nation's leader in production of trout. Those industries need a lot of water from the lakes and groundwater of the high mountain desert of south-central Idaho.

Martini gets plenty of opportunity to educate people about the impor-



Fielding phone calls from members of the public is sometimes part of a day's work for Ralph Martini. (Photography by Ashley Smith)

tance of those water resources. "We all know each other," he says. "I meet people on the streets and they ask me questions. They have my phone number and can call me 24/7, and they do."

Such was the case while planning a 2008 upgrade to the city's activated sludge treatment plant (now 1.1 mgd) that discharges to the Snake River. By law, bonding for the \$6 million project, designed to meet limits, required a public vote. "I, the other plant workers, and city council members went door-to-door explaining it," Martini says.

The utility charges most users a flat monthly fee that covers anything up to 7,500 gallons a month. In 1993, the monthly fee increased from \$10 to almost \$16 to fund improvements at the plant. In 1997, residents approved another hike to \$25. The 2008 upgrade required a jump to \$42.85.

"If you don't keep people in the dark, you get better response than if you try to shove it down their throats," says Martini. That attitude helped garner "yes" votes from 75 to 80 percent of residents in the recent rate increase referendums.

## ACTIVE IN THE FIELD

Martini says the city has been very supportive of his involvement in various associations that help him keep current with the industry, regulations, and new treatment strategies — even though those activities take him away from work. He has been an area director for the Southeast Idaho Operators section of the Pacific Northwest Clean Water Association for eight years and was named one of the group's Wastewater Operators of the Year in 2010.

PNCWA ensures that operator training meets the state's continuing edu-



"We all know each other. I meet people on the streets and they ask me questions. They have my phone number and can call me 24/7, and they do."

RALPH MARTINI



Ralph Martini looks out over the clarifiers.

## profile



### Ralph Martini, Heyburn, Idaho

- TITLE:** Public works director
- EXPERIENCE:** 18 years in wastewater and drinking water treatment
- DUTIES:** Oversee wastewater treatment plant and collection system, water treatment plant and distribution system, and public works staff
- EDUCATION:** High school diploma and various water and wastewater continuing education units
- CERTIFICATIONS:** Idaho Class 4 wastewater, Class 2 wastewater collections, Class 2 water distribution, backflow testing
- GOALS:** Continue meeting drinking water and wastewater regulations
- WEBSITE:** [www.heyburnidaho.org](http://www.heyburnidaho.org)
- GPS COORDINATES:** Latitude: 42°32'46.71"N;  
Longitude: 113°46'15.25"W





LEFT AND ABOVE: Ralph Martini checks the oxygen levels in the activated sludge process.

"I'm responsible for making sure all the systems in my area are aware of our training, meetings and goals. We're all small operators, and we all look out for each other. The big cities lend us people and equipment, and we do the same for each other."

**RALPH MARTINI**

## TWO-EDGED SWORD

Idaho's climate demands widespread use of irrigation. The practice dates back to 1838 in the state, and some of the original irrigation ditches are still in use.

While it makes dry farming possible in the high mountain desert region around Heyburn, public works director Ralph Martini says irrigation presents an inflow and infiltration challenge every year.

It starts in spring as farmers begin irrigating their land. "Our wastewater treatment plant flows go from about 300,000 gpd up to 800,000 gpd because of I&I," he says. "We are treating clean water that we shouldn't have to treat."

The key reason goes back to the small size of the city and lack of financial resources. Now that the treatment plant upgrade is complete, the city is attacking the collection system. "The majority of it has been here since 1948 and is deteriorating," Martini says.

The state Department of Environmental Quality tries to help wastewater systems, but with so many small operators, the funds are in great demand. "We all submit projects for funding and the state prioritizes all the projects and assigns money to them," he says. "If you don't make the list, you just keep doing whatever you can to keep your system in compliance."

cation requirements. "I'm responsible for making sure all the systems in my area are aware of our training, meetings and goals," Martini says. "We're all small operators, and we all look out for each other. The big cities lend us people and equipment, and we do the same for each other."

Martini has also served as president and vice president of a drinking water group he helped form, the Idaho Chapter of the American Backflow Prevention Association. He also attends meetings of the Idaho chapter of the National Rural Water Association.

His employers haven't even balked at him operating his own company, MC Environmental, which he formed with Christensen. "We are contract operators for small wastewater plants in the area," he says.

The venture helps him learn and keep up with industry changes, and provides a valuable resource for the plants he serves. Idaho requires each system to have a responsible operator and a backup operator — difficult for small systems like those at campgrounds and trailer parks.

"That's what we provide," says Martini. "We are the liaisons to the Department of Environmental Quality (DEQ) and EPA. We do the water testing and monitoring that is required, write the annual reports, and do troubleshooting and repairs."

MC Environmental customers include two small cities with no licensed operators on staff, five trailer courts, and a large truck stop. "They have limited finances," he says, "so the biggest thing is keeping them up to date with the regulations."

For instance, he and Christensen are working with customers with lagoon systems to make sure they meet a new requirement that all lagoons in Idaho be safety-tested by 2012. "They have to be thinking about hiring an engineer, because there aren't many firms offering the service," Martini says.

## STARTED IN CHILDHOOD

Martini came by his interest in water early in life. His mother was an envi-





Ralph Martini checks equipment in the headworks building at the Heyburn treatment plant. The Salsnes filter from Blue Water Technologies, located in the building, is the first defense against solids entering the plant.

projects may be panning out. "If we have to do another upgrade, I'm sure we'll be able to start reclaiming some of that water," he says. "It may not happen in my tenure here, but we're laying the groundwork for it."

And that may mean more door-to-door selling. **tpo**

**more info:**

**Blue Water Technologies, Inc.**  
888/710-2583  
www.blueh2o.net

ronmental specialist at an Ore-Ida plant near Heyburn, so he often went to work with her in the lab on the weekend as she did testing for the plant's wastewater facility. Those childhood experiences gave him some awareness of the environmental field, but it wasn't until later that he came to appreciate it.

After graduating from high school in 1978, he held various jobs around the community until he was hired at the drinking water treatment plant across the river in Burley in 1989. For that job, he also had to be familiar with the wastewater plant as part of his on-call duties. Reading trade journals in the break room gave him an idea.

After two years in Burley, he saw a potential niche in the market. Recycling was gaining popularity, but there wasn't much of it going on around Burley and Heyburn. So he left the city to start his own recycling company, with Burley as a main customer. After a year, he got the chance to manage a recycling center, which he did for three years.

Then came an opportunity to work for the Heyburn wastewater plant. It was a good-paying city job with benefits, so he applied and was hired as operator in training in February 1993. He earned the necessary licenses and certifications through education programs from the various industry groups and was ready to step up when the wastewater plant manager left four years later.

#### TIME TO RECLAIM?

Martini credits the continuing education programs, other operators in the area, DEQ staff, and trade journals with the growth of a career that has pretty much enveloped his life. "At times I wonder why I'm doing this, but it's rewarding and I get a lot of satisfaction out of it," he says.

"A lot of people take wastewater for granted. But in my mind, it's just like recycling. We take clean groundwater, it goes through some beneficial use, we treat it, and we discharge clean water."

Looking ahead, Martini would love to be able to reuse Heyburn's wastewater. "We use a lot of surface water around here for irrigation, but we're a small town so we don't have the resources to make Class A water for reuse," he says.

Not yet, anyway, but it's another niche he would like to fill someday. That will depend on economic growth in the community, and it looks as if some



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# Wastewater Treatment Systems

By Briana Jones

## NONCONTACT BLOWER

The High-Speed Turbo Blower from APG-Neuros operates an oil-free noncontact air bearing system, making aeration more energy efficient and reducing operating costs. The blower reaches flow rates up to 20,000 scfm and design-discharge pressures up to 15.5 psig. All models are equipped with a PLC, and power ratings range from 30 to 700 hp. Dual-core models (400 to 700 hp) combine two cores in the same unit to offer a wide flow range and turndown rate of up to 76 percent. The blower has a 55 percent smaller footprint than conventional blowers. **866/592-9482; www.apg-neuros.com.**



High-Speed Turbo Blower from APG-Neuros



Wastewater treatment systems from Ashbrook Simon-Hartley

## MULTIPLE PROCESSES

Activated sludge wastewater treatment systems from Ashbrook Simon-Hartley use the conventional activated sludge process, extended aeration process and completely mixed activated sludge process. The conventional process includes an aeration tank with a long, narrow configura-

tion so that the wastewater flows through the tank and approximates plug flow. The extended process provides 24 hours of aeration coupled with a defined settling period to achieve high-quality effluent.

In the completely mixed process, the aeration tank is mixed with air blown in through diffusers. The tank geometry and mechanical mixing are designed to approximate a completely mixed reactor. The main applications are sludge flows of high concentration or hard-to-oxidize waste. The complete mixing dilutes such flows into the entire tank's contents more rapidly than a plug flow design. Flow capacities range from 5,000 gpd to 3.0 mgd. **800/547-7273; www.as-h.com.**

## SCREW BLOWERS

ZS screw blowers from Atlas Copco offer an energy-efficient range for air blowing applications. The blowers use internal compression instead of external compression. The technology is a scaled version of the principles used in an air compressor: paired male and female rotors trap and then squeeze air between them. Air is compressed internally during each rotation. The oil-free compressors have flow ranges from 176 to 2,700 cfm and pressure ranges from 4.35 to 17 psig. **803/817-7479; www.encyclopedia.com.**



ZS screw blowers from Atlas Copco



Foam Buster from AQUAFIX

## FILAMENT FOAMING

Foam Buster from AQUAFIX is a micronutrient blend to control foaming and reduce filaments in wastewater processes. The blend contains vitamins and biostimulants that help overcome filament foaming and settling. The product works in oxidation ditches, SBRs, extended aeration treatment plants and aerobic digesters.

Filaments such as *Microbrix parvicella*, *Nocardia* and Type 1863 can be controlled. The blend energizes naturally occurring bacteria to degrade fats, oils and grease along with surfactants. It also reduces sludge and scum production and lowers BOD and TSS. **888/757-9577; www.teamaquafix.com.**

## UV DISINFECTION

The OpenLine UV disinfection system from Aquionics uses open-channel, low-pressure, high-output UV amalgam lamps to destroy microorganisms' reproductive abilities on a cellular level. Treated effluent is free of residual chemicals. The system is available in eight models with flows from 15 to 1,400 gpm. The UV lamps have a 14,000-hour lamp-life guarantee and an automatic quartz sleeve wiping system for reduced maintenance. **800/925-0440; www.aquionics.com.**



OpenLine UV disinfection system from Aquionics



ASBR wastewater treatment system from AWT Technologies

## ADVANCED SBR

The Advanced Sequencing Batch Reactor (ASBR) wastewater treatment system from AWT Technologies delivers high-quality effluent with biological nutrient removal at low capital investment. The system uses fewer tanks and minimal equipment to make maintenance easy and operation simple. Single or multiple basins

provide operational flexibility, while high-efficiency aeration minimizes power consumption. The system provides flow capacities from 5,000 gpd to more than 50 mgd. **403/453-2298; www.awt-technologies.com.**

## LIQUID DEODORIZERS

Microcat-ECL and Microcat-DNTRF from Bioscience alleviate odor problems caused by FOG deposits and oxygen-deficient areas that favor anaerobic bacteria, which generate sulfides. Microcat-ECL is a liquid blend of natural proteins and surfactants that emulsifies, removes and breaks down odor-causing materials. It is formulated for primary treatment, sludge processing and handling, and anaerobic or facultative lagoons.

Microcat-DNTRF is a synergistic blend of selected, adapted microorganisms to liquefy and degrade greases and fats and to maintain plumbing and collection systems free of blockages. It also contains enzymes and ingredients to keep drains and traps clear. It helps minimize the buildup of FOG without causing downstream problems. **800/627-3069; www.bioscienceinc.com.**



Microcat-ECL and Microcat-DNTRF from Bioscience





Wastewater treatment system from BIOWORKS

## EXTENDED AERATION

The BIOWORKS wastewater treatment system from BIOWORKS North America uses large-volume earthen or concrete basins for long sludge age and a stable extended aeration process. Components

include the OXIWORKS energy-saving aeration system and OXIRISE maintenance and retrieval system. Systems feature nitrification, denitrification and biological phosphorus removal in one module, while a crossflow clarifier provides optimum settling efficiency. **912/445-5021; www.bioworksus.com.**

## GREEN BATCH REACTOR

Sequencing batch reactors (SBR) from Cromaglass Corporation use automatic programming to reduce unnecessary aeration and cut electrical consumption. The units, covers and locking hatches are constructed of lightweight fiberglass. Recent manufacturing initiatives lowered emissions of air pollutants and reduced wastes; only raw materials and adhesives emitting the least amount of pollutants are used. **570/326-3396; www.cromaglass.com.**



SBR from Cromaglass Corporation

## DIFFUSER SYSTEM

The FlexAir StreamLine diffuser system from Environmental Dynamics International includes multiple sizes and configurations to meet the wide range of aeration applications. The system eliminates air distribution piping and individual diffuser components. High stress points and material fatigue are reduced using integral diffusers, a tubular membrane, and inline support components.

The diffuser family includes several models, each delivering flexibility, oxygen transfer efficiency and mechanical performance. **877/334-2478; www.wastewater.com.**



FlexAir StreamLine diffuser system from Environmental Dynamics International

## QUIET AERATION BLOWERS

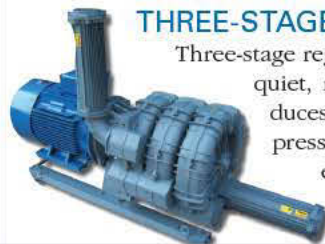
Bi-lobe (MB Series) and tri-lobe (ZG Series) aeration blowers and packages from Eurus Blower are rated at 15 psig with airflows to 3,950 cfm. Used for MBRs, sludge tanks and equalization tanks, the blowers have integral-shaft ductile iron impellers, dual-splash lubrication, oversized roller bearings, piston ring air seals and viton lip seals.

The blower packages feature high-efficiency intake filter/silencers with washable polyurethane filter media, combination base and heavy-duty discharge silencer and vibration dampers for noise and vibration control, plus OSHA guard and V-belt drive with auto belt tensioner for easy maintenance. Optional equipment includes motors to 200 hp, check valve, safety valve, flexible connector, and sound enclosure. **757/538-1717; www.eurusblower.com.**



Bi-lobe (MB Series) and tri-lobe (ZG Series) from Eurus Blower

## THREE-STAGE BLOWER



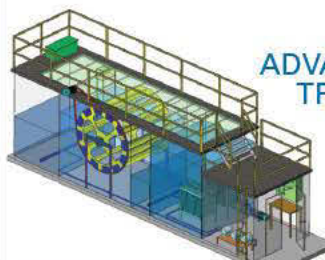
Three-stage regenerative blowers from FPZ

Three-stage regenerative blowers from FPZ allow for quiet, maintenance-free operation that produces pressures over 12 psig. The additional pressure capability allows the use of regenerative blowers where once only positive displacement blowers were used. The blowers have no belts and need no lubrication.

FPZ inverter duty motors can be tied to dissolved oxygen sensors that allow the blower to operate at various speeds. At night when oxygen demands are low, the blower can operate more slowly, producing less air and consuming less power. As oxygen demands increase, the blower speed can be increased. Low noise suits treatment plants near residential areas. **262/268-0180; www.fpz.com.**

## ENERGY-EFFICIENT MBR

The LEAPmbr from GE Water & Process Technologies offers low life cycle costs, operational simplicity and a compact footprint. The unit reduces energy costs, improves productivity due to greater treatment capacity, and decreases membrane aeration equipment and controls for a simpler design with lower construction, installation and maintenance costs. A reduced physical footprint leads to lower consumption of cleaning chemicals. **866/439-2837; www.ge-energy.com/LEAPmbr.**



Bio-Wheel and Bio-Brane MBR from H2O Innovation

## ADVANCED BIOLOGICAL TREATMENT

The Bio-Wheel and Bio-Brane MBR from H2O Innovation is an advanced approach to biological treatment, producing high-quality effluent. The system eliminates a clarifier filter and achieves almost nondetectable BOD and TSS. The system combines activated sludge and

fixed-film in a single biological treatment system, providing compactness, flexibility, efficient use of available biology, and reduced power consumption.

The nonchemical system delivers nutrient removal via nitrification and biological phosphorus removal with fixed-film and carbonaceous BOD reduction. The thin fixed-film provides a stable environment that resists upsets, while the activated sludge provides sufficient oxygen and mixing. The system uses less than 12 hp for flows greater than 75,000 gpd. **418/688-0170; www.h2oinnovation.com.**

## BLOWER PACKAGES

Com-paK Plus EB 291C and EB 421C plug-and-play tri-lobe blower packages from Kaeser feature Omega Control Basic, variable-frequency drive and reduced current starting. All instrumentation is mounted, piped and wired. Dry contacts are included for output to SCADA. Packages can be remotely started and stopped. Units are available from 25 to 100 hp with flows from 577 to 1,420 cfm at 4.4 psig. **540/898-5500; www.kaeser.com/omega.**



Com-paK Plus EB 291C and EB 421C blower packages from Kaeser

(continued)



### NITRATE ANALYZER

The Hach NITRATAX sc UV nitrate analyzer uses advanced absorption technology, eliminating reagents, sample conditioning and frequent calibrations. With few moving parts, it is simple to operate and maintain for continuous nitrate analysis. It can be used with the same Hach sc digital controller as LDO, pH, ORP, suspended solids, conductivity or sludge level. **800/227-4224; www.hach.com.**



**NITRATAX sc UV nitrate analyzer from Hach**

out an electrician. The mixer is resistant to clogging by fibrous material, has long maintenance intervals, and requires minimal spare parts inventories.

Available in multiple sizes, the Amaprop mixer is a low-speed gear-drive submersible mixer/agitator with break-proof propeller. The propellers have diameters up to eight feet, and are configured and positioned for energy efficiency. The system offers hydraulic drive for reduced energy costs, and has a tandem mechanical seal with leakage reservoir to contribute to its three-stage sealing. Both mixers require oil change intervals every 16,000 operating hours or two years. **804/222-1818; www.ksbusa.com.**



**Amamix and Amaprop horizontal submersible mixers from KSB Inc.**

### CYCLONE FILTRATION



**Hurricane filtration system from Harmsco**

The Hurricane filtration system from Harmsco combines cyclonic separation, cartridge filtration and Up-Flow technology. The Up-Flow design prevents air entrapment and rotational flow improves cartridge-load performance. The filter housings are made of electropolished 304 or 316 stainless steel and can be coated to resist seawater or corrosive compounds. Housings are available in a variety of sizes with many filter cartridge options. Built to ASME standards, the system

is NSF-61 listed. **800/327-3248; www.harmsco.com.**

### INCLINED SCREW PRESS

The RoS3Q inclined screw press from Huber Technology offers fully automatic operation. The press uses minimal energy to dewater municipal and industrial sludge and biosolids, resulting in optimal cake solids, polymer consumption and capture rates. It generates minimized noise and wear due to the low speed of the compacting screw. The rotating auger and wide gap between the screw conveyor and sieve make the unit insensitive to coarse material. **704/949-1010; www.huber-technology.com.**



**RoS3Q inclined screw press from Huber Technology**



**Closed-Loop Reactor (CLR) process from Lakeside Equipment**

### CLOSED-LOOP BNR

The Closed-Loop Reactor (CLR) process from Lakeside Equipment provides biological nutrient removal using nonproprietary designs. As a modified form of the extended aeration complete mix process, the process produces removal efficiencies that meet and exceed those of advanced tertiary treatment processes.

BNR configurations are available with in-basin designs for nitrification and denitrification, as well as external selector configuration for Bio-P and Total N removal. **630/837-5640; www.lakeside-equipment.com.**

### SUSPENDED SOLIDS METER

The multipurpose Suspended Solids Meter from Markland Specialty Engineering monitors the concentration of primary, secondary and return activated sludges in open-top tanks, pipelines, SBRs and sand/membrane filters. It can measure sludge too thick for optical methods, or thinner than the backwash from drinking water plants. Using nonradioactive ultrasounds, it requires no approvals. The self-cleaning, low-maintenance sensor is nonclogging, smooth-bore and nonintrusive.



**Suspended Solids Meter from Markland Specialty Engineering**

The meter automatically shuts off the desludge pump before sludge becomes too thin, resulting in optimum density for feeding to digesters, belt presses and centrifuges. This enables correct dosing and calculation of solids mass flow. Readings are not affected by color of particulates or fluid. The system can be supplied as an inline spool piece or throw-in style probe. Free testing of samples is available with follow-up report. **905/873-7791; www.sludgecontrols.com.**

### VERSATILE FILTER

The Baleen Filter from JDV Equipment can screen from 5 to 500 microns through a combination of high- and low-pressure sprays that dislodge material from the filter screen media, while sweeping away material for collection. Inspired by the baleen whale, the system can be used at any point during the treatment process.



**Baleen Filter from JDV Equipment**

**973/366-6556; www.jdvequipment.com.**

### SUBMERSIBLE MIXERS

Amamix and Amaprop horizontal submersible mixers from KSB Inc. mix, homogenize and suspend sludge. The Amamix has a tandem mechanical sealing that seals the shaft, while a leak-proof cable entry prevents wicking inside the motor. The pumps have a closed-coupled design, direct-drive motor, and cable plug that will plug and unplug with-



**Carrousel MD digestion process from Ovivo**

### RECYCLED PERMEATE PROCESS

The Carrousel MD digestion process from Ovivo uses Kubota membrane units to prethicken waste activated sludge. The process creates reuse-quality permeate, achieves thickening up to 4 percent solids without polymers, eliminates decanting, reduces footprint, and provides constant



feed operation and custom automation.

The permeate can be recycled to the head of the plant or sent to disinfection. Continuous nitrification and denitrification sequencing reduces nitrate and ammonia, and provides pH control, preventing the dissolution of inorganic phosphorus. Conditions favoring biological phosphorus release and uptake ensure minimal amounts of soluble phosphorus in the permeate. The process produces Class B sludge. **801/931-3000; [www.ovivowater.com](http://www.ovivowater.com).**

## AMMONIA TREATMENT

The PRD-AMS process from PRD Tech adds alkalinity to influent wastewater using magnesium hydroxide slurry and biologically treats the ammonia. The process consists of an aerated vessel that uses a Venturi system to increase oxygen transfer efficiency, and uses a proprietary moving biomedium with high surface area to biologically convert ammonia to nitrogen gas. The effluent is monitored continuously for ammonium concentration with automatic controls for alkalinity, pH and dissolved oxygen. With a compact footprint, the process can be operated with minimal operator intervention. **513/731-1800; [www.prdtechinc.com](http://www.prdtechinc.com).**



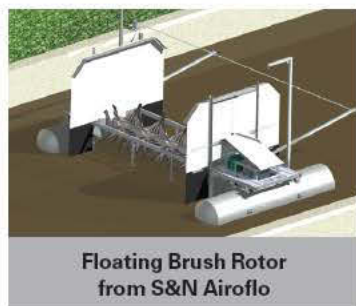
**Rotary Fan Press from Prime Solution Inc.**

## COMPACT FAN PRESS

The Rotary Fan Press from Prime Solution Inc. simplifies dewatering performance for sludges and slurries using continuous pressure differential technology. With a rotational speed of less than 1 rpm, the unit is portable, enclosed and offers a long service life. Several capacities are available to meet various flow applications. Skid-mounted systems include control panel, feed pump, chemical prep, inline mixing and plant integrated controls. The compact designs can be configured for portability with mobile systems containerized or trailer mounted. **269/673-9559; [www.psirotary.com](http://www.psirotary.com).**

## DIRECT-DRIVE ROTOR

The Floating Brush Rotor from S&N Airoflo combines cup-shaped blades and a spiral design that reduces power consumption. The floating unit easily drops into ditches, lagoons, digesters and stormwater basins, while a direct-drive rotor increases efficiency and reduces maintenance. No adjustment is required for water level changes and the rotor maintains high productivity. Wastewater lubricated bearings increase equipment life and eliminate greasing. **662/455-2804; [www.airoflo.com](http://www.airoflo.com).**



**Floating Brush Rotor from S&N Airoflo**

## LARGE-VOLUME MBR

The TITAN MBR FE System from Smith & Loveless is a pre-engineered field-erected tankage for large-volume MBR treatment. Submerged in the aeration section, the flat-plate membrane maintains high permeability and flux rates even at peak-day rates. With air scouring to prevent fouling, the unit does not require back pulsing or the associated equipment and chemical costs. The flat-plate membranes experience



**TITAN MBR FE System from Smith & Loveless**

less wear and tear than hollow-fiber types and can be cleaned in place. Systems come in standard and custom designs with flow capacities from 5,000 gpd to 3.0 mgd. The systems meet effluent requirements of less than 3 mg/l BOD, 1 mg/l TSS, 2 mg/l TKN and 1 mg/l NH<sub>3</sub>. **800/898-9122; [www.smithandloveless.com](http://www.smithandloveless.com).**

## PORTABLE TREATMENT PLANT

The on-site portable pilot trailer from WSI International demonstrates different water treatment processes. It comes with a staff that operates the trailer and answers questions. A final report explains the results after the demonstration. The trailer is equipped with mixing chambers, ozone, DAF unit, air compressor, UV, fiberball filter, ceramic membrane, disc filter and spiral membrane systems. The portable treatment plant allows customers to see which system will work best for their application. **303/985-0885; [www.wsi-llc.com](http://www.wsi-llc.com).**



**Portable pilot trailer from WSI International**

## TURBO BLOWER

The AyrJet Series 400 high-speed, high-efficiency single-stage turbo blower from The Spencer Turbine Co. features a direct-drive oil-free permanent magnet motor and variable-frequency drive with PLC controls. With flows to 8,200 cfm and pressures to 15 psig, it handles applications from 300 to 400 hp and includes built-in vibration and temperature monitoring.



**AyrJet Series 400 turbo blower from The Spencer Turbine Co.**

All blowers come standard with built-in inlet filtration; externally mounted inlet filters are optional. Higher horsepower in a larger, single blower provides more power at less cost. The blower offers plug-and-play installation, minimal maintenance, oil-free air delivery, and a sound-reducing enclosure. PLC and operator interface terminal (OIT) allow for flow-based, pressure-based or level-based control. **800/232-4321; [www.spencerturbine.com](http://www.spencerturbine.com).**

## TORQUE LIMITATION

The Cyclo 6000 torque limiter drive from Sumitomo Drive Technologies is a grease-filled unit for easy vertical mounting and handles up to 500 percent shock load. The enclosed torque limiter design is built into the gearbox, while a high-precision coil spring provides accurate torque readings. It transmits signals that relay warnings and automatic motor shut-off at specified torque levels. Bidirectional torque setting means instantaneous overload response. An indicator gauge shows the load percentage available against the set torque. The unit extends gearbox life. **800/762-9256; [www.smcyclo.com](http://www.smcyclo.com).**



**Cyclo 6000 torque limiter drive from Sumitomo Drive Technologies**

*(continued)*



### THREE-STAGE BNR

The Continuously Sequencing Reactor (CSR) from Schreiber is a biological nutrient removal (BNR) system contained in a single basin. Oxidic, anoxic and anaerobic phases occur sequentially. Aeration and mixing occur separately. With full turndown capability, the aeration can be turned off while the CSR applies low-energy mixing. The contents of the basin are mixed as the rotating bridge moves around. Close proximity of suspended retrievable diffuser units to the tank bottom provides localized scouring to maintain solids suspension. The unit requires 2.5 to 3.5 hp/mg. **205/655-7466; www.schreiberwater.com.**



Continuously Sequencing Reactor from Schreiber



MeurerMBR MCP from Meurer Research

### MEMBRANE CLEANING

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



## UPCOMING TRAINING & EVENTS

**Inspector Training & Certification:**  
**November 10-11, 2011 - Lakewood, CO**  
 CHURCH Onsite Wastewater Consultants  
 Contact: Kim Seipp at (303) 622-4126 or Bob Wright at (720) 272-6469

**January 26-27, 2012 - Red Deer, Alberta**  
 NAWT Operation & Maintenance Training Part I  
 Alberta Onsite Conference  
 Contact: Keith Gylander at (780) 489-7471

**January 30-31, 2012 - Laughlin, NV**  
 Southwest Onsite Wastewater Conference  
 Contact: Kitt Farrell-Poe at (520) 621-7221

**Operation & Maintenance Training Certification:**  
**November 1-2, 2011 - Malibu, CA**  
 NAWT Operation & Maintenance Training Part II  
 Contact: Kit Rosefield at (530) 513-6658 or kit@septicguy.com to register for training or visit www.COWA.org for more info.

**December 9, 2011 - Malibu, CA**  
 Installation of OWTs  
 County of Sacramento  
 Contact: Kit Rosefield at (530) 513-6658 or kit@septicguy.com to register for training or visit www.COWA.org for more info.

**WATCH THE NAWT WEBSITE AND INDUSTRY MAGAZINES FOR UPDATES**

**FOR MORE INFORMATION CALL 800-236-6298**

**WWW.NAWT.ORG**

# Coming In Next Month's Issue

# 2012

# Calendar

**COLE publishing**





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**WATER QUALITY MONITORS!**



**FINALLY! A D.O System that's Virtually Maintenance Free!**

**ATI's Q45D-ODO** On-line D.O. System provides the most reliable, lowest maintenance dissolved oxygen monitor you can buy. Combining an optical D.O. sensor with extended life optical element and a proven automatic sensor cleaning system, the Q45D will provide years of trouble free service.

**FEATURES**

- Dissolved Oxygen Monitoring without the Maintenance
- \* Air-Blast Sensor Cleaning Insures Accuracy & Reliability
- Save Power and Improve Aeration System Performance
- Guaranteed Performance in Any Aeration Environment

**NEW!**



**RESIDUAL CHLORINE MONITOR**  
Model Q46H  
An All-in-One Unit!

**FEATURES**

- Chlorine, pH & Temperature in one
- 3 SPDT relays standard
- Pre-assembled system panels available
- Option for 3 additional low power relays
- Profibus-DP, Modbus or Ethernet communications



**DISSOLVED AMMONIA MONITOR**  
Model Q45N  
Dissolved NH<sub>3</sub> Monitor

**FEATURES**

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### Val-Matic Releases Product Brochure

Val-Matic Valve & Mfg. Corp. released an expanded version of its product line brochure, including air valves, check valves, shut-off valves, VaultSafe products, actuators and control systems. The brochure is available at [www.valmatic.com](http://www.valmatic.com).



### Parkson Partners with Biowater

Parkson Corp. and Biowater Technology have formed a partnership that gives Parkson exclusive distribution rights for Biowater's existing and future fixed-film wastewater technologies in North America.

### Advanced Waste Acquires Waste Water Systems

Advanced Waste Services Inc. of Milwaukee, Wis., acquired Waste Water Systems LLC of Cedar Rapids, Iowa. WWS operates a nonhazardous waste processing facility. The acquisition complements the company's existing service and expands its market into Iowa. Mark Lob, president of WWS, will serve as operations manager.

### Standex Electronics Publishes Sensor Catalog

The latest product catalog from Standex Electronics features standard and custom fluid level, proximity, current and motion sensors. Technologies include magnetic, inductive, conductive and current sensing models in both standard and custom design. The 16-page catalog can be downloaded at [www.standexelectronics.com](http://www.standexelectronics.com).



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### NOV Monoflo Names Waters Sales

Dwight Waters has joined NOV Monoflo as sales director. He brings 20 years of international selling, consulting, project management, engineering and distribution experience in the PC pump industry to the position.



Dwight Waters

### DYK, Natgun Form DN Tanks Inc.

DYK Inc. of El Cajon, Calif., and Natgun Corp. of Wakefield, Mass., merged to form new parent company DN Tanks Inc. Both companies specialize in the design and construction of prestressed concrete storage tanks. The merger results in expanded construction capacity and new technical expertise.

### SCFI Launches Online Energy Calculator

SCFI launched an interactive calculator on its website, [www.scfi.eu](http://www.scfi.eu), that allows industry professionals to determine how much energy can be recovered in their waste stream by using AquaCritox sustainable sludge destruction technology.

### Garlock Acquires One-Up Pump Diaphragm

Garlock Sealing Technologies LLC acquired the One-Up Pump Diaphragm business from W. L. Gore & Associates Inc. The acquisition enables GTS to expand its diaphragm pump market. One-Up's manufacturing business will relocate to GST's facility in Palmyra, N.Y.

### WILO Names VP, Produces Training Videos

WILO SE named Jeff Bredeson senior vice president sales region Americas. He will oversee the growth and development of the North, Central and South American subsidiaries. WILO USA LLC, subsidiary of WILO SE, collaborated with Richard Trethewey, plumbing and heating expert for the PBS series *This Old House/Ask This Old House*, on a series of training videos for the company's high-efficiency pumps.



Jeff Bredeson

### Synagro Launches Company Website

Synagro Technologies Inc. launched its redesigned website, [www.synagro.com](http://www.synagro.com). The site features simplified and intuitive navigation with interactive menu roll-over functionality, integration with social media networks, case studies and downloadable sales sheets.

### BASF Completes Acquisition of Inge Waternotechnologies

BASF SE completed acquisition of German-based ultrafiltration specialist Inge Waternotechnologies AG. Through the acquisition, BASF gains access to the ultrafiltration technology market used in the treatment of wastewater.

### HSI Offers WWTP Strategy Game

HSI Inc. offers *Efficient City WWTP*, a character driven, single-player simulation, training and marketing game. The game consists of multiple levels where the player faces different sets of challenges. The objective is to manage the facility and run it as efficiently as possible.



Players learn about HSI products and how they can save money by replacing the facility's antiquated blowers. Initially lacking funds, players earn rewards to replace the old blowers and controls with HSI products. Visit <http://www.youtube.com/user/HSIBlowers>. tpo





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**2. RUHRPUMPEN INTRODUCES LOW-FLOW PUMP**

A low-flow version of the CPP-21, the model CPP-L end-suction low-flow centrifugal pump from Ruhrpumpen complies with ANSI B73.1 standard and can be used to replace existing equipment without piping or base changes. Features include radial vane impellers for hydraulic control. **800/334-2553; www.ruhrpumpen.com.**

**3. DIALIGHT INTRODUCES LED AREA LIGHT**

The 70-watt SafeSite LED area light from Dialight is Class I and II, Div. 1 certified. Approved for use in hazardous locations, the light is designed to

replace up to 150-watt HID fixtures and delivers 79 lumens per watt. The light is available in both cool white and neutral white models. **732/919-3119; www.dialight.com.**

**4. UNIVERSAL OFFERS VORTEX-SHEDDING FLOWMETERS**

Model P420 plastic, vortex-shedding flowmeters from Universal Flow Monitors Inc. with CPVC body, sensor and bluff can transmit the flow rate of hot water or other fluid with a maximum operating temperature of 180 degrees F. Available in five pipe diameters, the meters have a flow range of 12 to 200 gpm: 1/2 inch (1.2 to 12 gpm), 3/4 inch (2.5 to 25 gpm) and 2 inches (20 to 200 gpm). **866/524-9641; www.flowmeters.com.**

**5. PALMER WAHL INTRODUCES MULTIFUNCTION CALIBRATOR**

The Wahl C150 on-site multifunction calibrator from Palmer Wahl features built-in, easy-to-connect terminals, portable and bench-top flexibility, and intuitive embedded software. Fully protected with an external antishock rubber boot with IP54 rating, the unit features five user-selectable languages, 0.005 percent accuracy over one year, NIST traceability









### 12. PROMATION OFFERS SPRING-RETURN ACTUATORS

PA/O-PD/O quarter-turn electric spring-return actuators from Promotion Engineering are made for use with all ball and butterfly valves or dampers with load requirements ranging from 450 to 2,300 inch lbs. The actuators have a hardened steel gear train and are available with or without clutch-free manual handwheel. Features include integrated position indicator, two auxiliary switches (rated at 3A 250V), internal low-power, anticondensation heater, hydraulic damper and cast aluminum polymer-coated housing rated NEMA 4X for safe exposure to high hose and corrosion resistance. The actuators also are available for 24 VAC/DC, 120 VAC and 230 VAC supply voltages. They are ISO 5211 compliant and come equipped with electrical and mechanical safety interlocks. 352/544-8436; [www.promationei.com](http://www.promationei.com).

### 13. DENSO INTRODUCES TANK BASE PROTECTION SYSTEM

The tank base protection system from Denso provides a cost-effective repair for outer tank bases and chimes. Featuring a series of tapes and coatings, the hand-applied system seals gaps to protect the tank base against further corrosion. 888/821-2300; [www.densona.com](http://www.densona.com). tpo

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## people/awards

The **Water Environment Association of Texas** announced these award recipients:

- John Bennett, Trinity River Authority, Arthur Sidney Bedell Award
- Warren Brewer, Retired Trinity River Authority, Pillars of the Profession Award
- Dow J. "Jody" Zabolio, Upper Trinity Regional Water District, Outstanding Service Award
- Frederick Moore, San Jacinto River Authority, William D. Hatfield Award
- Buda Wastewater Treatment Plant Guadalupe-Blanco River Authority, Municipal Wastewater Treatment Plant of the Year (<1 mgd)
- Woodlands Wastewater Treatment Plant Number 1, San Jacinto River Authority, Municipal Wastewater Treatment Plant of the Year (1-15 mgd)
- Kerry Maxwell, City of College Station, Outstanding Operator of the Year
- City of Arlington Water Utilities-Wastewater Collection Systems Division, Sidney L. Allison Award
- Leonard E. Ripley, Dallas, Winfield S. Mahlie Award
- Jeff Sober, Dallas, Emerging Leader Award
- J. Kevin Ward, Trinity River Authority, Outstanding Public Official Award
- City of Waco Water Utility Services, Ronald B. Sieger Biosolids Management Award
- Alan Plummer, Alan Plummer and Associates, Alan H. Plummer Environmental Sustainability Award (inaugural award)

### WEF Awards

The **Water Environment Federation** announced the winners of the 2011 WEF Excellence Awards, presented during WEFTEC 2011 in October in Los Angeles:

- Camp Applied Research Award, Dr. Henryk Melcer
- Collection Systems Award, Joan Hawley
- Eddy Wastewater Principles and Processes Medal, Chakkrid Sattayatewa, Krishna Pagilla, Robert Sharp and Paul Pitt
- Emerson Distinguished Service Medal, Dr. Charles A. Sorber
- Fair Distinguished Engineering Educator Medal, Dr. Nancy Love
- Gascoigne Wastewater Treatment Plant Operational Improvement Medal, Amanda McInnis, Herb Bartle, Tom Adams and Coralynn Revis
- Industrial Water Quality Achievement Award, Boehringer Ingelheim Chemicals, Inc.
- Innovative Technology Awards: Adaptive N-Impeller, ITT Water and Wastewater USA, Collection Systems Category; BNR IntelliPro, Aqua-Aerobics Systems, Instrumentation Category; AdvanTex Treatment System, Orenco Systems, Process Equipment Category; Smart Conveying Technology, seepex, Solids Handling/Disposal Category
- McKee Groundwater Protection, Restoration or Sustainable Use Award, Hua Cai, Alessia G. Eramo, Patrick J. Evans, Rodney Fricke and Rachel A. Brennan
- Morgan Operational Solutions Award, Woodie Mark Muirhead
- Member Association Achievement Award, Puerto Rico Water & Environment Association
- Outstanding Young Water Environment Professional Award, Tom Johnson
- Public Education Award: Jeffrey Kalmes, Individual Category; LOTT Clean Water Alliance, Other Category
- Public Officials Award, The Honorable John D. Dingell, Michigan; Robert E. Moore, The Metropolitan District Commission, Hartford, Conn.; and Councilwoman Jan Perry, Los Angeles
- Water Quality Improvement Award, Loxahatchee River Preservation Initiative
- WEF Canham Graduate Studies Scholarship, Trevor Ghylin

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.*

## CALENDAR OF EVENTS

### Nov. 2-4

Nebraska Water Environment Association Conference, Holiday Inn, Kearney. Visit [www.ne-wea.org](http://www.ne-wea.org).

### Nov. 9-10

New England Water Environment Association North East Residuals, Biosolids and Energy Conference, Seekonk, Mass. Visit [www.newea.org](http://www.newea.org).

### Nov. 13-16

North Carolina American Water Works Association and Water Environment Association Annual

Conference, Embassy Suites Concord Convention Center, Concord. Visit [www.ncsafewater.org](http://www.ncsafewater.org).

### Nov. 15-16

Georgia Association of Water Professionals Fall Conference & Expo and Laboratory Symposium, Athens. Visit [www.gawp.org](http://www.gawp.org).

### Nov. 16-18

Indiana Water Environment Association Annual Conference, Indianapolis. Visit [www.indianawea.org](http://www.indianawea.org).

## education

### British Columbia

The British Columbia Water & Waste Association has these courses:

- November (dates TBA) – SCADA Seminar: Modern SCADA System 101 for Wastewater
- November (dates TBA) – P3 Seminar: Exploring Public-Private Partnerships

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

### Georgia

The Georgia Association of Water Professionals has a Fall Conference & Expo and Laboratory Symposium in Athens on Nov. 15. Visit [www.gawponline.org](http://www.gawponline.org).

### Illinois

The Illinois Water Environment Association has a Collections Systems seminar in Lisle on Nov. 2. Visit [www.iweasite.org](http://www.iweasite.org).

### Massachusetts

The New England Water Environment Association has a Residuals, Biosolids and Energy Conference in Seekonk Nov. 9-10. Visit [www.newea.org](http://www.newea.org).

### Michigan

The Michigan Water Environment Association has a Process seminar in East Lansing on Nov. 9. Visit [www.mi-wea.org](http://www.mi-wea.org).

### North Carolina

The North Carolina American Water Works Association & Water Environment Association has these courses:

- Dec. 1 – Customer Relations, Statesville
  - Dec. 13 – Safety, Wrightsville Beach
- Visit [www.ncsafewater.org](http://www.ncsafewater.org).

### Ohio

The Ohio Water Environment Association has a Biosolids Workshop on Dec. 8. Visit [www.ohiowea.org](http://www.ohiowea.org).

### Ontario

The Water Environment Association of Ontario has a Biosolids Beneficial Use seminar in Burlington Nov. 7-8. Visit [www.weao.org](http://www.weao.org).

### Texas

The Texas Water Utilities Association has these courses:

- Nov. 7 – Wastewater Collection, Corpus Christi



- Nov. 8 – Pumps and Pumping, Gatesville
  - Nov. 15 – Wastewater Collection, San Marcos
  - Nov. 15 – Basic Wastewater, New Braunfels
  - Dec. 13 – Distribution, Waco
- Visit [www.twua.org](http://www.twua.org).

The Water Environment Association of Texas has these courses:

- Nov. 2-3 – Asset Management Workshop, Austin
  - Dec. 1 – Renewable Energy, Energy Efficiency and Best Practices, Austin
- Visit [www.weat.org](http://www.weat.org).

#### Wisconsin

The Wisconsin Department of Natural Resources is offering these courses:

- Nov. 3 – Lab 201, Milton
  - Nov. 10 – Microscopy, Chippewa Falls
  - Nov. 10 – Wastewater Treatment Systems Overview, Richland Center
  - Nov. 17 – Microscopy, Oconomowoc
  - Dec. 8 – Wastewater Treatment Systems Overview, Valders
- Visit [www.dnr.state.wi.us](http://www.dnr.state.wi.us).

The University of Wisconsin Department of Engineering-Professional Development has a Sanitary Sewer and Collection System Engineering seminar Dec. 6-8 in Madison. Visit [www.epdweb.engr.wisc.edu](http://www.epdweb.engr.wisc.edu). **tpo**

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

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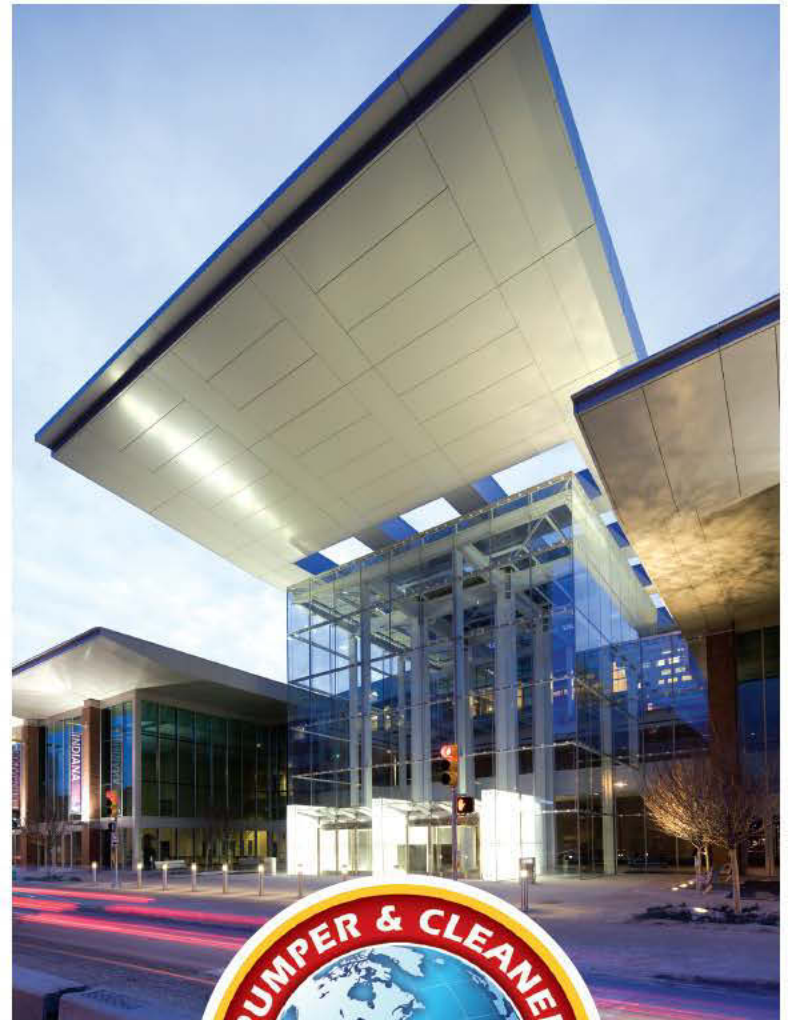
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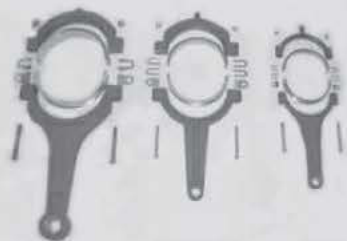
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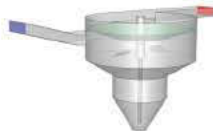


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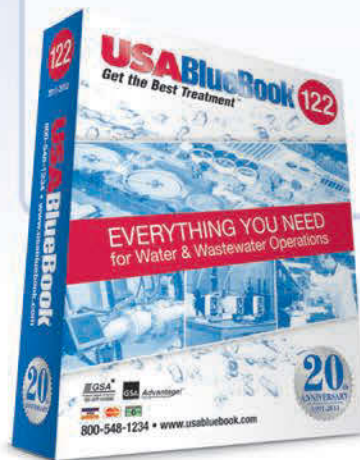
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