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AUGUST 2010

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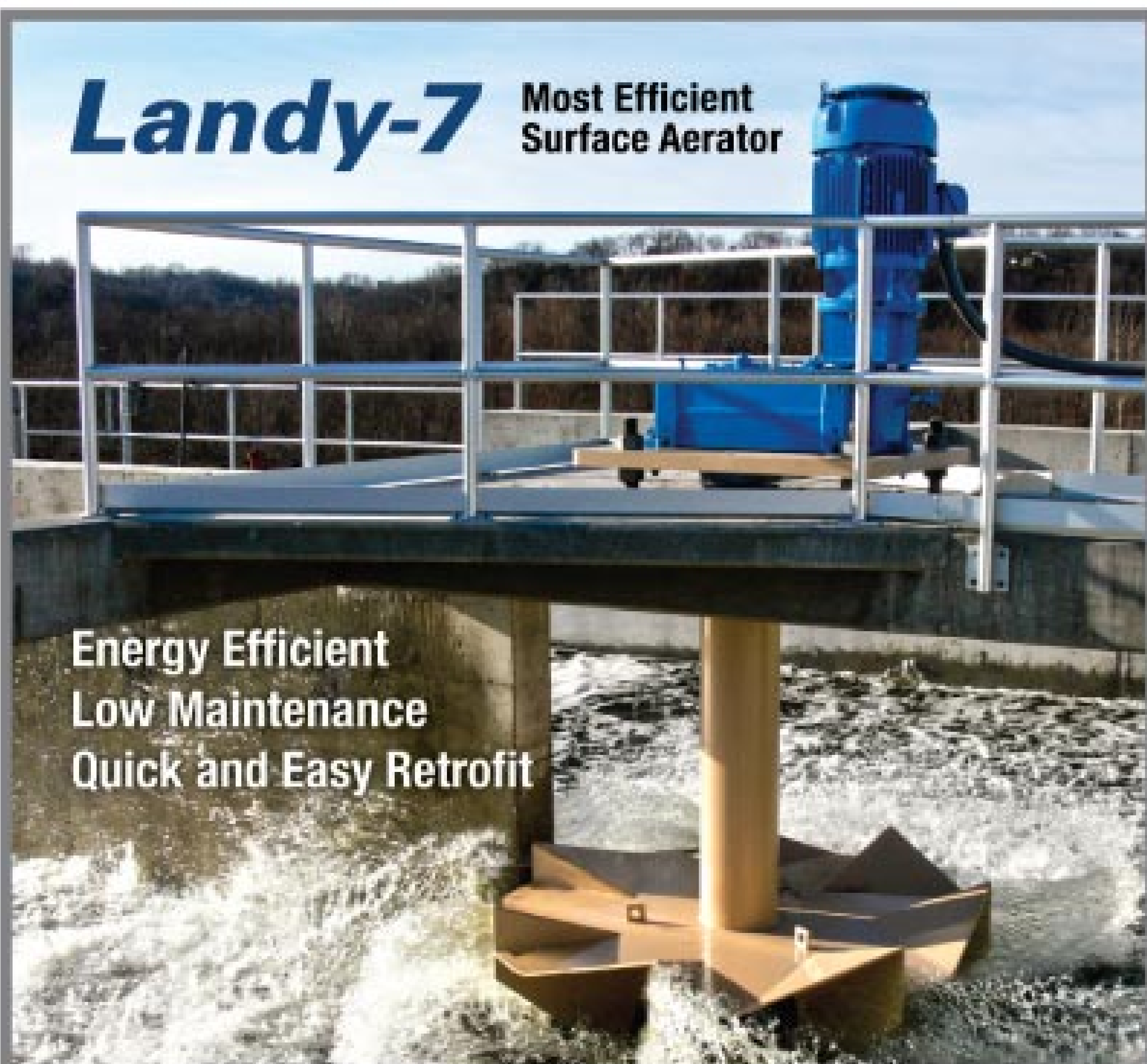
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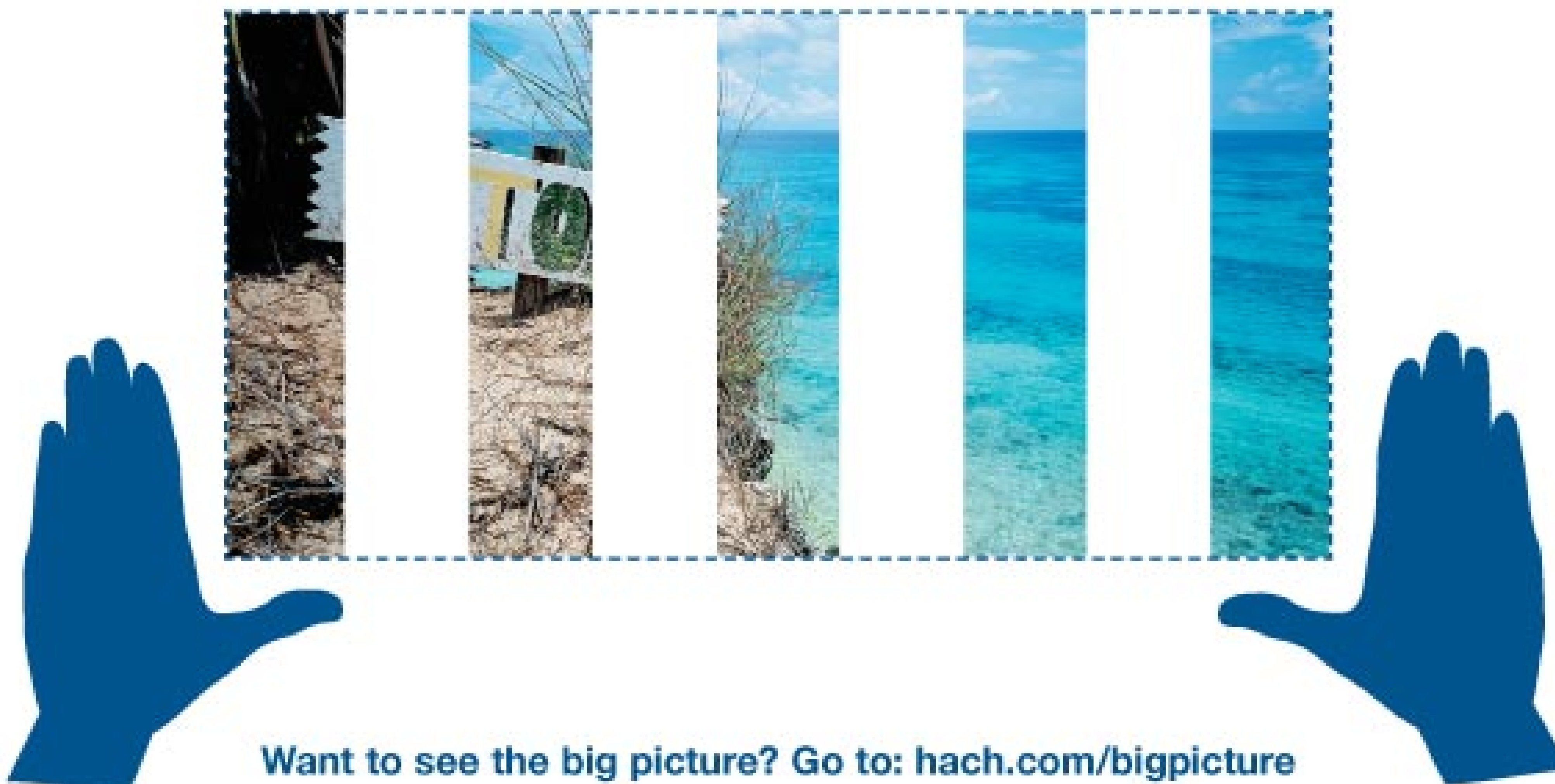
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on the cover

The San Antonio Water System uses both drying beds and belt filter presses to prepare biosolids for its composting process, operated by a contractor. Robert Yrle, (left) director of treatment operations, and Tad Eaton, Water Recycling Center manager, are shown at the outfall of the Dos Rios Water Recycling Center. (Photography by Catherine Dominguez)



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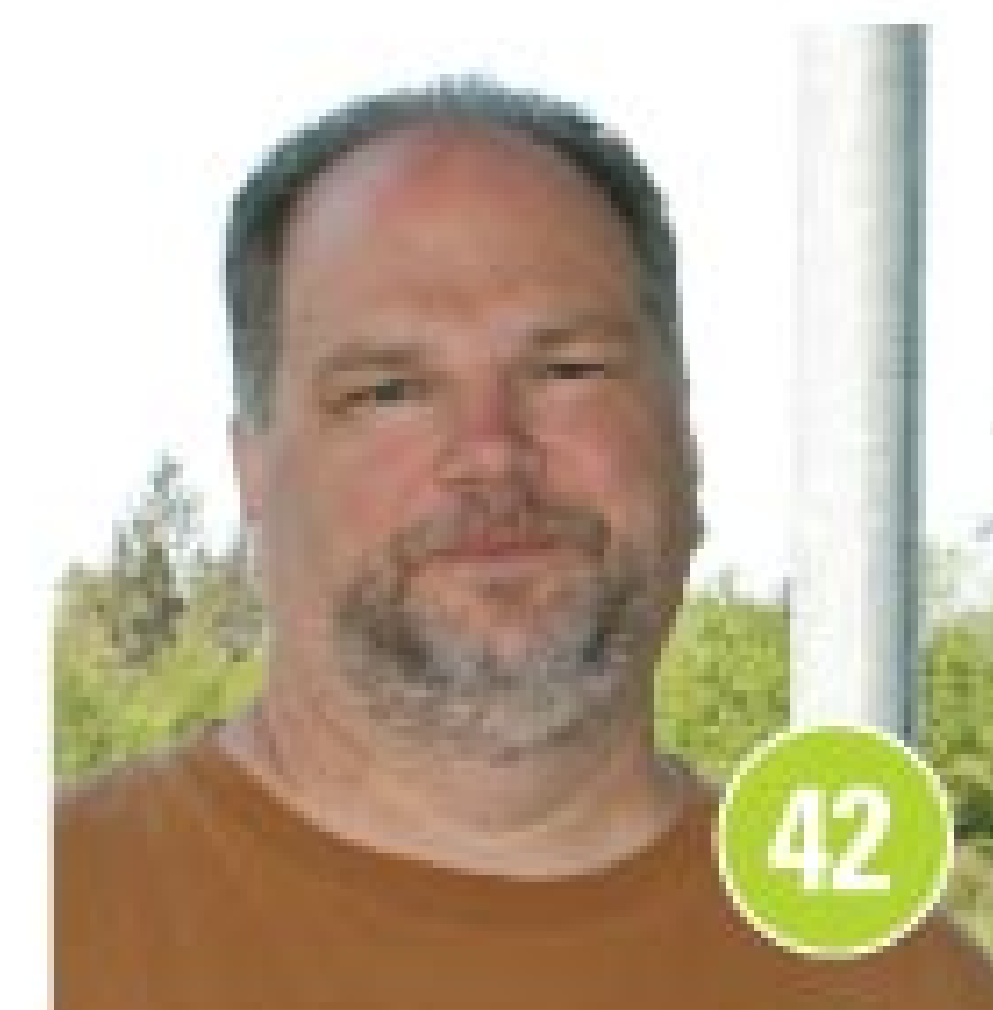
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let's be clear

Making a Statement

TREATMENT PLANT TEAMS DEMONSTRATE THAT PUBLIC EDUCATION DOESN'T HAVE TO BE EXPENSIVE OR TIME-CONSUMING. ALL IT TAKES IS A LITTLE OLD-FASHIONED INGENUITY.

By Ted J. Rulseh, Editor

Ask a team of treatment operators to fix an odor problem, improve a process, find ways to conserve energy, or get more from a piece of equipment, and the result just might amaze you. This magazine has been full of stories where operators solved problems faster and at far less cost than remedies cooked up by engineering firms.



But ask a group of operators for ways to engage the public in their clean-water mission, and that's a little bit tougher. The reasons are fairly obvious: Operators signed up to run mechanical, chemical and biological processes that protect waterways and comply with discharge permits — not to figure out how to teach Boy Scouts, school kids, and Rotarians about the importance of clean water.

And yet, public education is an important part of the job, if not for the front-line operators then certainly for the plant managers and superintendents. If you doubt it, consider that most state and regional industry associations have education committees.

Why is education important? Because the public (customers) pay the bills, and the more they think what happens at the treatment plant is wonderful, necessary, miraculous, the more they will support plant upgrades and improvements that cost them money.

Why is education important? Because the public (customers) pay the bills, and the more they think what happens at the treatment plant is wonderful, necessary, miraculous, the more they will support plant upgrades and improvements that cost them money.

HOW IT'S DONE

So, how do operators do it? In each issue of *TPO*, the "Hearts and Minds" column tells how someone does it. Sometimes we've profiled education centers run by larger agencies, to which smaller plants can only say, "Must be nice."

But in many or most cases, we tell about small plants' initiatives, from which facilities of almost any size could "borrow" without a lot of time or great expense. For example, in past issues, we've reported on:

- Troy Cassidy's Kids Science & Water Workshop at Haines City, Fla., designed to get kids ages 8 to 12 interested in clean-water professions.

Do you have an education program you'd like to share? It doesn't have to be big or fancy. In fact, if it's not, so much the better, because then more of your peers in the profession might be able to adapt it to their plants.

- The Wheels to Water program in King County, Wash., that buses in students in grades 4-12 for treatment plant tours. (King County's is a major urban operation, but the concept is pretty simple).
- Peter Hartz's rain garden/outdoor classroom at the Village of Johnson Creek (Wis.) treatment plant.
- Matt Meeks' educational DVD, G-rated (for grit, grime and grease), designed to introduce people of all ages to wastewater treatment, and produced on a shoe-string in Maize, Kan.
- The Clean Water Cadets program at the Southern Regional Wastewater Treatment Plant in Hollywood, Fla., that uses creative endeavors, including original plays, to encourage behaviors that protect the waters.
- The annual Open House and Reuse Rally in Delhi Charter Township, Mich., held as part of Water Quality Awareness Week.
- The 180-gallon aquarium, stocked with Atlantic salmon swimming in plant effluent, that greets visitors to the Bangor (Maine) treatment plant.

WHAT'S YOUR APPROACH?

Do you see anything in that list that you might duplicate? Or, more to the point, do you have an education program you'd like to share? It doesn't have to be big or fancy. In fact, if it's not, so much the better, because then more of your peers in the profession might be able to adapt it to their plants.

Tell us about what you're doing to get your publics — kids, potential employees, customers, teachers — on board with your mission through education. We'll report on your initiatives in future issues of *TPO*.

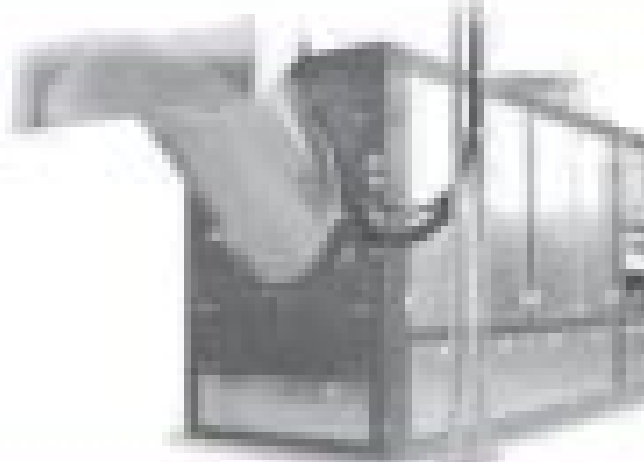
Just send me a note that briefly describes your program, and include a picture or two. All of us at *TPO* look forward to hearing from you. **tpo**

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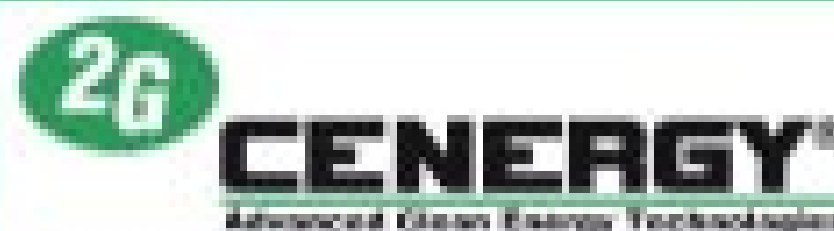
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'A Glass of History'

GO-GETTER JEFF KALMES VISITS NUMEROUS CLASSROOMS AND LEADS PLANT TOURS TO TEACH KIDS ABOUT THE VALUE OF WATER AND THE NEED TO PROTECT IT

By Diane Gow McDilda

If you want to catch up with Jeff Kalmes, you'd better lace up your running shoes — he's a man on the move.

In 1986, Kalmes hired on as a lab technician at the Billerica (Mass.) Wastewater Treatment Plant. Since then his responsibilities have expanded and, 17 years ago, he took on the education and outreach program. In 2009, the New England Water Environment Association took notice, presenting him with its Public Educator of the Year Award.

In the lab, Kalmes performs analyses during different stages of treatment at the 5 mgd plant. He also handles solids generated at the plant, including wasting, dewatering, primary pumping and transporting solids offsite.

When it comes to outreach and education, he visits local elementary schools, schedules and conducts plant tours, and in the fall hosts World Water Monitoring Day (WWMD) activities. Kalmes modifies his hours at the treatment plant when he's in educator mode. Colleagues fill in and an additional employee is hired to help cover his responsibilities.

Still, the outreach programs keep Kalmes busy. And because of them, children in Middlesex County know where their water comes from, where it goes and how to protect it.

REACHING OUT

To publicize the program, Kalmes reaches out to teachers through their mailboxes.

"When March comes around, I think it's that time of year again,"

says Kalmes. "There are six elementary schools in town, and I put letters in the teachers' mailboxes. Then they start calling and e-mailing. If you do a good job and are good with the kids, they call you back."

He must be doing something right: He visits 80 to 100 classes each season, April through June. Class presentations are geared to the grade level. All grades learn about the water cycle and conservation, but second graders also learn about groundwater, third graders surface water, and fourth graders wastewater and drinking water. Fifth graders get a combination of everything.

Kalmes keeps detailed notes, so he knows what ages he has presented to and what he has covered. That keeps him from repeating material and boring the students. He also makes sure the timing fits with the grade level: First and second grade talks last 30 minutes, and the rest 45 to 60 minutes, depending on how many questions kids ask.

He brings along poster displays, and the children watch videos. Fourth and fifth graders really get an added prize — wastewater from the treatment plant. Kalmes shows the students samples from the different stages of treatment, so they can see what actually happens.

"Most of the students will see the presentations every year, first through fifth, each with difference pieces," Kalmes says. "Every year, I explain that water is a puzzle, and this is another piece of the puzzle."

He emphasizes that water is nothing new: What we have now has been and will be around for generations. "I tell them that there's no such thing as new water," Kalmes says. "Every glass of water is a glass of history and a glass of geography."

SHOCK AND AWE

Kalmes encourages teachers to bring their students to the treatment plant. He coordinates tours to include the drinking water and



PHOTOS COURTESY OF JEFF KALMES

Billerica students participating in World Water Monitoring Day are shown in front of a local lake where they collected water samples.

What's Your Story?

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



Jeff Kalmes, Billerica wastewater educator, receives the New England Water Environment Association Public Educator of the Year Award for 2009 from Robert Cutone, then NEWEA president.

wastewater plants, scheduling about two hours for both. Last year, 30 classes made the trip. Besides visitors from elementary schools, classes from the University of Massachusetts Lowell, Harvard, Middlesex County Vocational and Technical Schools, home-school groups, and even Boy Scout troops came to the plants.

A lot of parents come along as chaperones, and Kalms sees that as a public relations opportunity. "I love seeing the parents' faces," Kalms says. "Some were born and raised here in town. All they know about water is that it comes from the faucet and goes down the drain.

"I ask the group questions about how much water they think they use in a day. They start with 10 gallons and are shocked that it's

"When March comes around, I think it's that time of year again. There are six elementary schools in town, and I put letters in the teachers' mailboxes. Then they start calling and e-mailing. If you do a good job and are good with the kids, they call you back."

JEFF KALMES

closer to 100 gallons. They think their water is expensive, but I compare it to the cost of bottled water. With the cost of bottled water at about \$8 a gallon, that's \$800 a day. Here, they're only charged five cents a gallon."

From the drinking water plant, it's on to the wastewater plant. "We call the wastewater treatment plant our shock and awe tour," says Kalms. "There are lots of different smells, and some kids are holding their noses. I explain that what we see and what we smell is part of the job. As we go through the plant, I ask them, what they smell now."

As the tour progresses, the students understand that the water is being cleaned, process by process. And the message sticks. Kalms

recently met a student at a vocational school who remembered the tour from when he was in elementary school 10 years before.

A WORLDWIDE EFFORT

The last two years, local engineering firm Woodard & Curran sponsored field trips for third graders to take part in World Water Monitoring Day, officially observed on Sept. 18 and sponsored by the Water Environment Federation and the International Water Association.

The students ride a bus to a local lake where Kalms collects a bucket-sized sample. It's divided up for four different stations where students use kits to measure temperature, pH, turbidity and dis-

solved oxygen. Then Kalms posts the data on the WWMD Web site (www.worldwatermonitoringday.org).

Back in the classroom, teachers can access the monitoring day online spreadsheets so students can see data from hundreds of towns, some from the other side of the globe. "We do emphasize that all over the world there are different bodies of water, and that kids are collecting samples from those bodies of water," Kalms says.

It's a telling experience that illustrates that a glass of water really is a glass of geography — and is well worth protecting. **tpm**

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Compliance at a Bargain

By Jim Force

STAFF INNOVATION HELPS A PENNSYLVANIA SANITARY AUTHORITY MEET STRICT CHESAPEAKE BAY NUTRIENT REQUIREMENTS AT FAR LOWER COST THAN CONSULTANTS PREDICTED



Members of the team at Wyoming Valley Sanitary Authority: From left, Chuck Zambito, maintenance supervisor; Joe Hines, electrical supervisor; Bernie Biga, director of operations; Jack Farrell, chief chemist; Barry Motsko, industrial pretreatment manager; and Gil Atherholt, road crew supervisor. (Photography by Linda A. Paul)

IF THE NITROGEN REDUCTION STANDARDS FOR THE CHESAPEAKE BAY WATERSHED ARE NOT MET in the next few years, it won't be the fault of the Wyoming Valley (Pa.) Sanitary Authority.

The agency's 32 mgd wastewater treatment plant near Wilkes-Barre is using staff-driven solutions to reduce effluent nutrients even more than the Chesapeake Bay strategy regulations mandate. And, contrary to previous predictions, it's not costing an arm and a leg.

"We're ahead of the game where the new Chesapeake Bay nitrogen and phosphorus caps are concerned," says director of operations Bernie Biga, a 34-year veteran of the wastewater treatment profession and winner of the 2010 Pennsylvania Water Environment Association Operator Research Award. "In fact, depending on what nitrogen trading arrangements are agreed upon, we're set up to generate some revenue from our reduction processes."

That's a big change from the position the plant was in a few years ago, when a consultant predicted that it could cost up to \$20 million to meet new nutrient caps. Using probe technology from the Hach Co. among other low-cost modifications and improvements, Biga and his team are achieving nitrogen reductions of nearly 74 percent through the plant and falling more than 40 percent under their Chesapeake Bay cap.

Influent brings about 2.1 million pounds of nitrogen to the plant each year, and only 340,000 pounds



Water leaves the final clarifier at the Wyoming Valley treatment plant.

of it ends up in the receiving stream, the Susquehanna River. Effluent phosphorus is considerably below the cap, as well.

MULTIPLE COMMUNITIES

The Wyoming Valley treatment plant is a regional facility, serving industries and residents in metropolitan Wilkes-Barre and 34 other service communities across a 200-square-mile area in northeast Pennsylvania.

The original primary plant, now used for combined sewer overflow treatment, dates to 1969. An expansion in 1988 added secondary treatment designed for biological nutrient control, as well as biosolids treatment.

Flow originates from a sprawling sewer system containing 60 pumping stations. Where lines remain combined, the stations have diversion cham-

"We're ahead of the game where the new Chesapeake Bay nitrogen and phosphorus caps are concerned. In fact, depending on what nitrogen trading arrangements are agreed upon, we're set up to generate some revenue from our reduction processes."

BERNIE BIGA

profile

Wyoming Valley (Pa.) Sanitary Authority Wastewater Treatment Plant

BUILT:	1969, upgraded 1988
POPULATION SERVED:	250,000
FLOWS:	32 mgd design, 50 mgd wet weather
RECEIVING STREAM:	Susquehanna River
TREATMENT LEVEL:	Advanced secondary
TREATMENT PROCESS:	Activated sludge, biological nutrient reduction
BIOSOLIDS:	Centrifuge dewatering, incineration, ash lagoons, ash to landfill
LEADERSHIP:	Bernie Biga, director of operations; Chuck Zambito, maintenance supervisor; Joe Hines, electrical supervisor; Barry Motsko, industrial pretreatment manager; Steve Zannetti and Bill Roughsedge, operations supervisors; Jack Farrell, chief chemist; Gil Atherholt, road crew supervisor
EMPLOYEES:	121
ANNUAL BUDGET:	\$19 million (operations)
WEB SITE:	www.wvsa.org



Chuck Zambito, maintenance supervisor (left) and Joe Hines, electrical supervisor, discuss the operating pressure of the Sharples (Alfa Laval) centrifuge.

bers to send a portion of the flow into interceptor sewers that lead to the plant. Average flow is around 25 mgd, wet-weather design flow is 50 mgd, and CSO conditions can push flows beyond 100 mgd at times.

During normal flow, wastewater passes through fine screens and is lifted by pumps some 35 feet to the headworks, which include grit and scum removal units. The flow moves on to a Parshall flume and then to four activated sludge treatment trains.

The plant uses Schreiber low-load counter current extended aeration technology. Air is supplied by rotary lobe blowers to suspended fine-bubble membrane diffusers through single and double rotating bridge structures.

All four trains contain two 185-foot-diameter, 16-foot-deep aeration basins with capacity just over 5.5 million gallons; and a 1.44-million-gallon anoxic zone for denitrification. When installed, it was the largest Schreiber installation of its type in the world. After biological treatment, the water enters the final clarifiers and chlorine disinfection before discharge.

BETTER NUTRIENT REMOVAL

Pumps move waste biosolids to a Sharples (Alfa Laval) centrifuge for dewatering. A fluid bed furnace incinerates the cake. On-site lagoons receive the incinerator ash as a slurry. The lagoons are cleaned out once a year and the removed ash is landfilled.

The Wyoming Valley operation was designed for biological nutrient removal from the start, but the nitrification and denitrification processes have seen their share of difficulties. The original oxygen minimizers, installed to control aeration cycling by turning blowers on and off, did not function as designed. They had inherent problems that led to plant upsets and were abandoned shortly after startup of the secondary upgrade.

“In the meantime,” notes Biga, “we were getting good nitrogen removal with high mean cell residence time and high mixed liquor suspended solids concentrations, but nitrification was limited by the capacity of the aeration system because of leaks in the air lines.”

At about that time, the \$20 million plant upgrade proposal emerged. It included extensive re-piping and new pump stations to accommodate nitrate recycle streams, along with two large denitrification filters and an expensive chemical addition system.

Rejecting such a costly fix, Biga and his operations team tried other remedies. An initial attempt to cycle the blowers with timers failed because the rubber gaskets in the air lines deteriorated. Water filled the lines when the air was turned off and then shorted out the collector rings in the center of each rotating bridge when the air was turned on. They couldn’t be repaired because of their position in the system.

To remedy the situation, the team abandoned the air lines under the reactors and replaced them with ducts along the floors of the tanks. This eliminated the air leakage, but even then, while Biga’s team was achieving reductions in total effluent nitrogen, the aeration on-off sequence was arbitrary, and they were not getting complete nitrification-denitrification.

PROBING FOR A SOLUTION

In December 2008, a pilot unit tested ammonia and nitrate probes supplied by Hach. Air supply was based on the range of ammonia and nitrate concentrations detected by the probes. Results were excellent.

“The Hach probes are very accurate,” says Biga. The company originally established on-off signals at set-points between 4 and 2 mg/l of ammonia, but the staff later found the “sweet spot” to be lower.

“On two trains, we’ve set the air to come on at 0.96 mg/l and turn off at 0.72 mg/l,” says Biga. “On the other two trains, the range is between 1.06 and 0.82 mg/l. We

Wyoming Valley (Pa.) Sanitary Authority Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
CBOD (monthly avg.)	173 mg/l	4 mg/l	25 mg/l
TSS (monthly avg.)	179 mg/l	5 mg/l	30 mg/l
Nitrogen load	N/A	330,089 lb/compliance yr	584,467 lb/compliance yr (yearly cap, beginning 10/1/10)
Phosphorus load	N/A	35.5 lb/compliance yr	78 lb/compliance yr (yearly cap, beginning 10/1/10)

CHESAPEAKE BAY NUTRIENT LIMITS

In 1983, the states and the federal government signed an agreement to restore the Chesapeake Bay. At an average depth of 21 feet, the bay suffers from algae growth that blocks sunlight, kills seabed grasses and creates oxygen-depleted zones.

The sheer size of the watershed is an issue: It covers 64,000 square miles, includes more than 400 municipal wastewater treatment plants in six states and the District of Columbia, and is home to 17 million people.

The U.S. EPA and its governmental partners are pursuing a new plan to establish Total Maximum Daily Load (TMDL) pollution caps for nitrogen, phosphorus and sediment that flow into the bay. State and local governments are now allocating funds and upgrading treatment plants to meet the limits.

Cost is a concern. One study put Pennsylvania’s cost of improving 184 treatment plants in the bay watershed at \$1.4 billion. The state has committed \$1.2 billion for water infrastructure, including money for dams, flood control, wastewater treatment and other projects.

Bernie Biga,
director of
operations.



"The Hach probes signal our PLC system, letting us sequence the blowers so they don't all start at the same time. That reduces load."

JOE HINES

Jack Farrell, chief chemist (left) and Rich Crane, electronics technician, calibrate the Hach sc1000 controller.



Rich Crane, electronics technician, observes the operation of equipment controlled by Allen Bradley Panel View PLC.

calibrate the system once a week, and it's certainly worth it. The effluent numbers are so good, they're almost unbelievable. We confirm them by using an outside lab in addition to our own lab."

The numbers now show that the Wyoming Valley plant is reducing total nitrogen dramatically, to about 340,000 pounds annually, versus a total nitrogen cap of about 584,000 pounds per compliance year beginning this coming October.

If it sustains the current level of treatment, the plant will have more than 200,000 pounds of total nitrogen credits to trade for cash, assuming new nutrient trading laws for point sources are adopted in the near future.

That could make the plant's nutrient-control efforts even more cost-effective than they are now. So far, Biga reports, costs to limit nutrient discharges have run in the hundreds of thousands of dollars — not the millions. Nonetheless, the plant has prepared a contingency plan in case nutrient reduction becomes more stringent in the years beyond 2011.

Those revisions are estimated to cost around \$7 million — still far below the \$20 million estimated earlier. And they could run even less if delivery rations (DRs) are used to establish nitrogen and phosphorus caps that are actually higher than now anticipated. "In fact," says Biga, "if that happens, I could see that \$7 million drop to a much lower number."

In other words, Wyoming Valley is prepared to meet its nutrient reduction mandates at no more than a third of the originally forecast costs, not counting any income from potential nutrient trading credits.

AN ENERGY BOOST

Changes to the plant's treatment configuration have netted more than nutrient reductions: There's an energy payoff, too. Biga says the plant is seeing decreases of 30 to 40 percent in energy consumption, worth about

\$300,000 annually, electrical supervisor Joe Hines estimates.

"The Hach probes signal our PLC system (Allen Bradley, a Division of Rockwell Automation), letting us sequence the blowers so they don't all start at the same time. That reduces load," Hines says. The plant is also configured so that certain processes can run off emergency power during peak loads that can produce brownout or blackout conditions in the heavily populated area. By shedding load in this way, the plant can actually be reimbursed by the utility.

The improvements don't stop here. The sanitary authority already has an aggressive grease trap inspection program, but Biga's staff continues to work toward better grease control in the plant headworks.

A plow suspended from a traveling bridge now pushes the grease from one end of the rectangular grease chamber to the other. Then the grease, along with trapped water, is pushed over a beaching plate into dump containers. "It's an O&M nightmare, needing operator attention and frequent maintenance," Biga says.

The authority is looking at an air conveyance system that uses a series of nozzles to push the grease along the water line into a hopper, where a screw conveyor would dewater the grease and discharge it into dump containers.

Other headworks improvements have included replacement of aging enclosed screws with new dry-pit submersible pumps. "We're also replacing old hydraulic cone valves," says Chuck Zambito, maintenance supervisor. "We can't get parts, and they require us to have a pressure vessel inspection." The units are being phased out and replaced with pressure-controlled duck-bill check valves from Red Valve Co. Inc.

The staff is also contemplating improvements in solids handling. "Our fluid bed furnace is nearing the end of its useful life," Biga says. They're also planning to convert the solids dewatering centrifuge to direct drive to eliminate problematic fluid couplings.

Even more changes could be coming. Biga observes that shale deposits in the Wilkes-Barre area have potential to produce enormous quantities of natural gas as the United States seeks local fuel sources. He suggests that plant effluent could be used for hydrofracturing and then be re-treated for reuse in a zero-discharge process.

"We're always looking to the future, as best we can," he says. **tpu**

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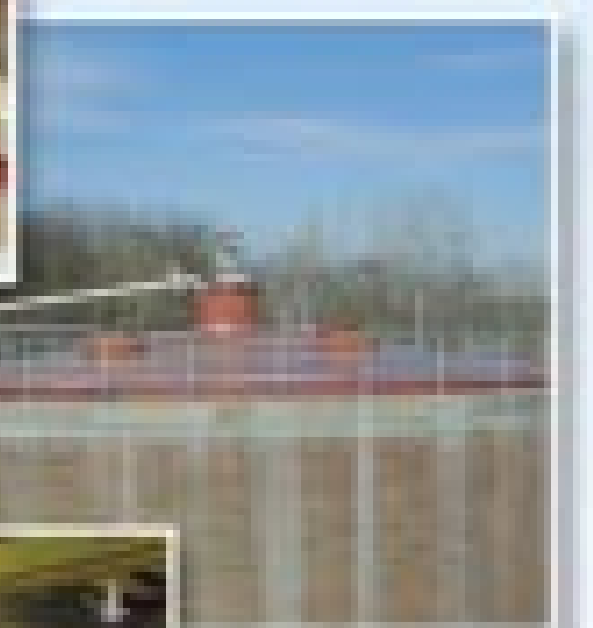
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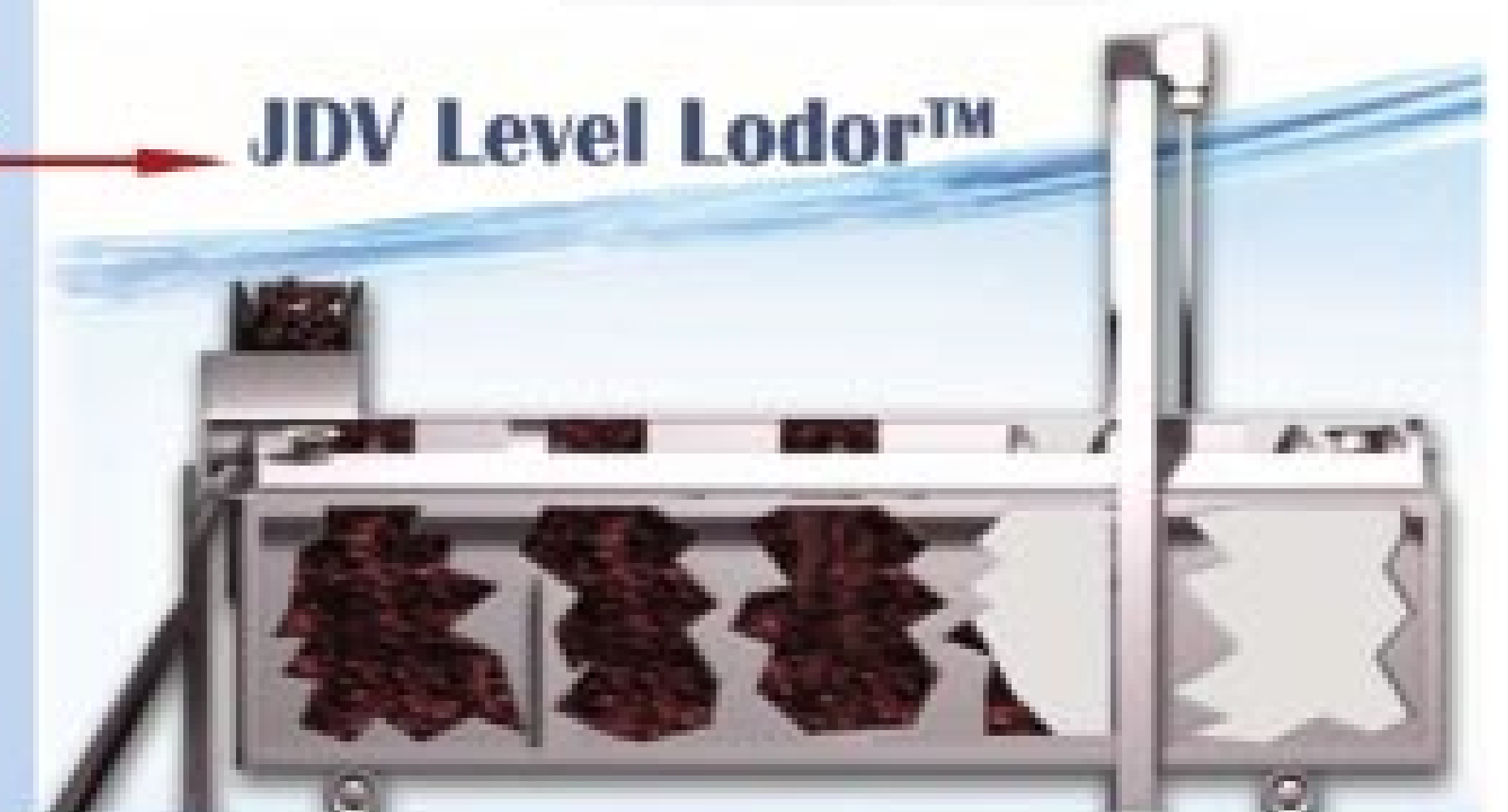


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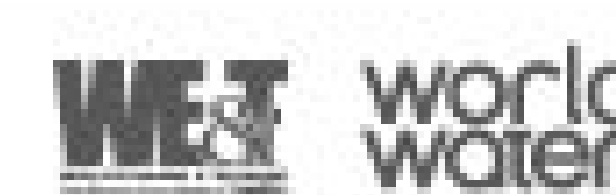
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Living in the Present

AN ARKANSAS CLEAN-WATER PLANT USES ONLINE WATER-QUALITY INSTRUMENTATION TO GET REAL-TIME VISIBILITY TO PLANT PROCESSES AND MAKE TIMELY ADJUSTMENTS

By Bob Dabkowski

The Rogers (Ark.) Pollution Control Facility has seen reduced process variability and energy and labor savings by operating in real time with online water-quality instrumentation.

Robert Moore, operations manager, began the quest in 1996 with online dissolved oxygen sensors for aeration control. Over the years, they added measurements to control alum dosing, blanket levels in the secondary clarifiers, and mixed liquor suspended solids concentration. They have also used secondary measurements to verify the control measurements.

Transparency from the real-time data allows the staff to respond to changing conditions quickly and correctly, ensuring compliance with a permit that includes a 1.0 mg/l total phosphorus limit.

BIOLOGICAL REMOVAL

The Rogers facility, in northwest Arkansas, is part of the Illinois River watershed. Point sources in the watershed from Arkansas to Oklahoma agreed to limit phosphorus in their effluent to protect the scenic river, and the Arkansas Department of Environmental Quality later added permit limits for phosphorus. The facility serves 50,000 people with an average flow of 7.5 mgd.

To remove phosphorus biologically, the Rogers plant uses three parallel trains of a Five-Stage Bardenpho system, which consists of an anaerobic zone, a first anoxic zone, an oxidation ditch for the aerobic zone, a second anoxic zone, and then an aeration zone.

The water then flows into circular secondary clarifiers and is polished by tertiary mixed-media filters before chlorine disinfection. In addition to its phosphorus limit, the plant must meet CBOD and TSS limits of 15 mg/l and a seasonal ammonia limit from 1.5 to 3.0 mg/l. To achieve these limits and operate in real time, the staff installed several DO, suspended solids, pH and ORP sensors, plus three phosphate and ammonia analyzers (all Hach Co.).



The Rogers (Ark.) Pollution Control Facility, in northwest Arkansas, helps protect the Illinois River watershed.

COMPLIANCE AND SAVINGS

In 1996, the plant installed polarographic membrane-based DO sensors in the oxidation ditch to control the DO level automatically. Until then, three shifts of operators were taking DO measurements every two hours and manually adjusting the water level and speed of the aerators. "The online DO sensors allowed for better control and removed the labor intensive manual measurements," Moore says.



PHOTOS COURTESY OF GREG WILSON AT HACH CO.

Plant operator Armando Garcia checks reagent levels inside the instrument panel.

In 2003, the staff replaced aging membrane-based DO sensors with optical luminescent dissolved oxygen (LDO) sensors. "This new technology allowed for more precise measurement and faster response to changes in the actual DO concentration," notes Moore.

The facility improved its control plan again by monitoring the oxygen demand between two sensors and using those values to set the speed and depth of the aerator blade. Comparing the energy consumption before and after that change became difficult due to an electric rate change and a plant upgrade, but Moore estimated an additional 15 percent energy savings. Two trains now have four sensors installed (two per aerator), and the third train is offline. Four more sensors will be added in the third train as increasing flow necessitates.

In 2002, the staff saw a pending effluent phosphorus limit and decided to meet the limit before it became a regulation. "The system was working well removing phosphorus biologically, but there were times when a chemical polish became necessary," says Moore.

To capture these incidents in real time, the staff installed a phosphate analyzer after the oxidation ditch to alarm and control the alum feed pump if the concentration rose above 0.8 mg/l PO₄-P. This allows enough time for the alum to precipitate the orthophosphate. The larger flocs settle out in the secondary clarifier, and the

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Armando Garcia verifies instrumentation values.

an environmental indicator and as a control measurement. In the anaerobic zone, Moore and his staff aim for an ORP measurement between -300 and -350 mV by controlling the mixers. This allows additional fermentation of the incoming wastewater, increasing the concentration of volatile fatty acids that the polyphosphate-accumulating organisms (PAOs) consume in an anaerobic environment.

The ORP also acts as an indicator of nitrate or dissolved oxygen entering the cell, either of which could inhibit the PAOs from releasing intracellular phosphate. "This ensures that we don't lose or inhibit biological phosphorus removal," says Moore. "Without ORP we wouldn't know how anaerobic that selector is."

In the anoxic zone, the target is -200 to -125 mV. It is controlled through a combination of the wastewater coming from the anaerobic zone and the internal mixed liquor recycle. "Even though we don't need to denitrify to meet our permit, the alkalinity and oxygen that come from denitrification make our system run better," Moore says.

Lastly, ORP sensors installed in the oxidation ditch verify the LDO sensor measurements and allow the staff to keep a very low DO concentration in the effluent of the ditch, ensuring anoxic conditions in the first and second anoxic zones.

Suspended solids sensors are installed in the mixed liquor and return activated sludge to manage solids inventory in real time. The staff has MLSS targets of 2,200 to 2,400 mg/l in summer and 3,500 to 3,800 mg/l in winter. "When we only measured TSS in the lab with grab samples, we would have once-a-week snapshots of the mixed liquor



Operations manager Robert Moore monitors instrumentation data on the plant's control system.

"We used to spend about 27 hours per week manually taking process control measurements, and now we spend less than eight hours per week maintaining the instrumentation. Trading 27 hours a week for eight hours a week was a smart decision."

ROBERT MOORE

that could vary quite a bit," says Moore. "With the suspended solids sensors, we have eliminated that variability, and we have a much more realistic picture of what is happening in the mixed liquor in real time."

SIMPLE MAINTENANCE

Maintenance of the sensor systems has been simple. "We used to spend about 27 hours per week manually taking process control measurements, and now we spend less than eight hours per week maintaining the instrumentation," Moore says. "Trading 27 hours a week for eight hours a week was a smart decision."

Always looking ahead, Moore and his staff see tightening of the phosphorus limits to 0.1 mg/l and total nitrogen limits being added to the permit in five years. To meet those limits, they are already investigating more instrumentation and control options. "The instrumentation has allowed us to see things developing in real time so we can make control changes," Moore says. "As our permit changes, we'll be able to change with it." **tpo**

finer particles are removed in the mixed-media filter. While the effluent limit is 1.0 mg/l, the facility aims to maintain a 0.5 mg/l total phosphorus concentration. "With alum costs rising more than 150 percent last year, controlling the dose is critical to managing costs," says Moore. "The Hach PHOSPHAX allows us to feed the exact amount we need to meet our goals — economic and compliance."

Another cost-saving measure was installation of Hach SONATAX sludge blanket level monitors in the secondary clarifiers. Moore and his staff now have a real-time view of the secondary sludge blanket, allowing them to keep the blanket below levels that would cause a secondary release of orthophosphate, and to watch for upsets during wet-weather events.

"Before these sludge-level monitors were installed, we would manually take core samples once a shift, three times a day," says Moore. "Now we only take core samples once a month to verify the online sludge level monitors." This further reduced labor costs and allowed the staff to focus on optimizing the process to meet tightening regulations.

REAL-TIME TRANSPARENCY

Other measurements the staff has found helpful include ammonia, ORP, and suspended solids in the mixed liquor and return activated sludge. The ammonia analyzers measure the mixed liquor and ensure that nitrification is complete. "With an ammonia limit of 1.5 mg/l, you don't have the luxury of incomplete nitrification, and the Hach AMTAX allows us to see small changes quickly," Moore says.

ORP is used in the biological nutrient removal (BNR) process as

ABOUT THE AUTHOR

Bob Dabkowski is a wastewater specialist for Hach Company, a licensed Colorado wastewater operator, and author of several papers, articles and application notes on wastewater treatment. He can be reached at 970/663-1377, Ext. 2191, or BDabkows@hach.com.

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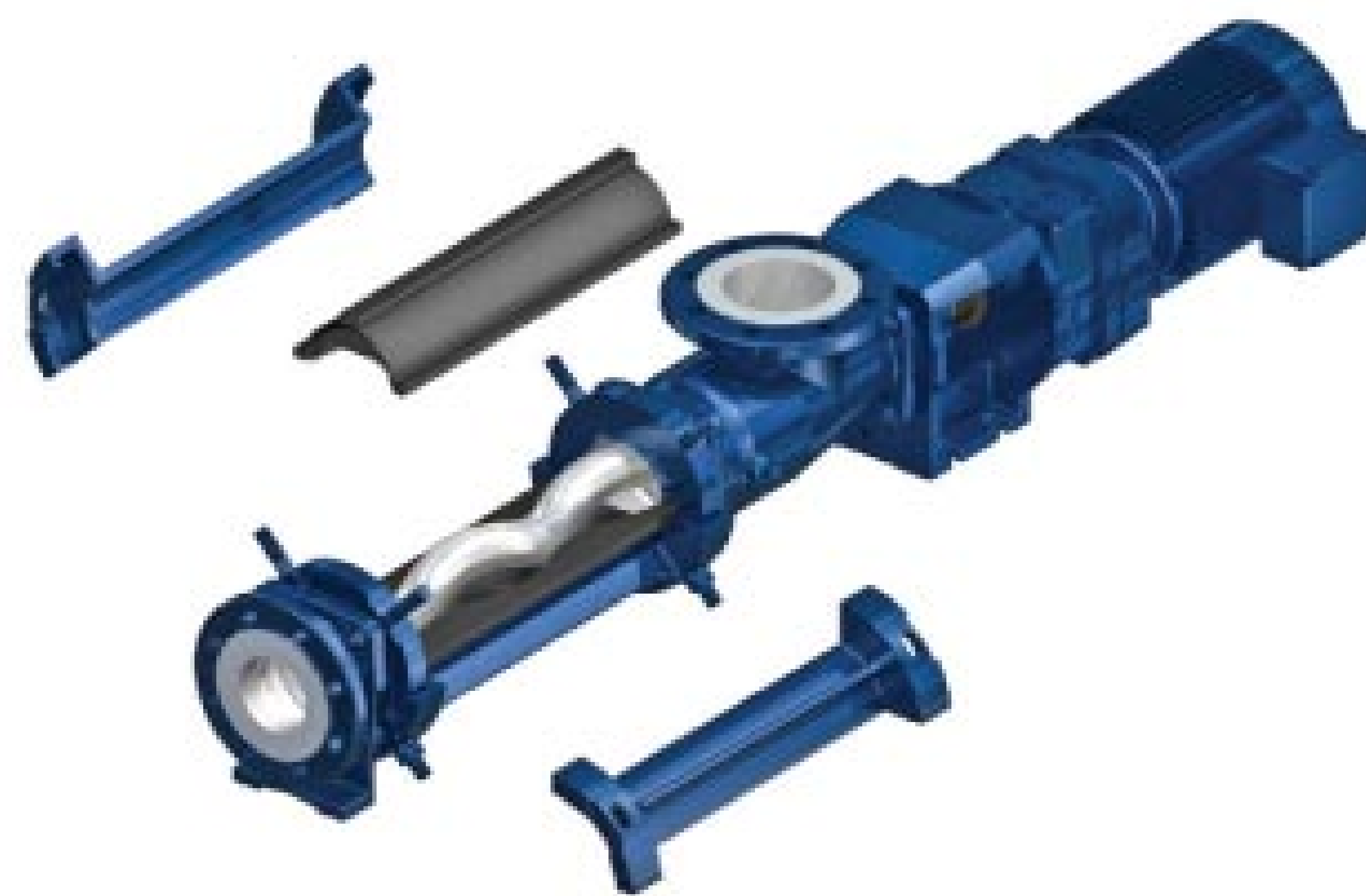
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"There is minimal cost for labor and electricity. And the end result is a product that is 80 to 85 percent solids. You can't get that off a belt filter press or a centrifuge."

TAD EATON

Best of *Two Worlds*

THE SAN ANTONIO WATER SYSTEM APPLIES BELT FILTER PRESSES AND SAND DRYING BEDS TO PREPARE BIOSOLIDS FOR ITS CONTRACTED COMPOSTING PROCESS

By Diane Gow McDilda

THE MANAGERS OF SAN ANTONIO'S WATER RECYCLING OPERATIONS BELIEVE IN WORKING

with nature. Today, the city's three recycling plants use the sun's warmth as a major part of their strategy for drying biosolids.

Drying beds covering some 25 acres work in concert with belt filter presses to produce dewatered material for contracted composting operations. All told, the San Antonio Water System's three water recycling plants produce 37,000 dry tons of biosolids per year.

The staff of the SAWS centralized biosolids processing facility at the Dos Rios Water Recycling Center (WRC) focuses on optimizing both drying processes. That includes deploying natural predators for vector control on and around the drying beds.

An experienced staff keeps the biosolids facility running smoothly. It's all part of a management program that is increasing beneficial use of both biosolids and the methane gas from the anaerobic digesters.

COMBINING FLOWS

The Dos Rios WRC (design flow 125 mgd) receives combined biosolids from the Medio Creek WRC (16 mgd) and the Leon Creek WRC (46 mgd). Dos Rios and Leon Creek are conventional activated sludge facilities, while Medio Creek uses extended aeration.

Tad Eaton, WRC manager, previously worked at the utility's compost facility. When management decided to contract for composting operations,

Eaton moved upstream and began working to improve operations of the drying beds and other biosolids processes.

Solids arriving at Dos Rios are blended, thickened and digested before being dewatered. "The weather in San Antonio is conducive to drying beds, but it's also unpredictable," says Robert Yrle, director of treatment operations for San Antonio Water System (SAWS), the umbrella organization for wastewater and biosolids management. "We handle 400 wet tons of solids a day. Because of the high volume we have to balance both methods."

Dos Rios handles two types of solids. Combined waste activated sludge (WAS) from all three facilities is first treated using a diffused air floatation thickener (Eimco Water Technologies). First-stage activated sludge from Dos Rios goes through one of two Ashbrook Simon-Hartley gravity belt thickeners. (Within the year, the diffused air floatation thickeners will be taken out of service and replaced with two more gravity belt thickeners.)

USING THE METHANE

After thickening, the two streams are combined at 4.7 percent solids. From the blend tank, they are run through strain presses (Parkson Corporation) where solids are augered through a fine mesh screen, removing foreign



San Antonio Water System drying bed specialists (left to right) include utility operators Manuel Olivarez III, Manuel Anthony, Dwayne Isbell, Macario Vasquez, and Richard Lugo. (Photography by Catherine Dominguez)

LOWER PHOTO: The return activated sludge (RAS) pump station at the Medio Creek Water Recycling Center. Each of the five Gorman-Rupp pumps is capable of delivering 1,300 gpm. RIGHT PHOTO: Belt filter press specialist Joe Villanueva takes samples for testing at the Dos Rios Water Recycling Center.



materials like hair and grass, which are detrimental to the digestion process and associated equipment. The material then goes to one of eight 2.2-million-gallon anaerobic digesters.

A portion of the digester gas (methane) is used to fire boilers that heat the digesters. During fall and winter, about 20 percent of total methane production goes to the boiler, and in summer, 10 to 15 percent. Excess methane is flared. A project is now underway to transport methane to a retail distribution pipeline.

Solids remain in the digesters for 25 days and would stay longer if Eaton had his way. "Longer means more gas produced and more volatiles destroyed," he says. From the digesters, the material is pumped to one of two holding tanks. Depending on the weather, solids are sent to the drying beds or belt filter presses.

APPLYING EXPERIENCE

"The plant was designed to use drying beds exclusively, but there were operational issues, so 20 years ago the belt filter press was added," Yrle says. "Through the years, the two processes worked in tandem. Then about 10 or 12 years ago, we decided to focus on improving the efficiency of both. With our expertise and our employees' experience, we use both to our advantage."

CREATING AN ATTRACTION

It's no wonder that San Antonio's Dos Rios Water Recycling Center has received several awards. In 2003, the facility was named Treatment Plant of the Year by the Water Environment Association of Texas, and in 2004 it earned the Clean Water Act Recognition Award from the U.S. EPA. Then in 2008, the plant earned the Operations Award for Biosolids Management given by the National Association of Clean Water Agencies.

But there have been successes not recognized with formal awards. For example, it is likely that wastewater effluent quality was a contributing factor in attracting companies like Toyota and Microsoft to locate in San Antonio. The city's water recycling plan includes the distribution of 30 mgd of reclaimed water to commercial and industrial users.

"When the Toyota team visited from Japan, they would come over, take samples and review our logs," says Robert Yrle, director of treatment operations for San Antonio Water System (SAWS). "Ultimately, they were satisfied that we could provide consistently high-quality recycled water." Today, Toyota uses a million gallons of recycled water per day as process water in its San Antonio operations.

The facility operates a dozen 2.2-meter Winklepress filter presses (Ashbrook Simon-Hartley) that produce material at approximately 20 percent solids. Solids not destined for the belt filter press are distributed to one of the 132 drying beds next to the biosolids processing area. While those beds encompass 25 acres, they are less of an imposition than one might think, considering that the Dos Rios WRC spans 700 acres.

"There is minimal cost in labor and electricity," says Eaton. "And the end result is a product that's 80 to 85 percent solids. We can't get that off the belt filter press or a centrifuge."

Solids from the storage tank are pumped to the beds through an underground manifold piping network. Each bed has its own controls and must be manually opened and closed. The beds are 84 by 100 feet and are poured to a depth of 10 to 18 inches, depending on the time of year (shallower in fall and winter, deeper in spring and summer). There are 12 rows of 11 beds.

Filtrate from the beds passes through an underdrain system with a 12-inch top layer of fine aggregate mix and a 12-inch bottom layer of coarse aggregate. Perforated 6-inch pipes collect the filtrate and allow it to drain through 8-inch collection lines to pump stations, which return the filtrate to the Dos Rios plant headworks.

The biosolids are not turned in the drying beds. When the material reaches about 80 percent solids, an operator uses a Bobcat compact track loader to remove the dried biosolids from the beds. "The time spent in the bed varies, but there are some extremes," says Eaton. "I've seen them pulling off dry solids in seven days when we've had temperatures in the 100s. The other extreme was the last six months when we had our highest rainfall in San Antonio for years. We poured in October and didn't clean out until February. On average, it's about 15 to 20 days."

COMPOSTING OPERATIONS

Biosolids from both the filter presses and the drying beds are stockpiled for no longer than three days. Material is removed during work hours Monday through Friday and as needed on Saturday. Composting contractors haul the material.

San Antonio used to operate its own composting facility at the Leon Creek WRC, but in 2001 the agency contracted with Texas Disposal Systems Garden-Ville to operate the facility. Since 2008, SAWS has also contracted with New Earth Soils and Compost, which operates its own composting facility 22 miles away. Both companies sell various mixes of commercial compost.

"Basically, we made some really good compost, but we didn't market it very well," says Eaton. "Both Garden-Ville and New Earth are really good at marketing. And because of that, they're better at

Belt filter press specialists Kevin O'Brien (left) and Henry Salazar monitor the control panel at the Dos Rios plant.



EXPERT OPERATORS

The Dos Rios Water Recycling Center, site of the San Antonio Water System biosolids processing facility, relies on expert operators who know their equipment. Even though each operator has specialties, there is regular cross-training. Robert Yrle, director of treatment operations, compares it to a sports team: "It builds bench strength."

Belt filter press specialists are water recycling technicians Kevin O'Brien, Henry Salazar, Al Morin and Joe Villanueva. Drying bed specialists are utility operators Richard Lugo, Manuel Olivarez III, Dwayne Isbell, Manuel Anthony and Macario Vasquez.

selling, they get better prices, and their operations are more cost-effective."

Long-term contracts stabilize the process. San Antonio is required to provide material at 18 percent solids from the belt filter press and 50 to 95 percent solids from the drying beds. The expectation is that 70 percent of the solids will come from the belt filter press.

At the composting facilities, the biosolids are mixed with local wood chips and formed into windrows, where they are turned and allowed to cure. Wood chips come from the City of San Antonio, nearby military bases, City Public Service Energy, the local electric utility, and various other commercial landscaping and tree trimming sources.

Even with cost-effective composting, a portion of solids always needs to be landfilled. "Our goal for biosolids was for 80 percent to go to beneficial use," says Eaton. "Last year, 98 percent was beneficially used, and 2 percent did go to the landfill. And it always pays to have multiple avenues of disposal."

Eaton sees composting as a budding business. "We feel there will be even more players in the composting business because the business is growing and retail markets are expanding," he says. "In 2009, between the two compost contracts, 300,000 cubic yards of compost was produced and 500,000 cubic yards of carbon material was used."

MANAGING VECTORS

In operating sand drying beds, it helps that the facility is on 700 rural acres. As people move closer, there could be more challenges, but Yrle and Eaton feel up to the task. "We'll always have a



LEFT PHOTO: Robert Yrle (left), director of treatment operations, and Tad Eaton, Water Recycling Center manager, stand near one of dozens of drying beds at the Dos Rios plant. LOWER PHOTO: The water system operates two Ashbrook gravity belt thickeners that are replacing 10 diffused air floatation thickeners.



"Originally, the plant was designed to use drying beds exclusively, but they were having a hard time, so 20 years ago the belt filter press was added. Through the years, they worked in tandem, and then about 10 or 12 years ago, we started concentrating on improving the efficiency of both."

ROBERT YRLE

challenge with public perception," Yrle says. "It's the nature of the business. If it happens, we will overcome it and find a solution. We've worked together for 20 years, and we've resolved many issues to the satisfaction of the public."

One issue with potential to flare public opinion is insects around the drying beds. To head off problems, Eaton started a program at Dos Rios similar to one he applied with success when he ran the SAWS composting facility. "We purchased and installed eighty 12-compartment purple martin houses surrounding the solids drying beds," he says. "This effort is for fly control, but only adult flies." The team also attacks the flies by deploying tiny parasitic wasps that feed on the fly pupae.

Another problem is drain flies, commonly found on trickling filters. "About five years ago, they just showed up. They caught us off guard," says Eaton. To manage these pests, workers inject Bt (a microbial insecticide) and methoprene (a growth regulator) into the solids as they are being pumped to the drying beds.

Pests were one reason the drying beds weren't fully utilized until Eaton investigated various control strategies. "A guy would fog with pesticide, putting toxic chemicals on the drying beds," says Eaton. "Employees would have to go inside, which kept them from working. It wasn't friendly or green."

Yrle observes, "Now that Tad has developed this program, vectors issues are minimized. Because we can control odor and vectors, we're able to use the drying beds to our advantage." But Eaton is always looking to improve operations.

"If solids were able to stay longer in the digester, there would be less odor and even less vectors," Eaton says. And as improvements are made at the facility, Eaton may just get his wish. **tpo**

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ALWAYS LOOKING FORWARD

CHRIS McCALIB BRINGS A PROGRESSIVE OUTLOOK AND A TEAM ORIENTATION TO HIS JOB AS OPERATIONS MANAGER RESPONSIBLE FOR TWO TREATMENT PLANTS

By Jim Force

HOW MANY WASTEWATER TREATMENT PLANTS HAVE VOLUNTEERS

coming out to help with plant operations? Next question: How many have a waiting list of volunteers?

That's the situation at the Lakehaven (Wash.) Utility District (LUD). Wastewater operations manager Chris McCalib has created an environment where employees look forward to coming to work every day and where people are willing to work for free to gain experience.

"We're a staff of experienced and seasoned operators who've been around awhile," says assistant wastewater operations manager Norman Cook. "But Chris inspires us, makes us excited to get to the plant." As a result, the district's treatment operations are popular with prospective employees eager to give their time. At present, four non-paid interns work with McCalib and his staff, learning the processes and building their resumes.

Working with his team, McCalib has created a collaborative environment where people work together to deploy innovations in wastewater treatment and energy management, and where it's standard procedure to plan for the future.

BROAD RESPONSIBILITY

The LUD is a special purpose municipality serving 112,000 people in a mostly residential area between Seattle and Tacoma in King and Pierce Counties. It serves most of the city of Federal Way, parts of the cities of Auburn, Pacific, Tacoma, Des Moines and Milton, and an unincorporated area of King County.

The sewer system includes 350 miles of mains, 27 pump stations and two wastewater treatment plants. The water system includes 400 miles of mains, 22 wells, and 12 storage tanks with 31 million gallons of storage capacity. The average daily pumping rate is about 10.6 mgd.



Chris McCalib, shown at the Lakehaven Utility District's Lakota Wastewater Treatment Plant, gained experience in the U.S. Navy that helped him in his clean-water career. (Photography by Seth Bynum)

McCalib came to Lakehaven in 2006 as assistant manager and assumed the top job two years later. Today, he's responsible for the Lakota treatment plant, a 10 mgd (design) activated sludge facility, and the Redondo treatment plant, a 5.6 mgd trickling filter operation.

Lakota has a headworks with mechanical screens, followed by grit removal, primary clarifiers, a four-basin complete-mix activated sludge system, secondary clarifiers and UV disinfection. At Redondo, the headworks contains a new perforated screen. Then come primary clarifiers, two parallel-feed trickling filters, secondary clarifiers and UV. Both discharge through deep outfalls into bays on Puget Sound.

Class B biosolids from each plant are digested, dewatered, and trucked over 200 miles for application to dry-grass wheat fields. The application site is operated by Boulder Park Inc., a cooperative organization encompassing 14 wastewater treatment agencies.

A WORLD VIEW

McCalib has always had a keen interest in the world around him and how things work. His father was a contractor, and McCalib has known about the construction business ever since he could walk. After high school, he joined the U.S. Navy and was assigned to the *USS Bunker Hill*, a guided missile cruiser. He made three cruises to the Western Pacific, visiting 23 countries, and as a mechanic's technician he got to know engines, generators, boilers and pumps.

Later in his 4-1/2-year tour of duty, he served as a Second Class Chief Petty Officer aboard the frigate *USS Ford*, running the auxiliary systems in the engine room, including making freshwater, handling oil-water separation, and dealing with wastewater.



Chris McCalib walks the catwalk above the secondary clarifier effluent weirs at the Lakota plant.

profile



**Chris McCalib,
Lakehaven (Wash.) Utility District**

POSITION:
Wastewater operations manager

EXPERIENCE:
11 years

RESPONSIBILITY:
Operations of the two wastewater treatment plants

EDUCATION:
Finishing B.S. degree in environmental science, University of Washington

CERTIFICATION:
Group IV operator, Grade II collections operator, journeyman maintenance electrician

GOALS:
Finish degree, obtain Professional Engineer certification, oversee plant improvements to meet needs into the future

The Lakota wastewater treatment plant is a 10 mgd activated sludge facility.



“We’re a staff of experienced and seasoned operators who’ve been around awhile. But Chris inspires us, makes us excited to get to the plant.”

NORMAN COOK



ABOVE: The staff of the Redondo Wastewater Treatment Plant includes, from left, Mike Morrissey, Norman Cook, Chris McCalib, Mike Ming, Joel Castanza, and Sid Elkins. Not pictured are Ron McCoy and Dave Hamrick. BELOW: The Lakota treatment plant staff includes, front row, from left, Chris McCalib, Michele Zachery, Barb McCoy, Virginia Wolf, Patricia Carlton, Carol Briggs, Norman Cook; middle row, Joe Coleman, Kel Erickson, Rich Fujimoto, John Buhl, Gary Cook, John Barton, Howard Moreland; back row, Phil Stryker, Scott Hastings, Dave Hornung, Jeff Armfield, Don Blaser, Tim Warford, and Craig Hansen.



If he loved getting a different look at the world during his time at sea, he is just as excited about the view of science and technology he gets in wastewater treatment. “You see all facets,” he says. “Biology, mechanics, chemistry. A treatment plant is a living, breathing organism.”

After the Navy, he did a short stint with a local manufacturing firm, then signed on with the Southwest Suburban Sanitary District outside Seattle in 1999. He spent a year in the field learning collections and earned his senior operator grade and electrician’s licenses in four years. In 2006, seeking more opportunity to advance, he joined the Lakehaven team.

“It’s very, very interesting,” he says. “Changing regulations, emerging compounds of concern, endocrine disrupters. It takes a lifetime to get your

“We’re seeing big changes in technology, driven by cost and efficiency. And we’re true stewards of the environment, giving back to the public and the ratepayers. You know, very few of us who get involved in this business ever leave it. It’s a career.”

CHRIS MCCALIB

hands around this profession. It’s not redundant like other jobs.”

He communicates that enthusiasm and vision to his managers and staff. “I took him under my wing 13 years ago,” says Cook, who is nearing retirement. “He has far exceeded everything I taught him. He’s intense and serious about this profession. He has a vision, and he inspires the same among the staff — where we’re going, looking forward, and finding innovative ways to resolve issues. Staff shares his enthusiasm, and asks how they can do more.”

LUD general manager Don Perry agrees: “He makes my job easier. I’ve

Chris McCalib and senior operator Mike Ming inspect the Redondo Wastewater Treatment Plant from a building roof.



ENJOYING THE RESOURCE

Chris McCalib is proud of the effluent discharged into Puget Sound by the two wastewater treatment plants under his supervision, and he has a vested interest to see the local resources preserved for his children and future generations.

McCalib, a member of the Water Environment Federation and the Pacific Northwest Clean Water Association, Puget Sound Operators Section, is married and has children ages 7 and 4. “We enjoy fishing the rivers, as well as Puget Sound, and we eat fish from the waters,” he says. “Mostly salmon and steelhead. The whole family fishes, and it’s a great family affair.”

McCalib also hunts birds and big game. He was a golf instructor at one time and still carries a 2 handicap. He’s also an advocate of a stress management technique, Brazilian Jiu Jitsu/mixed martial arts fighting. “I used to do it when I was in the service in Japan,” he says.

been involved in wastewater treatment, coming up through the ranks. So I know how hard it is to meet permits. Chris is really focused on the quality of the water we produce and is doing things I never thought were possible.”

VOLUNTEER EFFORT

Some folks might not think it possible to have volunteers on the plant site, but McCalib and his crew make the arrangement work, and they acknowledge benefits in both directions.

“Right now we have four volunteers on board — two at each plant,” McCalib says. “And we have a waiting list. They’re non-paid interns, but they shadow our employees, get experience in all tasks, learn trades, and receive a letter of recommendation and documented plant time.”

The plant benefits, as well, and not just from the free help. “The interns keep

our employees engaged in their work," McCalib notes. "The thought processes are stimulating. We get asked questions we haven't had to answer in years."

The district does a background check and drug test on applicants and pays about seven cents an hour to cover labor and industry insurance. "When our interns leave here, they're employable," says McCalib. Three recent volunteers have gained positions at other treatment plants in the state.

"We're talking with other communities about forming a regional volunteer intern program," he says. "We need to get our local colleges on board. Students learn more if we put boots on their feet. It's in our best interests. It provides a backup of talent to make sure all our needs are met."

THE FUTURE

All of McCalib's colleagues give him high marks for forward thinking, and there are concrete projects to prove it. "We've rehabbed the secondary treatment processes at both plants," says Cook. "We've taken those processes (activated sludge, biotowers) and made them function on all eight cylinders."

The staff is now installing new dewatering equipment at the Redondo plant and is exploring solids-to-energy technologies at both facilities. "We have solids constraints at the Lakota plant," McCalib says. The upgrade plan will expand digestion capacity and improve thickening and dewatering. Ultimately, digester gas will be used for cogeneration to make the facility more energy independent.

At Redondo, energy efficiency is even farther along. The plant is installing a pair of engines (Stirling Biopower Inc.) to produce 85 kW of renewable electricity and 500,000 Btu/hr for the digesters and buildings. The project will replace an aging boiler.

Down the road, McCalib sees the need for biological nutrient removal as part of increased efforts to reduce the nutrient loading in Puget Sound. General manager Perry comments that McCalib is always checking things off, looking ahead. It's a challenge, because the district doesn't always have the funds to accomplish everything McCalib envisions.

But whatever changes the district makes, it's a sure thing that all of McCalib's employees will be involved in the process, and the process will be well-planned.

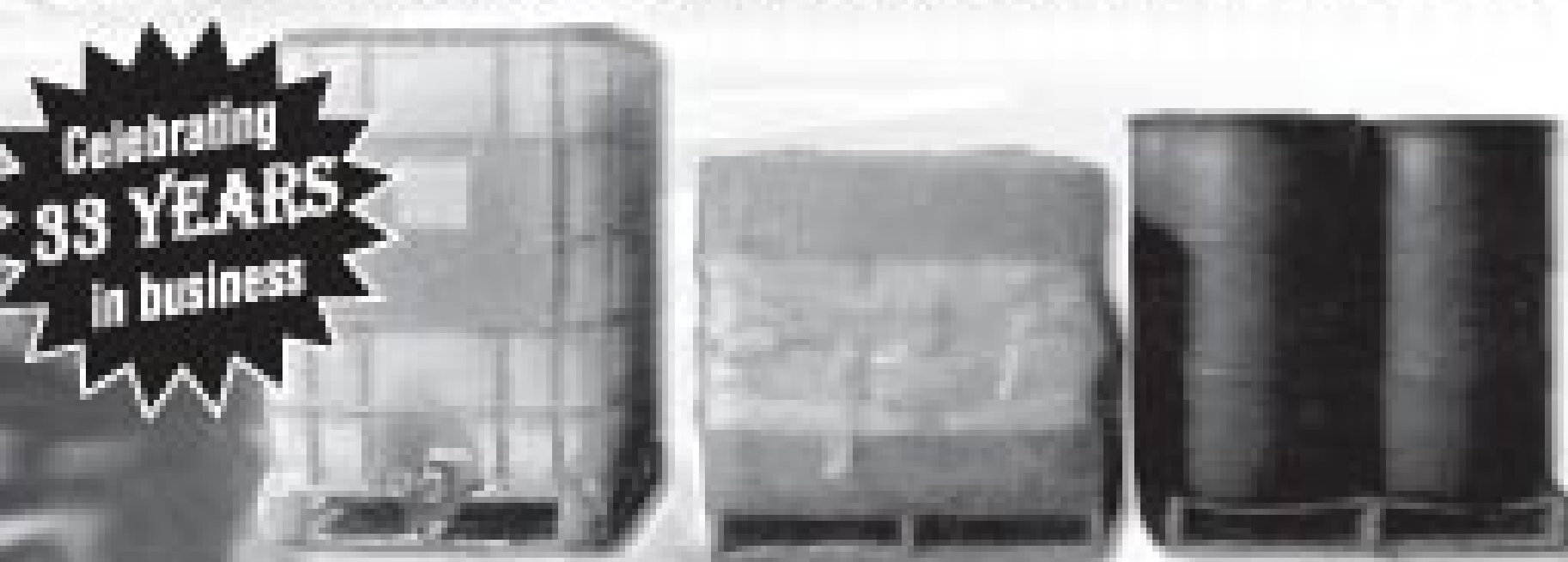
"He's changed the way we view equipment," Cook remarks. "We take everything down to a science. And we get everyone involved in the process. We go over drawings and plan for the full sequence of events. Everybody has an opportunity to voice an opinion. With consensus like this, we have very few hiccups."

McCalib adds, "We have lots to do. My job is to take a 30,000-foot view and apply it to everyday situations to get the plant and district ready for the next 20 to 30 years. It's very exciting. We're seeing big changes in technology, driven by cost and efficiency. And we're true stewards of the environment, giving back to the public and the rate-payers. You know, very few of us who get involved in this business ever leave it. It's a career." tpo

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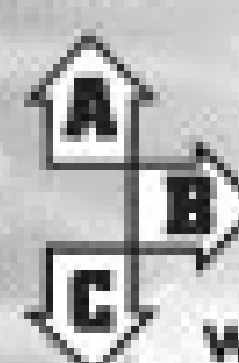


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SOLAR-POWERED MIXING TECHNOLOGY HELPS AN OHIO TREATMENT PLANT CUT ELECTRIC BILLS, AVOID CAPITAL COSTS AND IMPROVE TREATMENT PERFORMANCE

By Michael Christensen

The village of St. Henry, Ohio, was outgrowing its wastewater treatment plant. Bucking the trend among farming communities in the state, the village was growing as industries such as turkey processing expanded.

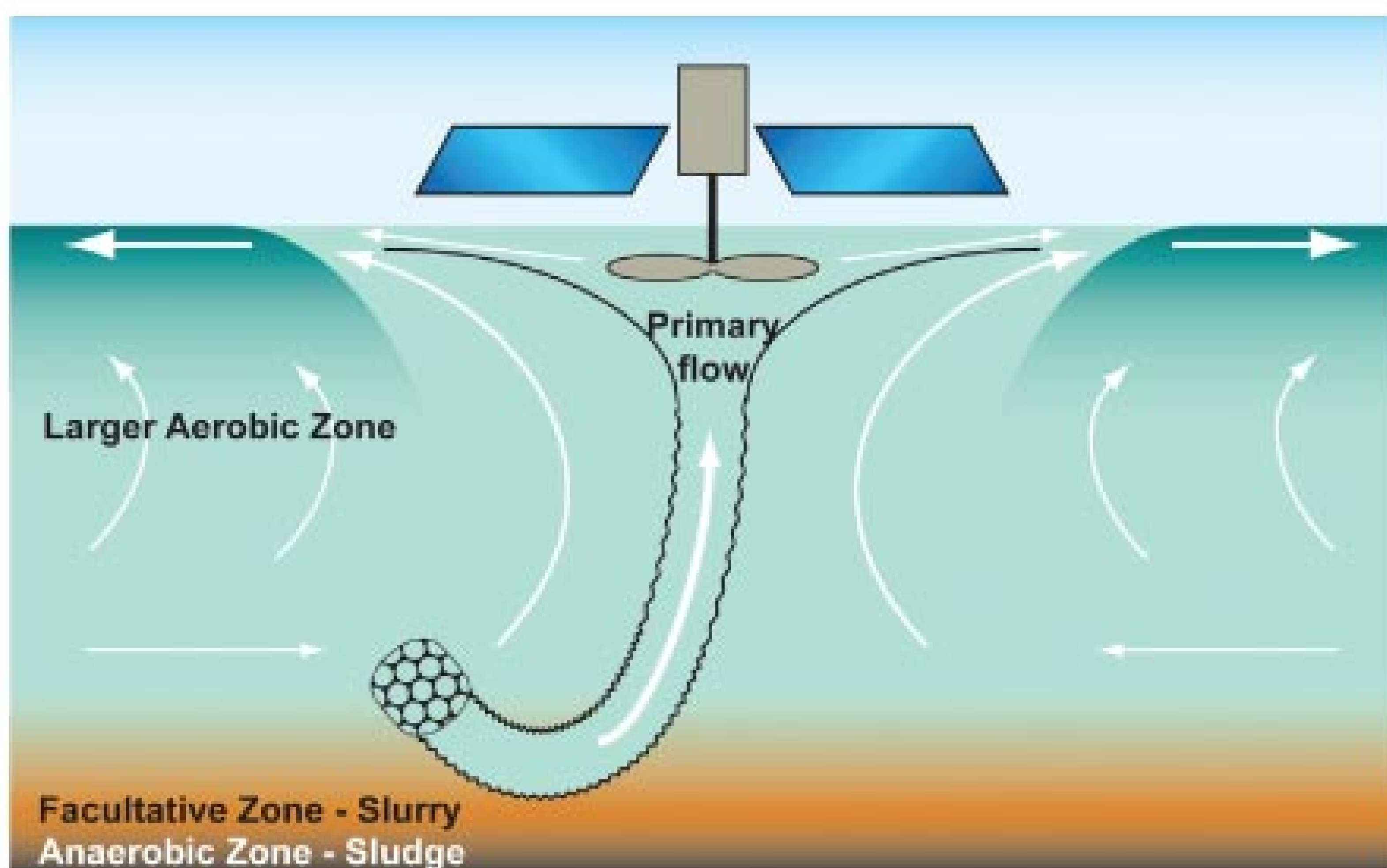
Despite its good fortune, this community of 2,700, about 40 miles northwest of Dayton, faced fiscal constraints. When village officials learned that a wastewater treatment plant upgrade would cost almost \$500,000 and add \$49,000 in annual energy costs, they looked for alternatives.

Ultimately, instead of adding energy-intensive aeration equipment, the village saved \$100,000 in capital costs by adding solar-powered circulation equipment from SolarBee Inc. to the existing aerated lagoon system. The reconfigured plant saves \$20,000 annually in utility costs.

MORE AERATION

The new equipment thoroughly mixes the ponds and significantly reduces energy consumption, according to Stan Sutter, public utilities

Horizontal and vertical circulation patterns help improve distribution of oxygen, algae, bacteria, and nutrients. During the day, dissolved oxygen is above saturation. Oxygen that otherwise would bubble out and be lost is captured and mixed throughout the pond. At night, when dissolved oxygen is at less than saturation, surface reaeration adds dissolved oxygen to the pond.



IMAGES COURTESY OF ST. HENRY TREATMENT PLANT

Solar-powered circulation technology at the St. Henry treatment plant reduces the need for energy-consuming aeration equipment. Aeration run time is cut by 60 percent and utility bills by \$20,000 per year.

supervisor. “The problem with the old system was that it was undersized,” he says. “We needed more aeration, and we needed a new cell for extra storage capacity.”

The plant staff considered installing a diffuser blower system that would replace the existing surface aerators. In that configuration, three large blowers would force air through a common header along the whole outside of the lagoon. “But the blower system would have increased our horsepower by 30 percent and our utility bill as well,” Sutter says. “We were determined to solve our problems without all that extra expense.”

The St. Henry staff and consulting engineers decided to reconfigure the first aeration pond, reduce mechanical aeration run time, and add solar-powered circulation to mix the ponds thoroughly, in the process reducing odors.

HIGH EFFICIENCY

The SolarBee technology combines solar power with long-distance, near-laminar-flow circulation to provide radial, horizontal and vertical pond mixing. The mixers help conserve dissolved oxygen by mixing and distributing oxygen-saturated surface water throughout the pond, replacing 20 to 40 hp of grid-powered aeration per unit.

The mixing efficiency means the plant can offload a large portion of its energy-intensive aeration and mixing, while significantly reducing BOD, TSS and ammonia. Near-laminar-flow circulation also minimized odor and reduced sludge buildup.

The circulation equipment is designed around pumps that can move up to 10,000 gpm, or 14.4 mgd. Because of the hydraulic design,

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the system needs only 36 watts to power a 1/2 hp direct-drive motor with 90 percent or higher efficiency. Three 80-watt photovoltaic panels charge an onboard battery, allowing the units to run around the clock on solar power.

Reconfiguring the treatment plant meant dividing the first 8-acre rectangular lagoon into two sections. This concentrates treatment in a small, total-mix, high-solids lagoon and essentially creates an activated sludge basin without the expense of building one, Sutter observes.

In section A of the first pond, eight aerators and one SolarBee unit concentrate the aeration and provide deeper mixing. About 800 to 1,000 mg/l of CBOD runs through the first cell, and about 100 mg/l of CBOD leaves the pond after a three-day detention time.

After the first pond, the system returns to a facultative process. During the day, the gentle and continuous mixing of the circulation unit brings nutrients to the surface, promoting the growth of algae that produce energy-free dissolved oxygen at up to 250 pounds per acre per day.

A high pH also occurs near the surface. The high-oxygen and high-pH water is continuously and thoroughly mixed throughout the pond instead of being mostly underutilized as in all-natural ponds. The higher dissolved oxygen throughout the pond helps reduce BOD by 70 to 90 percent.

GREEN PAYBACK

In total, seven SolarBee units and 11 aerators mix and aerate the lagoons to meet permit requirements. A newly installed fourth pond provides an additional 67 million gallons of storage.

By the time wastewater reaches the fourth pond, there is not enough carbon, ammonia or phosphorous to cause permit problems, or to support algae growth high enough to result in BOD and TSS problems. Aeration run-time has been cut by 60 percent and the utility bill by \$20,000 per year.

To Sutter, that's a green payback. "Green goes hand in hand with operational cost savings," he says. "We're not consuming nearly as much power as we were originally looking at. In fact, we've decreased

"The problem with the old system was that it was undersized. We needed more aeration, and we needed a new cell for extra storage capacity. ... A blower system would have increased our horsepower by 30 percent and our utility bill as well. We were determined to solve our problems without all that extra expense."

STAN SUTTER

our horsepower rather than increasing it, and any time we can use fewer resources, it benefits the entire community."

With a renewed wastewater treatment system designed with an eye on holding down costs, St. Henry is prepared to accommodate population growth, host new industries, and meet stringent regulatory requirements. **tpm**

ABOUT THE AUTHOR

Michael Christensen is the North U.S. Regional Manager for SolarBee Inc., a manufacturer of solar-powered equipment for water treatment applications. He can be reached at 866/553-5590 or mikec@solarbee.com.

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A MULTI-PARAMETER ANALYZER HELPS A KENTUCKY TREATMENT PLANT STEP UP TO THE PLATE AND MEET A NEW PHOSPHORUS LIMIT IN ITS PERMIT

By Scottie Dayton



PHOTOS COURTESY JIM WORTEN

Plant operator Chris Cummins checks the sample flow on the ChemScan system from ASA Analytics.

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To monitor phosphorus removal, engineers selected the PHOSPHAX orthophosphate analyzer from Hach Co. and the ChemScan UV-4100 analyzer from ASA Analytics, which measures nitrite, nitrate, ammonia-nitrogen, and orthophosphate at eight treatment stages in real time.

The system also allows the plant to begin denitrification in its clarifiers, returning fewer nitrates to the BPR process and thereby shortening detention times. Today, the phosphorus in the plant discharge to West Hickman Creek averages 0.5 mg/l.

ASSEMBLY REQUIRED

The 270-acre facility has a peak design capacity of 64 mgd, but flows average 22 to 23 mgd. The plant treats more than 8 billion gallons annually, serving a population of 150,000 in Fayette and north Jessamine Counties.

Contractors installed the ChemScan system in four months. “They took tanks and channels out of service, core-drilled through the walls, and installed Bettis (Emerson Process Management Valve Automation) electric actuators,” says Worten. “Then they synchronized the solenoids to open and close the actuators simultaneously and in sequence. An extensive piping system of 1.5-inch PVC Schedule 80 pipe connects everything.”

ChemScan representatives programmed the computer and trained the staff, who found the learning curve uncomplicated. “I sat down with the manual and went right through it,” says Worten. “It’s all keypads and touchscreens.”

The analyzer receives samples from eight treatment stages. On a 60-minute cycle, it monitors the influent channel entering the BPR tank, the midway point in the tank, and the effluent end. It draws influent and effluent samples off the first- and second-stage aeration basins, and from the line returning activated sludge to the BPR tank.

Lines flush automatically for three to four minutes to ensure fresh samples. Then the system analyzes ammonia, nitrite and nitrate levels. When analyzing phosphorus levels, the lines flush again before sampling. Monitoring of the four parameters takes eight minutes, and monitoring for only the nitrogen parameters takes five minutes.

The time it takes for samples to travel to the analyzer — as far away as 200 yards — is part of the hourly equation. To fit everything into the 60-minute cycle, the software enabled Worten to eliminate some unnecessary tests at certain stages.

In 2001, the Lexington Fayette Urban County Government West Hickman Creek Wastewater Treatment Plant in Nicholasville, Ky., was starting Phase II of its third upgrade since 1972, when the state imposed a phosphorus limit.

Total phosphorus hovered around 6 mg/l, but the permit required 1 mg/l monthly average and 2 mg/l daily maximum from May through October. Engineers from Tetra Tech, the Lexington-based company designing the expansion, converted the anaerobic

“By monitoring ChemScan, I can tell where we are not getting proper treatment and adjust accordingly.”

JIM WORTEN

digesters to aerated sludge holding tanks and the primary clarifiers to biological phosphorus removal (BPR) fermentation tanks.

They also modified the two-staged activated sludge nitrification system and added two final clarifiers, chlorine contact, and three new 2-meter belt presses to replace the old ones.

As part of phosphorus removal, operators feed sodium aluminate precipitant at Zone 2 in the aeration tanks before the wastewater enters the final clarifiers. “The chemical enhances the BPR process by binding to the phosphorus in the return activated sludge and waste sludge,” says Jim Worten, supervisor senior of plant operations.



Plant operator David Adamovich records readings from the ChemScan system.



The ChemScan pump and grinder at the West Hickman Creek Wastewater Treatment Plant.

The system does not extend to the final effluent, so the staff monitors its orthophosphate with the PHOSPHAX analyzer filtration system.

ADJUSTMENTS MADE

"We had problems with the double-disc supply pump during our first year of operating the system," says Worten. "Not all the sample points provided a flooded head for the pump, causing damage to the discs from air in the system." When the staff switched to a progressive cavity pump (seepex), the problem disappeared.

The ChemScan system has two sets of 4-foot-tall cross-flow filter membranes, one element on either side of a U-shaped frame that slips into a fitting. "We run samples through one side of the pumping system," says Worten. "When that set of membranes starts to blind, we switch to the other side and clean the first set. They're rotated every two weeks."

Operators put water and a small amount of bleach in a cleaning station, remove the filter frame and flush the elements. They last about three years before the bleach turns the membranes brittle. A new set costs \$1,200. In 2008, ChemScan representatives did a scheduled complete service overhaul.

NEW HORIZON

The phosphorus permit totally changed how the plant operates from May through October. "Everything focuses on phosphorus removal," says Worten. "When we notice ammonia levels increasing in our first-stage aeration, we know we're not getting the proper breakdown for good treatment. ChemScan enables us to answer

questions such as: Do we need to drop some tanks? Is our flow too high for the number of tanks we're using? Do we add a tank to get better treatment?"

Worten also uses the system to monitor trends as microbial action changes with the seasons. "It helps us know when to take out or add tanks," he says. "By monitoring ChemScan, I can tell where we are not getting proper treatment and adjust accordingly."

Occasionally, operators pull samples off ChemScan and the laboratory analyzes them to check the machine's accuracy. "To be honest, the unit is dependable and works well," says Worten. "The lab numbers usually are close to those from the analyzer, and when they aren't, the machine comes out on top of the argument." **tpo**



Each sampling point in the ChemScan system has a Bettis electric valve from Emerson Process Management Valve Automation.

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3. BILCO OFFERS FALLS PROTECTION GRATING

Fall protection grating from The Bilco Co. is made from corrosion-resistant fiberglass and includes lift assistance and an automatic hold-open arm for ease of operation and user safety. It is equipped with stainless

steel hardware for maintenance-free performance and rated for a 300 PSF live load. The grating is available in standard and custom sizes. Kits are available to retrofit the grating onto Bilco doors in the field. **203/934-6363; www.bilco.com.**

4. PRESSURE SYSTEMS OFFERS SDI-12 TRANSDUCER

The KPSI Model 501 SDI-12 (serial data interface at 1200 baud) transducer from Pressure Systems meets the requirements of the U.S. Geological Survey Office of Surface Water accuracy specifications for stage monitoring. The transducer offers ± 0.05 percent PS total error band accuracy and repeatability as well as measurement level accuracy of ± 0.01 ft. H₂O and onboard surge protection. **800/328-3665; www.pressuresystems.com.**

5. MARKLAND OFFERS SLUDGE DEPTH METER

The Model 602 sludge depth meter from Markland Specialty Engineering Ltd. is made to measure the sludge level in dissolved air flotation tanks, SBRs, inclined plate clarifiers, tanks and clarifiers. The meter has four power levels to adjust for different concentrations of sludge, enabling it to find the thick sludge in wastewater treatment plants as well as the light flocs found in some drinking water plants. The meter also can be used to find the level of any interface in a liquid. **905/873-7791; www.sludgecontrols.com.**

6. JEIO INTRODUCES HIGH-CAPACITY, HIGH-SPEED SHAKERS

Lab Companion SKC high-capacity, high-speed shakers from Jeio Tech

have a direct-drive mechanism. Features include programmable motion control, LED displays, unbalanced load sensors and self-protecting cutoff function. The shakers offer speeds up to 500 rpm, a maximum orbit of 2.8 inches and clamps that accommodate up to six liter flasks. **781/376-0700; www.jeiotech.com/eng.**

7. LIBERTY PROCESS OFFERS CAVITY PUMP PARTS

Spare parts for progressive cavity pumps, including rotors, stators and seals, are available from Liberty Process. Parts are available in a variety of models, sizes and materials and meet or exceed ISO 9001 performance standards. **847/640-7867; www.libertyprocess.com.**

8. GREYLINE INTRODUCES STINGRAY PORTABLE FLOW LOGGER

The Stingray portable open-channel flow logger from Greyline Instruments is designed for area-velocity flow surveys in sewers, open pipes and channels, municipal stormwater, combined effluent, raw sewage, irrigation water and stream flow. The unit uses a submerged ultrasonic sensor to measure both velocity and level in the channel. No calibration is required. Powered by Alkaline D-cell batteries, it can operate up to four

years. Electronics are housed in a watertight IP67 enclosure and rated for operation from -4 degrees to 140 degrees F. Enclosed Greyline Logger software can retrieve and display logged data by RS232 or modem connection. The software calculates flow for round, rectangular, trapezoid and egg-shaped channels, as well as flumes and weirs. **888/473-9546; www.greyline.com.**

9. METROHM OFFERS 826 MOBILE PH METER

The 826 Mobile pH meter from Metrohm is waterproof and suitable for hard environments. Features include level IP67 protection for dust and water, wireless printing, choice of 1-3 calibration points, memory capable of holding 200 results and impact-resistant carrying case. **800/727-6768; www.metrohmusa.com.**

VAL-MATIC OFFERS SUPERVALVES AIR VALVES

The SuperValves line of air valves from Val-Matic Valve & Mfg. Corp. are coated with fusion-bonded epoxy internally and externally, holiday tested and include 315 stainless steel bolts. **630/941-7600; www.valmatic.com.**

(continued)

product spotlight

New Sampler Automates Sample Preparation

By Ed Wodalski

The AQUATek 100 waters-only purge and trap autosampler from Teledyne Tekmar is designed to automate sample preparation using a fixed-volume sample loop and pressurized gas. The system can add two independent volume programmable internal standards to the sample, transferring the entire aliquot to the purge and trap for compound concentration and subsequent separation and detection using a GC/GC-MS quantification system.

The interchangeable loop system is available in 5 ml, 10 ml, 20 ml and 25 ml sizes. Water samples can be run from any position in the sample sequence. Internal standards are stored in two 15 ml amber glass vessels that prevent transmission of UV radiation. Vessels are sealed with a PEEK cap to prevent adsorption and contamination. The automated internal standards and surrogate process eliminate waste.

Designed for standard 40 ml volatile organic analysis (VOA), the unit's 100-position carousel drive is electronically controlled and has a removable tray for easy loading of vials. "Traditionally, it takes operators time to load these samples into the concentrator one at a time using a glass syringe," says Thomas Hartlein, product line manager. "If the system can do that for them, they save time on just the loading and cleanup between samples. Therefore, the next sample is ready to go without any cross-contamination."

Quality-control blanks can be added automatically via the controlling software platform. Auto-blanking frees up vial space for increased throughput. A High-Temperature OptiRinse heats blank water to 90 degrees C for complete pathway rinsing.

Customized TekLink software integrates the autosampler and purge and trap for seamless operation. Logs give users a status report that notes the processing of the sample. In case of a data detection discrepancy, the logs can be cross-referenced to determine if the discrepancy is in the sample preparation or in the detection system. The unit also can be configured to send an e-mail when analysis is complete or if there was an error.

The software records a complete history of all samples, schedules and method information. It also records and saves changes to methods, schedules and configurations. A vial chiller tray is provided for sample cooling (recirculating bath required).

A slide-out compartment provides access to plumbing, tubing and connections, helping facilitate a turnaround time of less than 10 minutes when switching between loops. The unit measures 28.5 inches high, 18 inches wide and 19 inches deep and weighs 39 pounds. It has an operating temperature of 10 to 30 degrees C and storage temperature of -20 to 60 degrees C.

The front cover and carousel tray are corrosion-resistant to water with a pH range of 1 to 10. The water heater has a variable control of 35 to 90 degrees C. **513/229-7000; www.teledynetekmar.com.**

AQUATek 100
waters-only purge and
trap autosampler from
Teledyne Tekmar





10. CSI CONTROLS INTRODUCES VARIOSPEED FREQUENCY DRIVE

The VARIOSpeed variable-frequency drive from CSI Controls is designed for pressure control applications. As the flow and head conditions change in the pumping system, the unit automatically controls the pump speed and maintains a constant discharge pressure that can be set using the keypad. The control is available in 5 hp to 150 hp at 208-240 V and 5 hp to 250 hp at 380-480 V, single phase or three-phase supply voltage. Built-in features include PID control, energy optimization control, adjustable electronic overload, automatic system restart, high- and low-pressure alarms and more. **800/363-5842; www.csicontrols.com.**

11. TOP HAND INTRODUCES 15 MIL LATEX GLOVES

Disposable 15 mil latex gloves from Top Hand Safety are 12 inches long, extra strong and suited for a variety of uses. **800/282-1007; www.tophandglove.com.**

12. OIL SKIMMERS OFFERS CART-MOUNTED OIL SKIMMER

The Model 6V cart-mounted oil skimmer from Oil Skimmers is designed to remove animal, vegetable and petroleum-based oils, fats and grease and oily wastes that float on water. The unit can remove as much as 100 gallons of waste oil per hour, decanting it into a collection drum. It has a 60-inch floor frame mounted to a portable cart with lockable

castors and handle with enough room for a collection drum. A Model 5H collection system also can be mounted to the cart. **440/237-4600; www.oilskim.com.**

13. INDUSTRIAL TEST OFFERS EXACT PHOTOMETER

The eXact LEADQuick photometer from Industrial Test Systems is made for field testing lead, mercury and cadmium in potable water. **800/861-9712; www.sensafe.com.**

14. PENTAIR INTRODUCES PANELITE ENCLOSURE LIGHTS

The PANELITE family of enclosure lights from Pentair Technical Products include compact LED and fluorescent versions, designed for quick installation in Hoffman PROLINE and other enclosures. The LED lights have an operating life of up to 50,000 hours and operate on 24-volt DC current and are available in 15-inch lengths. The fluorescent lights are available in 15-, 18- and 28-inch lengths. Both lights are UL and CSA certified. **763/421-2240; www.hoffmanonline.com.**

15. TROJAN INTRODUCES UV SOLO LAMP

The UV Solo Lamp from Trojan Technologies, paired with the energy-efficient Solo Lamp Driver, offers the high electrical efficiency of a low-pressure UV system, while providing the low lamp count of a medium-pressure UV lamp system. By using fewer and more efficient lamps, the carbon footprint associated with UV treatment is reduced to less than one-third that of medium-pressure UV lamp systems. The increased efficiency translates into a significant reduction in wasted energy, peak electrical loads and associated electrical infrastructure. **519/457-3400; www.trojanuv.com.**

16. WAGO OFFERS 713 SERIES CONNECTOR SYSTEM

The 713 Series MCS MINI-HD double row connector system from WAGO Corp. is a low-voltage (150V/10A and 160V/10A) wire-to-board connector for control circuits, including I/O interfaces and sensor cables. A high-density design features rear-side CAGE CLAMP terminals for factory or in-field wiring. The 16-mm wide connector also trims front panel space by up to 40 percent. **800/346-7245; www.wago.us. tpu**

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EDI Partners with Ameren UE

Environmental Dynamics Inc. has partnered with St. Louis-based electric utility Ameren UE as part of its Business Energy Efficiency Program. EDI, suppliers of aeration systems for wastewater treatment, assists eligible communities in receiving cash incentives for making energy-efficient upgrades to their wastewater treatment facilities.

Blackmer Launches Smart Energy Web Site

Blackmer has launched its Smart Energy Web site at www.blackmersmartenergy.com. The site was created to illustrate how manufacturing operations can benefit by incorporating Blackmer pumping equipment and technologies into their energy-management processes and procedures.



SPX Adds Nettco i-Series to Online Store

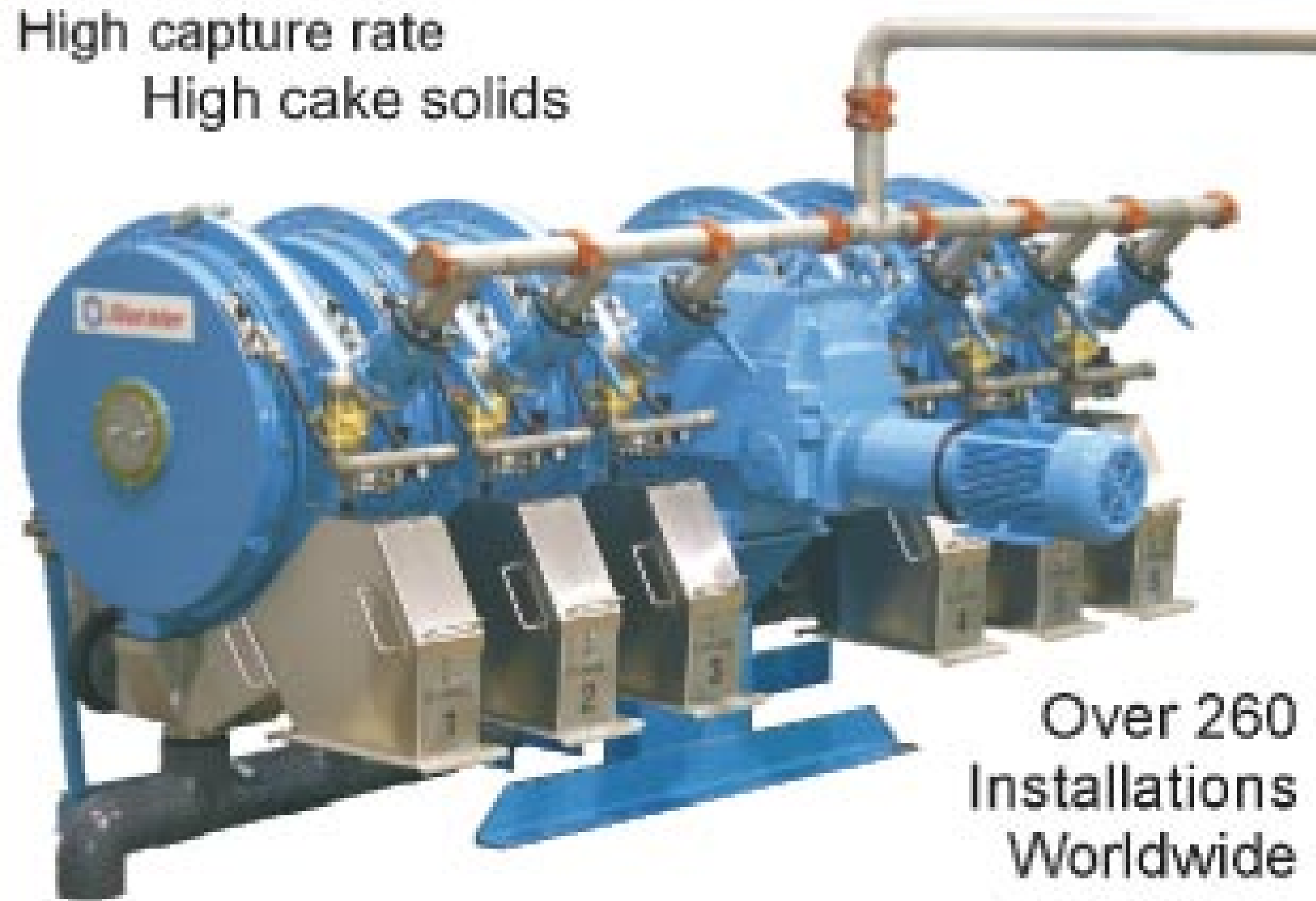
SPX Flow Technology's LIGHTNIN Brand Online Store (www.lightninmixers.com/store) has added the clamp mount Nettco i-Series to its product offerings. **tpo**

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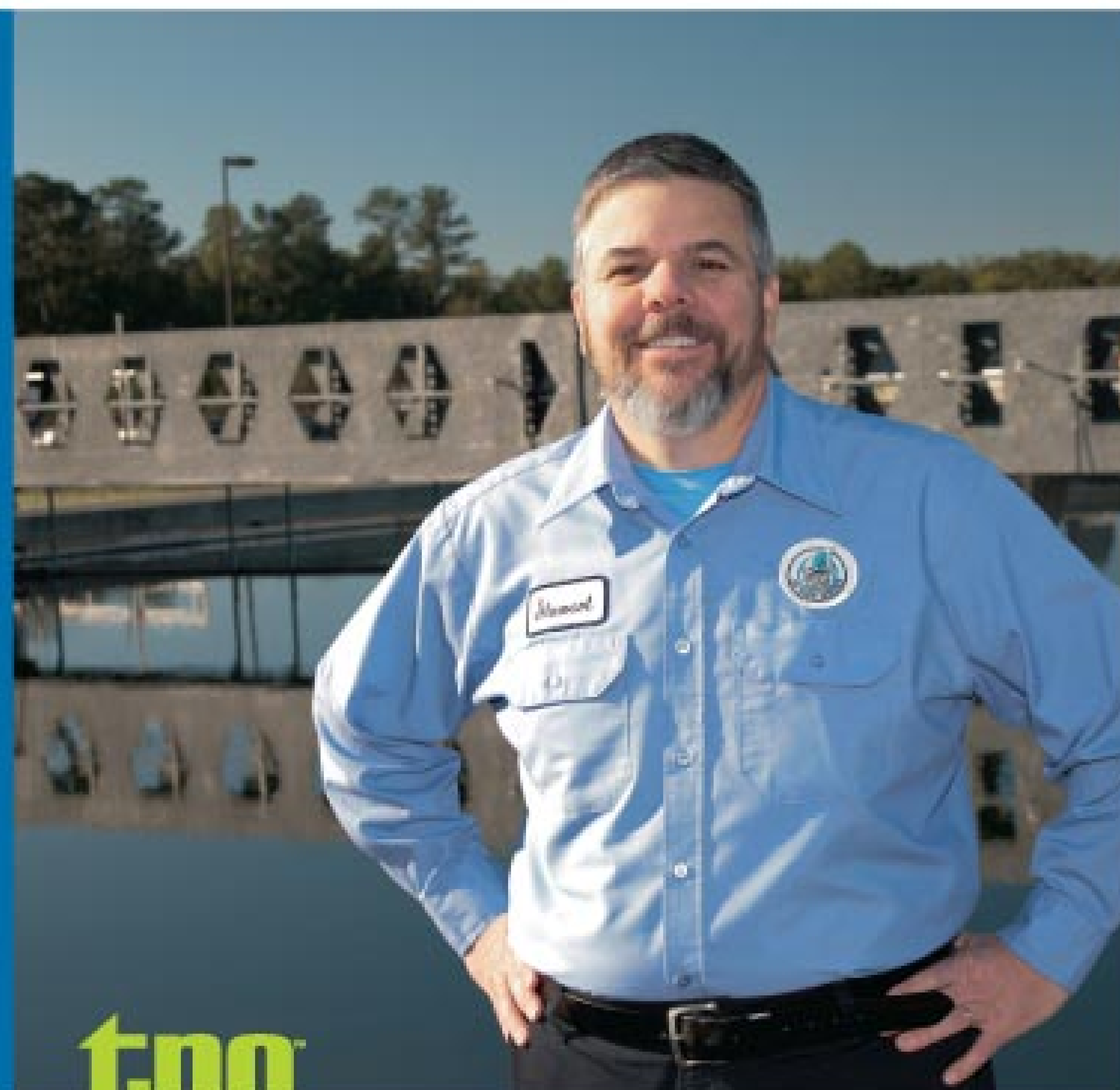
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Solids Management

By Benjamin Wideman

HIGH-QUALITY CAKE

The Prime rotary fan press from Prime Solution Inc. produces cakes averaging 18 to 24 percent solids for a range of applications. The unit, with a slow rotational speed of 1 rpm, has a continuous dewatering process that is totally enclosed, eliminating odor and reducing corrosive exposure to nearby equipment.

Self-contained skid, mobile and modular units require little supervision and have a semi-automated self-clean cycle. Units are compact with footprints from 40 to 70 square feet. Varying models produce 100 to 2,000 pounds of dewatered biosolids per hour. Single or dual presses are available with 18-, 24-, 36- and 48-inch screens.

The process flow is controlled from inside the press. Material moves slowly toward the outlet, forming a cake. An adjustable two-piece pneumatic restriction plate controls pressure at the outlet. The frictional force of the slow-moving filter plates and controlled outlet restriction produces cakes as dry as 60 percent solids. **269/673-9559; www.psirotary.com.**



Prime rotary fan press from Prime Solution Inc.



ISAM sludge reduction system from Fluidyne Corporation

SLUDGE REDUCTION

The ISAM sludge reduction system from Fluidyne Corporation incorporates a constant-level anaerobic basin, followed by a surge/anoxic/mix (SAM) tank, and an aeration basin that incorporates BOD, TSS and nitrogen removal along with sludge reduction in an integrated system.

Complex organic solids undergo hydrolysis to simpler soluble organics, which pass to the SAM tank. In addition to flow regulation, the SAM tank provides an anoxic environment for rapid denitrification of recycled nitrates and concurrent stabilization of the soluble organics from the I-tank. The conditioned mixed liquor then passes to the final aerobic tank for completion of BOD and nitrogen removal and solids separation. **312/266-9967; www.fluidynecorp.com.**

BAGGING COMPOST

Compost manufacturer McGill Environmental Systems has added compost bagging service. Residuals are transported to a composting facility and, at the customer's option, bags of EPA Class A compost suitable for unrestricted end use are returned. Lime stabilization is not required for materials accepted for processing. The company has computer-controlled indoor facilities. **910/532-2539; www.mcgillcompost.com.**



OdoWatch software from Kruger Inc.

REAL-TIME ODOR MEASUREMENT

OdoWatch software from Kruger Inc. provides continuous, real-time odor measurements. The electronic nose (e-nose) is calibrated to quantify site odors in odor units. The system is comprised of one or more e-noses, a weather tower, a wireless communications system, and a computer preconfigured with the software.

The e-noses are positioned near the odor sources. Using weather data, the system performs real-time dispersion modeling using AERMOD and displays the results as a color-coded plume on an aerial view of the site. The system alerts operators when odors begin to reach threshold values. The device can distinguish between the odors generated at the site and those originating from other sources. The sensors in the e-noses are calibrated based on data from an odor panel. **919/653-4574; www.krugerusa.com.**

SHAFTLESS CONVEYORS

The integrated sludge-handling system from SPIRAC includes a receiving bin with a shaftless screw live bottom and 19 other shaftless conveyors, including two trains of vertical shaftless screw conveyors to convey biosolids with 80-foot vertical lift into a storage silo. The design provides redundancy and the ability to move more than 1,600 tons of biosolids per day. **770/632-9833; www.spirac.com.**



Sludge-handling system from SPIRAC



Double Disc pump from Penn Valley Pump Co.

REPAIR-IN-PLACE HOUSING

The Double Disc pump from Penn Valley Pump Co., incorporates a repair-in-place hinged housing design for complete servicing without disturbing the piping. With flow rates to 1,400 gpm, the pumps are used for sludge handling applications such as belt press feed, centrifuge feed, rotary press feed, thickener feed, thickened sludge, digested sludge, primary sludge, scum and septage. The pumps are self-priming and able to handle high suction lifts. They can run dry without damage. **800/311-3311; www.pennvalleypump.com.**

REMOTE-CONTROLLED DREDGE

The Pit Hog dredge from Liquid Waste Technology is an electrically powered, remote-controlled unit available with a standard 40 hp high-efficiency, high-chrome pump. A Bottom Sense feature minimizes damage to lined ponds by following the bottom contours automatically. The stainless steel unit has higher-horsepower models. Dredging depths of 15 feet are standard, with options up to 30 feet. **800/243-1406; www.lwtpithog.com.**



Pit Hog dredge from Liquid Waste Technology



VOMM sludge dryer from Drycake

SINGLE-PASS DRYER

VOMM sludge dryer thin film technology from Drycake uses convection and conduction heat transfer to enable Class A drying from and to any desired dryness up to 98 percent. The system has low energy cost and safe and simple operation in a closed loop with no odor emissions and up to 50 percent

heat recovery. More than 150 systems are installed worldwide. **877/379-2253; www.drycake.com.**

HIGH EFFICIENCY

The 2G Agenitor cogeneration plant from CENERGY Power Systems Technologies Inc. is a biogas powered, thermodynamically output-optimized combined heat and power module offering 40.6 percent electrical and 85.5 percent overall power plant efficiency. The generating system is connection-ready, is factory tested, and comes as a complete module for quick installation.

The unit has an electronically controlled ignition system with bus coupler to the master control and optimized gas mixer for improved startup, minimization of pressure and high efficiency. Other features include oversized generator for extended operating life and automatic tracking of gas qualities and heat value fluctuations. **904/579-3217; www.2g-cenergy.com.**



2G Agenitor cogeneration plant from CENERGY Power Systems



Flump dredge from SRS Crisafulli Inc.

COMPLETE DREDGE PACKAGE

The remote-controlled Flump dredge from SRS Crisafulli Inc. is an integrated system comprised of major standard and optional components including flotation system, primary and secondary motors, hydraulic and electrical systems, cutterhead, pump, ladder, manual or programmable computerized skills, cabled traverse system, and Crisafulli

Integral Floating Discharge System. The unit is fabricated in a variety of materials, including special metals for abrasive or corrosive sludges. All four models are powered with electric motors and have standard dredging depths to 12 feet (custom depths to 30 feet). **800/442-7867; www.crisafullipumps.com.**

ISOTROPIC MIXING

The Linear Motion Mixer from Eimco Water Technologies produces isotropic mixing due to the combined effect of oscillating velocity and pulsating pressure waves. The motion is created by the controlled up-and-down movement of a thin, doughnut-shaped Hydro-Disk driven by a Scotch yoke and cam follower drive, which is powered by a gear motor. **512/834-6047; www.eimcowater technologies.com.**



Linear Motion Mixer from Eimco Water Technologies



Centrifugal dewatering systems from Centrisys

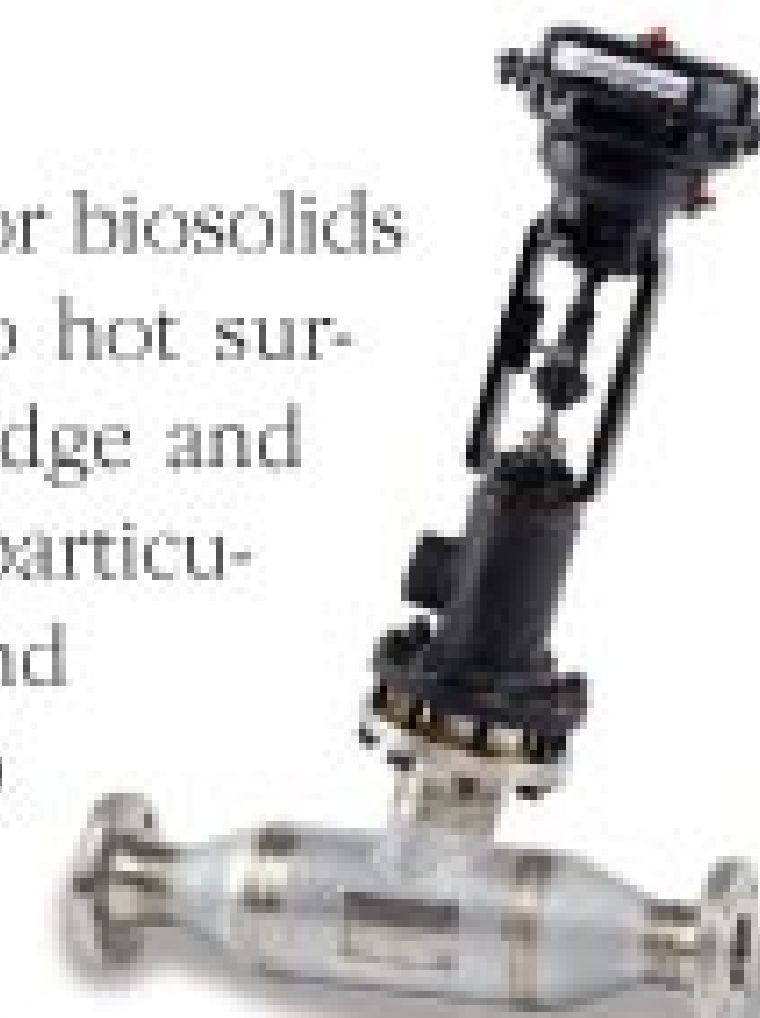
SINGLE SKID

Centrifugal dewatering systems from Centrisys provide a complete dewatering process on a single skid. Systems range from 25 to 300 gpm. Low floor loadings and vibration eliminate structural issues. **262/654-6006; www.centrifuge-systems.com.**

INLINE HEATER

ProSonix offers the PSX inline sludge heater for biosolids heating and anaerobic digestion. The unit has no hot surfaces, eliminating plugging and fouling. Inline sludge and slurry flow is designed for high solids and large particulates. The system is designed to handle slurries and sludge that have high viscosities and are difficult to pump. A low liquid pressure drop across the heater, typically 1-2 psig, reduces energy demand and allows for smooth integration with the pumping system.

Steam injection via internally modulated steam control allows rapid and complete mixing and condensation of the steam for smooth and stable operation. The steam injector's diffuser design produces 360-degree delivery of steam into the material for uniform heating. **800/849-1130; www.pro-sonix.com.**



PSX inline sludge heater from ProSonix

EASY GRIT HANDLING

The Grit Classifier from Schreiber LLC is designed to wash and dewater grit slurry from grit removal systems, enabling easy handling and transfer of grit for final disposal. The system is effective over a wide range of grit particle sizes, including sugar sand.

The grit slurry is transferred to the grit classifier, where the inlet flow is directed downward. The grit settles into the bottom of the hopper. A shaftless screw rotates, lifting the grit from the bottom of the hopper up the trough, further washing and dewatering the grit. The decanted water flows over a weir and is returned to the waste stream, and the discharged grit is dewatered and ready for the landfill.

The system is fully enclosed and is made of 304 stainless steel. A hardened steel shaftless screw requires no submerged bearing, resulting in low maintenance. The system is available in 12-inch diameter for flow rates up to 150 gpm and 20-inch diameter for up to 300 gpm. **205/644-7466; www.schreiberwater.com.**



Grit Classifier from Schreiber LLC

AUTOMATIC RE-PRIMING

Gusher self-priming centrifugal pumps are completely interchangeable with similar pumps from other brands. Users can install new pumps or rebuild existing pumps using a replacement rotating assembly. The large-volute design allows the pumps to re-prime automatically without suction or discharge check valves.

Self-priming is achieved with the pump casing only partially filled with liquid and with a completely dry suction line. Pumps range from 2 to 10 inches. The line includes pumps that handle solids up to 3 inches and pumps made from ductile iron, 316SS or CD4M. All models come pre-assembled and ready to install. **800/548-1234; www.usabluebook.com.**

PRE-PIPED AND PRE-WIRED

Skid-mounted dewatering systems from FKC Screw Press come with a screw press, flocculation tank, sludge pump, controls and polymer system. Everything is pre-piped and pre-wired. The systems are upgradeable to be used to dewater and produce Class A biosolids. **360/452-9472; www.fkcscrewpress.com.**



Skid-mounted dewatering systems from FKC Screw Press

DRYING AND COMPOSTING

Brown Bear Corporation produces four sizes of self-propelled composting and sludge-drying machines. The four units range from Model 200 at 130 hp and 800 cubic yards per hour to the Model 500 at 350 hp and 3,000 cubic yards per hour. All units are used for composting of biosolids.

641/322-4220; www.brownbearcorp.com.



Composting and sludge-drying machines from Brown Bear Corporation

KNIFE VALVE

A.H. Stock Mfg. Corporation offers the 12-inch-square Newton Knife Valve, designed for vehicles hauling biosolids to fields for land application. The air-operated valve uses a stainless steel knife edge to shear off foreign objects that may obstruct the seal area, thereby preventing leaks. During development, the valve was tested successfully in various conditions including sawdust, straw, sand bedding and municipal waste. **920/726-4211; www.ahstockmfg.com.**



Newton Knife Valve from A.H. Stock Mfg. Corporation

ALKALINE STABILIZATION

Cemen Tech Inc. offers mobile alkaline stabilization equipment available in sizes from 10 to 80 tons per hour. The units can be driven by utility power or by a diesel genset. The alkaline materials are fed to the units from low-profile silos that are provided. The machines can produce Class A or B biosolids. **800/247-2464; www.cementech.com.**



Mobile alkaline stabilization equipment from Cemen Tech Inc.

CAPABLE SPREADER

The Stoltzfus BMS 1516 spreader includes a hopper with 53-degree sides. At the bottom of the sides is a 4-inch-deep pan containing a 30-inch-wide, slat-type conveyor chain with exposed links that pull the material to the rear-metering gate. For dense, low-fiber materials, there is a low-rpm, flail-type agitator that runs the length of the hopper to slice the material and break up any bridging.

The shredder has a low-rpm, flail-type device that sets sideways outside the rear-metering gate and above the dual spinners. It shaves off a continuous flow of materials

down to the spinners, eliminating gaps between large lumps in materials that do not flow evenly. **800/843-8731; www.stoltzfusmfg.com.**



BMS 1516 spreader from Stoltzfus

BIOSOLIDS DRYING TECHNOLOGY

EcoWave 1000 Series drying technology dries municipal biosolids to produce a Class A product using a microwave/near-infrared process. The process is safe, energy efficient, and highly scalable. It produces little to no odor, has low operation and maintenance costs and minimizes emissions of secondary pollutants such as dust, CO, CO₂, NO_x and SO_x, according to the manufacturer. The technology has a compact footprint — a 50-wet-ton-per-day machine has less than a 900 square-foot total recommended install area.

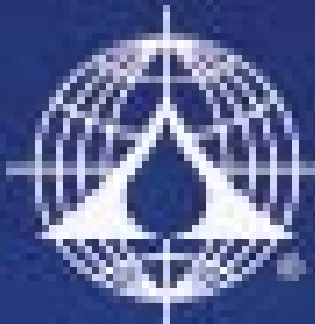
The technology combines the heating characteristics of microwave and near-infrared rays. The action of microwaves generating heat inside and the near-infrared rays heating the surface enhances heating and drying. The electric drying technology uses an agitator-equipped screw conveyor that agitates the material being moved in the dryer in order to apply heating evenly, for a uniformly dried product. EcoWave has a fully functioning pilot unit mounted to a truck available for demonstrations. **321/217-3181; www.ecowaveusa.com. tpo**



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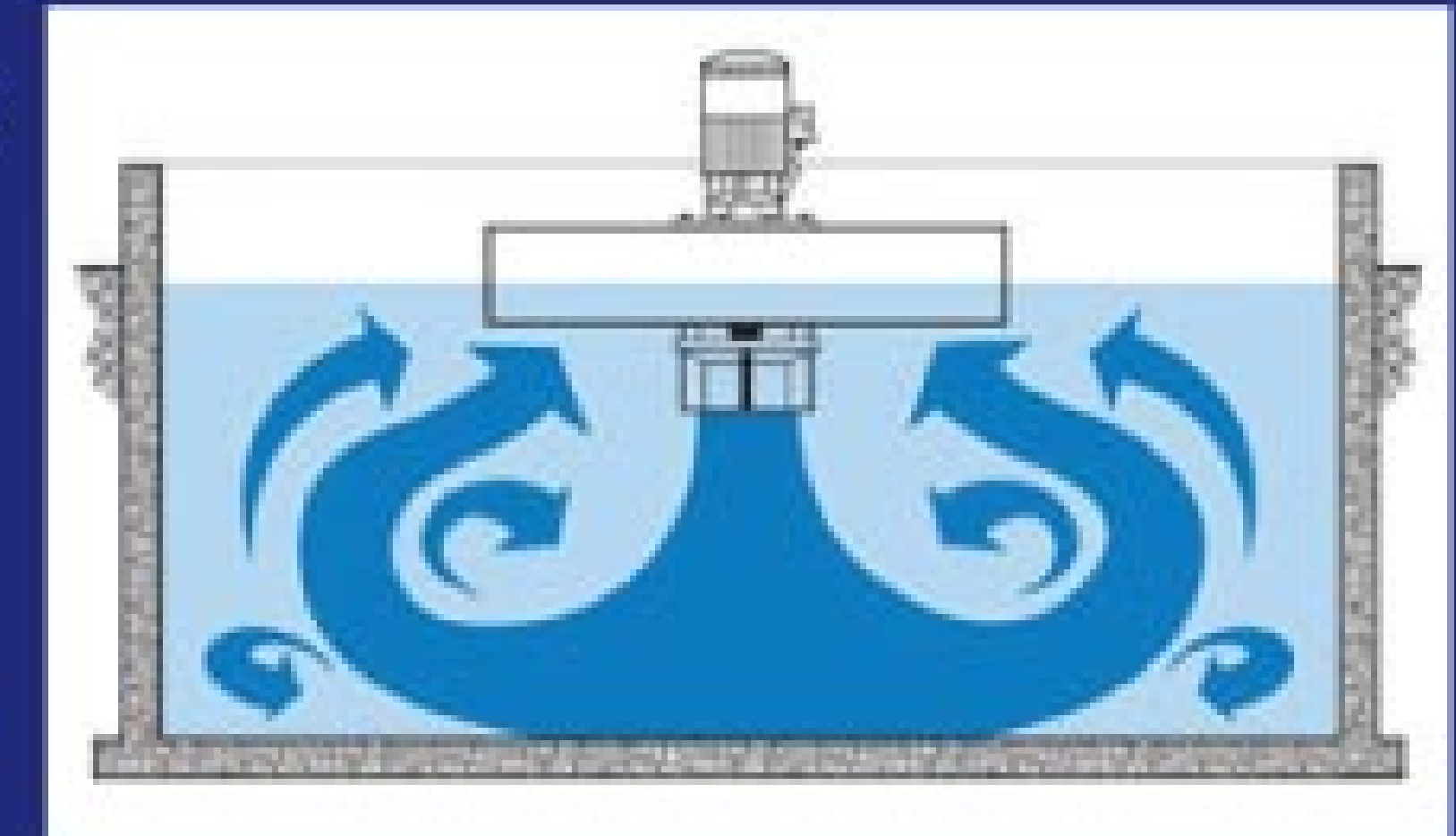


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Showing the Way

AN OPERATOR IN THE STATE OF WASHINGTON BELIEVES PROFESSIONALS SHOULD BE READY TO OFFER GUIDANCE TO PEOPLE INTERESTED IN CLEAN-WATER CAREERS

By Ted J. Rulseh

Many wastewater treatment operators at work today didn't really seek out the career — they fell into it through connections or circumstance. That's true of Larry Littrell, an operator with the Lake Stevens (Wash.) Sewer District.

The district, about 20 miles north of Seattle, operates a 2.3 mgd (average) plant serving a residential community of about 30,000. Littrell holds Group IV certification, the state's highest level, and is one of three full-time operators at Lake Stevens. The facility uses an activated sludge process with aerated earthen lagoons. A new plant using membrane filtration will open in about 18 months and will deliver reuse-quality water.

Littrell sees growing demand for operators as veteran professionals retire, and he believes those entering the field will need to be better educated and more technologically savvy than the first wave of operators hired in the early 1970s.

Therefore, in his opinion, the profession will need people who have specific interest in the field. His experience indicates that many young people are not aware of the opportunities in the profession and, even if they are, may not know how to go about applying for and winning positions.

“Even when I talk to operators now about what it takes to get into this field, a lot of them really don't know. I'm interested in having operators be aware of what it takes just to get started in the profession.”

LARRY LITRELL

Littrell believes operators should take an active role in stimulating interest in clean-water careers and in showing young, bright people how to prepare themselves for the job market and compete successfully for positions. He spoke about his ideas in an interview with *Treatment Plant Operator*.

tpo: Do you envision a shortage of operators in your part of the country?

Littrell: Yes. I've been told that almost half of the operators in the State of Washington are going to retire in the next five years. The median age for operators is high — in the later 50s. There's going to be a lot of turnover in the next five years.

On top of that, the industry is changing so much. Being an operator used to mean cleaning out a tank, throwing a switch. Now it's becoming so much more technical that it's going to be harder to get people into the plants and trained. With all the new technology com-

ing in, we're going to need a more diverse workforce.

tpo: What do you observe in terms of awareness among the general public about careers in clean-water occupations?

Littrell: In my circles, I talk with people who are out of work and want a long-term career, or with people who are working for low pay with not really great benefits. In general, people have no idea what we do. They hear wastewater, and they think you're wading around in sludge. They don't have any idea. Once I talk to them about the systems, they discover it's totally different from anything they thought.

I feel a lack of vocational training for wastewater careers is a big problem. People coming out of the military or even high school can get vocational training for electrical, carpentry, welding, auto mechanics and more. Where do they go to get training in the water and wastewater fields? The industry is huge, but there is little vocational training.

tpo: Why do operators have trouble advising interested people on how to enter the profession?

Littrell: Several years before I came into the profession, I asked a couple of operators how to get into the field. Their answers were rather vague. My feeling was that many operators didn't know how to get into the field because they got in through connections with relatives, or they transferred to the treatment plant from other city departments, or they just sort of fell into it. Even when I talk to operators now about what it takes to get into this field, a lot of them really don't know. I'm interested in having operators be aware of what it takes just to get started in the profession. You don't have to be able to tell a prospect how to get to Group IV certification or how to become a supervisor, but it would be nice to be able to give a little more specific information about how to begin.

tpo: How did you come into the profession?

Littrell: I'm one of those who kind of fell into it. I worked as a corrections officer for about 10 years, first for the Washington State Reformatory in Monroe where I live, and then at a King County drug and alcohol rehab center. Then I got laid off.



Larry Littrell

“Once you pass the test and earn an Operator In Training certificate, wherever you go to apply, they know that with one year of experience you can automatically apply for an upgrade to Group I operator. Coming in off the street, that gives you an advantage over someone who doesn’t have that certification.”

LARRY LITRELL

At the time the county had some wastewater operator jobs available. I had always thought about that line of work. Because I was laid off, I had preference for interviewing. I had done some apartment maintenance in my past. I had done general electrical work, and some plumbing.

Those experiences helped me get one of the jobs, and that got me started in the field. Now that I’m in it, I wish I had gone into it when I was 20. I’ve now worked as an operator for King County, the City of Monroe, and Lake Stevens — 10 years in total.

tpo: Once you were hired, what did you need to do by way of training and education?

Littrell: I went to work at King County’s West Point treatment facility. They hired ten of us at the time. They brought in an instructor from Green River Community College who gave us essentially a wastewater operator 101 course. I passed a test and got my Operator In Training certificate. A year later I applied for an upgrade to Group I operator, and I received that. I now have Group IV certification.

tpo: What would you advise prospective operators to do as a first step toward entering the clean-water profession?

Littrell: I would advise them first of all to get their Operator In Training certification. By doing that, you acquire some general knowledge of what it takes to run a treatment plant, and so you can tell if you really want to get into the profession.

In our state, you can get your Operator In Training certificate with three CEUs or 30 hours of training. You can take training locally through a community or technical college, or you can take the Sacramento Volume 1 training course.

Once you pass the test and earn an Operator In Training certificate, wherever you go to apply, they know that with one year of experience you can automatically apply for an upgrade to Group I operator. Coming in off the street, that gives you an advantage over someone who doesn’t have that certification.

tpo: So, now you’ve earned your Operator In Training certificate. What are the next steps?

Littrell: Then it’s a matter of using any work experience or schooling you have that’s somehow related to the field — getting it on a professional resume, putting in applications, and getting an interview for a position.

When you do get an interview, one of the important things to do is to go and tour the plant. In my experience, when I have asked for a tour, I’ve never been refused. By taking the tour, you show that you’re sincerely interested. It also gives you a chance to see what processes they’re using, so you can go back and study up on those as part of your interview preparation.

tpo: How does a prospective operator find job openings?

Littrell: Most positions are advertised in the local newspapers. It’s also a good idea to identify the cities, towns and counties where you’re interested in working and keep an eye on their Web sites. There are also state organizations to check on. For example, in our state we have the Washington Association of Sewer and Water Districts and the Washington Association of Cities. They list job openings on their Web sites.

One thing to remember in looking for positions is to go ahead and apply even if you don’t meet every qualification the listing asks for. Often, a position will be posted for, say, a Group II operator with two years’ experience, but the agency will hire an Operator In Training, because they can’t find anyone with the experience they want. As an Operator In Training, you can’t apply for a manager position, but you can apply for an operator position that specifies slightly more experience than you have.

tpo: What about the interview process itself?

Littrell: The interview is by far the most important part of the whole process. The main thing is to be ready for it, and taking a tour helps a great deal. Also, realize that operations is becoming more and more professional, and dress the part. I’ve always believed you should dress a step up from what you’re applying for. So wear a pair of good slacks and a nice dress shirt.

Prepare as best you can. Get some information on the city or district where you’re applying so you have some general knowledge about them. Take along some questions you want to ask. At the end of the interview, they’re going to ask if you have any questions.

When you walk into the room and the interviewers introduce themselves, write their names down. Afterward you’ll want to send them a note to thank them for seeing you. Above all, show your interest in wastewater operations as a career, so they know you’re not just trying to find a job for a year.

tpo: Why is it important for operators to help steer people into the profession?

Littrell: Because what we do is very important. One of my managers told me that wastewater operators do even more for public safety than firefighters and police officers do. Our role is extremely vital. What if we weren’t here and we were just running all the wastewater straight out into the rivers? I think we constantly need to emphasize the importance of what we do.

“One of my managers told me that wastewater operators do even more for public safety than firefighters and police officers do. ... I think we constantly need to emphasize the importance of what we do.”

LARRY LITRELL

We may encounter a friend, or one of our wives’ co-workers, or someone else who is looking for a career. We may meet kids coming out of high school, not interested in college, looking for a trade, thinking of becoming a plumber, electrician or carpenter. They may not even know this career exists.

We should know the basics of how to get someone like that started in the right direction. A lot of operators who have been in the field for a while, who are Group II, Group III, or Group IV, may not give much thought to what it takes to enter the field. But it’s a great field, and we need good people. **tpo**

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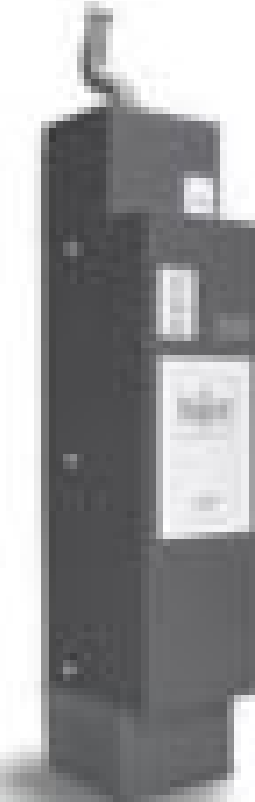


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LISTINGS

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

Texas Septic and Sewer Business. Well-Established and Profitable Texas Septic, Sewer & Installation Business For Sale. Grossing in excess of \$600,000 annually, customer list of nearly 2,000 accounts and 430 contracted customers. Includes nice late model equipment, most are 2007, 2008 model years. Real estate with rental income included in asking price - office and home generate \$1,000+ per month in rental income. **\$799,000.**

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

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

Northern California/Reno, Nevada Area Portable Restroom Service Business For Sale. Averaging \$115,000 in revenue over past 4 years. Includes two service trucks, 100 restrooms, trailers and more. **\$75,000 REDUCED \$55,000** - motivated seller.

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

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

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

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

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

people/awards

The **Virginia Institute of Marine Science** received two awards for its performance in managing wastewater on its 40-acre shoreline campus in Gloucester Point: A Diamond Award from the Hampton Roads Sanitation District, and an Industrial Waste and Pretreatment Environmental Excellence Award in the Platinum Category from the Virginia Water Environment Association.

Veolia Water North America received the Collection System of the Year Award from the California Water Environment Association for operating and managing the wastewater collection system in Palm Springs.

The **New York Water Environment Association** inducted five members into its Hall of Fame: Robert Adamski, Brooklyn; Henry Chlupsa, Smithtown; Janice Jijina, Bellmore; Jerry Lastihenos, Plainview; Norman Melbinger, Locust Valley.

AceOps, the Alliance of Certified Environmental Operators, elected eight members to its board of directors: Kenneth Goering, Rick Graves, Jake Groby, Philip Koundakjian, Cody Rensink, Mark Simms (president), Royce Stephens (vice president), Dennis Williams and Steve Moehlmann (secretary-treasurer).

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.

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

education

Kansas

The Kansas Water Environment Association has its annual Water and Wastewater School on Aug. 3-6 in Lawrence. Visit www.kwea.net.

Massachusetts

The New England Water Environment Association has a Collection Systems Conference and Exhibit on Sept. 9 in Westford. Visit www.newea.org.

Michigan

The Michigan Water Environment Association has a Collections Seminar on Sept. 9 in East Lansing. Visit www.mi-wea.org.

North Carolina

The North Carolina Water Environment Association has a Back to the Basics Seminar on Aug. 19 in Fayetteville. Visit www.ncsafewater.org.

Ohio

The Ohio Water Environment Association has a Plant Operations/Lab Analysis Workshop on Sept. 1-2 in Columbus. Visit www.ohiowea.org.

Pacific Northwest Clean Water Association

The PNCWA has Safety and Occupational Health Webinars on Aug. 12 and Sept. 9. Visit www.pncwa.org.

South Carolina

The South Carolina Section-American Water Works Association has these courses:

- Aug. 2-5 – Collection Systems, Spartanburg
 - Aug. 19 – Laboratory Workshop, Columbia
 - Sept. 23 – Backflow Repair Workshop, Sumter
- Visit www.scawwa.org.

Texas

The Texas Water Utilities Association has these courses:

- Aug. 23 – Basic Wastewater, Corpus Christi
 - Aug. 24 – Basic Wastewater, Victoria
 - Sept. 13 – Effective Instructional Design, Austin
 - Sept. 14 – Wastewater Collections, Marble Falls
 - Sept. 20 – Utilities Management, Waco
 - Sept. 21 – Pumps and Pumping, Victoria
- Visit www.twua.org.

The Water Environment Association of Texas has these courses:

- Aug. 2-5 – EPA/RVIPA Pretreatment Workshop, Irving
 - Aug. 30-31 – Capacity Management Operation and Maintenance Seminar, Austin
- Visit www.weat.org.

WEF

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

Wisconsin

The University of Wisconsin Department of Engineering-Professional Development has a Wastewater Treatment Plants: Processes, Design and Operation course on Sept. 8-10 in Madison. Visit www.epdweb.engr.wisc.edu.

The Central States Water Environment Association-Wisconsin Section will hold a Management Seminar on Aug. 5 at Cabela's in Richfield, Wis. **tpo**



CALENDAR OF EVENTS

Aug. 10-13

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

Aug. 15-18

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

Aug. 15-18

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

Aug. 19

Fox Valley Operators Association Mini-Conference, Algonquin Public Works Building, Algonquin, Ill. Call 847/742-2068 or visit www.fvoa-illinois.org.

Aug. 30-Sept. 1

Florida Rural Water Association Annual Training and Technical Conference, Hyatt Regency Jacksonville-Riverfront. Call 402/592-6565 or visit www.frwa.net.

Aug. 30-Sept. 2

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

Sept. 12-15

WaterReuse Symposium, Omni

Shoreham Hotel, Washington, D.C. Call 703/548-0880 or visit www.watereuse.org.

Sept. 12-15

Rocky Mountain Water Environment Association and Rocky Mountain Section-American Water Works Association Joint Annual Conference, Keystone Resort and Conference Center, Keystone, Colo. Visit www.rmwea.org.

Sept. 12-16

South Carolina Section-American Water Works Association Annual Conference and Exhibit, Myrtle Beach. Visit www.jsc.scawwa.org.

Sept. 15-16

New York Water Environment Association Watershed Science and Technical Conference, Hotel Thayer, West Point. Visit www.nywea.org.

Sept. 15-17

South Dakota Water and Wastewater Association Annual Conference, Ramkota Inn, Sioux Falls. Visit www.sio.midco.net/sdwwa.website/index.htm.

Sept. 19-21

Northwest Biosolids Management Association Annual Conference, Campbell's Conference Center, Chelan, Wash. Visit www.nwbiosolids.org.

Sept. 21-24

Western Canada Water Annual Conference and Trade Show, Hyatt Regency, Calgary, Canada. Visit www.wcwwa.ca.

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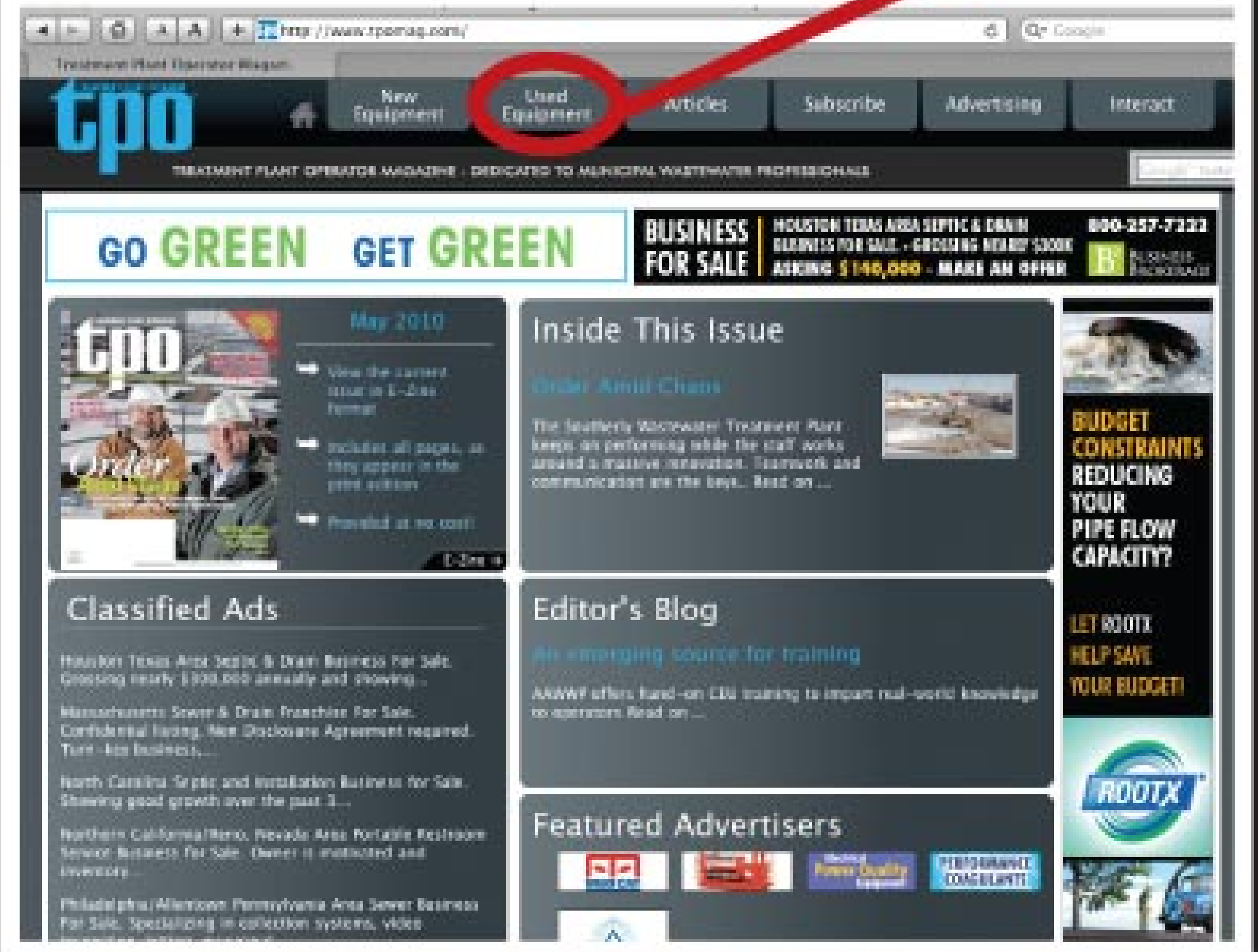
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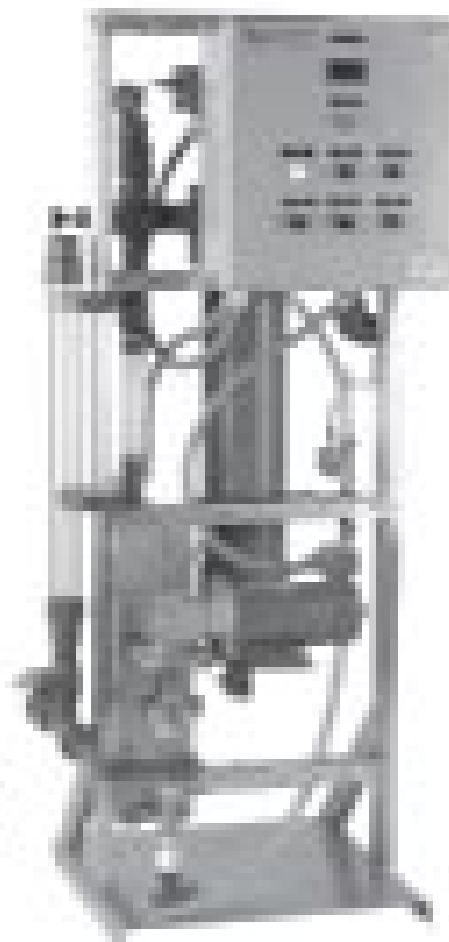
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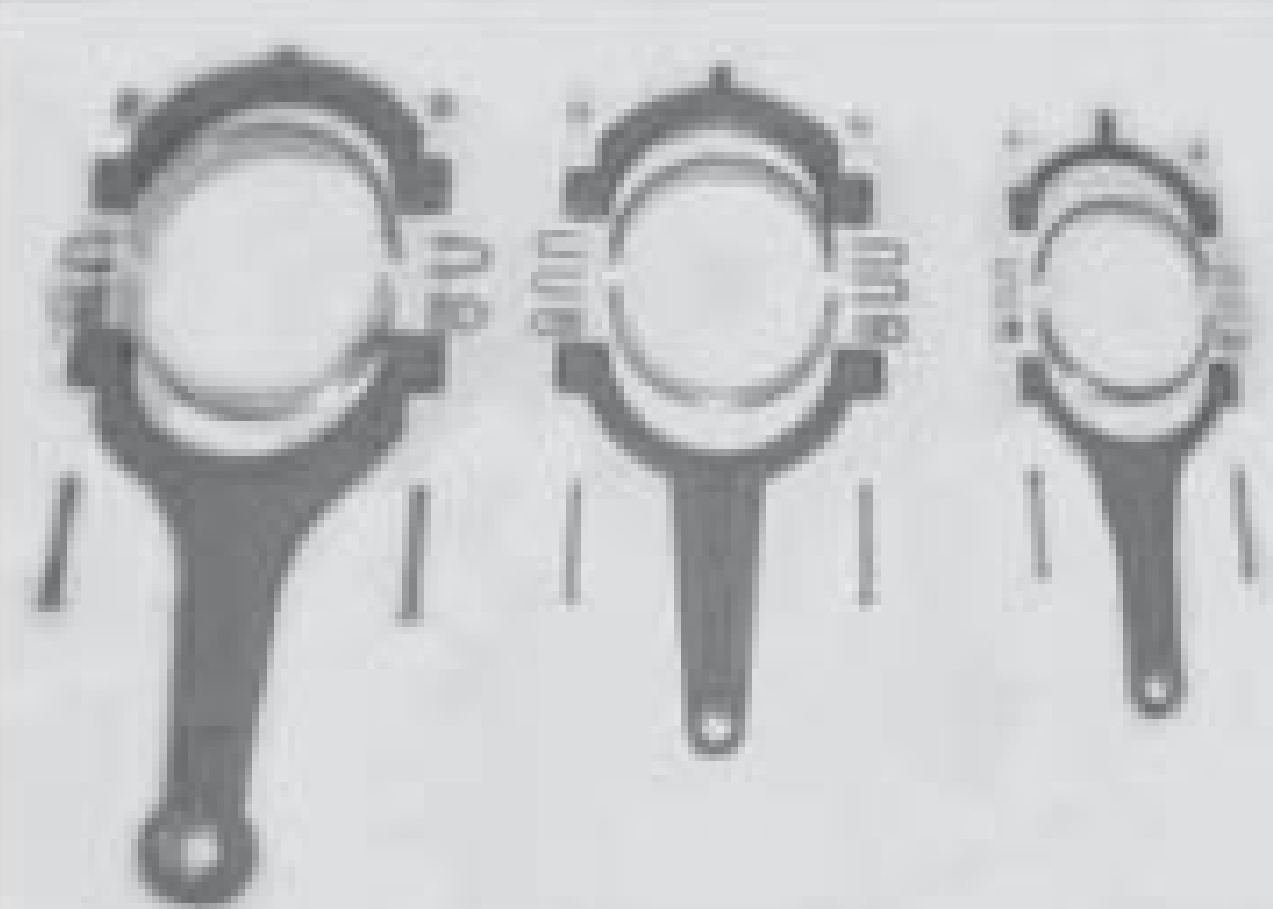
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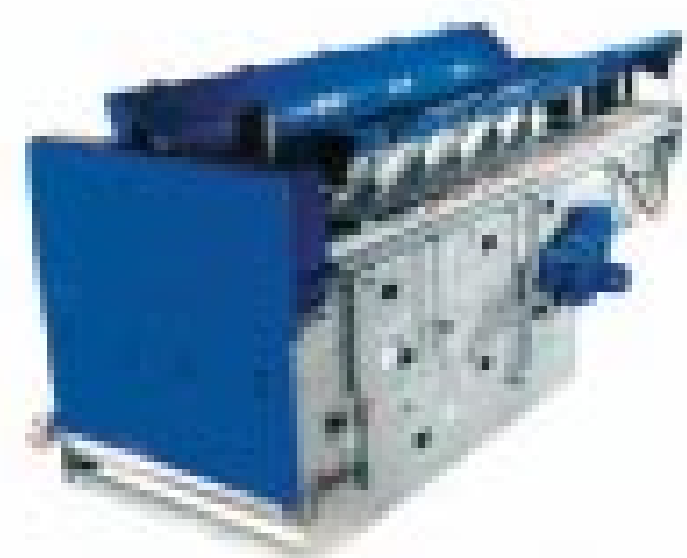
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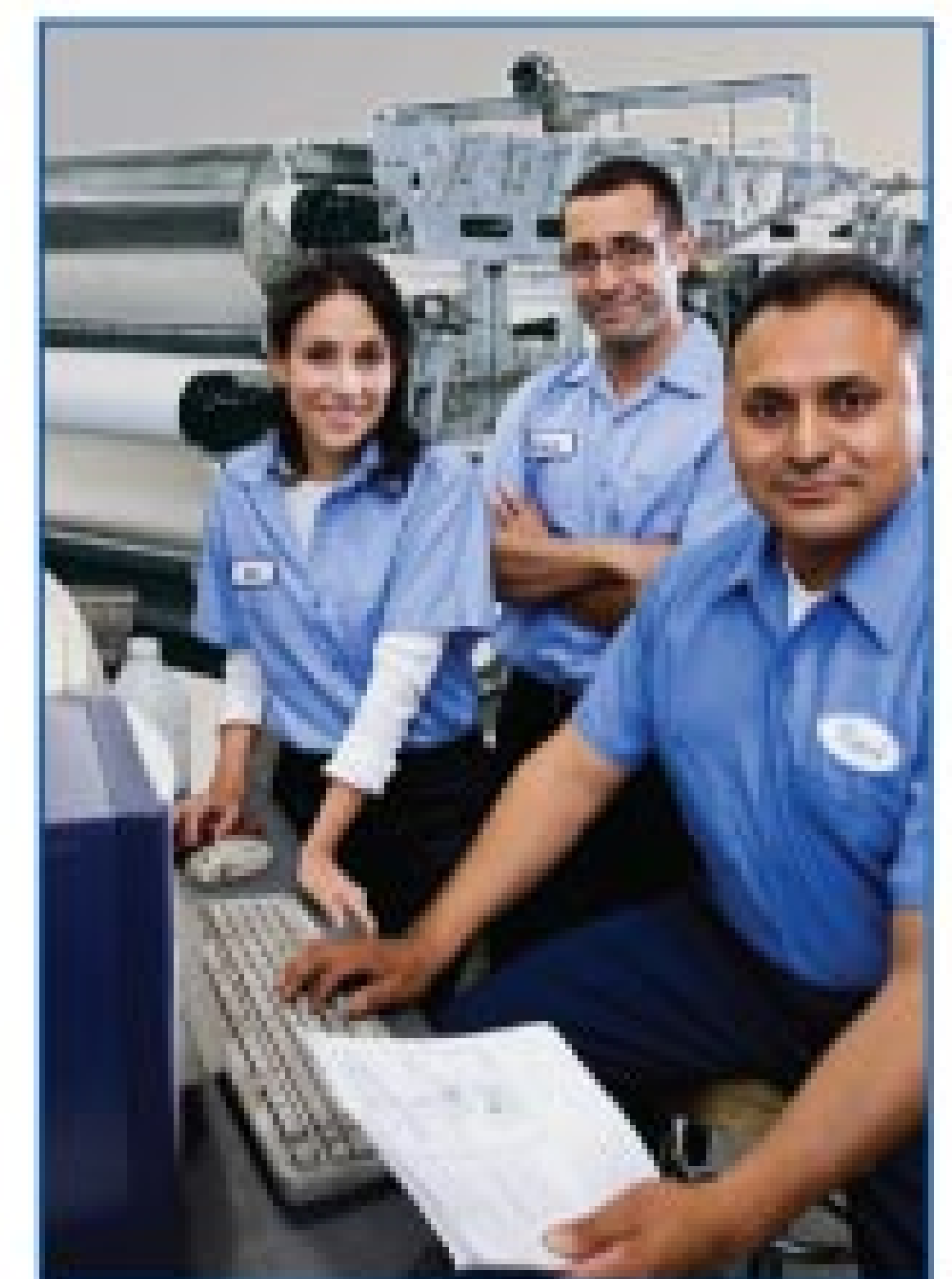
From centrifuge technology to drum thickeners and from belt filter presses to gravity belt thickeners, we wrote the book on cost-effective dewatering so you don't have to struggle with this problem. Our technologies are famous for optimum energy and polymer management and they will help make you famous for staying inside your budget.



Ashbrook Simon-Hartley brings ease-of-use and ease-of-maintenance to biosolids.

The other guys can only sell you equipment, we bring comprehensive knowledge and every technology option to the party—plus, we deliver results that are guaranteed. It just doesn't get any easier.

- Gravity Belt Thickeners
- Belt Filter Presses
- Centrifuge Technologies
- Rotary Sludge Screens



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www.as-h.com
800.362.9041
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11600 East Hardy
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