TREATMENT PLANT OPERATOR

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DEDICATED TO MUNICIPAL WASTEWATER PROFESSIONALS

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FEBRUARY 2009

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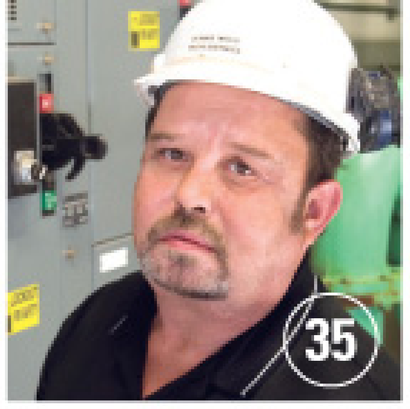
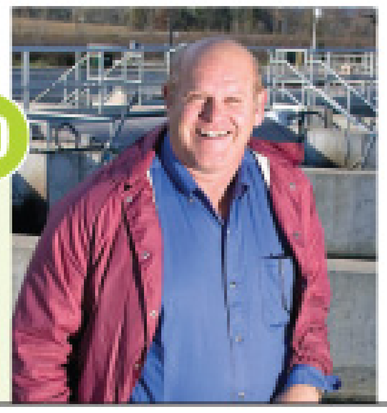


departments

on the cover

The Dane-Iowa Wastewater Treatment Plant in Mazomanie, Wis., uses the Schwing Bioset process for biosolids — a technology more common in southern climates. Richard McKee is facility superintendent. (Photo by Andy Manis)



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Exceeding the Limit

MEETING PERMIT REQUIREMENTS IS GREAT. IT'S EVEN BETTER TO FIND WAYS TO GO BEYOND THOSE STANDARDS WITH COST-EFFECTIVE INNOVATIONS.

By Ted J. Rulseh, Editor

In an old novel I read years ago, *Adam Bede*, the title character conveys an attitude toward work that has always stayed with me.

Adam is a carpenter who takes pride in his craft. He has disdain for workers who simply show up and go through the motions. Early in the story, he complains that some workers, if the quitting-time bell rang while they had their hammer raised and a nail half driven, would just put the hammer down and leave.

Name any profession: The best people in it feel the way Adam Bede does. It's not about going home at the stroke of 5 p.m. or whatever your quitting time is. It's about doing the job, doing it well, and being proud of it.

Wastewater treatment operators have pride in abundance. They're justly proud when their plants win honors like the Platinum Peak Performance Award from the National Association of Clean Water Agencies, recognizing five years of continuous permit compliance.

MINIMUM STANDARDS?

But what about doing better than the permit says? Even far better? That's one thing that separates the good from the great in treatment operations.

These days, NPDES permit requirements set the performance bar pretty high, and they seem to inch it up a little every time a permit comes around for renewal. But still, when you think about it, what permits spell out are, by definition, minimum standards. And who really wants to do the minimum?

Now, of course, meeting a permit consistently and continuously is no small achievement, especially when a plant process is subject to changes in flow and waste strength caused by weather, upstream industrial process changes, and other factors no operator can control.

And of course, beating the permit would be easy if everyone could just drop in a tertiary plant and put out pristine effluent around the clock. The reality is that money is always an object, and taking out that extra BOD and TSS may come at a price.

ALWAYS GETTING BETTER

But then there are plants where the managers and operators really do look at their permit limits as minimum standards and do everything in their power (and within their budget) to drive effluent parameters lower.

The same applies to biosolids. There are plants that struggle to comply with regulations, and there are those that produce superior products (and biosolids is in fact a product) while keeping the community on their side.

Improving performance can be difficult, but tools are available to make it easier and to make change lasting. In private industry, initiatives like Six Sigma and Lean help facility teams take a scientific approach to solving problems and fixing processes.

Improving performance can be difficult, but tools are available to make it easier and to make change lasting. In private industry, initiatives like Six Sigma and Lean help facility teams take a scientific approach to solving problems and fixing processes.

Six Sigma follows a five-step approach — Design, Measure, Analyze, Improve, Control — to find the root cause of process variation, devise remedies, and make those remedies stick. Decisions are driven by data, not by experience, intuition, gut feel or trial and error.

Lean is a set of methodical approaches to reducing waste in all its forms, such as time, material, motion, defects and overprocessing. It is a way of getting to the desired result in the most efficient and effective manner possible. I wonder how many treatment plants have investigated methods like these.

CASE IN POINT

There's another kind of discipline that's widespread in private industry and is gaining a foothold on the biosolids side of wastewater treatment. It's called an environmental management system (EMS) — a way of documenting and standardizing processes so that people can implement them effectively and consistently.

The National Biosolids Partnership offers an EMS program to wastewater agencies. You can read about it in this month's "In My Words" feature — an interview with the Partnership's Sam Hadeed.

Six Sigma, Lean and EMS have helped work wonders for many businesses. Has your facility explored how they might help you refine your process and beat your permit by a mile? If not, maybe that's something to look into in the near future. If so, we'd certainly like to hear your story and share your successes with readers of this magazine.

Feel free to drop me a note about your process improvement initiatives. Just send a message to editor@tpomag.com. tpo

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.

Right Down the Pipe

THE TWIN CITIES' WASTEWATER AGENCY REACHES A VAST AUDIENCE WITH A POPULAR EDUCATIONAL EXHIBIT AT THE SCIENCE MUSEUM OF MINNESOTA

By Ted J. Rulseh

The entry to the Mississippi River Gallery exhibit at the Science Museum of Minnesota appropriately resembles a large stormwater pipe, complete with men's and women's restrooms and important displays about wastewater and drinking water. (Photography by Lawrence A. Jones)

Visitors to the Science Museum of Minnesota can learn about sewer systems by walking right into one — symbolically, at least.

In an exhibit created by the museum staff and Metropolitan Council Environmental Services, which provides wastewater treatment services to Minneapolis-St. Paul and surroundings, visitors to a Mississippi River gallery enter the restrooms by walking through a 12-foot-diameter sewer pipe rich in displays and information. The displays continue inside the men's and women's rooms. The exhibit illustrates that public education about wastewater treatment need not be confined to treatment plant properties. It also shows the value of treatment agencies collaborating with experts in education.

In 2000, the exhibit won the Annual Environmental Excellence Award from the Minnesota Environmental Initiative, a public-private partnership aimed at finding consensus on environmental issues.

"Partnerships are the most effective when the partners make use of each other's strengths."
LINDA HENNING

BEST OF BOTH

"Partnerships are the most effective when the partners make use of each other's strengths," says Linda Henning, an environmental education specialist with MCES. "Our strength was that we understood the treatment system and how it works, and members of our operations and technical staff were involved at various stages of the exhibit.

"On the other hand, the science museum exhibit staff are experts in knowing how to convey information to the general public visually and with words, in ways that grab people's attention. We had materials such as old photos that showed what the river used to look like, and of construction workers building the system. They had the talent on their staff to use those items effectively and to design things we didn't have."

MCES treats wastewater at eight regional treatment plants and develops plans to preserve and manage the region's water resources. The council conducts region-wide surface and groundwater planning and nonpoint source pollution abatement. MCES treatment plants process 300 mgd from more than 2 million residents.

One of many informational exhibits in the Mississippi River Gallery portion of the Science Museum tells the tale of treatment plant sophistication.

The Science Museum of Minnesota, founded in 1907, is a major attraction, located on the bluffs overlooking the Mississippi River in downtown St. Paul. Its programs combine research and collection facilities, a public science education center, extensive teacher education, school outreach programs and an IMAX theater.

The 370,000-square-foot facility that includes the restroom display opened in December 1999. Its 70,000 square feet of exhibit space includes a 10,000-square-foot temporary exhibit gallery and five permanent exhibition halls.

INSIDE AND OUTSIDE

The wastewater treatment exhibit starts at the drinking fountains outside the restrooms, where a display asks: Who drinks the river? A map and graphics show that the Mississippi provides drinking water for about half the Twin Cities' metro population.

As they enter the restrooms through the interceptor pipe, people see a display of household objects that were flushed down toilets and screened out at the treatment plants: toys, a dollar bill, false teeth, a baseball, a baby rattle and others.

"Also inside the pipe is a display that explains the difference between storm and sanitary sewers," Henning says. "Another display explains the completion of a CSO project, and another shows the importance of cleanliness of urban storm runoff." At the entry to the bathrooms is an illustration that shows the locations of the council's treatment plants and its 600 miles of interceptor sewers.

Just outside the restrooms, a 4- by 12-foot mural shows the river's path through the Twin Cities and the points where drinking

This display gives museum visitors a clear picture of how wastewater is treated for discharge into the Mississippi River.

"Many of our employees went to see it. It engendered a lot of pride, as a lot of educational efforts end up doing. Our employees liked seeing the public react positively to what they do. They don't often get that kind of feedback."
LINDA HENNING

water is drawn. "It also shows the positive impacts clean water has on preservation of natural resources, preservation of wildlife, and daily life for humans," Henning says. "People pay a lot of attention to it. It's very colorful and it's organized in a way that is highly educational and also very interesting."

Inside each restroom, the stall doors picture stories on them:

- Portable Toilet Adventures
- What Is a Septic System?
- Mighty Microbes
- Ode to Odor.

At the wash basins, signage reinforces the need for handwashing and how it helps prevent the spread of common diseases like colds and flu.

MEETING THE CHALLENGE

"The challenge in creating the exhibit was to take underground infrastructure that is invisible, and treatment plants that are generally located out of view, and bring them into the open to increase public awareness of the services they perform and the impact they have on public health," says Henning.

"The museum staff members were involved in reviewing the plans and specifications for design of the museum," she says. "They knew from the beginning that if we were going to turn restrooms into an educational exhibit, the restrooms had to be built in a way that would facilitate that. By working from a very early state, before the new museum was built, we were able to accomplish our goals."

A side benefit of the exhibit was that it gave a morale boost to the MCES staff. The museum promoted the exhibit heavily during the weeks of its grand opening, which attracted about 1 million visitors.

"We told our employees what was going on," says Henning. "We had lots of photos to show of people going through the exhibit, and their reactions to it. Many of our employees went to see it. It engendered a lot of pride, as a lot of educational efforts end up doing. Our employees liked seeing the public react positively to what they do. They don't often get that kind of feedback." tpo

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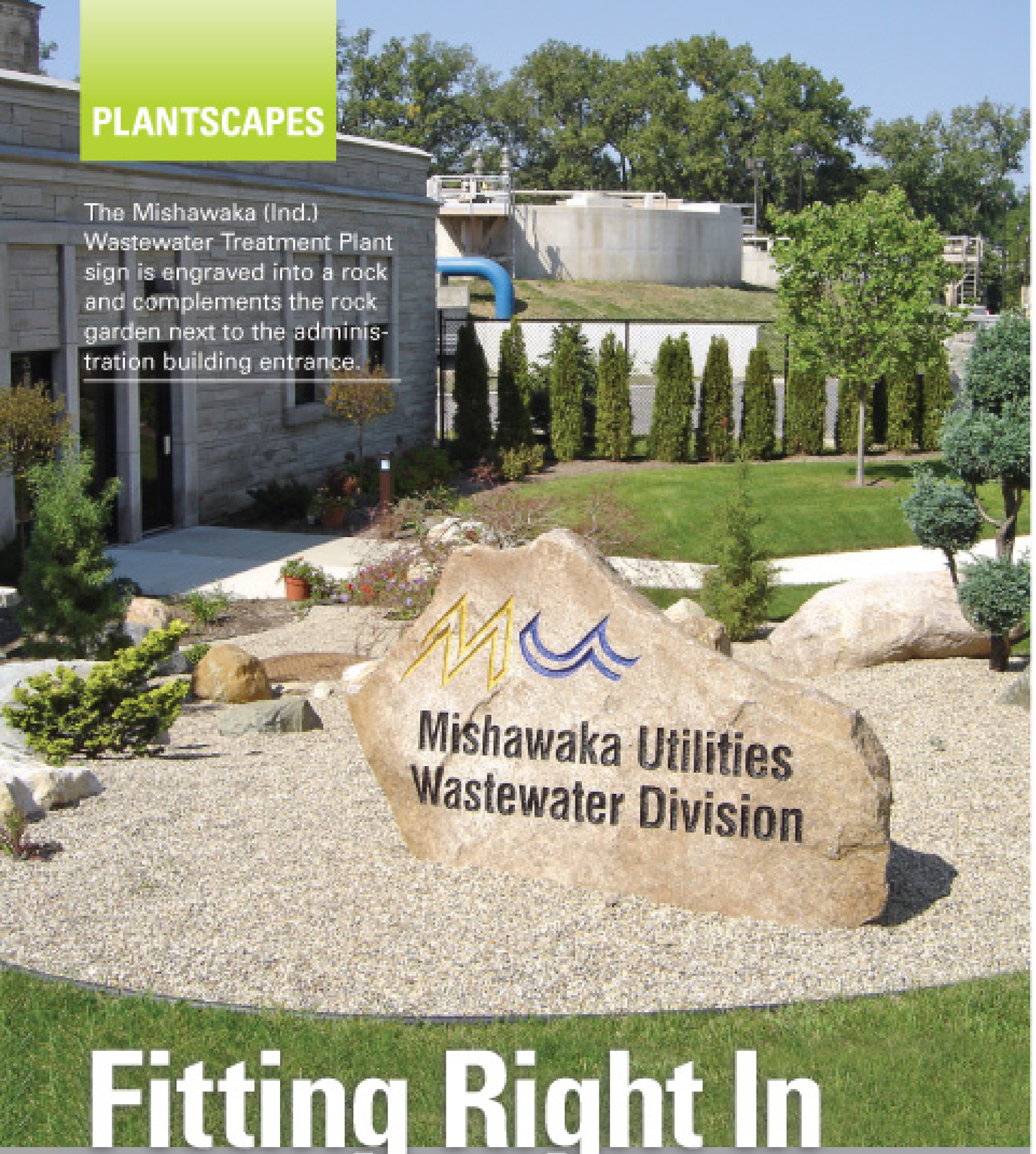

The Mishawaka (Ind.) Wastewater Treatment Plant sign is engraved into a rock and complements the rock garden next to the administration building entrance.

PHOTOS COURTESY OF MISHAWAKA UTILITIES WASTEWATER DIVISION

The $42 million expansion of the Mishawaka plant was completed in June 2008. Landscaping was a priority because the facility is located in a neighborhood park and is next to the Mishawaka Riverwalk. Shown here is the administration and headworks building.

Fitting Right In

GREENERY, FLOWERS AND NATIVE ROCKS MAKE AN INDIANA WASTEWATER TREATMENT PLANT COMPATIBLE WITH ITS SETTING NEAR DOWNTOWN

With evergreens lining the road and daylilies adding color, the grounds of the Mishawaka (Ind.) Wastewater Treatment Plant complement the facility's limestone buildings, nearby neighborhoods and the downtown's green space.

When the plant was built in 1952, there were just a handful of houses nearby, but as the neighborhoods grew, so did the plant that served them, narrowing the space between. "We're just west of downtown, between two neighborhoods," says Karl Kopec, Mishawaka Utilities Wastewater Division manager. "The neighbors and the mayor wanted to make sure the plant looked good, and we said we'd emphasize the landscape as part of the plant expansion."

HELP FROM A MASTER

Plant employees became key players. "When the original design was done for the expansion, the bids came in higher than the engineer's estimate," Kopec says. "We had to look for cuts. Landscaping was eliminated from the project initially and we decided we'd handle it separately. When the construction was nearing completion, there was pressure on the staff to get the landscaping done."

The added workload had its benefits. "It was more work for us," says Kopec. "But we had more input. Our administrative assistant at the plant, Marge Pieters, is a master gardener. She worked with a local landscape nursery to modify the original plan that was deleted from the plant expansion scope of work."

Landscaping began in fall of 2007 and continued through spring of 2008, as plant renovations were completed. The landscaping includes 22 types of plants, and there are hopes that more plants will come. Rocks were incorporated into the layout, including a rock garden at the entryway of the administration building.

"Marge designed the rock garden with Rick Springer of the city's park department," Kopec says. "Park department and treatment plant staff built the rock garden. Rocks that were used in the landscaping were unearthed during the construction of the expansion."

"Our administrative assistant at the plant, Marge Pieters, is a master gardener. She worked with a local landscape nursery to modify the original plan that was deleted from the plant expansion scope of work."

KARL KOPEC

ROCK ENGRAVING

One large rock is inscribed with, "Mishawaka Utilities Wastewater Division," along with the county's logo. This one was not found on-site. Kopec and utility general manager Jim Schrader visited a rock engraver in a nearby town and found the future sign sitting out front.

The treatment plant borders the St. Joseph River, where a major downtown renovation is underway. In addition, the Mishawaka Riverwalk, a looped path connecting downtown locations, passes the plant.

"A lot of wastewater treatment plants are isolated," says Kopec. "But we get a lot of foot traffic and we get a lot of compliments." tpo

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

The Derry Township Municipal Authority (administrative office shown here) operates the 5 mgd Clearwater Road Wastewater Treatment Plant. (Photography by Kenneth Smith)

Out of the *Grease Trap*

DERRY TOWNSHIP USES AN AEROBIC GREASE PRETREATMENT UNIT AS THE KEY TO A WINNING STRATEGY FOR HANDLING A PROBLEMATIC WASTE

By Suzan Marie Chin

AS THE REGIONAL GREASE TRAP WASTE ACCEPTANCE facility for its growing population, Derry Township Municipal Authority (DTMA) was looking for a way to deal more effectively with the growing volume of material.

The answer was an aerobic grease pretreatment (AGP) unit. While the system was not a "magic bullet," DTMA made the venture successful by careful structuring a program to accept and treat the waste. Regulation and rate modifications, post-construction performance, equipment monitoring and research studies all contributed to a highly productive process for dealing with grease, improving wastewater treatment plant performance and generating revenue.

The Clearwater Road Wastewater Treatment Plant is a 5 mgd (design) advanced secondary facility that serves the unincorporated Village of Hershey, Pa., and surrounding Derry Township. The plant treats an average of 3.9 mgd, including 0.7 mgd of pretreated waste from the industrial pretreatment facility at the Hershey Co., producer of the chocolate for which the community is known.

Since 1991, DTMA has operated a highly successful septage receiving facility. From the beginning, septage was passed through a self-cleaning rotary screen and lime-stabilized to enhance settling. This removed the entire solids and organic loadings from the plant's oversized primary clarifiers, reducing the load on the plant's activated sludge process.

BECOMING CRITICAL

"Grease has been a problem since day one," says Wayne Schutz, assistant manager for DTMA. "However, in the late 1990s, our Collection Department began to implement a grease trap inspection program. We quickly found that until food preparation establishments could find a disposal location for the grease trap pump-outs, they couldn't provide our inspectors with proof of trap maintenance."

At first, DTMA accepted grease waste only from establishments in Derry Township, but the authority soon started on the path to becoming the regional grease acceptance facility. The authority established grease trap regulations early on to encourage dilution of grease trap waste on the hauling trucks as a way to avoid plugging problems.

Handling of the material was the biggest challenge. Primary clarifier scum baffles, beaches, troughs and pits required daily cleaning to control buildup. About every quarter, it was necessary to empty a primary clarifier and remove 30 to 40 cubic yards of congealed grease from the center well. A crew would enter the tank, mix the gelatinous liquid with sawdust, and remove it with a Vactor combination truck for landfill disposal. In addition, the primary sludge line had to be opened and flushed every six weeks to remove grease blockages.

Although the rates for accepting grease trap wastes reflected the maintenance and disposal costs, the volume of grease still grew. DTMA tried numerous degreaser, enzyme and bacteria products before settling on BioGenerators from ECO Bionics, a division of NCH Corp. The product ferments bacteria in a controlled environment, allowing the population to reach exponential growth before discharge to the waste stream. The authority tested the product in a primary clarifier scum pit and found it promising, although not a solution in itself.

Assistant manager Wayne Schutz observes the operation of the grease pretreatment process. In addition to the aerobic grease pretreatment (AGP) unit, the plant purchased a third chopper pump, installed a grinder on the truck connection, and installed a bulk magnesium hydroxide storage tank and chemical feed system as an alternative to lime for pH control.

"We are an integral part of the hauler's business plan and they are typically receptive to our changes, whether it's a rate increase or procedure modifications, because the same rules and standards apply to everyone."

WAYNE SCHUTZ

profile

Clearwater Road Wastewater Treatment Plant, Derry Township (Pa.) Municipal Authority

BUILT:
1976 (upgrades: 1996, 2000, 2003, 2005, 2007)

CAPACITY:
Design 5.02 mgd, average 3.9 mgd, maximum 6.09 mgd

SERVICE AREA:
Village of Hershey, Township of Derry, Pa.

TREATMENT LEVEL:
Advanced secondary

TREATMENT PROCESS:
Activated sludge

PERMIT LIMITS:
20/25 mg/l BOD, 30 mg/l TSS, 7/21 mg/l NH3-N, 2 mg/l total P, 5.0 mg/l DO, 5.0-9.0 pH

RECEIVING STREAM:
Swatara Creek (Susquehanna River tributary)

LEAD PERSONNEL:
General manager Ralph G. Watters, assistant manager Wayne A. Schutz, operations supervisor Michael L. Snyder

Operations supervisor Mike Snyder checks the grease pretreatment process bacteria feed, which uses ECO Bionics BioGenerators.

THE DESIGN CONCEPT

After opening a new septage receiving facility in 2002, DTMA recognized that grease would continue to be a challenge. At about the same time, preliminary design had begun for a treatment plant upgrade and expansion, and design meetings focused on ways to address the grease problem.

"We evaluated numerous acceptance and treatment alternatives and dismissed them for a variety of reasons, ranging from traffic issues to administration and operational problems," Schutz recalls. The discussions reinforced the staff's opinion that feeding untreated grease trap wastes directly to the anaerobic sludge digester was not acceptable.

"The grease trap waste pretreatment alternative we chose was truly a collaborative effort between DTMA staff and our engineering firm, Buchart Horn," Schutz says. The solution, a pretreatment unit to be located at the existing septage receiving station, included these design features:

- Tank volume of 40,000 gallons (two to three times the average daily grease volume)
- Simplicity of operation
- Continued use of purchased bacteria
- Aerobic process
- Submersible chopper pumps with separate mixing and aeration cycles
- Mixing via submerged nozzles
- Aeration via simple Venturi tube technology
- Fill-and-draw batch process with mixed liquor bleed off
- pH control using available hydrated lime slurry.

DAILY OPERATION

March 2005 marked the completion and launch of the grease trap waste pretreatment facility and the AGP process. Now, instead of diluted grease waste, it was desirable to discharge the thick, full-strength loads to the treatment tank. DTMA therefore restructured its rates to create an incentive for the haulers to bring in pure grease waste. Mixed or diluted loads are now charged a higher rate.

"We are an integral part of the hauler's business plan and they are typically receptive to our changes, whether it's a rate increase or procedure modifications, because the same rules and standards apply to everyone," Schutz says.

Soon after process startup, the plant staff saw some significant improvements in the treatment plant, and some minor issues with the AGP. "The improvements were almost immediate and were dramatic," says Schutz.

"The amount of grease collecting in and on the primary clarifier influent wells, the scum baffles, beaches and V-notch weirs steadily decreased, and within a few weeks they disappeared totally. Similarly, the volume and consistency of material in the primary scum pits returned to what might be categorized as normal."

DTMA staff performed a follow-up line cleaning of the primary sludge line to remove any residual grease and monitored discharge pressure on the primary sludge pumps. Cleaning of the primary sludge line has not been necessary since the pretreatment system went on line.

CLOSE TO PERFECT

The AGP was not a perfect solution — some issues remained. In particular the amount of miscellaneous debris discharged into the tank is much higher than expected. Items like stainless steel flatware have jammed the chopper pumps numerous times. In addition, the grease waste includes more grit than expected, and the volume of lime slurry required for pH control is higher than DTMA has calculated.

The most challenging problems are odor and foam. The odor was relatively easy to manage through the proper maintenance of pH and dissolved oxygen. However, that process in turn produces foam. Although a large tank freeboard has prevented foam-outs, the process must operate at less than its optimum to keep foaming under control. To meet these challenges, the authority made improvements that included:

- Purchase of a third chopper pump
- Installation of a grinder on the truck connection to deal with the debris, grit and flatware
- Installation of a bulk magnesium hydroxide storage tank and chemical feed system as an alternative to lime for pH control
- Continued evaluation and test methods to control the foam.

"After nearly three years and treatment of more than 15 million gallons of grease trap wastewater, we consider the AGP a resounding success that has provided DTMA with an innovative way to handle large volumes of a problematic material," Schutz says.

The process is providing other benefits, as well. The AGP process biologically transforms grease trap wastes into a mixed liquor that is periodically removed and discharged to the wastewater treatment plant headworks. In

GENERATING NATURALLY

After installing its aerobic grease pretreatment (AGP) unit, the Derry Township Municipal Authority conducted several studies of the unit.

One comparative staff study revealed that after startup, there was a clear correlation between the amount of methane produced and the amount of grease waste accepted, pretreated and discharged into the wastewater treatment plant. Methane production in the anaerobic digester stayed in nearly direct proportion to the amount of grease trap waste accepted.

This extra methane production was a bonus to the treatment facility. The methane is already being used to keep the plant's 1.2 million-gallon digester at the optimal 100 degrees F, as well as to produce steam to dry biosolids cake into a granular product, recently designated Class A Exceptional Quality by the state Department of Environmental Protection.

The authority plans to install a cogeneration system next year to burn the balance of the methane. That will mean almost every ounce of methane is being put to good use.

TOP LEFT: An anaerobic digester. LEFT, Dave Seibert, operator IV, checks grease trap unloading connections. The Derry Township Municipal Authority runs the region's grease trap waste acceptance facility. ABOVE: Ken Snyder, operator III, checks a sample for pH.

"The AGP process was a smart move. It was not without its challenges, but all-in-all it was a great decision for our organization."
WAYNE SCHUTZ

the headworks, this material mixes with plant influent and is screened and degritted. The AGP mixed liquor settles as sludge in the primary clarifiers and is pumped to the anaerobic sludge digestion process.

HUGE SAVINGS

As a screened and degritted feed material with a very high fraction of volatile and highly digestible components, it provides the treatment plant's anaerobic digester with a food source that increases methane production. The alkalinity from the pH control in the AGP process benefits the anaerobic digester as well. Finally, the AGP mixed liquor gives the treatment plant influent a steady inoculation of bacteria that attack other FOG sources in the treatment stream.

"We've now resolved a problem which, if left unchecked, could have resulted in sewer line plugging from grease, and pump station failures," Schutz says. "The unit has helped us save huge amounts of time involved in cleaning tanks and lines.

"The unforeseen side effects, such as increased methane production, will contribute to additional cost savings and potential revenues in the future. The AGP process was a smart move. It was not without its challenges, but all-in-all it was a great decision for our organization." tpo

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Winning the War

A ROTARY FAN PRESS HELPS A TREATMENT PLANT IN VIRGINIA DEWATER BIOSOLIDS COST-EFFECTIVELY, RELIEVE CAPACITY ISSUES AND SATISFY REGULATORS

By Scottie Dayton

Sludge was winning the battle at the Front Royal (Va.) Wastewater Treatment Plant outside Washington, D.C. An outdated belt press was inefficient, producing cakes too wet to land-apply in winter or pass landfill requirements. In any case, insufficient land was under permit for land application.

Depending on a contractor to manage the biosolids was a nightmare for plant operator Tim Fristoe. The hauler took two weeks to empty the 375,000-gallon digester, and did not return for a month. The tank was too small to meet the 60-day storage requirement for land application, and the plant had no drying beds or covered storage. Regulatory officials noticed and responded.

The town planned to upgrade the facility to a membrane bioreactor (MBR) with autothermophilic aerobic digestion in 2010. Fristoe, however, needed an economical solution to last three or more years until the upgrade and comply with state regulations. A magazine article on rotary fan presses prompted him to call Prime Solution Inc. in Allegan, Mich.

Area representative Matt Winschel made the trip from Richmond in two hours. Before the visit ended, he scheduled a demonstration trailer to process sludge at the plant and promised Fristoe a loaner until his 48-inch dual-chamber Prime Solution rotary fan press was ready. The unit paid for itself in the first year and cleared up the regulatory issues.

BOTTOM LINE

In 2005, the Department of Public Works put out a bid to replace the two-meter belt press. It came back at more than $400,000. A year later, the bid reached $500,000. The contractor who land-applied the sludge charged $400,000 per year. The town budget included $400,000 to replace the belt press over two years, but no provisions for the hauler.

The Front Royal plant (design flow 4 mgd, average flow 3.3 mgd) produces 350 dry tons of aerobically digested biosolids per year. "To handle that volume, we needed the largest rotary fan press the company made," says Fristoe. "The $220,000 we saved by hiring a waste disposal company to landfill the biosolids from that press instead of land-applying them paid for it."

TPO welcomes news about interesting methods or uses of technology at your facility for future articles in the How We Do It column. Send your ideas to editor@tpomag.com or call 877/953-3301.

The demonstration unit, a 36-inch dual-chamber rotary fan press on a trailer, ran for three days. "I was impressed with its clean, odorless operation," says Fristoe. "We didn't have water spraying all over. We had no wash water consumption issues and we did not have to treat that water. The unit was self-contained, and once we learned how to make operational adjustments, it needed little attention."

Plant operator Tim Fristoe adjusts the rotary fan press system at the Front Royal Wastewater Treatment Plant. (Photography by Alan Lehman)

Biosolids, fed into two rectangular channels, slowly moves between two parallel revolving stainless steel filter plates. Filtrate passes through these slotted, wedge wire plates as the flocculated material advances. Dewatering continues until the material reaches a tapered restriction zone at the outlet of the press. An adjustable two-piece pneumatic restriction plate squeezes the material into the final dry cake.

IN A PINCH

The 48-inch dual rotary fan press was back-ordered for 12 months. Winschel, appreciating Fristoe's dilemma, sent a 36-inch dual unit on skids, enabling him to dismiss the liquid contractor. "The loaner arrived in January 2007 and didn't leave until my 48-inch press came in February 2008," says Fristoe.

The 36-inch unit is rated for 70 gpm, but Fristoe fed 40 gpm. Running it two 8-hour shifts per day kept the plant ahead of the biosolids. Some cakes were as high as 28 percent solids, but the average was 22 to 24 percent. Fristoe stored the cake in three 20-cubic-yard covered roll-off containers that were emptied twice per week.

Officials from 20 towns and as far away as Chicago came to see

the 36-inch press. "The technology is so new that few have seen it in action," says Fristoe. "People spent a couple of hours with me, watching and learning. I ran the daylights out of that machine."

When the 48-inch unit arrived, Fristoe hooked up his biosolids pumps and fed 80 to 100 gpm into the press, which is rated for 140 gpm. Depending on the season, the feed material sludge varies from 1.8 to 4 percent solids. Cakes consistently average 23 to 24 percent solids.

The process yields high-quality biosolids cake at 23 to 24 percent solids.

"Anyone can figure out the touchscreen given 45 minutes running the machine. It's easy to operate. We dreaded shutting down the old belt press because it took an hour to restart. This rotary fan press is like a light switch. Once I dial it in and set it up, nothing changes no matter how often I turn it off and on."
TIM FRISTOE

"The numbers on the solids are phenomenal for aerobically digested sludge," says Fristoe, who processes 30,000 gallons in eight hours. "Power consumption isn't bad either. Every 100,000 gallons probably uses a 55-gallon barrel of polymer."

SIMPLE ADJUSTMENTS

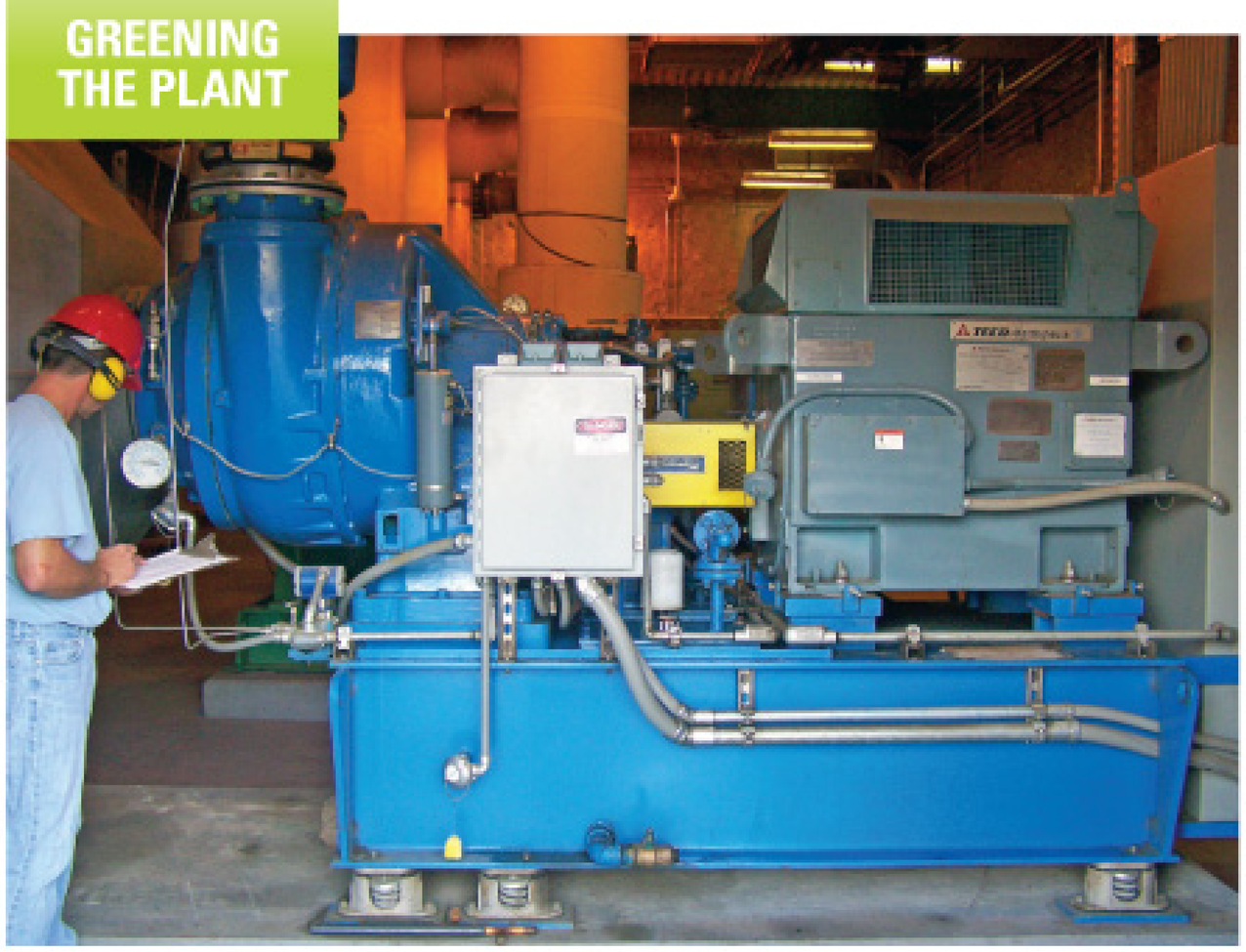
Unless the biosolids change, Fristoe makes all the daily adjustments within 30 minutes of starting the press. A touchscreen with icons controls the programmable automatic wash cycle and the pneumatic-operated pinch valves with magnetic flow meters that equalize flow for maximum efficiency. Other icons control gear ratios for variable speed and emergency stops of the press, water and polymer.

"Anyone can figure out the touchscreen given 45 minutes running the machine," says Fristoe. "It's easy to operate." The press is shut off and cakes removed every 15 to 20 minutes.

"We dreaded shutting down the old belt press because it took an hour to restart," says Fristoe. "This rotary fan press is like a light switch. Once I dial it in and set it up, nothing changes no matter how often I turn it off and on."

UPPER LEFT: Tim Fristoe uses the rotary fan press touchscreen controls. BELOW LEFT: Fristoe adjusts the polymer injection pressure.

The rotary fan press enabled Fristoe to defeat the encroaching biosolids, satisfy regulatory officials, save money and renew the plant's operating permit. He can meet EPA and landfill regulations and is no longer haunted by the 60-day storage requirement. **tpo**



PHOTOS COURTESY OF GLOVERSVILLE-JOHNSTOWN JOINT WASTEWATER TREATMENT FACILITY

ABOVE: A 50,000-cubic-foot dual-membrane gas holder helps the Gloversville-Johnstown plant take advantage of biogas after improvements in the plant's anaerobic digestion process. Inside this sphere, a fabric membrane expands and contracts with the influx and outflow of gas. AT LEFT: Thomas Ambrosino, wastewater operator, performs a daily check and records readings on the plant's 450-hp Turblex blower, installed to reduce energy consumption.

Nearing Perfection

THE GLOVERSVILLE-JOHNSTOWN TREATMENT PLANT USES A COMPREHENSIVE STRATEGY TO INCREASE BIOGAS OUTPUT AND GENERATE ALL OF ITS OWN ELECTRICITY ON-SITE

By Mike Grennier

No wastewater treatment plant has the perfect formula for saving energy, but the Gloversville-Johnstown Joint Wastewater Treatment Facility has a strategy that comes close to the ideal.

This 30-mgd (peak) activated sludge plant, 35 miles west of Albany, N.Y., is cutting energy consumption, more than doubling its capacity for on-site electric power generation, and boosting production of digester methane to fuel its combined heat and power (CHP) system. The net result: energy independence by early 2010.

Necessity, says plant manager George Bevington, is the mother of invention. "In 1990, less than 5 percent of our operating budget was for energy," he says. "A couple of years ago, energy costs consumed maybe 15 percent of the budget. That means energy became a much more important economic driver when you're trying to run a plant in a cost-effective manner."

"In 1990, less than 5 percent of our operating budget was for energy. A couple of years ago, energy costs consumed maybe 15 percent of the budget. That means energy became a much more important economic driver when you're trying to run a plant in a cost-effective manner."

GEORGE BEVINGTON

CUTTING CONSUMPTION

The need to hold down costs became critical in the late 1990s when industrial use of the facility was at an all-time low after several area plants closed. Meanwhile, energy costs continued to climb. With the help of funds from the New York State Energy Research and Development Authority (NYSERDA), plant staff hired a consultant to identify ways to reduce power consumption.

"The aeration system was the biggest energy user," Bevington says. "When two-thirds of your electricity is used in an aeration system, it's the obvious first place to look." The system had been sized when industrial loadings were high and energy was relatively cheap. In addition, the plant no longer saw industrial discharges 24 hours every day. That meant the plant needed to automate the system to cope more efficiently with fluctuations in organic loading.

In 2002, the plant invested more than $1 million to upgrade the aeration system. The upgrades include a 450-hp blower from Turblex Inc. and new ceramic fine-bubble diffusers from Sanitaire. The system also uses sensors to monitor dissolved oxygen and control the operation of the air valves as oxygen demand fluctuates with loads.

When it was all said and done, the project reduced annual electricity usage by 30 percent, saving more than 1.3 million kWh per year ($195,000). It achieved payback in five years, rather than 10 years as anticipated.

OPTIMIZING DIGESTION

After a second study funded in part by NYSERDA, plant staff focused on improving anaerobic digestion and capitalizing on bio-

gas. The existing digesters had been built when natural gas and electricity costs were low.

As a first step, the plant eliminated gas leaks in the secondary digester by repairing a misaligned floating steel gas-holder cover. To do so, workers floated the cover to the top of the digester and fixed it in place with steel I-beams and anchors.

Although that resolved the leakage, it eliminated the ability to store gas because the cover no longer floated up and down with fluctuations in gas production. The solution was to build a separate 50,000-cubic-foot dual-membrane gasholder. Inside this sphere, a fabric membrane expands and contracts with the influx and outflow of gas.

In the primary and secondary digesters, the plant installed bubble gun mixers from JDV Equipment Corp. and replaced older mixing systems. The mixers, fed by a compressor that operates on biogas, thoroughly and aggressively mix the digesters' contents.

The plant also built a 90,000-gallon equalization tank for high-strength waste, which is used as feedstock for the primary digester. Two feed pumps allow operators to control the feed to the digester. The steady, around-the-clock feeding results in steady, more efficient and less variable digestion.

"We do a very slow, continuous feed rate to the primary digester for a more steady input and a more steady output," Bevington says. To take advantage of the improved digester performance and increased biogas production, plant staff next addressed the existing 20-year-old CHP system. The project rebuilt the two 150-kW engine-generators so that both could operate continuously, instead of one engine operating at a time.

With the modifications, the unit now generates 1.8 million kWh annually, up from 800,000 kWh previously. By generating 1.8 million kWh on-site, the plant produces $273,000 worth of its own electricity each year. The system meets 40 percent of the plant's electrical needs and also provides process heat for the digesters and the facility's Energy Recovery Building. It also eliminates the need to purchase natural gas to heat the digesters.

ADAPTING TO CHANGE

Investments totaling $3.5 million in recent years paid off. By 2005, the facility cut its use of purchased electricity by 50 percent. Had the projects not been implemented, the plant would have had to increase its operating budget by $330,000 just to cover the rising costs of electricity and natural gas.

As often happens, the situation evolved, and the operation staff adapted. In spring of 2008, plant loadings began to pick up significantly with increased activity in the food manufacturing sector. With higher loadings and more biogas, there was little question that the plant could generate 100 percent of its own electricity. So the staff made plans to move closer toward its goal of energy independence.

A significant part of the plan is to increase anaerobic digestion efficiency to capitalize on the increased loadings. One step involves a new gravity belt and high-pressure rollers to remove as much water as possible before primary and secondary sludge enters the primary digester. The plant will also recycle a portion of the liquid from the gravity belt process and feed it back to the digester. The new technology will replace a gravity thickener and a rotary drum thickener.

"If the digesters can have more microorganisms inside, they should be able to do more digestion. There should be organisms in there to create gas," Bevington says. "Hopefully, we'll be producing biogas more thoroughly. If you're running too much loading into a digester, some of it isn't getting digested. Now we'll be converting more of the sludge to gas, and the less sludge you have, the less you need to haul to a landfill."

BETTER TECHNOLOGY

To use biogas even more effectively, the plant plans to change out key components of the CHP system. The existing engine-generators will be replaced by two 350-kW units to handle the peak electric load of 700 kW. Waste heat from the engines will continue to supply heat to the digesters. The plant will still purchase natural gas to heat its administration and garage facilities.

"I have much more biogas right now, but not enough generators," Bevington says. "In 2007, we flared 10 percent of our biogas. By midyear 2008, 50 percent of it went to flare with our two engine-generators running at full production."

Plans are also under way to construct two dissolved air flotation (DAF) tanks to pretreat the food manufacturers' wastewater. That will reduce loadings to the aeration system. The food companies' wastewater is now piped directly to the aeration tank, imposing a large organic load. In the DAF units, fats, oils and grease (FOG) will float to the top, where it will be skimmed for transport to the digesters. The clarified effluent, with greatly reduced BOD, will be fed to the aeration tanks for further treatment.

> "If you can take wastewater that nobody wants, effectively treat it, and discharge it in an environmentally acceptable manner — and do it without the use of purchased electric power — that's a pretty neat goal."
> **GEORGE BEVINGTON**

"What we're trying to do is treat the solids in an anaerobic environment where it belongs and the liquid in an aerobic environment where it belongs," says Bevington. "The DAF unit helps us separate those two streams."

The goal is to reduce the loadings to the aeration system by as much as 70 percent, significantly reducing energy usage.

EVERYTHING IN PLACE

The plant will have invested some $7 million to improve the process and create more energy savings. The primary components of the investment include the gravity belt and high-pressure rollers, CHP system and DAF units. Bevington is sure the plant will achieve its goal to be 100 percent energy-independent.

"If you can take wastewater that nobody wants, effectively treat it, and discharge it in an environmentally acceptable manner — and do it without the use of purchased electric power — that's a pretty neat goal," he says.

Gloversville-Johnstown's efforts are gaining attention. The plant won the New York State Department of Environmental Conservation's 2007 award for environmental excellence. In spring of 2008, it won the department's Operations and Maintenance award.

Plans are to complete the plant upgrades and energy initiatives by early 2010. Bevington and his team look forward to taking energy conservation to an even higher level. "Generating 40 percent of our power is not a bad number, but if we can get to 100 percent that would be even more exciting," he says. "Everything seems to be falling into place." **tpo**

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

CST Industries Acquires Conservatek

CST Industries Inc., designer, manufacturer and distributor of coated metal storage tanks and silos, has acquired Conservatek Industries Inc., manufacturer and installer of custom-designed aluminum covers for various industrial applications, including wastewater.

JWC Environmental Achieves ISO Certification

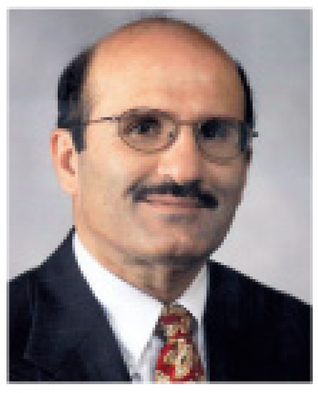
JWC Environmental's Santa Ana, Calif., manufacturing site has been accepted into the Underwriters Laboratories Directory of Registered Firms in compliance with ISO 9001:2000, certificate number A16182. As part of its certification, JWC is required to pass regular audits of its quality assurance program.

Hydro International Realigns Business Structure

Hydro International has realigned its U.S. business structure, bringing its Hydro and Eutek Systems wastewater operation, based in Hillsboro, Ore., under one roof. The new operation offers solutions to separate, wash and dewater grit from municipal and industrial wastewater.

Procorp Brochure Details Sustainable Wastewater Treatment System

A brochure from Procorp Enterprises LLC focuses on targeted phosphorus extraction pellet reactor systems that provide cost-effective, zero-waste wastewater treatment. The brochure can be downloaded at www.procorp.com/wastewater-products/pellet-reactor.html or requested by calling 414/258-8777.



Saied Mostaghimi

Mostaghimi Receives Soil and Engineering Award

Saied Mostaghimi, Virginia Tech professor and head of the biological systems engineering department, has been named winner of the American Society of Agricultural and Biological Engineers 2008 Hancor Soil and Water Engineering Award. Mostaghimi was recognized for developing strategies and tools for assessing the impact of agriculture and urban activities on water quality and developing and validating computer simulation models for use by agencies involved in water resources and land-use planning. Mostaghimi is a 27-year member of ASABE and was elected a Fellow of the society in 2006.

ADS Receives Water Quality Awards

ADS Environmental Services and Accusonic Technologies, two divisions of ADS LLC, received the Innovative Technology Award from the Water Environment Federation, an international not-for-profit technical and educational water quality organization. ADS Environmental Services was recognized in the collection systems category for its ADS Spider technology, which merges two existing technologies to increase the efficiency of alarm notification. Accusonic Technologies was recognized in the instrumentation category for its 7510+ flow meter. The device uses multiple chordal path, transit-time technology to provide flow metering capability across a range of pipes and channels.

Osprey Biotechnics Receives EPA Recognition

Munox from Osprey Biotechnics Inc. was recognized by the U.S. Environmental Protection Agency's Design for the Environment Program as being a biological wastewater treatment for industrial and commercial applications with improved environmental and human health characteristics. The Munox system degrades animal and vegetable fats, oils and grease in wastewater, sending cleaner water to the municipality for further treatment.

Distillery Chooses Eisenmann Biomass-to-Energy System

The WESP-2F integrated multipollutant control technology by Eisenmann Corp. has been selected by a major bourbon distillery to control boiler emissions. The biomass-to-energy system will burn a variety of biomass and Kentucky coal for steam production. With integrated scrubbing and wet electrostatic precipitation technology, the system is capable of removing a full range of biomass boiler effluent pollutants, including acid gases as well as mercury.

CRC Press Releases Book on Wetland Treatment System

Written by Scott Wallace and Robert Kadlec, the 1,016-page *Treatment Wetlands: Second Edition*, available through CRC Press, features advances in the planning, design and performance of wetland treatment systems for water pollution control and wastewater treatment. The volume includes detailed information on wetland ecology, performance data, wastewater characterization, procedures for analyzing hydraulics, and more. For more information, call 800/272-7737 or visit www.crcpress.com. tpo

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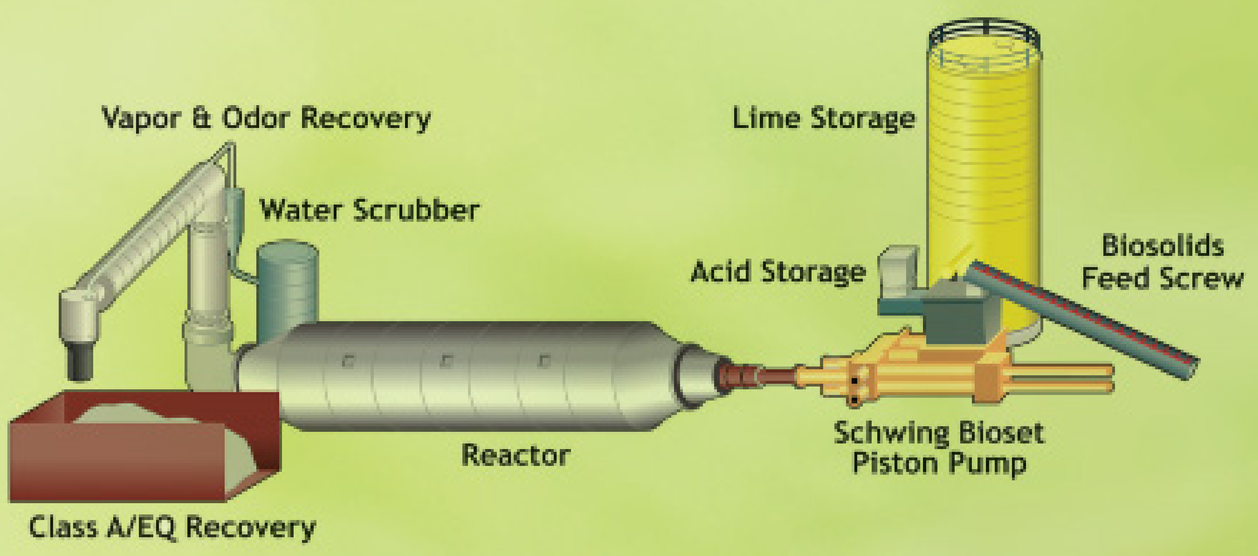
Schwing Bioset's products are used around the world providing solutions for the handling and treatment of high viscosity materials in demanding environments. We have a big vision; make the world a better place with the products we engineer. The Bioset® process is our patented system for converting biosolids from Class 'B' to Class 'A'. Using a natural exothermic reaction the Bioset® process treats biosolids that would normally be sent to our landfills and instead creates a natural fertilizer that stimulates plant growth. The Bioset® process is just one example of our ability to design solutions that make a difference.



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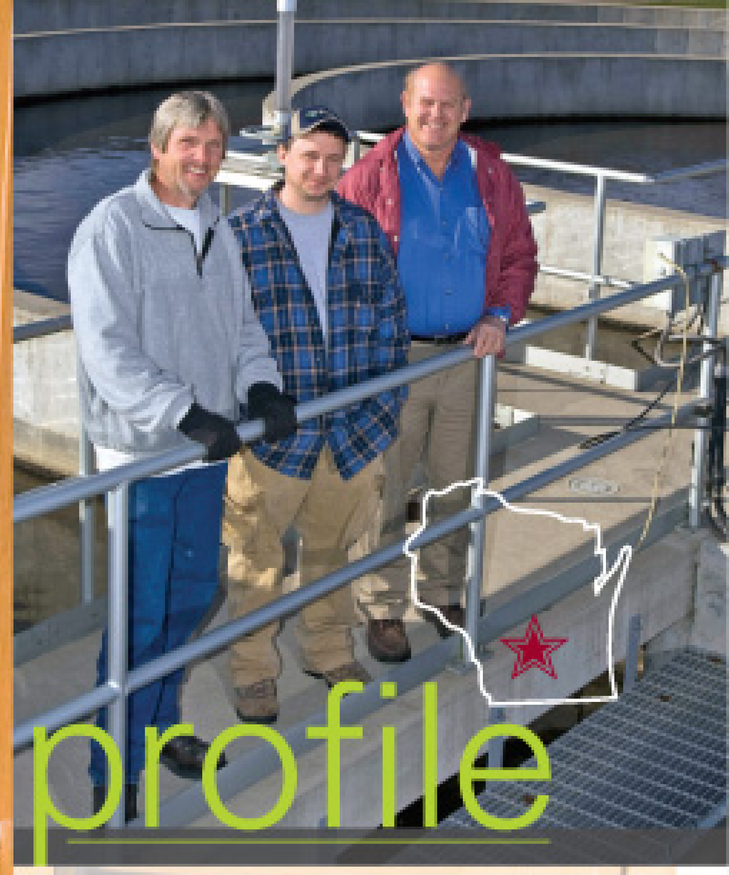

profile

Dane-Iowa Wastewater Treatment Facility, Mazomanie, Wis.

BUILT: 2000 (modified 2008)

TREATMENT LEVEL: Secondary

TREATMENT PROCESS: Orbital oxidation ditch

FLOWS: Design 0.75 mgd, average 0.69 mgd, peak 1.98 mgd

PERMIT LIMITS: 30 BOD, 40 TSS, 4.6 ammonia, under evaluation phosphorus, 5/9 pH

RECEIVING WATER: Black Earth Creek

PLANT MANAGER: Richard McKee, facility superintendent, Grade 3 wastewater operator

OPERATORS: Brian Sroda, lead operator, Grade 4; Jeff Moyer, Grade 2 operator

WEB SITE: www.daneiowa.com

Migrating North

THE DANE-IOWA WASTEWATER TREATMENT FACILITY IN SOUTH CENTRAL WISCONSIN USES A BIOSOLIDS PROCESS MORE TYPICALLY FOUND IN SOUTHERN CLIMATES

By Diane Gow McDilda

OPPOSITE PAGE: Brian Sroda, lead operator at the Dane-Iowa Wastewater Treatment Facility, tests for suspended solids. INSET: From left, Jeff Moyer, Brian Sroda and Richard McKee. (Photography by Andy Manis)

Jeff Moyer operates a front-end loader to move the facility's Class A biosolids.

THE DANE-IOWA WASTEWATER TREATMENT FACILITY in Mazomanie, Wis., is turning biosolids into a valuable commodity using a process that's relatively new to the midwestern United States.

"We were the first plant in the northern part of the country to have this system," says Richard McKee, facility superintendent. "All of the others were in the south." The Schwing Bioset process used at the plant draws plenty of curiosity. It's typical for McKee to receive four or five visitors per year and more phone calls asking about the process and his experience with it.

The Bioset process achieves Class A biosolids through time versus temperature equation and pH adjustment according to EPA 503 regulations. Quicklime and sulfamic acid are added to the biosolids, and the material is mixed and pumped through an insulated reactor.

"We decided upfront to use the biosolids process, but with just three villages it wouldn't be cost-effective. We have a 20-year contract with the Village of Cross Plains to process their sludge. It's the economy of scale."

RICHARD McKEE

The plant makes the finished product available at no charge to area farmers for land application. Advantages of the process to date include simple operation, low maintenance, consistent and stable Class A product, minimal dust and odor, and affordable cost.

Richard McKee, facility superintendent, checks a seal in the pump room.

ECONOMY OF SCALE

Putting biosolids to beneficial use was an important component during the plant's design, but the economics had to be addressed.

The Dane-Iowa treatment plant in south central Wisconsin has a design capacity of 750,000 gpd. It receives influent from the villages of Black Earth, Mazomanie and Arena, and from Wisconsin Heights High School. But these sources alone would not generate enough biosolids to justify the cost of processing equipment. To up the volume, the Dane-Iowa Wastewater Commission made a deal to accept material from the Village of Cross Plains.

"We decided upfront to use the biosolids process, but with just three villages it wouldn't be cost-effective," says McKee. "We have a 20-year contract with the Village of Cross Plains to process their sludge. It's the economy of scale." It's also a win-win solution, as Cross Plains, which wanted a solids-handling unit but could not afford it, now has a reliable biosolids management solution.

The front end of the Dane-Iowa plant uses relatively standard equipment. Mechanical screens remove coarse solids and plastics. Influent then flows to an orbital oxidation ditch, which does not require a separate primary settling basin.

Biological processes within the oxidation ditch remove BOD, phosphorus and nitrogen. This eliminates the need for primary clarifiers and in turn reduces the system footprint. The water from the oxidation ditch flows to two final clarifiers. Effluent from the clarifiers is disinfected using ultraviolet (UV) radiation before discharge to Black Earth Creek, a locally well-known trout stream.

SIMPLE SOLIDS PROCESS

Solids are sent to a Roediger belt filter press and dewatered to about 16 percent solids. The end of the press marks the beginning of the Schwing Bioset process. "The dewatered sludge goes to a hopper, where quicklime and sulfamic acid are added," says McKee. The material is then mixed by a twin screw feeder and delivered to the reactor by a piston pump.

"The amount of quicklime added is based on the percent solids coming off the filter press and the temperature of the sludge," says McKee. "The lower the temperature, the more quicklime is needed. During the winter months, we add more."

The quicklime is added in pebble-sized particles. Its introduction creates an exothermic chemical reaction that raises the temperature to hotter than 160

Brian Sroda checks the solids level in a clarifier.

degrees F, while increasing the pH to at least 12, killing off pathogens.

Sulfamic acid is added in granular form. Through a proprietary process, the addition of acid moves liquid in the sludge mixture to the outer edges of the mass, where it acts as a lubricant, reducing the resistance and making the mixture easier to move through the pump and reactor. Because the process is enclosed within the reactor, it operates odor-free. The reactor discharge is the only place where gases can volatilize, and those gases are easily collected and deodorized with a small water scrubber. The final product has an odor similar to wet concrete.

The solids-handling process came online in June 2000. The original progressive cavity pump was ultimately replaced with a Schwing Bioset Model KSP-10H two-cylinder pump, originally designed to pump concrete.

"The stator on the progressive cavity pump was rubber-lined and was failing because of the abrasiveness of the lime," McKee says. "As a result, we were not able to waste on a regular basis." No permit violations resulted from the inconsistent operations.

"The new pump was installed in April 2008 and we haven't had any problems," McKee says. "It's very reliable."

> "We come in in the morning and run the process control test to determine the temperature and percent solids. Then we calculate the belt filter press and lime loading rate. We have our data to go by, but we can fine-tune it. If nothing changes, the system can be pretty much left unattended. All we do is check on it."
>
> **RICHARD McKEE**

WITHIN PARAMETERS

In concert with the U.S. Environmental Protection Agency (EPA), Wisconsin requires quarterly sampling of the biosolids end product for metals, pH, percent solids and fecal coliform. The plant also must meet performance criteria for compliance with Class A standards. During processing, the material must maintain a temperature of 160 degrees F for 30 minutes.

"We have temperature probes throughout the reactor to make sure we have a sterilized product," McKee says. "It's continuous flow through the reactor. By the time it hits the second probe, it's at 160 degrees. The detention time from the second probe to the end is 40 minutes."

Solids are processed two days per week. The equipment runs for six to six-and-a-half hours, allowing time for startup and shutdown. Startup, operation and shutdown are all monitored by a programmable logic controller (PLC) connected to the plant's

RECOMMENDATIONS FROM THE TEAM

Employees at the Dane-Iowa Wastewater Treatment Facility recommend the best uses of the Class A biosolids they produce.

The material can be used alone or in combination with other organic fertilizers. Because it is highly alkaline, it should not be used on plants that need acidic soil. The material can be used for top dressing or turf maintenance. It should be spread evenly at about one pound of material per square yard of turf. After application, the site should be watered normally.

The biosolids can be used as a garden amendment after the soil pH has been checked. Users should apply 1/4 to 1/2 inch of material to the surface, till the material into the soil, water thoroughly, and then plant.

For use as a horticulture blend, the material may be mixed one part biosolids to four parts potting media.

A computer screen shows the layout of the Dane-Iowa Wastewater Treatment Facility.


A sample from the plant's oxidation ditch is prepared for laboratory testing.

SCADA system. Startup and shutdown are handled at the push of a button. At startup, measurements must be taken to determine the dosing of the sulfamic acid and quicklime.

"We come in in the morning and run the process control test to determine the temperature and percent solids," says McKee. "Then we calculate the belt filter press and lime loading rate. We have our data to go by, but we can fine-tune it. If nothing changes, the system can be pretty much left unattended. All we do is check on it."

QUALITY PRODUCT

The processed biosolids is a valued commodity in the farming community. It contains about 40 percent hydrated lime and 60 percent inert matter and organic humus. It does not smell and, in keeping with Class A status, does not attract rodents or flies.

Farmers report that the biosolids react quickly with the soil, changing the pH within 60 to 90 days of being applied. The organic material helps stabilize the soil, increasing its ability to store nutrients and water. Plant staff members collect samples regularly to ensure compliance with Class A criteria and to provide farmers with concentrations of trace metals, nutrients and other parameters.

Employees at the Dane-Iowa treatment plant recommend the amount of material to apply. Most farmers land-apply the material in spring and late fall. It's not uncommon for one farmer to haul off 200 to 300 tons.

"We can tell the farmers how much they need," says McKee. "A simple soil test is all that's needed for farmers to zero in on their lime requirements. The pH really determines how much can be applied."

The plant produces about 800 tons of biosolids per year, all available to local farmers free on a first-come first-served basis. The treatment plant takes no responsibility for transporting the material from the facility or applying it to the fields.

Workers at the plant move the material to an on-site storage building using a front-end loader. Farmers use that machine to load their trucks or bring their own equipment. "We have one farmer who owns his own equipment and several who hire people to come and get the material," McKee says. "We end up with a little bit of fuel cost, but not much."

FINAL DESTINATION

Once at the farms the biosolids are spread on the fields using a side-slinger spreader. McKee doesn't recommend a typical manure spreader because it causes clumps. The side-slinger breaks up the material. The plant has a three-sided building that provides 180 days of storage capacity — land application is not allowed in winter.

Employees at the Dane-Iowa plant can attest to the quality of their product. "We used the biosolids on a test garden out here," McKee says. "We grew potatoes, carrots, tomatoes, onions and string beans." They not only produce a quality product — they're farmers to boot. **tpo**

more info:

Roediger Pittsburgh Inc.
412/487-6010
www.roediger.com

Schwing Bioset
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www.schwingbiosettpo.com

Another Way of Heating

DIRECT STEAM INJECTION OF SOLIDS OFFERS ADVANTAGES THAT CAN INCLUDE LOWER CAPITAL COST, HIGHER ENERGY EFFICIENCY AND LOWER MAINTENANCE

By Bruce Cincotta

Direct steam injection (DSI) is an emerging technology for municipal biosolids heating, especially in processes that use anaerobic digestion.

DSI has a long track record in challenging slurry heating applications. Steam is readily available and can be inexpensive to produce. Scaling from small to large flows with steam is effective and reliable. When applied correctly, DSI provides significant process benefits and overcomes a number of limitations that go with conventional solids heating methods.

HEATING IN ANAEROBIC DIGESTION

Most wastewater treatment plants with flows above 5 mgd use anaerobic solids digestion. Microbes in the digester break down the organic material, producing methane that can be captured to power boilers and electric generator sets.

Unlike aerobic digestion, which operates at ambient conditions, anaerobic digestion operates at higher temperatures to stimulate microbial activity and accelerate the biological process. To achieve higher operating temperatures, heat must be added to the process, and the temperature of the digester must be maintained.

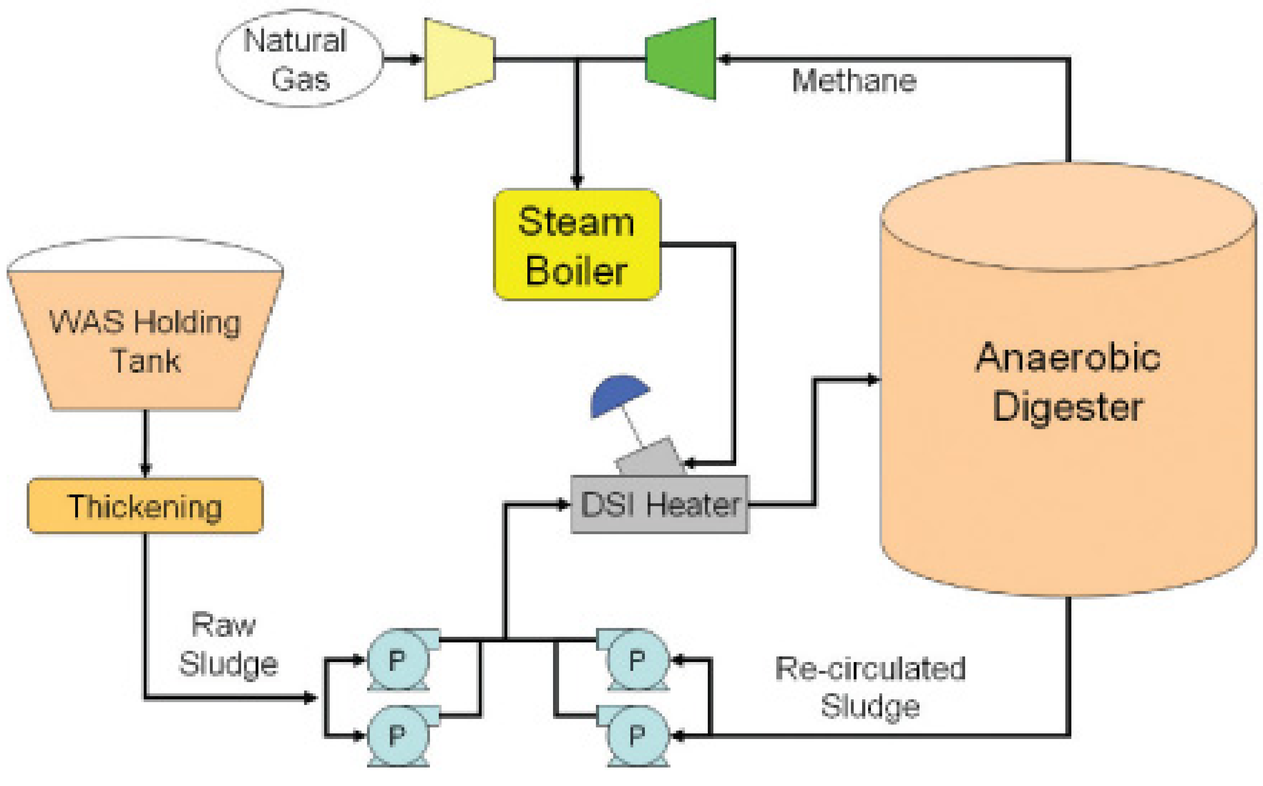


Diagram of an anaerobic digestion process with DSI heating. Anaerobic digestion operates at higher temperatures than aerobic digestion to stimulate microbial activity and accelerate the biological process. To achieve higher operating temperatures, heat must be added to the process, and the temperature of the digester must be maintained.

The operating temperature balance is critical for sustaining the correct biological environment in an anaerobic digester. Both acid former and methane former microbes optimize their processing capacity at stable temperatures. Mesophilic digestion is optimum at 95 degrees F and thermophilic digestion at 131 degrees F.

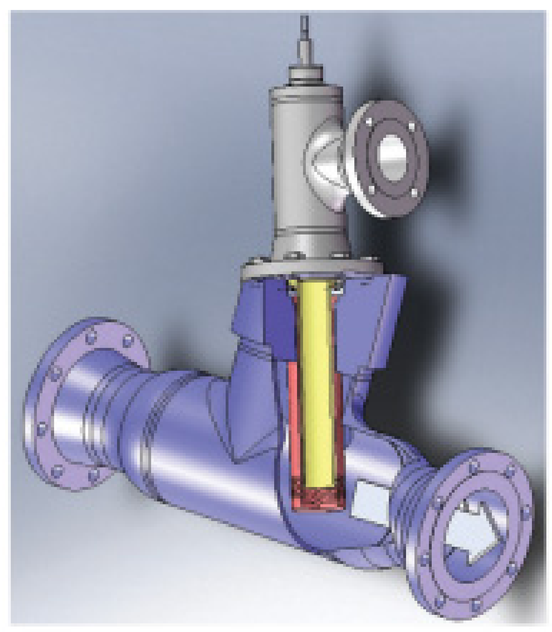


Diagram of an inline direct steam injection (DSI) sludge heater.

Precise temperature control provides the ideal environment. Solids can be heated before delivery to the digester and then recirculated through a heater to maintain the ideal processing temperatures.

One challenge present when heating municipal solids is the heat-sensitive nature of the material. The media used in solids heating generally is limited to 150 degrees F to avoid scorching and fouling. Municipal solids also tend to have high viscosity, which can cause large pressure drops and put excessive demand on feed pumps. Higher-viscosity solids also make it challenging to provide uniform heating, free of hot spots.

HOW DSI WORKS

Early attempts at DSI heating in anaerobic digestion commonly used steam sparge devices, which have a fixed steam exit area and use an external control valve to adjust the steam flow. These systems experienced problems with hammer and vibration, leading to unstable operation and poor temperature control.

One key factor in successful DSI is to maintain high steam velocity for effective mixing and condensation of the steam into the solids. High velocity is maintained by altering the exit area of the steam, rather than adjusting the steam pressure, to adjust steam mass flow. This approach is known as internal modulation to achieve choked flow.

Choked flow is the phenomenon of accelerating a vapor to sonic velocity by creating a pressure differential through an engineered nozzle. When choked flow is established, the steam mass flow can be metered to precisely control the heating of the slurry. This produces predictable results based on the position of the stem-plug.

Through a variable-area steam diffuser, steam flow is metered at the point where steam and liquid first contact and mix. This method

Efficiency	90%				
Duty	95%	0.08 $/KW-h		0.1 $/KW-h	
Horsepower	KW	$/d	$/y	$/d	$/y
1	0.8	1.51	552	1.89	690
2	1.6	3.02	1,103	3.78	1,379
3	2.4	4.53	1,655	5.67	2,069
4	3.1	6.05	2,206	7.56	2,758
5	3.9	7.56	2,758	9.45	3,448
7.5	5.9	11.33	4,137	14.17	5,171
10	7.9	15.11	5,516	18.89	6,895
15	11.8	22.67	8,274	28.34	10,343
20	15.7	30.23	11,032	37.78	13,790
25	19.7	37.78	13,790	47.23	17,238
50	39.4	75.56	27,581	94.46	34,476
75	59.0	113.35	41,371	141.68	51,714
100	78.7	151.13	55,162	188.91	68,952
200	157.4	302.26	110,324	377.82	137,905

The lower pressure drop (typically 1-2 psig) across a DSI heater translates into reduced demand on system pumps. This table shows typical costs for electric motor use. DSI heaters may lower the horsepower requirements by more than 50 percent when compared to multiple heat exchangers in series. DSI heating also transfers 100 percent of the heat energy into the material.

eliminates the need for an external steam control valve or downstream mechanical mixing devices.

SELECTING A DSI HEATER

In choosing a DSI heater for solids, the first and most important factor is the need for a differential between the steam pressure and the liquid pressure. DSI heater operation is optimized by maintaining high steam velocity to drive the condensation of the steam and transfer energy in a stable and rapid manner. The pressure differential determines the velocity of the steam.

Steam injectors that use an external steam-pressure regulating valve need to operate with the liquid pressure at less than 60 percent of the absolute steam pressure. In externally controlled heaters, the steam pressure is substantially reduced through the steam-control valve, so the available steam pressure is much lower than the design pressure. Reduction of the steam pressure also reduces steam velocity, leading to poor steam condensation and process upsets.

A second critical factor is to maintain a minimum differential between the steam pressure and the liquid pressure. This condition presents fewer process upsets, leading to more stable DSI heater operation (free of hammer and vibration), better pump integration, and improved temperature control. All these can be optimized by maintaining high-velocity steam injection to promote rapid and complete steam condensation.

A jet diffuser heater design using internal steam control allows the steam and liquid pressures to be much closer while still providing high-velocity steam injection. The ability to operate with liquid pressures up to 80 percent of the absolute steam pressures allows for stable operation across a wide operating range, minimizing process upsets.

There are a variety of ways to achieve the desired condition in real-world applications. The first is to choose a steam supply of sufficient pressure to meet the requirements. The second is to reduce the liquid pressure by moving the heater to a higher elevation, trimming the pump impellers, or changing the pressure settings in the control loops — or some combination of these.

Another essential factor for DSI heating is maintaining high-velocity steam (<1,000 fps ideal) for rapid condensation. Steam velocity is a result of the steam/liquid pressure differential. The proper steam jet characteristics also greatly influence steam condensation and help prevent hot spots in the slurry. Proper sizing is important for smooth operation. Finally, mechanical mixers to blend steam and fluid are not practical because uncondensed steam bubbles are too small to be impacted by a mechanical mixer.

BENEFITS OF DSI HEATING

Direct steam injection heating can overcome a number of limitations and process restrictions common in solids heating methods, such as those that use heat exchangers. The advantages include:

Precise temperature control. Steam is dispersed uniformly at high velocities into the solids. This provides instantaneous heat transfer in a single pass with precise temperature control to plus or minus 1 degree F without the need for an external steam-control valve.

No plugging or fouling. DSI heaters have no hot surfaces to initiate scorching of the material. This eliminates plugging and fouling, which is common in heat exchangers that use tubes or channels. That in turn means lower maintenance and greater reliability.

Lower capital investment. The physical size reduction going from a heat exchanger to a DSI heater can be significant. A 20-to-1 reduction in space requirements is not uncommon. No space is required for the removal of heat exchanger tubes, and the DSI heater can also be installed in the piping framework without the need for dedicated floor space or a foundation.

Energy savings. The lower pressure drop (typically 1-2 psig) across a DSI heater translates into reduced demand on system pumps. The accompanying table shows typical costs for electric motor use. DSI heaters may lower the horsepower requirements by more than 50 percent when compared to multiple heat exchangers in series. DSI heating also transfers 100 percent of the heat energy into the material.

Minimized flow disruption. An in-line design DSI heater can maintain the proper flow velocities and provide minimal hang-up points for fibrous rag-type materials.

Successful sludge heating using DSI is an attainable goal with proper planning and wise use of available resources. DSI heating can be integrated with an anaerobic process reliably and with predictable results. Installation can be done in existing sludge feed or recirculation lines.

DSI is a viable alternative for wastewater treatment plants seeking to optimize the anaerobic digestion process.

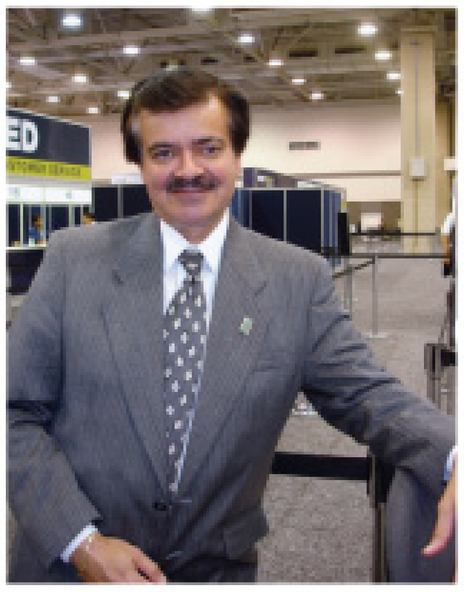
Bruce Cincotta, MEng, is chief technical officer and co-owner of ProSonix LLC, a company that specializes in solving difficult process-heating problems. He can be reached at 800/849-1130 or info@pro-sonix.com. **tpo**

DSI has a long track record in challenging slurry heating applications. Steam is readily available and can be inexpensive to produce. Scaling from small to large flows with steam is effective and reliable.

It's the System

TREATMENT PLANTS CAN MANAGE BIOSOLIDS MORE EFFECTIVELY UNDER AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) PROMOTED BY THE NATIONAL BIOSOLIDS PARTNERSHIP

By Ted J. Rulseh



Sam Hadeed

It has always been challenging for wastewater treatment agencies to run sound biosolids management programs. The regulations are strict, the processing technologies sometimes carry a learning curve, and public acceptance is often a hurdle.

The National Biosolids Partnership (NBP) has a remedy that growing numbers of agencies, large and small, are adopting. Called an Environmental Management System (EMS), it's a tool that helps agencies develop exemplary programs by following proven procedures and adopting best biosolids management practices.

NBP leaders say that working within the EMS and achieving certification demonstrates to the community a commitment to producing and managing high-quality biosolids in an environmentally sound way. The program helps operators, managers and administrators prevent problems or violations before they occur, improve plant efficiency, and optimize treatment performance. Return on the investment in the EMS comes in improved community relations, operational cost savings and enhanced communication among all parties.

"We wanted the process to be more than having a consulting engineer or someone in the profession conduct a review and say, 'You are fine — here's your certification.' We realized that to have credibility, we needed to raise the bar."

SAM HADEED

The NBP is a not-for-profit alliance formed by the National Association of Clean Water Agencies, the Water Environment Federation and U.S. EPA to advance sound biosolids management practices. Sam Hadeed, communications director, shared his thoughts on the benefits of the EMS in an interview with *Treatment Plant Operator*.

tpo: What exactly is the Environmental Management System?

Hadeed: It is a standardized and complete framework designed to assure that biosolids activities are managed effectively. It's based on a set of principles and strategic water quality management goals that emphasize quality biosolids management practices, better relations with interested parties, regulatory compliance and environmental performance.

tpo: Does this program follow any pre-existing standards?

Hadeed: Our EMS is based on ISO 14001 international standards for environmental management systems, but it actually goes a couple of steps further, in that it includes requirements for public participation and communication, and it emphasizes outcomes over simply documenting processes.

tpo: Why did the Partnership establish this program?

Hadeed: The EPA issued the Part 503 regulations in 1993. Then later they classified biosolids management as a low-risk activity and not an enforcement or regulatory priority. There was a public perception that the EPA walked away from the regulations and that there was a lack of oversight.

There was also a concern that issues the public had with biosolids were not part of the regulations. People were asking: What about odor? What about this truck traffic coming through my neighborhood? What about the noise? The EMS was a response to those concerns. It was a way for treatment agencies to standardize their processes and do a better job of managing the residuals that come from cleaning dirty water.

tpo: What does the EMS consist of?

Hadeed: The program has 17 elements grouped into five categories: Policy, planning, implementation, measurement and corrective action, and management review.

In essence the goals are quality management to produce a consistent product, better relations with interested parties, regulatory compliance that goes well beyond the minimum requirements, and environmental performance, in terms of reducing carbon dioxide, reducing pollutant emissions, and making beneficial use of biosolids as a nutrient to improve the soil.

tpo: How does an agency achieve certification under the EMS?

Hadeed: It's a process with four levels of recognition. First, they commit to a Code of Good Practice with the ultimate goal of certification. Second, they put the elements of an EMS in place and operate under it for six months. Third, they go through an independent, third-party audit and receive certification if successful. Finally, they complete interim audits to maintain certification.

tpo: Why does NBP require an independent third-party certification process?

Hadeed: We wanted the process to be more than having a consulting engineer or someone in the profession conduct a review and say, "You are fine — here's your certification." We realized that to have credibility, we needed to raise the bar.

We work with two audit firms: NSF International and KEMA Strategic Registrations. They are both internationally recognized certification agencies. We require them to have certified biosolids authorities on staff.

Once you become certified, that doesn't mean it's the end of the journey. Actually, it's the beginning. It's a continuous improvement process. You pass your initial audit with the 17 elements, but then the auditor comes back the next year and looks at perhaps seven or eight of those elements to see if you've made progress.

tpo: How many agencies have become certified?

Hadeed: We have 22 agencies certified so far. A good number of them are large agencies that helped us start the program — agencies with enough resources and management support to get their staffs involved in the effort. The first agency certified was Orange County Sanitation District in Fountain Valley, Calif. Other large agencies include the City of Los Angeles Bureau of Sanitation, the Metro Wastewater Reclamation District in Denver, the District of Columbia Water and Sewer Authority, and the Metropolitan Water Reclamation District of Greater Chicago.

tpo: Is it difficult for smaller agencies to become EMS certified?

Hadeed: We're trying to make it easier for them by creating a small-agency template. We have posted examples of EMS manuals, audit reports, policies and other materials. We're trying to make the process streamlined so it's not a daunting task. A number of medium-sized and smaller agencies have become certified. They include Louisville, Ky.; Lawrence, Kan.; Grand Rapids, Mich.; Butler County, Ohio; Albany, Ore.; Madison, Wis.; and Kent County, Del.

tpo: How exactly does the EMS help agencies improve their processes?

Hadeed: It helps them look at their processes holistically, instead of as individual pieces. In a typical situation, people show up for work, do their jobs and go home, and as long as the plant is in compliance, that's considered good enough. But then, if something goes wrong, what is the response?

An EMS ensures that they have a plan in place to deal with things, instead of putting out fires and making foolish mistakes. It's designed to help them connect the dots — to look at how they do business at every step.

Suppose a batch of biosolids comes out with an odor. With a process in place, the person responsible for biosolids may be able to discern that someone upstream used a different polymer that caused the odor. And now that you have an odor, what do you do? Do you continue to land-apply the material? Or do you decide maybe that batch should go to a landfill instead? Your process gives you that kind of guidance.

If you don't document how the pieces fit in a management system, you can have chaos. For example, suppose a truck spills a load of material. You don't have an emergency response plan, and now the media is there. What matters is not so much the fact that there was a spill — it's how you react. If you have a system in place, you know exactly whom to contact and what to do to minimize the damage.

tpo: How is the Partnership promoting participation in the EMS process?

Hadeed: We're embarking on a new initiative — the Biosolids Best Practices Network — to encourage more agencies to join the program. It's essentially for agencies that for now are renters, not buyers.

They're not sure they want to make the investment to go through the audit process, but they do want to implement best practices from their peers in the water quality profession. Here's a way for them to get into the program. There are some requirements they have to meet to be in the network. Once there, they have access to tools and incentives that can help them move toward becoming certified. It helps them improve their biosolids processes, and at some point we hope they become buyers.

"If you don't document how the pieces fit in a management system, you can have chaos. For example, suppose a truck spills a load of material. You don't have an emergency response plan, and now the media is there."
SAM HADEED

tpo: What about an agency that is already functioning well? Why should they pursue certification?

Hadeed: They may want to demonstrate a commitment to becoming better environmental stewards. They may want to be perceived as a progressive agency. Or they may perceive that they have succession planning issues.

Maybe they don't have their standard operating procedures documented, and if they start losing key people to retirement, then they may start having compliance issues, and problems with the public. In time everything goes downhill because they failed to plan. The EMS helps provide a big-picture vision.

tpo: How can agencies get more information about the EMS?

Hadeed: There is abundant information on our Web site at www.biosolids.org. It includes case studies in which agencies describe how certification benefits them. I am always happy to talk with anyone who would like more information. Just give me a call at 703/684-2418. **tpo**

Gary Hengst, chief plant operator at the Lincoln Wastewater Treatment and Reclamation Facility, makes sure everything runs smoothly. (Photography by Lezlie Sterling)

The Right *Frame of Mind*

AN OPTIMISTIC, GET-IT-DONE ATTITUDE AND STATE-OF-THE-ART TECHNOLOGY MAKE A WINNING COMBINATION FOR A CALIFORNIA RECLAMATION FACILITY

By Mike Grennier

IT MIGHT RANK AS ONE OF THE MOST ADVANCED facilities of its kind, but the Lincoln (Calif.) Wastewater Treatment and Reclamation Facility owes a great deal of its success to a team of operators with an optimistic, roll-up-your-sleeves, get-it-done attitude.

"You can have the best-designed facility in the world, but it doesn't mean much unless you have a competent, motivated staff who care about it and do what it takes to ensure it runs the way it should," says Gary Hengst, chief plant operator. "If you ask me what makes our plant unique, I'd say our staff is pretty incredible."

And it shows. The 4.2 mgd (design) facility, which serves Lincoln and surroundings in western Placer County near Sacramento, earned the Wastewater Treatment Plant of the Year Award in 2007 from the California Water Environment Association (CWEA).

The League of California Cities also awarded the facility its prestigious Helen Putnam Award for Environmental Excellence in 2005. And that's just the start of a long and growing list of awards (see sidebar).

The awards are gratifying, says Hengst, who works for ECO-LOGIC Engineering, which operates the plant for the city. Yet to Hengst, it's the effort behind the awards that matters most.

"People are proud to work here, and we want to see the operation succeed," he says. "The awards come because we're doing the work. We're not changing what we do just to win awards. We're doing the best job we can and the awards reflect that."

PROTECTING RESOURCES

For the City of Lincoln, the plant plays an important role in helping the area cope with steady development and protect the local aquatic environment. Lincoln is among the fastest growing cities in northern California. Its population doubled from 2000 to 2004 and is expected to increase from 38,000 today to 50,000 by 2010.

profile

Lincoln Wastewater Treatment and Reclamation Facility, Lincoln, Calif.

BUILT: 2004

TREATMENT LEVEL: Tertiary (water reclamation)

TREATMENT PROCESS: Activated sludge with maturation ponds and UV disinfection

FLOWS: Design 4.2 mgd, peak 8.1 mgd

PERMIT LIMITS: BOD/TSS: 10 mg/l monthly average, 15 mg/l weekly average, 20 mg/l daily maximum; turbidity: 2 NTU daily average, 5 NTU daily maximum; total coliform: 2.2 seven-day median; 240 daily maximum

RECEIVING WATER: Auburn Ravine Creek

PLANT MANAGER: Gary Hengst, chief plant operator

STAFF: Justin Gregory, supervisor; Trey Cain, Devon Morris and Mike Finnigan, senior operators; Joe Steer, operator; Bryce Morgan, lab analyst; David Morris, mechanic; Tina Kasabasich, part-time administrative/preventative maintenance specialist

Gary Hengst

Plans for the plant were laid in 1997 after the city's aerated pond treatment facility neared its capacity for discharging to land. The city worked with ECO-LOGIC, which had run the old facility for one year, to plan and design the new one.

The $85 million plant, built through a public-private partnership between the city and private developers, went on line in 2004, and ECO-LOGIC won the operations contract. "We were initially hired to do the startup, and the city felt we would be the best ones to operate the plant," Hengst says.

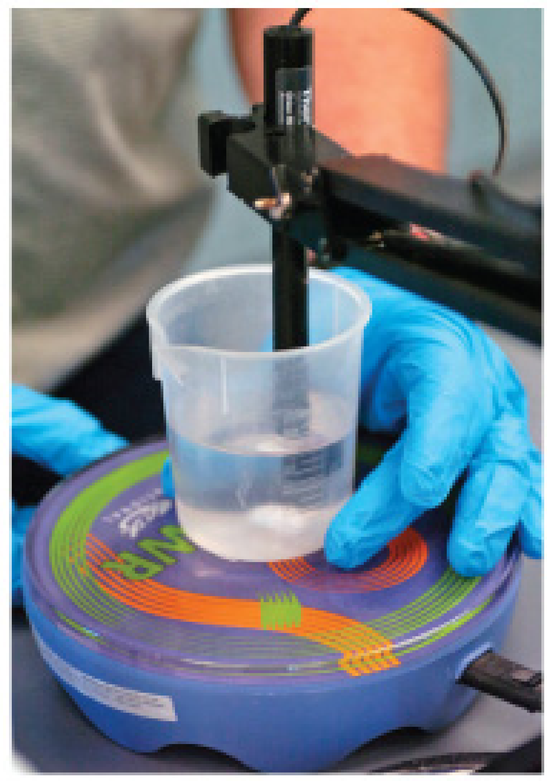
The choice was the right one, as ECO-LOGIC has a record for consistently meeting the plant's effluent limits.

"We understand that the environment can suffer if you make mistakes," Hengst says. "And we know we're making a difference. Even though many don't realize it, the wastewater treatment industry actually helps extend the lives of people. It's something that isn't taken for granted in other parts of the world."

"A treatment plant is like a chain, and it needs to be strong. You just can't have any weak links. Anywhere. It's really a matter of making sure that everything is in line."
GARY HENGST

MOST MODERN

The Lincoln plant is considered one of the most modern and environmentally friendly wastewater treatment plants in its area. Its innovative technologies include maturation ponds and ultraviolet disinfection on the way to meeting federal and state discharge requirements, including the California Toxics Rule. It is designed to meet the highest California Department of Health Services Title 22 standards as an unrestricted nonpotable reclaimed water source.



A lab technician at the Lincoln plant performs an ammonia test.

The plant's activated sludge process consists of anoxic basins and oxidation ditches. Secondary effluent from the clarifiers is pumped to the maturation ponds, which act as equalization basins.

The plant also uses dissolved air flotation (DAF) thickeners to treat effluent from the maturation ponds and, in some instances, from the tertiary storage basins. The primary purpose of the DAF treatment is to remove algae growth developed during storage. Effluent from the DAF units is pumped to a rapid mixer where a coagulant is added to allow remaining fine suspended particulates to agglomerate into flocs. The mixer effluent then flows to the tertiary filters, where the flocculated particles are removed as the water flows through granular media.

Final chlorinated effluent can be delivered to several discharge or reuse sites, which include Auburn Ravine Creek, designated agricultural or landscape irrigation sites, or temporary on-site storage. Waste solids are dewatered and hauled to off-site disposal.

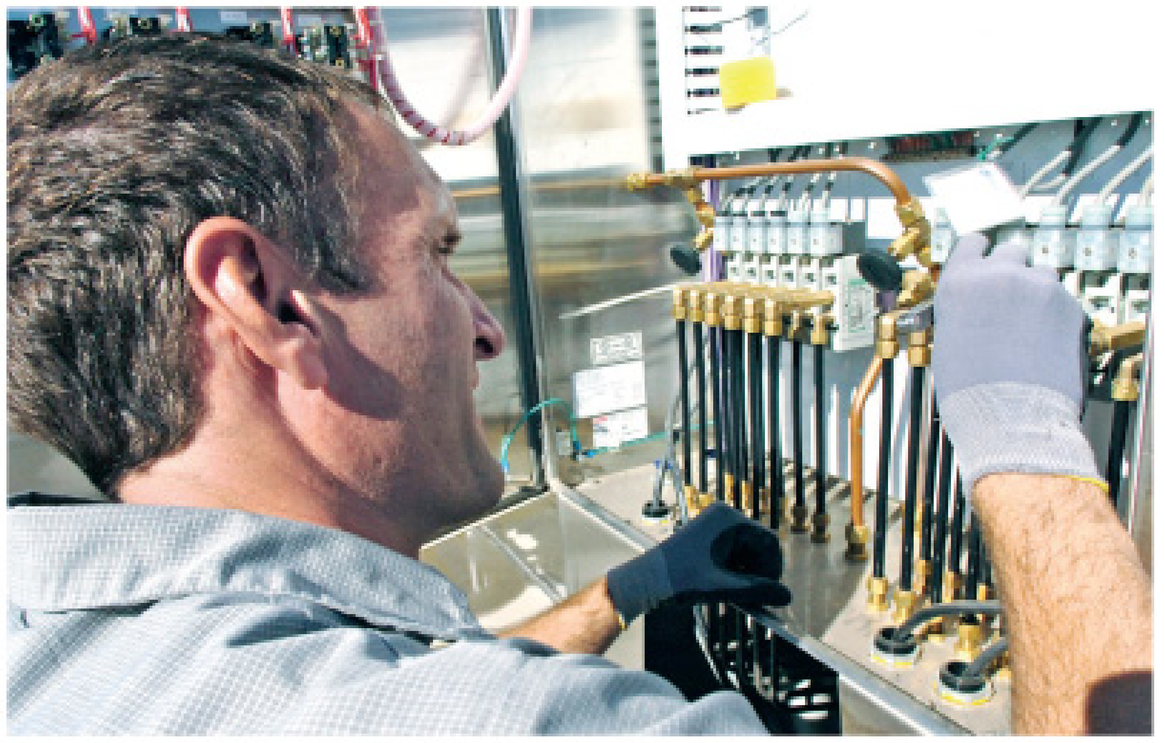
The high-quality effluent contributes to flows in the sensitive habitat of the receiving water, Auburn Ravine Creek, a critical habitat for salmon and steelhead migration. The plant also plays a key role in water reuse. Effluent is used for irrigating fodder crops and for dust control. It is permitted for irrigation of rice and strawberry fields, although to date it has not been used for those purposes.

"I think the plant design really complements our efforts," says Hengst. "It combines the best of the old technology with the new. When you couple the pond systems with the tertiary process and UV disinfection and all the other elements, it's much better than any of those processes by themselves."

EVERYONE PITCHES IN

Although plant design is key, Hengst places significant value on the staff's ability to work as a close-knit team. The plant employs nine people, including six treatment operators. The underlying management philosophy is as plain as day: Everyone pitches in. "We excel in helping each other," says Hengst. "We'll cross over to other areas and help where needed. No one here has an attitude that it's not my job to do maintenance, or it's not my job to do lab stuff. There are no lines drawn here and I can honestly say the attitude is very positive."

In Hengst's view, successful operation is often tied to intangibles, such as



Trey Cain manually operates air valves on the tertiary filters at the Lincoln plant.

Gary Hengst checks a UV disinfection channel at the Lincoln facility.

old-fashioned hard work and common sense. "There's no question that some of the work requires experience," he says. "But it's often, 'Let's get in there and get the job done.' It doesn't always require a grade level. If we have to change the oil in this pump, that's just something we have to do."

Or, the job might involve something even less glamorous. The former aerated pond facility now acts as an influent pumping station. At times, the pumps become clogged, and the crews need to remove solids that block the flow. All team members share the task, which they call "de-ragging the pumps."

"Taking the garbage out of the pumps is one of the nastiest things we do," Hengst says. "In some places, that's a Grade I operator's duty, but not here. We rotate that duty. I'll personally go pull weeds. There's no job where all of the sudden you get to a certain grade level and you don't have to de-rag the pumps anymore."

Of course, Hengst knows that jobs like de-ragging could make an operator feel less than enthusiastic about his career choice. But the need to tackle the grunt work is something he routinely addresses. "There is nothing more demotivating than doing a job you know just doesn't need to be done," he says. "But we don't perform any job that isn't important. I make sure everyone understands what they're doing has meaning."

EXPERIENCING IT ALL

While the plant's seven operators share the grunt work, they also share many other responsibilities. That's because a major goal at the Lincoln plant is for operators to develop a well-rounded career. From daily rounds to working in pairs to continuing education, operators experience it all. "That's what makes this job interesting," Hengst says. "There's so much you can learn. At this operation, you can contribute in a lot of areas and grow in a lot of different ways."

Qualified operators each get a turn at the wheel as operator of the day. Even lower-grade operators are responsible for plant checks. If and when an operator spots an issue that needs extra attention, he gets the right people involved. Hengst also makes it a point to have lower-grade operators and higher-grade operators work side by side whenever it makes sense.

"We'll put an experienced guy with an inexperienced guy for a lot of the preventive maintenance jobs," Hengst says. "This way, the less experienced person learns how to do it right. Of course, the job also gets done faster."

Lower-grade operators are also encouraged to pursue their interests at the plant. Hengst says everyone benefits when a particular operator demonstrates passion for a particular aspect of the operation. He points to Grade I operator Joe Steer's knack for operating the two 300-hp Westfalia centrifuges used for dewatering solids.

"That's something Joe just took a liking to, and he now knows that operation better than anyone," Hengst says. "That benefits the team because he really knows it and he can train people on it. But it's also important because he enjoys it. If you empower people to pursue their interests, it means you

have to sit back a little bit and let them take chances within bounds."

The plant's operators are certified by the California State Water Resource Control Board. Aside from on-the-job training, Hengst encourages his staff to follow through with continuing education. They regularly take part in CWEA training programs and events.

For Hengst, education and on-the-job training is about operators living up to their potential. "Bringing out the best in people is one of my top priorities," he says. Doing the best possible job is a common topic in daily meetings and training sessions.

"I don't want anyone going home at the end of the day and saying, 'I could've done this or that better,'" Hengst says. "I try to motivate them and say, 'We need to just get in there and give our best.'"

ATTITUDE IS EVERYTHING

With a knowledgeable and motivated staff, Hengst doesn't see any major challenges in running a relatively new and advanced facility. He sees the future success of the operation as largely a function of maintaining a positive atmosphere that inspires a job well done. And he knows just how to make it happen.

"You've got to take care of your people," he says. Toward that end, ECO-LOGIC provides competitive wages and benefits. But taking care of employees goes beyond the basics. "It's not just about a paycheck," says Hengst. "It's about making sure they're valued and respected, and that they're doing things that are meaningful."

Another key is to promote from within and hire the right people for the job. That means matching an operator's education and training with the job description. "There's no question that certification and an education are important," Hengst says. "But it's not everything. We look for problem-solvers and people who can make good decisions."

It's also an approach that pays dividends. Recently, repairs were needed on a comminutor used to reduce the size of solids in the influent before they pass through fine screens. Rather than purchase a new prescreening device, the team found they could use existing parts from elsewhere in the plant to rebuild the unit. The strategy saved thousands for the city, since ECO-LOGIC's profit is dictated by services rendered rather than the total operating budget.

"When we fix equipment like the comminutor, which has been discontinued and would have cost around $30,000 to replace, that money stays with the City of Lincoln," Hengst says. "Those are the kinds of things we take pride in."

STAYING ON TOP OF IT

The true motivation in operating the plant is to exceed customers' expectations. Hengst says the operators constantly look for ways to run the plant at peak performance — whether prioritizing and reprioritizing jobs, following through on comprehensive maintenance, or executing the right process control strategy.

"A treatment plant is like a chain, and it needs to be strong," Hengst says. "You just can't have any weak links. Anywhere. It's really a matter of making sure that everything is in line. If something doesn't look right, smell right or sound right, we address it immediately. You can't just relax and expect everything to go well. It's our job to stay on top of things."

With that attitude, the residents of the Lincoln area can relax, knowing the plant will keep pace with stringent effluent requirements, while helping to satisfy the growing need for recycled water. **tpo**

more info:

GEA Westfalia Separator Inc.
201/767-3900
www.wsus.com

MUCH DECORATED

The City of Lincoln is recognized as a civic leader for its visionary wastewater treatment and reclamation facility. In addition to processing wastewater for discharge, the technologically advanced plant enhances the reliability of the region's water supply by recycling water. The result is less reliance on potable water for irrigation and other uses.

In just over five years, the plant has earned a number of honors for design, environmental excellence and safety. Among the highest is the 2005 Helen Putnam Award for Environmental Excellence, recognizing outstanding achievements by California's 478 cities. Additional awards include:

California Water Environment Association (CWEA): Plant of the Year, 2007; Plant Safety Award, 2007.

CWEA Sacramento Area Section: Treatment Plant of the Year (<5 mgd), 2008.

CWEA local chapter awards: Plant of the Year (<5 mgd), 2006 and 2007; Plant Safety, 2005, 2006 and 2007; Special Achievement in Operations, 2005, Justin Gregory, treatment plant operator III; Engineering Achievement, 2003.

American Public Works Association local chapter award: Environmental Award, 2005.

Gary Hengst checks on a maturation pond.

"No one here has an attitude that it's not my job to do maintenance, or it's not my job to do lab stuff. There are no lines drawn here and I can honestly say the attitude is very positive."
GARY HENGST

Biosolids Processing

MANUFACTURERS OFFER A VARIETY OF SOLUTIONS FOR SEPARATING, MIXING, CONDITIONING AND DRYING WASTEWATER SOLIDS STREAMS

By Scottie Dayton

Biosolids processing accounts for a substantial share of treatment plant operating expenses. Manufacturers offer a variety of technologies to hold those costs down, reduce manual processing and supervision, and improve final product quality. Here is a sampling of the latest innovations.

MAKEDOWN SYSTEM

The explosion-proof **polymer makedown system from Fluid Dynamics Inc.** prepares, activates and injects liquid polymers in wastewater treatment applications. At 20,000 to 30,000 gallons per hour, the system produces 0.1 to 2.0 percent dilute solutions.

Besides stainless steel construction, units have the Gatlin Mixer, a motorized mixing chamber that segments the polymer into ultra-thin film for maximum activation regardless of fluctuating flow rate or water pressure. An interlock prevents polymer feed if water flow is insufficient. Standard systems include manual or automatic electronic metering pumps for polymer injection. Larger models use motor-driven metering or progressive cavity pumps. Accessories include a desiccant breather, calibration column kit and drum mixer. **888/363-7886; www.dynablend.com.**

Polymer makedown system from Fluid Dynamics Inc.

SOLID-LIQUID SEPARATOR

The high-flow **IFRS 36 separator from Accent Manufacturing Inc.** is a 36-inch rotary stainless steel screen for thickening and dewatering. Available in 3/4-hp electric or hydraulic drives, the friction drive system uses rubber-coated stainless steel wheels for positive traction and long life. The automatic cleaning system prevents clogging and ensures consistent flows. A bypass chamber, variable speed control, high-torque starting, and Delrin bearings eliminate flow control valves, maximize flow, optimize dewatering, and reduce maintenance and operating costs.

Simple to install, the separator operates manually or automatically. As a permanent receiving station, it reduces waste sludge costs by 30 percent. In its mobile configuration, the separator removes inorganic and non-biodegradable materials from septage and digester waste. **877/855-4890; www.accentmanufacturing.com.**

IFRS 36 separator from Accent Manufacturing Inc.

Quadra filter press from Ascension Industries

DRY FILTER CAKES

Quadra filter presses from Ascension Industries Inc. dewater biosolids with fully automatic or manual operation, producing dry filter cakes that reduce weight and lower transportation costs. A durable design provides years of service in corrosive environments. **716/693-9381; www.asmfab.com.**

SOLIDS CONDITIONING

The **FTXL model belt filter press from Frontier Technology Inc.** has a gravity solids conditioning zone, radial wedge section and optimal pressure roll section. Auxiliary equipment includes nip rolls, polymerization systems, pH balancing systems, sludge infeed, and discharge equipment with fully integrated controls. **269/673-9464; www.frontiertechnology.net.**

VAPOR PHASE ADSORBER

Wolverine HDPE-42 vapor phase carbon adsorbers from Simple Solutions Distributing LLC provide economical, effective odor control for convection or forced draft ventilation flows

FTXL model belt filter press from Frontier Technology

Wolverine HDPE-42 adsorber from Simple Solutions Distributing

up to 500 cfm in applications including solids press rooms. Factory-assembled corrosion-resistant vessels require only an electrical hookup and inlet piping to the odor source. They hold 800 pounds of regular carbon, 1,000 pounds of caustic carbon (impregnated), and 800 pounds of catalytic carbon.

With the proper media, units treat hydrogen sulfide, mercaptans, ammonia and common wastewater odors. In normal use, the media lasts about a year. At change-out, operators remove the lid, vacuum out the spent filter bed, and refill. Vessels secure to a skid or concrete slab with mounting tabs. Options include pressure blower, control panel, industrial skid, rain cap and various carbons and granular potassium permanganate. **866/667-8465; www.industrialodorcontrol.com.**

MECHANICAL SCREENING

Hydro-Flo mechanical screens from Hydro-Dyne Engineering have openings from 1 mm to 3 inches in stainless steel laced links, woven mesh or perforated panels. Very low head losses and stainless steel grids make these center-entrance, side-discharge screens suitable for numerous applications. Models, available in 24, 36, 48, 60 and 72 inches, handle low to high flows and incorporate into Hydro-Dyne septage receiving stations. **813/818-0777; www.hydro-dyne.com.**

Hydro-Flo mechanical screens from Hydro-Dyne Engineering

DEWATERING BOX

An **ADS 30-yard open-top roll-off dewatering unit from Aqua-Zyme Disposal Systems Inc.** replaces six standard drying beds. The filter container processes 22,000 to 25,000 gallons of sludge, septage or grease trap waste at 1.5 to 2 percent solids in about two hours. Dewatering reduces volume by 80 percent and BOD, COD, FOG and TSS by 98 percent. Clear effluent can return to the head of the plant. After draining the unit for 24 hours, workers can empty it at a landfill or composting facility. **979/245-5656; www.aqua-zyme.com.**

ADS dewatering unit from Aqua-Zyme Disposal Systems

MOBILE DEWATERING

Fluid Technology Inc., a mobile contract dewatering service, sizes the proper equipment for each project to deliver maximum efficiency and minimum disruption to workforces. Staffed by professionals, the company's 1.7- and 2.2-meter **mobile presses** operate in most climate conditions without significant loss in production. **888/844-7824; www.fluidtechnologyinc.com.**

TURNKEY SYSTEMS

Prepackaged on self-supporting skids or trailer-mounted for quick, portable operation, **belt filter presses from Bright Technologies, a division of Sebright Products Inc.,** exceed the requirements of municipal applications. Frames, rolls and pans are 304 stainless steel. A radius wedge and drainage roll allow for higher throughput and increased total output.

The first large-diameter fabricated pressure roll has 50 percent open area drainage for the upper and lower belts. As the drainage roll rotates upward, it channels water to the outside, washing out solids so they do not impede drainage in subsequent operations. The wing roll also cleans easily. The pneumatic steering and tensioning system is safe and easy to operate. The programmable logic controller and touchscreen controls integrate with SCADA systems. Ancillary equipment includes a rotary lobe solids pump, belt wash booster pumps, air compressor, polymer system and solids meter. **800/253-0532; www.brightbeltpress.com.**

(Continued)

Mobile press from Fluid Technology Inc.

Belt filter presses from Bright Technologies

Muffin Monster grinders from JWC Environmental

EQUIPMENT PROTECTION

In-line **Muffin Monster grinders from JWC Environmental** shred large rags, rocks, plastics, trash and other solids into tiny particles that flow harmlessly through pumps, pipes, digesters, centrifuges, belt presses and dewatering equipment. The homogenous particle size enhances the efficiency of centrifuges. Design improvements in the dual-shafted units include a unibody housing and hex-shaped mechanical seal. **800/331-2277; www.jwce.com.**

ROTARY PRESS

Prime rotary fan press from Prime Solution Inc.

Prime rotary fan presses from Prime Solution Inc. are compact, efficient units with low maintenance and operating costs. The continuous dewatering process 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. They install easily, and lower utility requirements cut building costs. 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.**

KLAMPRESS belt press technology from Ashbrook Simon-Hartley

LONG-TERM DEWATERING

KLAMPRESS belt press technology from Ashbrook Simon-Hartley is designed as a cost-effective and versatile dewatering process to adjust to the changing character of biosolids streams. A zone approach makes the technology effective with softer sludges that result from advanced treatment processes. Modular design allows easy modification, such as the retrofit of additional pressure zones or odor-control components. Systems are available with an independent gravity deck that allows independent operation of gravity belt thickening and belt filter press operations. A three-belt configuration saves space and significantly increases capacity. **800/362-9041; www.ashbrookcorp.com.**

NT-8000E dewatering container from NewTech Inc.

EFFICIENT DEWATERING

The model **NT-8000E dewatering container from NewTech Inc.,** is made of mild steel. It is equipped with 750 micron filter screens along both sides and a double screen down the center, mounted on a steel frame. The filter screens allow water forced from the solids by the flocculation process to flow through and out the drain ports in the bottom front.

The screens hold the solids in the container for later disposal. A full-width (hydraulic open/close, lock/unlock) rear door allows dumping of the solids after dewatering is complete. The rear door is equipped with 4-inch drains to aid in wash-up and to discharge partially dewatered sludge. A filler pipe, through which the container is charged with material, is located on the front. All ports are threaded to NPT standards. An attached ladder gives easy access to the top of the container.

The container can be tilted to dump loads. The mild steel is sand-blasted, primed and coated on the inside with an epoxy and outside with the color specified. Dimensions are 20.4 feet long, 8 feet high, 8 feet wide. The unit weighs 6,000 pounds. **800/210-2361; http://dewater91.com. tpo**

ON THEIR SIDE

AN AWARD-WINNING REGIONAL MANAGER FOR A PRIVATE WASTEWATER SERVICE PROVIDER TAKES A PEOPLE-CENTRIC APPROACH TO OVERSEEING OPERATIONS AND OVERCOMING CHALLENGES

By D. Douglas Graham

AS EASTERN IOWA REGIONAL MANAGER FOR PEOPLESERVICE Inc., Dennis White sums up his job with just one word: Advocacy.

"I'm responsible for hiring operators and getting them started, setting up all operational procedures, and ensuring that they provide the towns with the services for which they contracted," says White, whose water and wastewater contract operations company is based in Omaha, Neb.

"I currently work with 13 employees in 17 contracts throughout eastern Iowa," says White. "As an advocate, it's my job to see that plants are run as efficiently and maintained as best as possible. I try to keep them in compliance and oversee reports to state agencies. Occasionally, I defend operators when clients ask them to do something against regulations, of which they may not be aware."

White functions as a facilitator and trainer, referee, regional manager, compliance officer and mentor. Although he wears many hats, he is a treatment plant operator at heart, always looking at things through the operators' eyes.

That approach to leadership helped White win the 2007 Iowa Water Pollution Control Federation William D. Hatfield award for outstanding wastewater treatment operator performance and professionalism.

Dennis White records data from a control breaker panel at the wastewater treatment facility in Tripoli, Iowa. White manages 17 contracts in Eastern Iowa for PeopleService Inc. (Photography by James L. Shaffer)

BIG AND UGLY

Customers of PeopleService include smaller communities with populations from 500 to 10,000. As most fall somewhere in the middle, clients' water and wastewater plants are usually one-man operations, which PeopleService supports with training, guidance, equipment and extra help when really big problems raise their heads.

Big and ugly made its way to eastern Iowa via the 2008 flood, an event remembered by residents as Iowa's Katrina. "Most damage occurred on the week of June 8," White recalls. "While all 17 towns we serve were affected, the treatment facilities at Elkader and Nashua were hit hardest.

"At Elkader, sewer lines washed away, lift stations were lost, and the wastewater system suffered major infrastructure damage. The Nashua plant was submerged. Once the water receded, the operator pumped out the remaining water, then rescued the motors, pumps and anything else he could drag out."

The region's water and wastewater treatment plant network was stretched to breaking, and plant personnel found their duties divided between resuscitating drowned facilities and restoring lost pump service. Operators averaged 20-hour days.

White, meanwhile, traveled from town to town, supervising rescue efforts, pitching in when necessary, and performing public relations to ease concerns of city officials and citizens under siege. When an operator left in mid-June and White couldn't find a replacement, he ran the plant until an operator was hired.

"Dennis White's job is also his vocation," observes PeopleService president Alan Meyer. "He believes in our industry, and takes a personal stake in its performance. We're not talking here about an out-of-sight, out-of-mind sort of guy. Dennis' standards are high, and he's not the type to cut corners.

"Like anyone else, he takes time off, but a part of Dennis is always on duty. His other core superlative is his commitment to people, which is nothing short of total. He cares about operators, and where clients are concerned, bends over backward to make certain they receive what they were promised, and then some."

GETTING THERE

The wastewater business was a natural choice for White. "Dad was a pipefitter/plumber, and as I grew up, I traveled the same career path," he recalls. "My first job was laying sewer lines for contractors. That experience

"To pay the least amount to those who treat what becomes the water we drink says a lot about our society. We must stop looking at ourselves as just city employees and begin seeing ourselves as professionals. We have to become better at promoting the importance of what we do to elevate our pay scale."

DENNIS WHITE

Dennis White repairs a Cochran blower at the Tripoli wastewater treatment facility.

got me into the pipefitters union. When my wife wanted to be nearer her family, we relocated to Iowa, where I started working for a plumber in the small town where we lived."

Looking for more employment benefits, White took a job with the City of Clarinda sewer department. Seeing that he needed to learn more about the industry, "I took home study courses and worked my way up to collection system and treatment plant superintendent," White says.

In 1992, he attended a conference on contract operations. He liked what he heard. "Not long after the conference, I applied for a job with Peoples Natural Gas, which at the time was launching a water/wastewater contracts operation firm called PeopleService," he recalls.

White believes wastewater treatment operations should be run with the same financial discipline as utilities. He regards gas and telephone utilities as good models. They also are proficient at promoting themselves as places to build viable careers. White wants the wastewater treatment industry to do the same.

"The 'crying Indian' Keep America Beautiful public service announcements of the early 1970s had a great effect on me as a kid," says White. "Why can't our industry create a similar campaign? By treating wastewater, we have Earth Day every day. We invented green long before it became a popular slogan. We are the original environmentalists. The public needs to recognize this."

THE PAY FACTOR

A key challenge facing the industry, he says, is a shortage of operators, which is becoming worse as more retire. White observes that the wastewater profession lacks the luster to attract young people, who are drawn to flashier professions like law, business, technology and medicine.

Money is another factor — perhaps even more powerful than glamour, White believes. He sees private companies offering highly competitive salaries and benefits, helping drive compensation higher in the municipal sector as well.


White collects samples from the aerated lagoons at the Tripoli treatment plant.

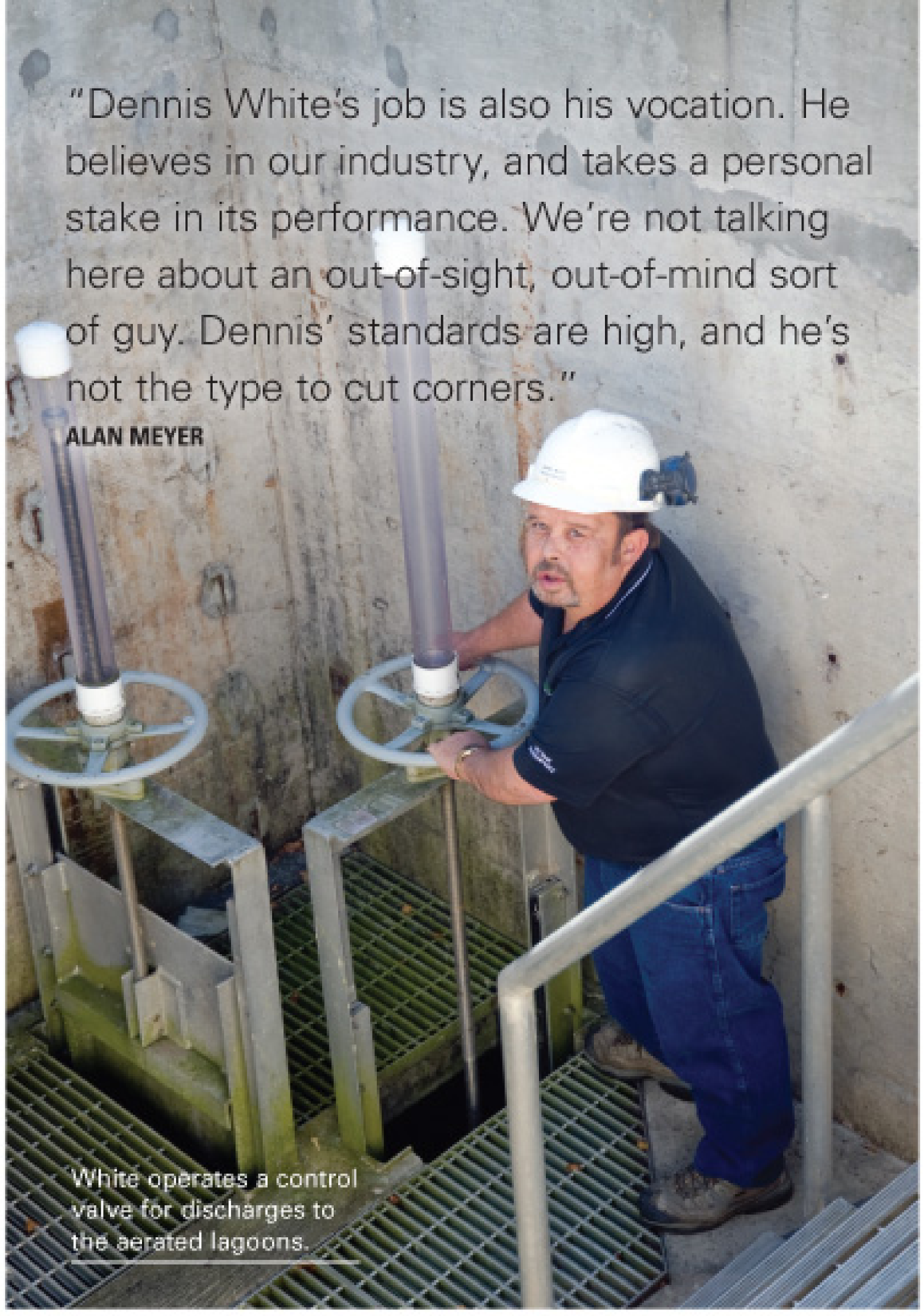
"To pay the least amount to those who treat what becomes the water we drink says a lot about our society," says White. "We must stop looking at ourselves as just city employees and begin seeing ourselves as professionals. We have to become better at promoting the importance of what we do to elevate our pay scale."

In 2008, PeopleService began an apprenticeship program. "Our goal is to place untrained individuals in treatment plants for one to two years, pay them a salary, pay for their schooling, and provide on-the-job training so they can take their operators' certification exam," says White.

PeopleService covers Nebraska, Minnesota, Iowa, Missouri and some of western Illinois. Individuals can apprentice in some of these states, but once certified, they must accept the first suitable opening within the company. The program, still in its infancy, has two apprentices working in Minnesota and one in southwest Iowa.

INDUSTRY IN TRANSITION

Other issues affecting the industry are permitting requirements and technology. White notes that permitting parameters have become more stringent with advances in scientific knowledge and environmental awareness.



White operates a control valve for discharges to the aerated lagoons.

In Iowa, regulations are tightening limits on BOD, TSS, fecal coliforms, ammonia nitrogen, TKN, and soon, phosphorous. Even factors such as temperature may soon see much tighter control depending on the type of plant.

"New permit parameters for Iowa treatment plants will have a far-reaching effect on the wastewater industry," White says. "In my opinion, the Iowa Department of Natural Resources doesn't do enough to educate affected parties about what's being proposed.

"When a new plant goes up, or is upgraded, its anticipated lifetime is 20 years. With fair warning, a module could be added in a new plant's design phase so the industry doesn't wind up scrapping a five-year-old facility to meet new permitting parameters."

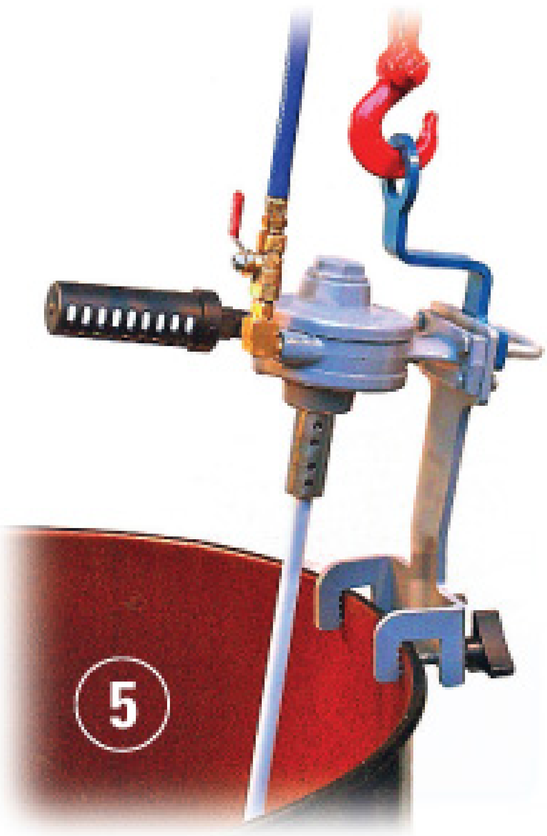
Technology — and especially automation — holds great promise for the industry, White believes. Solutions such as SCADA are likely to see greater adoption as municipalities cope with the industry's personnel shortage, and very small communities find more practical ways to facilitate limited onsite operation.

"With technologies like SCADA, an operator can check plant controls via the Internet from his home," White says. "It's conceivable that the same operator would need to visit the plant in person very infrequently, perhaps only when absolutely necessary.

"An operator working in tandem with technology would constitute 24/7 monitoring, greatly enhancing operation quality overall. More automation is coming, and it will do this industry a world of good." tpo

more info:

Cochran Compressor Co.
800/456-0242
www.cochranecompressor.com



1. BORD NA MONA DESIGNS MOVING-BED BIOLOGICAL REACTOR

The PuraMAX moving-bed biological reactor from Bord na Mona is designed to achieve a high quality of effluent at low cost within a small overall footprint. The system is engineered for municipal, decentralized or onsite community and commercial wastewater treatment applications. Using an attached growth activated sludge process, the system consists of recycled plastic media that provide an extended surface area for bacteria. An aeration grid at the bottom of the reactor supplies oxygen to the biofilm. The biosolids are naturally sloughed off the media, which along with the treated wastewater flow by gravity to a clarifier for separation. **336/547-9338; www.bnm-us.com.**

2. RAVEN OFFERS WASTEWATER CENTRIFUGE

The bench-top Wastewater Centrifuge from Raven Environmental Products Inc. features a horizontal swing-out rotor that holds six centrifuge tubes. Made of heavy stainless steel and aluminum, the centrifuge delivers a digital, 15-minute spin test for mixed liquor suspended solids and return activated sludge suspended solids. It also is designed to provide a multitude of additional sludge quality parameters, such as aeration tank concentration, returns sludge concentration and clarifier sludge concentration. **800/545-6953; www.ravenep.com.**

3. POLYLOK INTRODUCES NEW-DESIGN CATCH BASINS

New-design catch basins from Polylok Inc. feature adjustable inlets and outlets and a patent-pending seal and nut assembly that instantly adapts to accept 2-, 3-, 4-inch and corrugated pipes. Available in 9-inch and 12-inch-square models, the basins allow up to four inlets or outlets. Made of high-impact plastic, the unit is suitable for landscape and hardscape applications, as well as light vehicle traffic. Cast iron grates are available. **888/765-9565; www.polylok.com.**

JWC INTRODUCES MONSTER BLIND DIAGNOSTIC SYSTEM

The Monster Blind Diagnostic System from JWC Environmental detects the percent blinding factor of a screen and notifies plant operational staff. An optional feature can control additional cleaning steps, including hot water spray wash or automatic brush adjustments. **800/331-2277; www.jwce.com.**

4. DELCO INTRODUCES ELIMINATOR PRESSURE WASHER

The Eliminator hot-water pressure washer from Delco Cleaning Systems offers from 2,000 psi at 4 gpm to 3,000 psi at 5 gpm. Designed for permanent, in-plant installation and operation, the front control panel features a centralized location for all controls, an hour meter and 24-volt electrical controls. Other features include Baldor motor and General pump, dual-belt drive system, automatic system shutdown after 4 1/2 minutes of inactivity, adjustable auto-stop timer and downstream chemical injector. **847/348-1589; www.delco-cleaning.com.**

EISENMANN INTRODUCES PYROBUSTER THERMAL BIOSOLIDS TREATMENT

The Pyrobuster system for the thermal treatment of biosolids from municipal water and wastewater treatment plants from Eisenmann Corp. is a two-stage process utilizing pyrolysis in a rotary drum followed by post combustion. Biosolids, sludge and other organic waste is pyrotically transformed into an energy-rich gas. The residual nonvolatile ash encapsulates minerals and metals, if present, into a stable inert form that permits disposal in landfills. Depending on local needs, the ash can also be used as filler for road construction, concrete products or similar applications. The system is designed to treat biosolids streams up to one dry ton per hour and works in conjunction with a dryer system to provide a

10:1 volume or mass reduction of dewatered biosolids. Waste heat can be recovered for use by the dryer or utilized to generate steam or renewable electrical power. Carbon credits may be generated from the reduction in emissions from transportation of the biosolids and from the generation of electrical power. **815/477-3232; www.eisenmann.com.**

5. DRUM-MATES OFFERS DRUM/TANK MIXER

The DM-55RAS open drum or tank mixer from Drum-Mates Inc. creates a rapid fluid flow at virtually any shaft speed with four blades blending the top, middle and bottom levels simultaneously. The adjustable swing-wing turbine impellers work in open head drums, tanks or fit through a 2-inch hole, opening and closing automatically. Available in hand-held, rim mounting and bunghole mounting models, mixers range from 5-gallon to 500-gallon models in either zinc-plated or stainless steel. **609/261-1033; www.drummates.com.**

6. CONVEYER INTRODUCES COMPACT SAFETY STOP

Conveyor Components Co. has released four compact versions of its cable-operated safety stop controls for use on indoor conveyor systems. The units are available in single-end and double-end versions, as well as slack-wire and tight-wire. The Model RSC-B and RSC-C taut-wire versions feature an external tension spring. If the cable is pulled or breaks, the unit will activate the output contacts, generating an alarm signal. A palm button in an NEMA 4 enclosure also is available. **800/233-3233; www.conveyorcomponents.com.**

PHILADELPHIA MIXING INTRODUCES MOMENTOUS FLOW TECHNOLOGY

Momentous Flow mixing technology from Philadelphia Mixing Solutions is designed to facilitate anaerobic digestion in wastewater and biofuels. The technology uses a single Z/T=3.0 axial impeller and no baffles in the upper part of the vessel to create centrifugal force. The force pushes membrane methane bubbles from anaerobic digestion to the center of rotation, where they coalesce and escape from the liquid into a collection cap. The methane is then harnessed to power digestion operations. **800/733-1341; www.philadelphiamixers.com.**

7. SIM/TECH DEVELOPS LARGE SLUDGE SAMPLER

The TruCore sludge sampler from Sim/Tech Filter is specifically designed for onsite systems and the core sampling of wastewater and other fluids. The unit enables samples to be taken quickly without creating excessive turbulence. Because there are no restrictions caused by valves, stoppers or flaps, fluid is allowed to flow freely and virtually undisturbed into the sampling tube, creating a true core sample of tank contents. The unit has an inside diameter of 1.65 inches and a capacity per foot of more than 14 ounces. The polycarbonate holding tube is surrounded by a PVC jacket. The outside diameter is 2 inches and measures 8 feet long. Optional extensions are available. The sampler is marked every 6 inches and numbered every foot and comes with a case. **888/999-3290; www.simtechfilter.com.**

product spotlight

WX-D belt filter press from Phoenix Process Equipment Co.

Phoenix Press Offers Two-Source Processing

By Ed Wodalski

Where space and time are a concern, the WX-D belt filter press from Phoenix Process Equipment Co. of Louisville, Ky., can process sludge from two different sources, allowing for the simultaneous thickening of one sludge and the dewatering of another.

Essentially two presses in one, the WX-D is an independent gravity belt thickener and a belt filter press that can be operated independently or in conjunction.

A diverter in the operator-controlled mode directs sludge from the pre-thickener belt discharge to a digester or another point in the process, while a separate nozzle directly feeds the press gravity zone.

"You can use the thickener to pre-thicken the sludge and feed the belt press below or you can divert the thickened sludge to the hopper and pump it to a digester or an aerated sludge holding tank or storage vessel prior to be taken away for land application," says Allen Justus, Phoenix's municipal sales manager. "At the same time you're doing that, you can be feeding the belt press from another source below."

For a treatment plant with limited floor space and a tight budget, the unit's independent operation feature enables both operations to be performed in a single shift, rather than thickening at one time and dewatering at another time.

The gravity belt thickener can process from 200 to 300 gallons per minute per meter of belt width, depending on the sludge, while the belt press below can handle between 70 and 100 gallons per minute per meter.

In the market since the early 1990s, the combination press was initially designed to thicken paper sludge and later adapted for other uses. "We simply stacked a gravity belt thickener on top of a belt press," Justus says. "What we did with this concept is reduce the height of the machine. We have a compact, low-profile gravity belt thickener on top of a conventional belt press." The unit stands slightly taller than a conventional belt press, approximately 11 feet, and measures 18 feet long.

"Most of the time the gravity belt thickener was simply used to pre-thicken very dilute sludges, which you can do with this one. In fact, the first of these units we put in Puerto Rico, where land is at a premium. They simply take the dilute sludge directly from the secondary clarifier to the gravity belt thickener, pre-thicken it and then send it to the belt press below."

In addition to the third belt pre-thickener and extended gravity and wedge zones, the combination press has a fully welded and easily accessible mainframe for easy maintenance. Its mostly nonproprietary components can be obtained from local supply houses.

A compact MC (medium capacity) model press is also available in either a two-belt or three-belt, dual gravity zone configuration for lower feed rates. A 2-meter unit takes up less than 16 square feet. Standing 6 feet tall and 8 feet long, it's designed for plants where space is truly at a premium. Output is in the 60- to 80-gallons per meter range. **For more information: 502/499-6198; www.dewater.com.** tpo

associations

Assistance With Hot Issues

The Michigan WEA Board of Directors created a new task force to help members deal with hot issues on which the media may focus. For each topic, consultants developed a three- to four-page briefing paper. Papers answer basic who-what-when-where-why questions and supply technical, unbiased information and quotes for the press.

Internet links and informational references conclude the work. Topics addressed include biosolids and sludge, sanitary and combined sewer overflows, total maximum daily load determinations and responsibilities, spills and stormwater and municipal separate storm sewer systems. The papers (member only) are at www.mi-wea.org.

Sewer History Exhibit at Utility Construction EXPO '09

A traveling exhibit on the history of sewage conveyance systems from 3500 B.C. through the 1930s is part of Utility Construction EXPO '09, March 4-6, at the Phoenix (Ariz.) Convention Center Exhibit Hall.

The photos and artifacts of Jon Schladweiler, historian of the Arizona Water & Pollution Control Association, offer insight into the origins of modern sewer systems and bring to light the contributions of sewer builders, engineers and operators. The Collection Systems Historical Photo and Artifacts Display is sponsored by the National Utility Contractors Association Foundation for Education and Research, Wendell Wood (SBH-NA Trench Shoring), Mark Accetturo (Reynolds Inc.) and Dick Foster (PKF-Mark III). Read more at www.sewerhistory.org.

Liquid Assets DVD Now Available

A DVD of *Liquid Assets: The Story of Our Water Infrastructure* is available for $24.95 from producer Penn State Public Broadcasting. The 90-minute documentary explores the history, engineering, political and economic challenges of water infrastructure. Order at http://liquid.assets.media.psu.edu/moreInfo_8015DVD.html.

Student Chapter Launches Leadership Forum

The Water Environment Association of Ontario (WEAO) Student Chapter Program has seven chapters and four in formation. To maintain its vigor, the Students and Young Professionals Committee (SYPC) created the 2008 Student Chapter Leadership Forum, a conference to help student chapter leaders run better programs. For developing chapters, the forum offered seminars on forming new chapters, resources available from WEAO and WEF, and how to tap resources at their respective schools. Established chapters attended seminars on program development, scholarships and finance.

The most important goal was to start the students talking to share ideas and provide feedback regarding special support they required to run better programs. Two workshops on programming and several mixer events were included. The forum, a first for WEAO and WEF, will be used as a model for similar programs in other member associations. E-mail Bill White, Student Chapter Program manager, at william.white@ch2m.com.

Joint Conference Call for Papers

The Joint Annual Rocky Mountain Section AWWA and Rocky Mountain WEA Conference Committee invite authors to submit technical papers for presentation at this year's event in Albuquerque, N.M. Abstract submissions are due in March. Visit www.rmsawwa.net or www.rmwea.org. Those interested in volunteering should contact Jill Peterson at jill.peterson@ch2m.com or Julie Samora at jsamora3@comcast.net.

awards

U.S. EPA National Clean Water Act Recognition Awards

Operation and Maintenance First Place:

- Large Advanced Plant – F. Wayne Hill Water Resources Center, Buford, Ga.
- Large Advanced Plant – El Paso Water Utilities Public Service Board, Northwest Wastewater Treatment Facility, El Paso, Texas.
- Medium Advanced Plant – Wahoo Creek Water Pollution Control Plant, Newnan, Ga.
- Small Advanced Plant – Waterville Wastewater Treatment Facility, Waterville, N.Y.
- Large Secondary Plant – Joint Water Pollution Control Plant, Carson, Calif.
- Medium Non-Discharging Plant – Southside Wastewater Treatment Plant, ESG Operations, Vidalia, Ga.
- Small Non-Discharging Plant – The Manor Water Reclamation Facility, Alpharetta, Ga.
- Most Improved Plant – Bristol (N.H.) Wastewater Treatment.

Exemplary Biosolids Management First Place:

- Large Operating Projects – Lawrence (Kan.) Municipal Wastewater Treatment Facility.
- Small Operating Projects – Tahlequah (Okla.) Public Works Authority Compost Operation.
- Public Acceptance – Metropolitan Water Reclamation District of Greater Chicago, Ill.

The entire list is at www.epa.gov/fedrgstr/EPA-WATER/2008/October/Day-21/w24693.htm.

Water Environment Federation Awards

- Camp Applied Research Medal – Orris Albertson, WEA of Utah.
- Emerson Distinguished Service Medal – Billy Gerald Turner, Georgia Association of Water Professionals.
- Engelbrecht International Achievement Award – Daniel A. Nolasco, AIDIS Argentina.
- Outstanding Young Water Environment Professional – Charles Bott, Virginia WEA.
- Public Official Award – Terrence O'Brien, president, board of commissioners, Metropolitan Water Reclamation District of Greater Chicago.
- Graduate Studies Scholarship – Jason J. Flowers, P.E., Ph.D. candidate, University of Wisconsin-Madison, Central States WEA.
- Fair Distinguished Engineering Educator Medal – Dr. Daniel H. Zitomer, Central States WEA and Dr. James H. Johnson, Jr., Chesapeake WEA.
- Public Education Awards: Individual Category – Isabel S. Tourkantonis, New England WEA.
- Public Education Awards: Member Association Category – Florida WEA Public Outreach and Communication Committee.
- Public Education Awards: Other Category – Sanitation Districts of Los Angeles County Clearwater Program.
- Member Association Achievement Award – Michigan Water Environment Association and Pacific Northwest Clean Water Association.
- Outstanding Member Association Award – North Carolina Water Environment Association.
- Member Association Safety Award – New England Water Environment Association.
- Collection Systems Award – George LeRoy Martin, WEA of South Carolina.
- Innovative Technology Awards: Collection

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

Systems Category – ADS Environmental Services, ADS Spider.
- Innovative Technology Awards: Instrumentation Category – Accusonic Technologies, Accusonic 7510+.
- Innovative Technology Awards: Process Equipment Category – Aqua-Aerobic Systems Inc., Aquadiamond Filter.
- Innovative Technology Awards: Solids Handling/Disposal Category – Penn Valley Pump Co., Double Disc Pump.
- Published Papers: Eddy Wastewater Principles/Processes Medal – Glen Daigger, Craig Adams and Holley Kaempfer Steller.
- Published Papers: Gascoigne Wastewater Treatment Plant Operational Improvement Medal – Kenneth Sedmak, Michael Gerbitz, Thomas Asmus, Larry Reinke and Timothy Stockman.
- Published Papers: Rudolfs Industrial Waste Management Medal – Ines D. Henriques, Richard T. Kelly II, Jennifer L. Dauphinais and Nancy G. Love.
- Published Papers: McKee Groundwater Protection, Restoration, Sustainable Use Medal – Shane Rogers, Say Kee Ong, Johanshir Golchin, Bruce H. Kjartanson and Greg Stenback.

Water Environment Association of Ontario

25-Year Service Awards: George Aldworth, Jacob Dick, Dr. Glynn Henry, Dale Murray, Dr. G. Elliott Whitby and Henry Jakubiec.

education

California

The California WEA has these workshops:
- March 5 – Math Anxiety, Vacaville
- March 11 – Crisis Communication, Whittier

Call 510/382-7800 or visit www.cwea.org.

North Carolina

The North Carolina AWWA-WEA has these classes at North Carolina State University, McKimmon Center in Raleigh, unless stated otherwise:
- March 30-April 3 – Collection and Distribution Eastern School
- May 4-8 – Biological Wastewater Operators Eastern School
- May 5-8 – Physical and Chemical Wastewater Operators School
- May 12 – Microscopic Examination for Wastewater, Charlotte

Call 919/784-9030 or visit www.ncsafewater.org.

Texas

The Water Environment Association of Texas has a Fats, Roots, Oil and Grease (FROG) workshop on Feb. 26-27 at the Marriott Houston Hobby Airport in Houston. Call 512/693-0060 or visit www.weat.org. **tpo**

CALENDAR OF EVENTS

Feb. 1-4
New York Water Environment Association Meeting and Exhibition, New York Marriott Marquis, New York. Call 315/422-7811 or visit www.nywea.org.

Feb. 3-6
Hawaii Water Environment Association Annual Conference and Pre-Conference Workshops, Blaisdell Convention Center, Honolulu. Call Scott McAdam at 808/277-1809 or visit www.awwa-hi.org.

Feb. 11-12
South Dakota Water and Wastewater Association Water Operators Seminar, Ramkota, Rapid City. E-mail rob.kittay@pie.midco.net or visit www.sdwwa.org.

Feb. 25-28
Pumper & Cleaner Environmental Expo International, Kentucky Exposition Center, Louisville, Ky. Call 800/257-7222 or visit www.pumpershow.com.

March 1-3
Pretreatment, Pollution Prevention and Stormwater Conference, Monterey, Calif. Call 510/382-7800, option 4, or visit www.cwea.org.

March 1-4
American Water Works Association Customer Service & Information Technology Conference, Westin Hotel, Charlotte, N.C. Call 800/926-7337 or visit awwa.org.

March 2-4
California WEA Pretreatment, Pollution Prevention and Stormwater (P3S) Conference, Hyatt Regency, Monterey, Calif. Call 510/382-7800 or visit www.cwea.org.

March 2-6
Texas Water Utilities Association Annual Meeting, Corpus Christi. Call 888/367-8982 or visit www.twua.org.

March 3-4
Michigan Water Environment Association Biosolids Conference, Holiday Inn South, Lansing. Call Steve Mahoney at 517/241-2508 or visit www.mi-wea.org.

March 10-13
Alberta Water and Wastewater Operators Association Seminar, Banff Park Lodge, Banff. Call 877/454-7745 or visit www.awwoa.ab.ca.

March 16-19
Illinois Water Environment Association Conference, Crowne Plaza, Springfield. Call Dennis Priewe at 815/387-7634 or visit www.iweasite.org.

March 17-19
AMERICANA International Environmental Technology Trade Show and Conference, Montreal Convention Centre, Ontario. Call 514/270-7110 or visit www.americana.org.

March 21-25
South Carolina Environmental Conference, Kingston Plantation, Myrtle Beach, S.C. Call 803/939-9574 or visit www.weasc.org.

March 22-25
Manitoba Water and Wastewater Association Conference and Trade Show, Keystone Center, Canad Inn, Brandon. Call 866/396-2549 or visit www.mwwa.net.

March 22-26
Kentucky Water and Wastewater Operators Conference, Lexington Center and Hyatt Regency, Lexington. Call Melissa Brothers at 502/226-8149 or visit www.kwwoa.org.

March 25-26
West Virginia Construction and Design Exposition, Civic Center, Charleston. Call 304/342-3976 or visit expo@wvexpo.com.

March 29-April 1
Missouri Water Environment Association Conference, Osage Beach. Call Clara Haenchen at 573/634-6566 or visit www.mwea.org.

April 1-2
South Dakota Water and Wastewater Association Wastewater Operators Seminar, Highland Conference Center, Mitchell. E-mail rob.kittay@pie.midco.net.

April 5-7
Water Environment Association of Ontario Technical Symposium and Exhibition, Westin Harbour Castle, Toronto. Call Darla Campbell at 416/410-6933 or visit www.weao.org.

April 8-10
Water Security Congress Conference, Omni Shoreham Hotel, Washington, D.C. Call 800/926-7337 or visit www.awwa.org/conferences/security.

April 14-17
Texas Water 2009, Moody Gardens Hotel & Convention Center, Galveston. 512/251-8101 or visit www.tawwa.org.

April 15-16
Virginia Water Environment Association Education Seminar, Holiday Inn Koger Center, Richmond. Call Clarke Walcraft at 540/639-3947 or visit www.vwea.org.

April 19-22
Alabama Water Environment Association Conference, Perdido Beach Resort, Orange Beach. Call Kim Polifka at 205/349-0067 or visit www.awea-al.com.

April 20-23
Illinois Association of Water Pollution Control Operators, Crowne Plaza Conference Center, Springfield. Call Scott Wallis at 217/530-2678 or visit www.iawpco.org.

April 25-29
British Columbia Water and Waste Association Conference and Trade Show, Penticton Convention Centre, Penticton. Call 604/433-4389 or visit www.bcwwa.org.

April 26-28
North Carolina AWWA-WEF Spring Conference, Sea Trail Golf Resort & Conference Center, Sunset Beach. Call 919/784-9030 or visit www.ncsafewater.org.

April 26-29
Arkansas Water Works & Water Environment Association Conference, Hot Springs Convention Center, Hot Springs. Call Angela Rogers at 501/975-1958 or visit www.awwwea.org.

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