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OCTOBER 2012

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Muscle Shoals, Ala.

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on the cover

John Riccio, superintendent of Massachusetts Water Resources Authority (MWRA) treatment plant in Clinton, Mass., keeps his staff well trained and ready for anything. The preparation paid off when the team faced a huge flow caused by a severe storm in March 2010. Performance in that crisis helped Riccio win the New England Water Environment Association (NEWEA) Operator of the Year award. (Photography by Ed Collier)

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let's be clear

For All to See

BRAVE NEW CLEAN-WATER PLANTS DON'T HIDE AT THE END OF A ROAD OUTSIDE TOWN. THEY STAND VISIBLY AS SYMBOLS OF WATER PROTECTION AND COMMUNITY INVESTMENT.

By Ted J. Rulseh, Editor



The classic location for a clean-water plant is outside town at the end of a road (maybe gravel), or hidden in some old industrial district. In part that always made sense. Economics dictate that to the extent possible, wastewater should flow by gravity. So the ultimate collection point is in a low spot, often right down near the river or the creek.

And probably not by accident, in a low spot well out of sight of downtown. Again necessity played a role: Look back 40 or 50 years and treatment plants had their issues with odors (some still do). All of this was unfortunate, since it tended to portray wastewater treatment as some-

thing off to the side, and wastewater operators as people with dirty, menial, undesirable jobs.

That is changing as older clean-water plants get replaced or upgraded. Often the new plant won't fit on the old site and a new location has to be found. Other times the old site is suitable but the community has grown up around it — and the new facility has to come up to some pretty high standards of appearance and cleanliness.

RIGHT OUT FRONT

In either scenario, the new plant or upgrade often becomes a highly visible part of the community. One such plant is profiled in the September issue. The Brightwater Clean-Water Treatment Facility, King County, Wash., stands in a neighborhood of low-density housing and light industry and will probably develop further.

So the county invested heavily in making it a good neighbor, committing to, among other things, no detectable odors beyond the fence line. All process areas are covered or inside buildings under negative pressure. All air that comes in contact with wastewater is scrubbed in three odor-control phases before it is exhausted.

There are many other examples of treatment plants blending in with their communities. Among the most extreme ex-



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amples is the North River Wastewater Treatment Plant in Manhattan — it has Riverbank State Park as its roof.

The Johns Creek Environmental Campus in Roswell, Ga., owned by Fulton County, lies just a few yards from well-to-do neighborhoods and is designed to be odorless and noiseless. Most of the process equipment is underground.

In a smaller-town setting, the Frisco (Colo.) Sanitation District treatment plant is located at the end of Main Street, a short walk from a marina, shops and condominiums. Its buildings are designed to blend right in — tourists barely know the facility is there.

Those are just a few examples. Many treatment plants make themselves showpieces with elaborate plantings and

An attractive, visible facility automatically raises the stature of and the respect given to the people who work there. Operators need and deserve to know the people they work for appreciate them. And the public needs to know the people who protect their water resources are well-educated and skilled professionals.

landscaping. They make their buildings not just functional but also attractive. Far from hiding in some remote spot, they essentially say to their communities, "Here I am."

EQUALLY IMPORTANT

And all that is good on several levels. For one thing, it makes a statement to the public (the people who pay the bills) that the clean-water plant is just as essential as the police station, the library and city hall when it comes to providing services.

For another, an attractive, visible facility automatically raises the stature of and the respect given to the people who work there. Operators need and deserve to know the people they work for appreciate them. And the public needs to know the people who protect their water resources are well-educated and skilled professionals.

And finally, an attractive facility makes an impression on young people — those who might one day become operators. It's not a stretch to say that one reason many kids say they want to be firefighters (in addition to the trucks, the spraying water, the heroism) is that they ride past the firehouse on the way to school or to the grocery store.

It can't hurt long-term recruiting potential to have boys and girls see the clean-water plant now and then in their travels around town — and to have them find it appealing. Maybe we'll know we're making progress when we start hearing kids in grade school career days say, "I want to be a clean-water operator."

Clean, beautiful and visible treatment plants alone won't make that happen, but they certainly can't hurt the cause. **tpo**

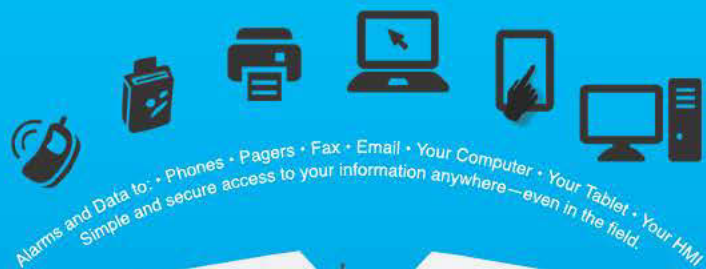
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Only the Best

THE PLANT TEAM IN WAUSAU, WIS., MADE ENERGY EFFICIENCY A TOP PRIORITY WHEN SELECTING NEW EQUIPMENT FOR A \$2 MILLION UPGRADE

By Doug Day

In completing a \$2 million upgrade to the Wausau Wastewater Treatment Plant, the staff did everything possible to improve energy efficiency with the new equipment.

Planning began three years ago and the project went online in fall 2011. "The existing blower equipment was dated, inefficient and breaking down," says Ken Ligman, project manager from the Becher-Hoppe Associates engineering firm in Wausau. The 8.2 mgd (design) advanced activated sludge plant serves Wausau, the City of Schofield, and part of a neighboring township. Its average flow is 4 mgd.

The old plant had three positive displacement blowers installed in 1970. The motors and two biogas-fueled engines were from 1989. "The engines required an awful lot of maintenance, and replacement parts were getting hard to find," says Ligman. "Money had to be spent. With a little foresight, we think we spent it wisely."

CAREFUL SELECTION

The city purchased all the equipment separately, rather than as part of a turnkey package. That enabled the staff to take proposals from various suppliers to find the best combination of technology. Ghidorzi Construction Co. of Wausau was the general contractor.

"We looked at engine-driven blowers, but it was more cost-effective to go with microturbines," Ligman says. Capstone 65 kW microturbines produce electricity that is used on site. Three Turblex 3,400 cfm blowers (Siemens Water Technologies) with variable-frequency drives (VFDs) provide aeration capacity.

"The microturbines use the gas the engines would have used to generate electricity, but they also generate hot water, which is used to heat the buildings and the anaerobic digester," says Ligman. Expected net energy savings amount to about 900,000 kWh a year and about 77,000 therms of natural gas, equating to \$130,000 a year at current utility rates.

The gas scrubbing equipment came from Unison. "The gas skid was placed in a separate building, and the existing 2-foot-high concrete bases for the blower engines were cut down to make the blowers more accessible for



Two Capstone 65 kW microturbines will help the plant avoid buying nearly 1 million kWh and 77,000 therms of natural gas from the local utility every year.



The gas treatment skid (Unison) removes contaminants like organic siloxanes from the biogas to protect the microturbines. The hydrogen sulfide removal vessel is located outdoors next to the plant.

operators," Ligman says.

The blowers are paced off the dissolved oxygen levels in the aeration tanks. The VFDs are controlled by the existing programmable logic controllers (PLCs) and SCADA systems, which were modified to account for the new machinery.

"For most of the day, a single blower runs at half capacity," says Ligman. "There are a couple of peak occurrences during the day, but not every day, when a second blower is used." When that happens, both blowers start at minimum capacity and adjust the operating speed based on dissolved oxygen.

"In summer, we'll need two blowers much more frequently," adds wastewater superintendent Dave Erickson. Other positive side effects of the project, especially for operators, are that the blower room is much quieter with the new blowers, and they don't have to spend as much time working on the blower engines.

IMPROVED AERATION

Funding was aided by grants from Wisconsin's Focus on Energy program. The aeration improvements garnered a \$100,000 grant,

What's Your Story?

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

PHOTOS COURTESY OF BECHER-HOPPE ASSOCIATES

ALWAYS A GOAL

Sustainability initiatives are nothing new at the Wausau Wastewater Treatment Plant. A transition to more efficient lighting has been going on for years. The plant also applies 1,200 dry tons per year of Class B biosolids on nearly 50 farm fields to help grow feed corn, alfalfa and soybeans while keeping the material out of landfills.

Effluent is used throughout the plant for cleaning and flushing equipment, reducing demand for potable water. Perhaps the most visible sign of sustainability is a plug-in electric utility vehicle purchased in 2011. Staff members use the cart, manufactured by Columbia Parcar Corp. of Reedsburg, Wis., to move around the grounds and haul tools and equipment.



Turblex blowers have improved aeration at the Wausau Wastewater Treatment Plant while also reducing energy needs.

while a \$135,000 grant helped pay for the microturbines. The local utility, Wisconsin Public Service, provided a \$25,000 incentive payment while two planning grants, totaling \$9,200, were also secured for the project.

Half of the plant's aeration tanks were updated as part of the upgrade. "We replaced the existing ceramic fine-bubble diffusers in three of the six tanks with Sanitaire membrane fine-bubble diffusers (Xylem)," says Ligman. The plant only uses three tanks at a time. New dissolved oxygen sensors were also installed in those three tanks, and airflow metering was added.

The project also included several minor changes, such as replacing 30-year-old slide gate valves in the aeration tanks along with drain and mud valves, and replacing corroded concrete effluent boxes. That added to the cost but helped improve plant operations.

Erickson says the plant will be saving energy and money while getting the same high-quality wastewater treatment for which it is known. **tpo**

"It is ideal for short trips around the plant and has the advantage of being able to drive right to the work area inside several of the plant buildings," says wastewater superintendent Dave Erickson.

The next efficiency improvement is replacement of the plant's UV disinfection system, installed in 1991, with a TrojanUV3000Plus system that has a chemical and mechanical cleaning system. The new system will automatically adjust UV output to flows and water quality. "We'll have a lot less labor cleaning the UV lamps and won't have to handle the acid like we did when doing it by hand," says Erickson.

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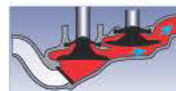
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Plant maintenance manager Bob Jones, plant director Roger Kirby, and assistant director/environmental coordinator Jon Koch with new primary clarifiers (WesTech). (Photography by Mark Tade)

As Clean as it Gets

THE AWARD-WINNING MUSCATINE BIOSOLIDS PROGRAM USES AN UMBILICAL SYSTEM TO DELIVER MATERIAL SIGHT UNSEEN TO A TRACTOR-DRAWN INJECTOR

By Ted J. Rulseh



profile

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DRIVE PAST A FARM WHERE CITY OF MUSCATINE, IOWA, STAFFERS ARE APPLYING biosolids and you probably wouldn't know what you were watching.

You'd never see or smell the material. You'd simply see a tractor crawling across the field, apparently doing tillage work — except that it's autumn, the crop is in the bins, and the tractor is attached to a long hose.

City staff members call it an umbilical (or dragline) system: Anaerobically digested material is piped two miles from the city water pollution control plant to a lagoon, and from there it is delivered, again via pipeline, to the injector behind a John Deere tractor. It's a clean, efficient, cost-effective process that helped the plant win the 2011 Biosolids Award for exemplary performance from the Iowa Water Environment Association (IAWEA) in the category for large operating projects.

BIG PAYOFF

Muscatine has land-applied biosolids since the mid-1970s. Back then, vacuum-filtered cake was stored in farm fields to be applied with tractors and manure spreaders. Material had to be trucked to the fields, creating a muddy mess in wet weather and clouds of dust in dry weather, according to Roger Kirby, treatment plant director. The process was labor-intensive, and the piles of dark material were unsightly and odorous and attracted insects and rodents.

In 1985, the water pollution control plant added anaerobic digestion, which produced a slurry product. The next year, land became available two miles west of the plant, and the city built two 6.5-million-gallon



The Muscatine staff includes, from left, Ron Lacina, Steve Brereton, Jim Allen, Roger Kirby, Jon Koch, Beth Lanfier, Sonja Painter, Kim Nguyen, Patti Fuller-Bloechl, Sharon Gillette, Harlan Lohff, Mike Lowe, Bob Jones, Rick Gordon, Jim Fox, David Ledbetter, Justin Freeborn, Aaron Whitlow, Scott Swift, Mike Beckmann, Matt Foor, and Mike Johnson. Not shown: Doug Barclay.

"It's a really good product. We consistently produce biosolids that in most respects qualify as Class A. We're still rated Class B because we don't always have the necessary fecal kill at every point that we test."

JON KOCH

earthen storage lagoons there. High-density welded polyethylene pipe was installed from the plant to the lagoons so that digested biosolids could be pumped for storage and further treatment.

The city contracted for 1,200 acres around the lagoons for land application and laid underground pipe from a pump house to hydrants in each field. The city's \$600,000 investment in the umbilical system has paid off handsomely, according to Kirby. There are no trucking expenses. Field work requires three people instead of the six it took to run truck-based deliveries. Complaints from neighbors and passers-by are nonexistent.

Of course, the city is fortunate to be able to apply material exclusively on land surrounding the lagoons. It also helps to have an experienced team to handle all aspects of a quality program. The key players are:



PHOTO COURTESY OF MUSCATINE WATER POLLUTION CONTROL PLANT

Crews use a dredge to draw biosolids from the lagoons for land application.

- Ron Lacina, biosolids team leader
- Jon Koch, assistant plant director and environmental coordinator, in charge of the industrial pretreatment program
- Bob Jones, plant maintenance manager

"We share the sampling information in annual reports and face-to-face meetings with the farmers. This goes a long way to assure everyone involved that environmental protection of the land and public health is our first priority."

RON LACINA

- Patty Fuller-Bloechl, chemist/lab supervisor
- Jim Allen and Steve Brereton, biosolids team mechanics

And finally, there's the material itself. "It's a really good product," says Koch. "We consistently produce biosolids that in most respects qualify as Class A. We're still rated Class B because we don't always have the necessary fecal kill at every point that we test."

QUALITY PROCESS

The 5.15 mgd (average dry-weather) Muscatine treatment plant uses a conventional activated sludge process. It recently underwent an \$18 million upgrade that included three new round primary clarifiers (WesTech), a fine-bubble aeration system with Gardner Denver blowers and Sanitaire (Xylem) diffusers, and two new mesophilic anaerobic digesters designed by Veenstra & Kimm with Gasholder covers and mixers from Olympus Technologies.

The upgrade also included a UV disinfection system (Siemens), because the plant's newest permit now requires disinfection for discharge to the Mississippi River. In the immediate plans are four effluent pumps (three 150 hp and one 100 hp) from Aurora Pump.

"Our topography is such that everything is pumped into this plant and everything is pumped out," says Kirby. "We have no gravity flow. We have 21 lift stations to get the water here and effluent pumps to move it out, although there isn't much head – it's fairly flat from here to the river."

MINIMAL PROCESSING

The solids process is simple: Primary sludge and waste activated sludge, the latter thickened to 4 to 5 percent solids by a dissolved air flotation process (Siemens), are pumped to digesters. About 50 percent of the methane from that process fires boilers used to heat the digesters. The balance is flared, although future plans call for burning more methane to heat plant buildings, fuel compressed natural gas vehicles, and possibly to generate electricity.

The digested material is pumped to four 125,000-gallon storage tanks before being piped to the lagoons. The north lagoon stores the biosolids until land application season. "We only apply in the fall at this point," says Lacina. "Farmers don't like running in the spring because of soil compaction."

During the year, the crew decants liquid from the north lagoon surface into the south lagoon, where it stands for a time to allow the ammonia to flash off before being returned to the treatment plant headworks. The biosolids product applied to land typically contains just over 5 percent solids.

NEIGHBOR-FRIENDLY

For the field operation, Lacina operates a small dredge pulled by a cable winch. The dredge feeds material through a hose into a wet well, pumping as

much as 300,000 gallons per day. From the wet well, the material is pumped underground to field hydrants. A hose is then hooked on to a field hydrant to convey the material to a toolbar injector pulled behind the tractor.

"While I am in the dredge, Jim Allen or Steve Brereton will be running the pumphouse and pulling and testing samples for solids content," says Lacina. "Whichever one of those two is not in the pumphouse will be operating the tractor. It's a very clean process. There's nothing being tracked out on the roads. It's very neighbor-friendly."

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An umbilical directly connects the tractor applying Muscatine biosolids to field hydrants supplied by a pump in a wet well. The material is then injected directly into the ground, making for an extremely clean operation.

PHOTO COURTESY OF MUSCATINE WATER POLLUTION CONTROL PLANT



PHOTO COURTESY OF MUSCATINE WATER POLLUTION CONTROL PLANT



The Muscatine team uses GPS technology to track sampling locations and document the effects of biosolids application over the years. Sampling information is shared in annual reports and face-to-face meetings with the landowners.

TO THE NEXT LEVEL

Muscatine's biosolids program is a success, but that doesn't mean the team is satisfied. The city is working with the National Biosolids Partnership to develop an environmental management system for the program. The aim is to complete and document 17 elements of the management system.

"We have many of those already completed," says Jon Koch, assistant director. "Now it's largely a matter of seeing the program through all the way to final third-party verification." A key focus is to improve outreach to the public and make sure people understand biosolids and why land application is beneficial.

"If the public is involved, then they'll have a better understanding of what we do," says Koch. "We want people to know what we're doing. Before they get a negative perception, we want to give them a positive perception. It's about allowing the public to have a say in what happens to their land and their community."

The benefits of the umbilical system became all the more clear in 2001, when the owner of 900 of the 1,200 acres around the lagoons declined to renew the biosolids application contract. In 2002, the city bought a used semi-tractor, three used tanker trailers and a new 7,400-gallon slurry tank with an injector toolbar for \$133,000 and established a mobile program.

Word of mouth was all it took to sign up six farmers totaling 890 acres with two additional on a waiting list for 500 acres more, all within 17 miles of the water pollution control plant. Biosolids were pumped back to the plant from the lagoons and loaded into the tanker trailers, which delivered the material to the slurry tank on site.

Despite charging farmers \$20 per acre during that period to help offset transport expenses, the city incurred significant costs. The landowner who had not renewed then came back in 2010 and signed a new five-year contract.

"Running the umbilical system alone has brought costs down from \$130.54 per ton to \$72.10 per ton, saving city ratepayers nearly \$57,000 in two years," says Kirby. "With new long-term contracts in place, the equipment used for the mobile program could be sold and maintenance costs recouped, adding more than \$100,000 in savings."

GOOD FOR CROPS

The biosolids program is based on sound science. Soils are tested in each field for pH and metals. "Since about 2001, we've been testing the soils for metals," Lacina says. "It's not required, but we've had people ask about it, so we started doing that. It's just to see if there has been any increase in metals in the soil. We haven't seen a meaningful increase."

Soil boring sites are marked on a GPS. "We share the sampling information in annual reports and face-to-face meetings with the farmers," says Lacina. "This goes a long way to assure everyone involved that environmental protection of the land and public health is our first priority."

Fuller-Bloechl also runs a standard nutrient test on a composite soil sample. The crew applies biosolids at two dry tons per acre, delivering about 170 pounds of total nitrogen, of which 80 to 100 pounds is available to the crop. In the bargain, farmers typically get 40 to 60 pounds per acre of phosphorus and 12 to 15 pounds of potassium.

The benefits of biosolids to farmers are undeniable. "The farmers on this ground are not buying any commercial nitrogen or phosphorus fertilizer," Lacina says. "They are getting great yields. Farmers don't like to advertise their yields. But a few years ago, one of our farmers had a fertilizer sales rep tell him he needed more nitrogen. That year, he put biosolids on 170 acres of

"The farmers on this ground are not buying any commercial nitrogen or phosphorus fertilizer. They are getting great yields."

RON LACINA

corn ground. I asked him, 'What was your average yield?' He said the farm averaged 195 bushels per acre. I said, 'How much more do you think you could get?'"

PROTECTING THE PRODUCT

While the material delivers abundant nutrients to the land, Muscatine's industrial pretreatment program helps keep heavy metals content low. The program monitors 12 permitted industries (six of them metal finishers) and 13 septage haulers in and around Muscatine to ensure compliance with strict discharge levels.

The plant's laboratory program is certified by the Iowa Department of Natural Resources, ensuring that sample results are accurate and consistent with required methods. "We test our industries on a quarterly basis for metals," says Fuller-Bloechl. "Some industries of concern are sampled multiple times a week throughout the year to track compliance.

"We also test our influent and effluent, and we do a monthly composite sample for our biosolids coming out of the digesters. That way we can monitor, and if we see any issues, such as metals that are going high, we can look around at the industries in town.

"For metals, we meet the standards for Class A biosolids. Copper is our most prevalent metal, as it is for virtually all cities. The Class B limit for copper is 2,800 mg/kg, and we are usually around 500 to 1,500 mg/kg. The limit for cadmium is 39 mg/kg, and we are less than 7 mg/kg. We're doing really well with our metals."

Koch adds, "The businesses here are very good participants in our pretreatment program. They do very well in reducing the amounts of metals they discharge. People in this role before me did a good job of bringing industries around to the idea that metals need to be removed at the source instead of being sent to our plant."

Looking ahead, the biosolids team was expecting by year's end to renew long-term contracts for the land application sites, whose owners include a retirement community and State Senator Jim Hahn. Successful renewals will lay a firm foundation for many more years of responsible land application of biosolids that benefits Muscatine sewer users and the farming community. **tpo**

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Plant maintenance manager Bob Jones, left, and biosolids lead worker Ron Lacina take a sample from one of two new Double Disc pumps (Penn Valley Pump).

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CLINTON WASTEWATER TREATMENT PLANT SUPERINTENDENT JOHN RICCIO FOSTERS EXCELLENCE IN HIS OPERATIONS TEAM — AND IT PAID OFF DURING A MAJOR EMERGENCY IN MARCH 2010

By Trude Witham

WHEN THE GOING GETS TOUGH, THE TOUGH GET GOING. THAT'S what John Riccio and his staff did when their plant flooded in March 2010. Riccio, superintendent of the Massachusetts Water Resources Authority (MWRA) wastewater treatment plant in Clinton, Mass., remembers it well.

"A bad storm caused a huge increase in influent flows, made worse by the South branch of the Nashua River overflowing its banks," Riccio says. "At one point, the influent wet well elevation rose so rapidly that the pumps couldn't keep up."

Riccio's team kept the plant running, and processed 6 to 7 million gallons of the estimated 20 mgd influent flow. His performance in this crisis was the main reason he won the New England Water Environment Association (NEWEA) Operator of the Year award.

The flood was just one of the challenges Riccio has conquered in his 33 years as a water professional. Besides the NEWEA award, he won the 1992 MWRA Excellence in Performance award. To recognize excellence in his own team, Riccio established the plant's Stellar Award, which has been a great staff motivator.

LIFELONG CAREER

A lover of animals and science, Riccio first planned to become a veterinarian and earned a bachelor's degree in biology from the University of Massachusetts, Boston. He decided on a different path after a veterinary program admissions process steered him toward laboratory work. He landed at the Metropolitan District Commission (MDC) Water Quality Laboratory in Somer-



John Riccio, superintendent, Clinton wastewater treatment plant. (Photography by Ed Collier)

ville, Mass., and then the MDC Laboratory at Deer Island in Boston.

"When I was out at the Deer Island wastewater plant taking samples alongside operators, I decided that I wanted to get out of the laboratory and work at an actual treatment plant," he says. He worked in the industrial pretreatment program, the operations department and the environmental quality department at the MWRA headquarters in Boston before being promoted to superintendent at Clinton in 1996.

He is glad he chose the wastewater field: "I love the variety. I can watch the maintenance guy work on a pump, or I can talk to an operator about sludge/chemical issues, or I can work on planning and budgeting for equipment upgrades."

ADVANCED TREATMENT

The Clinton plant serves the towns of Clinton and Lancaster. Designed for 3.0 mgd, it sees an average flow of 2.7 mgd and a peak of 12 mgd. The plant started as a pump station in 1896 and was upgraded to secondary treatment after World War II. The MWRA took over the plant in 1987, and by 1992 it had new primary, secondary and advanced treatment processes.

Major equipment includes a bar rack and grit system (Infilco Degremont), four primary clarifiers (FMC), four trickling filters and three intermediate lift pumps (Siemens Water Technologies), six aeration tanks (Case/Cotter), three clariflocculators and two gravity thickeners (Ovivo), two digesters with Komline-Sanderson pumps, two belt filter presses (Ashbrook) and chemical pumps (Milton Roy).

"My management style is to empower them to do their job. A manager is only as good as the players on the team, so I let them do what they do best."

JOHN RICCIO

John Riccio loves the daily variety of working in the wastewater treatment profession.

profile

John Riccio, Massachusetts Water Resources Authority, Clinton (Mass.) Wastewater Treatment Plant

POSITION: Plant superintendent

EXPERIENCE: 33 years

EDUCATION: Bachelor's degree in biology, master's degree in public administration

CERTIFICATIONS: Grade 7 wastewater treatment plant operator, Grade 4 collection systems operator

MEMBERSHIPS: New England Water Environment Association, Massachusetts Water Pollution Control Association

GOALS: Become better at developing and reviewing engineering specifications, and understanding procurement and bidding

GPS COORDINATES: Latitude: 42°25'50.35"N; Longitude: 71°40'48.78"W

WEATHERING THE STORM

Serious flooding in March 2010 at the wastewater treatment plant in Clinton, Mass., threatened plant operations. The flooding inundated the plant's stormwater retention area and storm drains, and infiltrated plant tanks and electrical manholes. Operations staff worked around the clock to keep the plant running. An operator and a maintenance employee were on duty during the normally unstaffed overnight shift, and senior staff members were available by phone or on site, in constant communication.

The first priority was protecting plant assets, the second was saving the biological process, and the third was maintaining full permit compliance. Says plant superintendent John Riccio, "At one point, the influent wet well elevation rose so rapidly that operators had to use auxiliary pumps, since the existing pumps couldn't handle the flow."

The team rented three 8-inch diesel pumps and used two at the influent well and one at the intermediate well. They sandbagged the area around the influent wet well to protect the primary generator and main electrical control rooms, where water was starting to enter. They also sandbagged electrical and instrumentation manholes to protect them from infiltration; it didn't work.

"We needed to maintain a fire watch since our electrical instrumentation was malfunctioning from water in the conduits and electrical manholes," recalls Riccio. "Also, we couldn't be confident of power being maintained from the utility or to the equipment because of water infiltrating the conduits and manholes."

The highest flooding, March 14-18, required drastic measures. "The flow was over 11 mgd on the 15th and over 12 mgd on the 16th. We had to bypass from the influent well from 11:45 a.m. on the 15th until the next afternoon. During this time, we tried to put as much flow as possible through the plant for treatment."

The plant bypassed secondary treatment during this same period to avoid washing out the biomass. "During the second day, we had to start and stop the diesel pumps because they are capable of pumping too much water even at low speed," says Riccio. "By this time the flooding had receded a bit, but the flow did occasionally overwhelm our plant pumps. So, we had to start the diesel pumps and pump down the well, then shut them off because there wasn't enough water in the well to keep them primed."

By intermittently operating the pumps, the plant was able to protect the main electrical room and primary generator. "If we hadn't taken this step," says Riccio, "a catastrophic failure of the plant might have occurred."

Discharge is to the South Nashua River. Dewatered biosolids are trucked to an 8.4-acre MWRA-owned landfill. Riccio's team operates the landfill, about 3.5 miles away. The plant is scheduled for upgrades to some equipment, including:

- Digester rehabilitation
- An energy-efficient diffused air activated sludge system
- New influent and intermediate lift station pumps
- Instrumentation and control coordination for pumps and aerators
- Primary clarifier rehabilitation
- Phosphorus treatment disc filtration system and pump station



John Riccio started out studying veterinary science but gravitated toward lab work and followed that path into wastewater treatment (pH test equipment from Thermo Fisher Scientific).

WINNING TEAM

Riccio's duties include setting operation and maintenance procedures, training, reviewing plans and specifications for new projects, budgeting, reviewing compliance and process data, and handling outside service contracts. Since the plant has no plumber, electrician or groundskeeper, Riccio hires contractors for that work. He reports to the MWRA Deer Island director, and supervises eight employees:

- Administrative assistant Jane Densmore (4 years at the plant)
- Area manager Robert Gorham, Grade 7 wastewater license (42 years)
- Area supervisors George Poske (26 years) and Paul Stanton (21 years), both Grade 6
- Operator Larry Thomas, Grade 7 (23 years)
- Maintenance and operation specialists Jeff Stanton (14 years) and David Miniscalco, Grade 2 (1 year)
- Facilities specialist Mike Amirault (5 years)

Lab chemists, Jeffrey Ferber (25 years) and Jeanette Spero (new) report to the MWRA central laboratory. The plant is staffed from 7 a.m. to 3 p.m. with an alarm system that dials the on-call operator after hours.

"Bob and George oversee the plant's day-to-day operation," says Riccio. "My management style is to empower them to do their job. A manager is only as good as the players on the team, so I let them do what they do best."

This style has paid off. His team won the EPA New England Operations and Maintenance Excellence award in 1996, the MWRA Excellence in Perfor-

mance award in 2001, and the National Association Clean Water Agencies Gold Award in 2004.

"My team is special because they are committed to their jobs and have the desire to improve themselves," says Riccio. "They take pride in the fact that they can operate all the processes in the plant, including laboratory process tests, dewatering equipment and chemical feed equipment, and see improvements from one process to another."

UPGRADE CHALLENGES

The team plans to install two influent gates that will allow operators to throttle incoming flow if flooding occurs again. "Our biggest issue is flow," Riccio says. "We often exceed our 3.0 mgd limit. It would be ideal if our permit was for 3.6 or 3.7, but the EPA won't allow it because the available dilution in the south branch of the Nashua River is not enough to support additional flow."

The MWRA is negotiating a new permit that will require stricter phosphorus limits — decreasing from 1.0 mg/L to 0.15 mg/L. That will require up to \$4 million in new processes and equipment.

Riccio worked with Parviz Amirhor and Carina Hart of Fay, Spofford and Thorndike (FS&T) to pilot-test a new disc filtration process with tertiary coagulation and flocculation. "This new process had never been used for phosphorus reduction," Riccio says. "We tested it over five weeks with different chemicals, such as ferric chloride, alum and polymers, to certify that the technology could meet our new proposed permit limits."

The study concluded that the technology consistently achieves 0.10 to 0.15 mg/L of total phosphorus. Tertiary coagulation and flocculation upstream of the disc filter are needed to achieve those results.

"Once the new permit is issued, we have four years to meet the new phosphorus limit — one year for the study, one for design and two for construction," says Riccio. "We are now in the preliminary design phase, and the design package will go out to bid." The plant will add another pump station and operator. The operations and maintenance staff will be trained on the new equipment by the vendor and, if necessary, an outside trainer.

EQUIPMENT REHABILITATION

Riccio and his team are challenged with running the plant while equipment is rehabilitated. For example, while the plant spends a year renovating a digester, only one digester is operating.

"The operators stopped digester feeding 30 to 45 days before the contractor vented and drained the system," says Riccio. "They isolated the sludge lines to the digester and blind-flanged the methane gas lines, which fully isolated the digester for safe cleaning and inspection before rehabilitation." Once the renovation is complete, operators will do the same thing with the second digester.

Another major project is rehabilitating the primary sedimentation tanks, as the concrete has deteriorated over the past 50 years. Contractors will remove 18 inches of deteriorated concrete before replacing internal equipment and chemically lining the tanks.

"I loved the phosphorus treatment pilot studies, because I could see the process and touch the equipment while reviewing the performance data from the laboratories. I like to watch and see, rather than study."

JOHN RICCIO

"The operators will prepare the tanks to be taken out of service by isolating them and washing them down," says Riccio. "We will plan when this work can be performed, preferably during the low-flow, dry season."

Riccio typically starts his day by meeting with the area manager and senior operator to review the maintenance plan for the day and coming week. In the late afternoon, the three regroup and discuss what happened during the day. "I try to walk around the plant every day to observe the operations. When I see the operators working on a project, I praise them and ask how things are going," he says.

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The Clinton plant team includes, back row, from left, area manager Bob Gorham, superintendent John Riccio, maintenance and operations specialist David Miniscalco, facilities specialist Mike Amirault, maintenance and operations specialist Jeff Stanton, area supervisor George Poske, and operator Larry Thomas; front row, administrative assistant Jane Densmore and area supervisor Paul Stanton. Not shown: chemists Jeff Ferber and Jeanette Spero.

rary soda ash system pump modification eliminated overflows from the soda ash slurry tank and helped to resolve higher-than-normal influent pH. Paul and Jeffrey Stanton won for their work on realigning and repairing the gravity thickener skimmer arm.

"Paul and Jeff realigned and welded the support arm, support pole and the skimming mechanism," says Riccio. "This was critical for proper flushing of the skimming trough, which had been clogging. The repair eliminated the clogging problem and saved many man-hours involved in clearing blockages."

FUTURE PLANS

Riccio isn't planning any career changes, except to get better at reviewing engineering plans and specifications.

"I loved the phosphorus treatment pilot studies, because I could see the process and touch the equipment while reviewing the performance data from the laboratories," he says. "I like to watch and see, rather than study." He also wants to improve his understanding of government procurement and bidding.

As for the future, Riccio has thought about teaching when he retires. "When I got out of college, I was a substitute middle school science teacher, and I liked that," he says. "Then again, I may want to lie on the beach for a while and do absolutely nothing!" **tpo**

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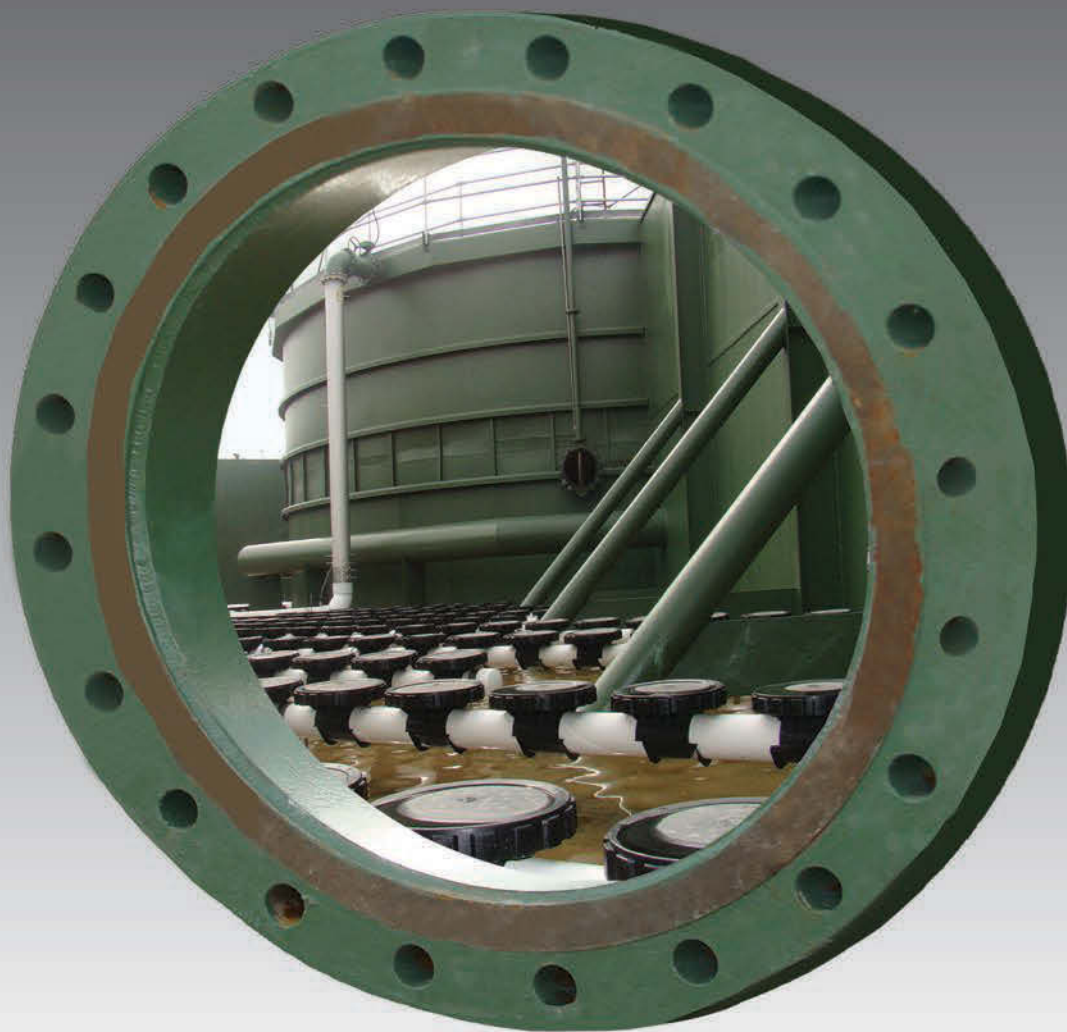
"My team likes new challenges, and they aren't shy about expressing ideas for improvements. If a staff member does an outstanding job on a project, or has a really great idea, they are eligible for the plant's Stellar Award," says Riccio.

The award identifies employees whose work or ideas improve the treatment plant process or maintenance efficiency. Riccio, Gorham and Poske judge each idea on its merits. The Stellar Award winner gets a certificate during a staff luncheon with food of his or her choice, for which Riccio pays. A notice of the award with the recipient's photo is posted on the front entrance bulletin board.

The staff luncheon fosters camaraderie. "They really have a good time," says Riccio. "It reinforces that we all work for the same place and enjoy each other's company." Four team members have won awards since January 2010, and the entire team won for its work during the 2010 floods.

Operator Larry Taylor was the first recipient. His idea for a tempo-

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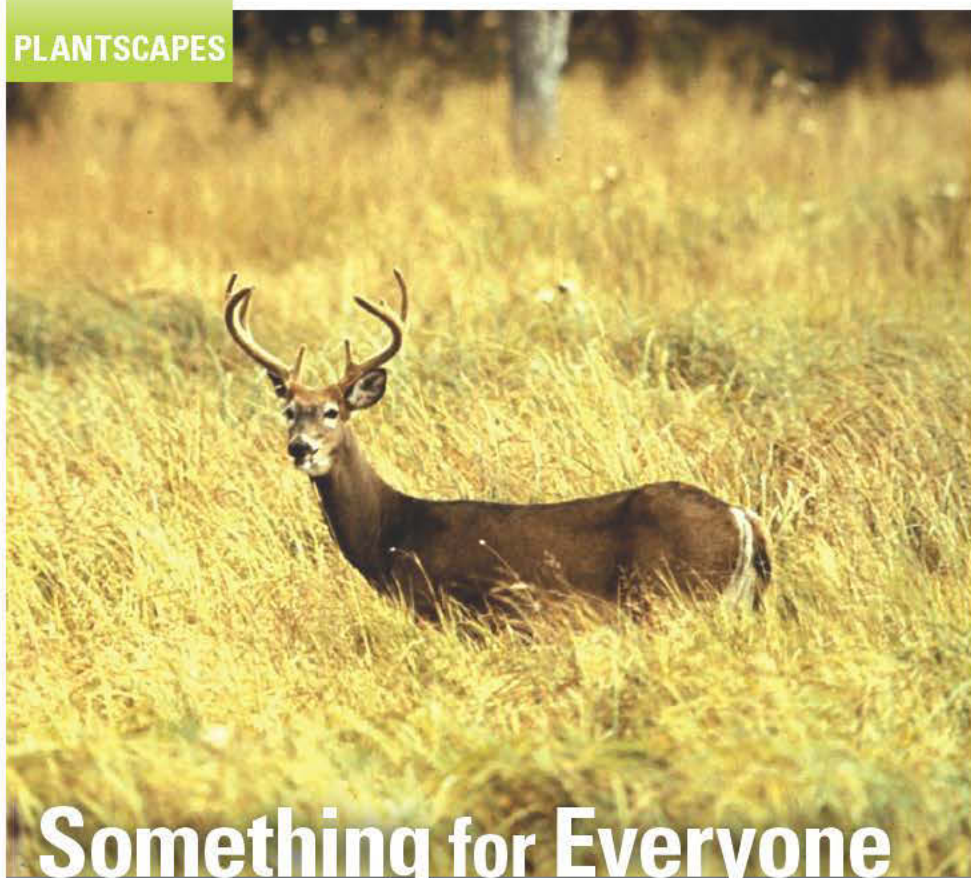
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THE EXPANSIVE MUSKEGON COUNTY WASTEWATER MANAGEMENT FACILITY CATERS TO GROUPS FROM BIRDBATCHERS AND HUNTERS TO ROCKET HOBBYISTS AND DOG LOVERS

By Jeff Smith

The Muskegon County Wastewater Management Facility in western Michigan has become a popular recreation area — and a whole lot more. Spanning 11,000 acres and designed to process 43 mgd (12 mgd average flow), the sprawling aeration and lagoon system treats waste from 16 communities before delivering clean effluent to the Muskegon River, three miles away.

With two 850-acre storage lagoons, two 10-acre extended aeration cells and two 20-acre settling lagoons, the facility attracts native and migrating birds, making it one of the premier birdwatching locations in the state.

"The birdwatchers appreciate the opportunity to be allowed on the facility," says wastewater director Mark Eisenbarth. "And so do bird hunters, upland game hunters, deer hunters and many other outdoor enthusiasts." The Muskegon chapter of the Audubon Society reports that some 259 species of birds have been documented at the facility since its completion in 1973. That's two-thirds of all species ever recorded in Michigan, among them the white wagtail, possibly the rarest bird in the state.

More than 3,000 migrating Canada geese pass through the site, sharing the area with birds of prey such as bald eagles and snowy owls. The plant's aeration ditches, dikes and grass-covered fields provide habitat that attracts other migrating shorebirds, waterbirds and raptors.

While visitors may bird watch from almost anywhere on site, there are designated areas for other public activities. A local radio-controlled airplane club maintains a 600- by 400-foot grassy field. A snowmobile club grooms some 20 miles of trails at the plant that connect with a 175-mile trail network. The local astronomical society maintains an observatory and clubhouse on the plant grounds. And a rocket club maintains a few acres for launching model rockets.

The facility's staff prepares a habitat area for Pheasants Forever by weed-spraying and preserving the native bluestem prairie grass and wildflowers.

Up to 300 permits are issued each year to archery deer hunters. Waterfowl and turkey hunters and trappers of muskrat, mink, raccoon, coyote and fox also are permitted each season.



A snowmobile club grooms some 20 miles of trails at the plant that connect with a 175-mile trail network.

PHOTOS COURTESY OF MUSKEGON COUNTY WASTEWATER MANAGEMENT FACILITY

The staff also helps the local Beagle Club by providing a designated area for working dogs. Up to 300 permits are issued each year to archery deer hunters. Waterfowl and turkey hunters and trappers of muskrat, mink, raccoon, coyote and fox also are permitted each season.

"Everybody visiting our facility needs a permit to be on site," says Eisenbarth. "Besides their normal responsibilities, our operators help keep an eye on our visitors to make sure they know where they can pick up a permit."

But other than treating wastewater at a facility so massive it has been seen by orbiting NASA astronauts, the biggest enterprise at the plant is growing and harvesting 5,200 acres of corn, alfalfa and soybeans. Much of the corn is sold to ethanol producers, while the other crops are sold for cattle feed. Revenue from sales is substantial and helps offset plant operating costs.

Crops are irrigated with effluent distributed through 54 circular spraying rigs that provide tertiary treatment by filtration through the sandy soil. The filtered water is collected in an underground tile drainage system and discharged through outfall to the Muskegon River.

Eisenbarth is excited about the next revenue-producing venture for the facility — a wind farm study by a major wind-turbine manufacturer that proposes to install enough turbines to provide up to 150 MW of generating capacity at the site.

Eisenbarth concludes, "I'm really proud of our employees and their dedication to this natural resource facility, and the array of activities that we offer back to the community." **tpo**

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By Jim Force

Chief operator Jim Listwan walks along the aeration tanks at the Salt Creek Sanitary District Wastewater Treatment Plant. (Photography by Rob Hart)



FRED DALE AND THE SALT CREEK SANITARY DISTRICT Wastewater Treatment Plant in Villa Park, Ill., have come a long way over the last 38 years.

When Dale entered the wastewater profession in 1972, many considered working at a treatment plant to be a dead-end job. And for many years the plant also had been the site of the community's garbage dump, reinforcing the negative impression. But now, as Dale retires after a long and successful career, he looks back on the many changes that have given the clean-water business well-deserved respect. "I saw the end of that old era and witnessed wastewater treatment becoming an honorable and respectable job," he says.

And at the 3.3 mgd (design) Salt Creek plant, numerous improvements exemplify the evolution of wastewater management. From the days when the old trickling filters struggled to cope with loads from the community's former Ovaltine plant, the facility has kept pace with technological advances and increasingly stringent effluent requirements.

As Dale hands over the district manager job to chief operator Jim Listwan, the plant is due for more upgrading — to replace its tertiary filters and reconstruct the filtration building.

CHANGING TECHNOLOGIES

The Salt Creek Sanitary District traces its roots to 1928, when it was formed as the Salt Creek Drainage Basin Sanitary District, serving Villa Park and four other suburban communities west of Chicago. Quarrels over bond issues and funding gradually prompted the other communities to withdraw from the district. Eventually it took on its current name, serving just the 22,500 residents of Villa Park.

In the early 1970s, two half-million-gallon pre-aeration tanks and two square final clarifiers were built, and the plant converted its old rectangular final clarifiers to chlorine contact basins. The pre-aeration basins were needed to cope with the large BOD and suspended solids loads periodically discharged by the Ovaltine plant. They still serve the plant today, providing temporary storage for sidestream flows as well as flow equalization during wet weather.

The treatment process took on a much different look in an ambitious 1976-78 project that added a third rectangular primary clarifier

District manager Fred Dale (right) and chief operator Jim Listwan.



**Salt Creek Sanitary District
Wastewater Treatment Plant
(Villa Park, Ill.)**

BUILT:	1928 (major upgrades 1941, 1954, 1972, 1978, 1992, 2006 and 2012)
POPULATION SERVED:	22,500
FLOWS:	3.3 mgd design, 3.4 mgd average
TREATMENT LEVEL:	Tertiary
TREATMENT PROCESS:	Activated sludge, disc filters
RECEIVING WATER:	Salt Creek (tributary of Des Plaines River)
BIOSOLIDS:	Anaerobic digestion, dewatering, land application
ANNUAL BUDGET:	\$1.4 million (operations)
AWARDS:	Illinois WEA George Burke Safety Award, 1994
WEBSITE:	www.invillapark.com
GPS COORDINATES:	Latitude: 41°52'54.12"N; Longitude: 87°57'34.89"W

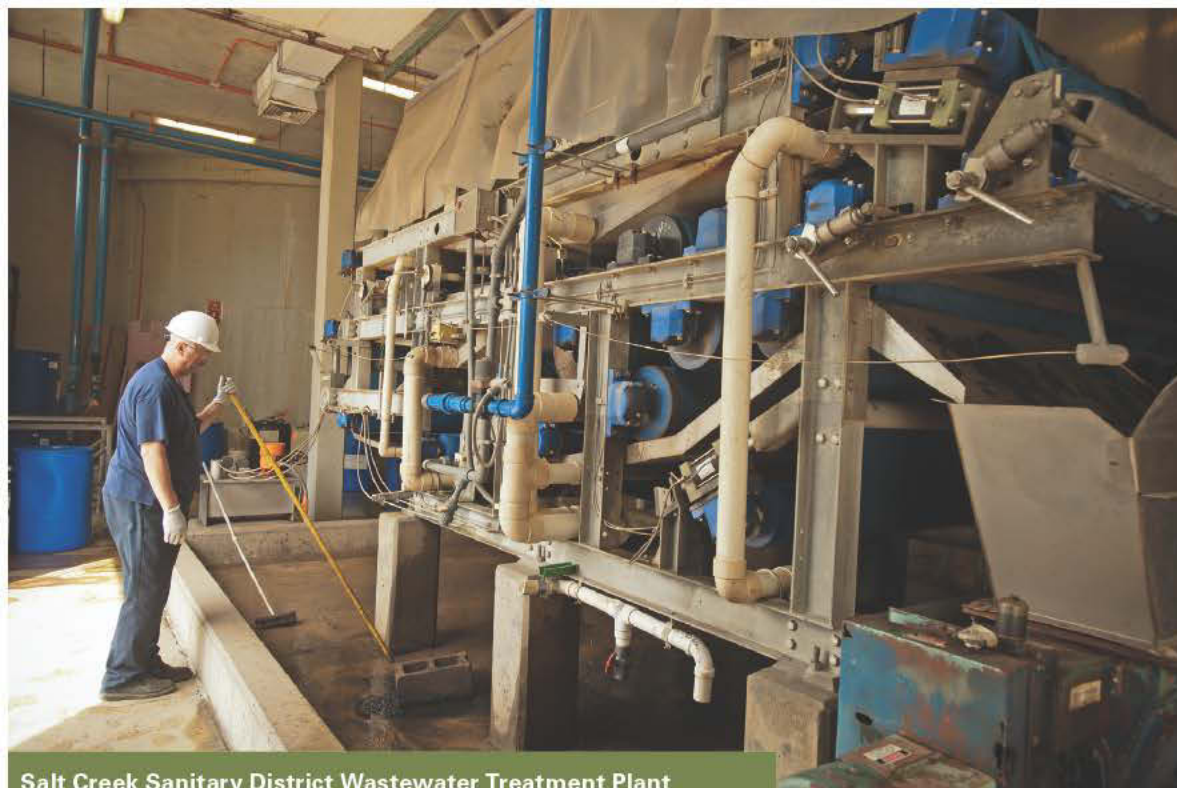


and one million gallons of activated sludge capacity, along with Hydro-Clear sand filters (Zimpro/Siemens Water Technologies) and a second 450,000-gallon anaerobic digester.

When the operating staff determined that the trickling filters were starving the activated sludge process and degrading effluent quality, they decided to shut them down. "When the tricklers were taken out, our performance improved quite a bit," says Dale. "We kept one pre-aeration tank for extra aeration and converted the other one to sidestream flow equalization, taking supernatant from our solids handling processes and bleeding it slowly back into the normal flow. These pre-aeration tanks have been serving us for years, just plugging away."

A 2-meter belt press was added in 1993 for solids dewatering, and in 1994 a fourth rectangular primary came online. Dale and his staff also oversaw another significant upgrade in 2004-2006 when three new aeration basins added another 0.5 mgd of capacity, and a pair of 14-foot side water depth (SWD) secondary clarifiers replaced the old square units. Also, UV light took





Salt Creek Sanitary District Wastewater Treatment Plant
PERMIT AND PERFORMANCE (2011 data)

	INFLUENT	EFFLUENT	PERMIT*
CBOD	291 mg/L	2.2 mg/L	10/20 mg/L
TSS	592 mg/L	1.5 mg/L	10/20 mg/L
Ammonia	26.2 mg/L	0.123 mg/L	1.5-3.0/4.0-8.0 mg/L

*Summer (April-October) / winter (November-March) limits



LEFT: Operator Chris Dale with the plant's biosolids belt press (Ashbrook).
RIGHT: Operator Doug Koch pulls debris from an aeration tank.

the place of chlorine and sodium hypochlorite for disinfection. The plant also got a new SCADA system.

THE FLOW TODAY

At present, Salt Creek flow averages about 3.4 mgd. Two influent pipes bring wastewater into the plant, where WEMCO pumps move it through an Envirex (Siemens) automatic bar screen, which Dale says "has been a workhorse for us." From there, the flow passes to a chain-and-flight grit chamber (Walker Process) and classifier-washer (Weir Specialty Pumps/WEMCO Pump). Four rectangular clarifiers provide primary settling; one tank is used mainly for sidestream flows.

A battery of seven aeration basins are designed to provide flexible biological treatment. They are operated in the plug-flow mode but can be converted to step-feed operation if the need arises. Dale says any one basin can be isolated for maintenance. Fine-bubble disc diffusers from Sanitaire (Xylem) provide aeration.

The secondary clarifiers are center-feed, Walker Process, 75 feet in diameter. In June 2012, the plant began construction of a new tertiary building with disc filters (Kruger). This will replace the 34-year-old Hydro-Clear filters. Filtrate is disinfected in a TrojanUV4000Plus, containing a single channel and two banks of UV bulbs. Effluent discharges through a weir to a pipe outfall in Salt Creek, which flows to the Des Plaines River.

Primary and waste activated solids are thickened, then anaerobically digested before dewatering on a belt press (Ashbrook) that dates back nearly 20 years. "It's been working well," says Dale. The plant staff has replaced belts and one cylinder and roller over time. Pressed cake averages 18 to 21 percent solids, and a dump truck hauls it to a 1,400-cubic-yard-capacity solids holding area. Synagro has a contract to pick up the cake and haul it to area farm

fields. Return activated sludge is pumped back to the first aeration basin.

The plant recycles a portion of its effluent for internal use. "It's not a lot," says Dale. "Maybe 2,500 to 3,000 gallons a day. We use it for our mechanical seals, lawn watering, hosing down equipment, and running the belt press."

OPERATIONAL CHALLENGES

Varying flows are a special challenge at Salt Creek. "About 30 percent of our town still has combined sewers, so we see large variances in incoming flows," says Dale. Volume can range from very low to as much as 20 percent above the design maximum, and influent values can swing widely, as well. "Last year, we recorded monthly influent ammonia levels from 15.6 to 41 mg/L, BODs from 86 to 484 mg/L, and suspended solids from 159 to 898 mg/L," Dale notes. "The swings can get pretty wild sometimes within the same week."

Creative operations enable Salt Creek to handle the changes. Dale and Listwan point out that the old pre-aeration tank plays a vital role in treating the higher flows by acting as a surge tank when flows exceed 7 mgd. The tank can handle up to 250,000 gallons.

"It enables us to accept a greater first flush without upsetting the system," explains Dale. After a wet-weather event, the excess flow is bled back into the system through the fourth aeration basin, where it mixes with the normal flow.

Through experience, Dale and Listwan have perfected their operation so that these storm surges do not lead to permit violations. "I watch the data from our lab closely, and we keep an eye on our flow and overall process,

(continued)



Operator John Bach performs tests in the lab in the Secondary Control Building at the Salt Creek plant.

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District manager
Fred Dale

A LONG CAREER

When Fred Dale came home from the Vietnam War in 1970, he was looking for the camaraderie he found in the Armed Services. He found it as a manager in the clean-water profession. "A lot of my colleagues came into the field about the same time I did," he recalls.

"I've met some great people, including my close friend John LaRocca at Roselle, Ill. [featured in April 2012 *TPO*]. I have great friends here at the plant. They're like my second family. I'm going to miss them. These past few years have been fun, seeing all the improvements we've made at the plant."

Dale's career has been highlighted by several awards, including an Outstanding Member Award from the Illinois Association of Wastewater Agencies, the Golden Shovel from the Illinois Water Pollution Control Association, the Water Environment Federation's Quarter Century Operator Club, and the 2002 William D. Hatfield Award from the Illinois WEA.

Still, as he hands over the controls to Jim Listwan, his chief operator, Dale is looking forward to the change that retirement will bring and the chance to enjoy some of his other loves, including his grandkids, and driving around the countryside, listening to the blues in his BMW 650i, the car of his dreams. "I plan to enjoy life," he says.



The Salt Creek plant team includes, from left, operator Bob Newland, chief operator Jim Listwan, operator Chris Dale, district manager Fred Dale, and operators Doug Koch and John Bach.

anticipating the effect of wet weather, or very low flows," says Listwan.

Dale adds, "We'll retain more solids and cut back on wasting if we see wet weather coming our way. We watch a number of different variables and have been tweaking the operation over the last several years, getting better and better."

Sludge age is a key: The target is about 12 days. Both Dale and Listwan credit their new Allen-Bradley SCADA system (Rockwell Automation) for much of their success. A fiber optic cable links secondary treatment with the administration building, operations and maintenance, the pre-aeration building, and the raw sewage area.

Various PLC nodes monitor the different equipment areas of the plant. The secondary control building serves as the central SCADA control station, featuring three main computers that process all system data and display it on 19-inch screens. "It really works well," says Dale. "Many of the pumps are now paced by the computer."

GOOD PERFORMANCE

Despite the storm surges and the frequent changes in the plant layout, Salt Creek has accumulated an exceptional performance record. Effluent limits for both CBOD and TSS are 10 mg/L (April to October) and 20 mg/L (November to March).

Over the last 12 years, plant effluent has averaged 2.66 mg/L for CBOD (based on annualized monthly averages) and 2.25 mg/L for TSS. Performance has been even better since the 2004-2006 upgrade. The same is true for ammonia removal: Effluent averaged less than 0.8 mg/L before 2006 and has averaged about 0.2 mg/L since. The permit requirement is 4 to 8 mg/L in cold weather and 1.5 to 3 mg/L in summer.

The plant also meets a dissolved oxygen target of not less than 6.0 mg/L (weekly average) during warm weather, and from 3.5 to 4 mg/L during winter. "Our operators use Hach portable units to monitor DO at various points

around the plant," says Dale. "We use settleometers to determine settleability every day."

The operators are the key to Salt Creek's success, Dale and Listwan will tell you. The team includes operators John Bach, Chris Dale, Doug Koch and Bob Newland. "I can honestly say this is the best staff I've ever had," Dale says. "It's a veteran team — three of our operators have at least 11 years of experience."

Listwan, who has 20 years under his belt, says, "These guys care about what they're doing. They don't want any violations. They go out of their way to make sure things are right, and they notice if there's even a slight movement in our effluent quality. They do a great job, and everybody pitches in. They all know what they have to do, and it's done correctly."

"I saw the end of that old era and witnessed wastewater treatment becoming an honorable and respectable job."

FRED DALE

Dale notes that Listwan and the staff benefitted from the experience of the 2004-2006 plant upgrade. "Everybody got to see how the new clarifier and the extra aeration basins were built," he says. "There's no substitute for that. You can tell people, but if they actually see it being built, they get a much better understanding of how the plant operates."

MAKING THE HANDOFF

With his planned retirement, Dale has had time to create a smooth transition of control to Listwan. "About a year ago, we started going over things here and there," says Dale. "Jim is as diligent as they come."

Adds Listwan, "I have a very strong grasp of operations, but Fred has taught me more about the budget and administration." Listwan has been on the job since 1992, coming over from a stint in manufacturing and machining. "It was a down economy, and I was looking for a job," he says. "I took a wastewater course at a local college, and my brother had worked for Fred."

Since then, Listwan has achieved his Class 1 (highest) certification and has been heavily involved in the major improvements at the plant, including the challenge of maintaining peak performance during two years of construction.

Now, he's in charge as Salt Creek undergoes yet another upgrade, switching to four new disc filters, tearing down the old filter building and replacing it with a new structure, and contemplating a switch to alum for phosphorus removal. "I'll be the one responsible now," he says. "We won't be able to ask Fred." **tpo**

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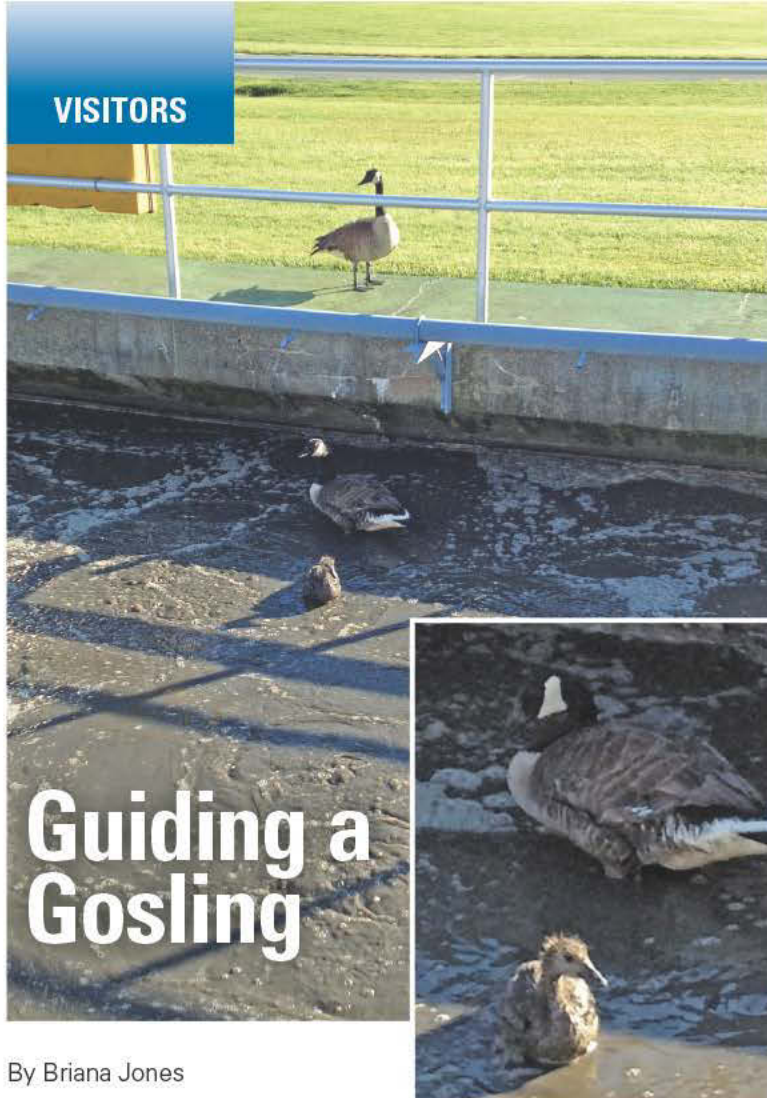
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VISITORS



Guiding a Gosling

By Briana Jones

Rescuing a baby goose from an aeration tank isn't usually on the to-do list of an operator. But last June that challenge fell to Nick Zappia, superintendent of the Village of Massena (N.Y.) Water and Wastewater Treatment Plants, and his team.

"I was adjusting the air to our aeration tanks and noticed the mother and her baby in the tank," Zappia says. "The geese had lost their flight feathers, so we actually spent most of the day trying to get the parents out of the tanks." (Geese molt each summer, losing their flight feathers, and grow them back by late summer to early fall.)

As in life, the parents took the lead and the gosling followed. "We had to open some gates and do some guiding, but a couple of hours later the mom and dad were free!" Zappia says. "Then we had to bring the gosling down to the river because the parents abandoned her."

The geese must have known that at the treatment plant they had a place where they would be protected. "They know they are safe here and have plenty of space to roam throughout the summer and fall," says Zappia. **tpo**

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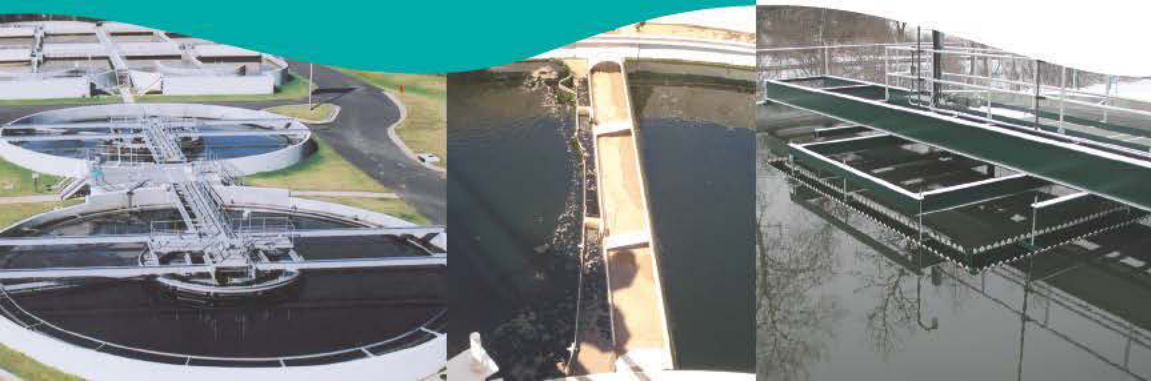
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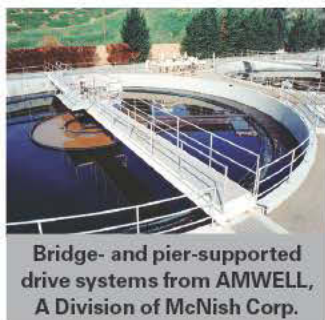
Tanks, Structures and Components

By Briana Jones

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Bridge- and pier-supported drive systems from AMWELL, A Division of McNish Corp.



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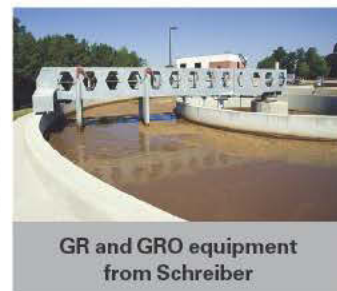
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GR and GRO equipment from Schreiber

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The ACTIFLO microsand clarification process from Kruger USA combines microsand enhanced floc formation and microsand enhanced settling. The process treats low-turbidity mountain runoff, reservoirs with algae, water with high total organic carbon, hard water, soft water,

groundwater, flashy rivers and streams, brackish water and seawater.

The process uses microsand as a seed for floc formation that later acts as a ballast or weight. The resulting sand-ballasted floc displays unique characteristics that allow for clarifier designs with high overflow rates, short retention times and small footprints. With high-quality solids removal, the process can be used in wastewater applications that need solids separation, including treating wet-weather flows, phosphorus removal and water reuse. 919/677-8310; www.krugerusa.com.



Spiraflo clarifiers from Lakeside Equipment Corporation

PERIPHERAL-FEED CLARIFIERS

Spiraflo clarifiers from Lakeside Equipment Corporation have a peripheral-feed design for an efficient hydraulic flow pattern. The clarifiers produce high-quality effluent, improve sludge collection and removal, promote full utilization of tank volume, eliminate short-circuiting, handle peak flows effectively, retain suspended solids in the sludge blanket and eliminate sludge wall creep. 630/837-5640; www.lakeside-equipment.com.



T-Max tanks from Orenco Systems

WATERTIGHT TANKS

Watertight, insulated T-Max tanks from Orenco Systems are portable, long-lasting, chemical-resistant fiberglass storage containers in capacities from 300 to 15,000 gallons. Tank units are up to 42 feet long and weigh up to 12,000 pounds. Units can be transported by truck,

rail, cargo container, helicopter or other aircraft.

Molded in a single piece using vacuum infusion, the tanks are con-

structed of 4-inch-thick foam-cored fiberglass walls. The process produces void-free, high-strength fiberglass laminates and allows for the encapsulation of foam core, which provides an estimated insulation value of R-26 (US) or R-5 (SI). The tanks withstand temperatures from -60 to 125 degrees F. Custom-built access equipment and railings are available, as are electrical control panels, pre-installed pump packages, anti-buoyancy devices and custom colors. 800/348-9843; www.orenco.com.

CONTAINER FILTERS

Sludge Mate container filters from Flo Trend Systems can dewater a variety of sludge and wastes such as alum, ferric, lagoon dredgings, digested sludge, septic tank and grease trap waste, wastewater residuals and sump bottom materials. The closed system design provides total odor control, no spillage, reduced maintenance and weather independence. Units have 10-gauge reinforced walls and 7-gauge carbon steel floors.

Available designs include peaked roofs with gasketed bolted-down access to hatches, drainage ports, inlet manifolds, floor filters and side-to-side rolling tarps. The units produce cake that passes the paint-filter test and can be transported straight to landfills. They dewater on site and are available in roll-off, trailer-mounted and tipping-stand-mounted styles and in sizes from 5 to 40 cubic yards. 713/699-0152; www.flotrend.com.



Sludge Mate container filters from Flo Trend Systems



Silo discharger from Sodimate

SILO DISCHARGER

The silo discharger from Sodimate features a vertical spindle fitted with flexible blades to ensure the mechanical discharge of dry solid materials from silos, rigid bins and hoppers. It rotates within the container bottom cone to prevent non-flowing materials from jamming, bridging, compaction or rat holing. The unit is designed for difficult dry chemicals, such as lime and soda ash.

The mechanical bin activator discharges gently and efficiently and can also integrate up to four volumetric screw feeders. Each screw feeder is independent and can feed up to 15,000 lb/hr with different length and throughput variations. The arch breaker is easy to mount and reliable. 773/665-8800; www.sodimate-inc.com.

BOLTED TANKS

Bolted RTP (rolled, tapered panel) potable and wastewater storage systems from Tank Connection combine bolted and field-weld tank construction into one product. The systems combine a high-quality coating system (LIQ Fusion 7000 FBE) and safe field installation processes. Standard liquid capacities range from 25,000 to 8 million gallons. Applications range from potable water to anaerobic digestion. Systems offer long life and low-maintenance storage. The company designs, fabricates and installs all four types of steel storage tanks including bolted RTP, field-weld, shop-weld and hybrid tank construction. 623/423-3010; www.tankconnection.com.



Potable and wastewater storage systems from Tank Connection

(continued)

EPOXY LINING

Series 431 Perma-Shield PL from Tnemec Company is a high-performance, ceramic-modified epoxy lining for ductile iron and steel pipe, formulated for aggressive sewer environments, with advanced permeation, abrasion and chemical resistance. It can withstand 2,500 psi hydrocleaning. Its light green color makes it easy to inspect. **800/863-6321; www.tnemec.com.**



**Series 431 Perma-Shield PL
from Tnemec Company**

FLAT-PANEL TANKS

Flat-panel bolted tanks from USA Tank Storage Systems offer high performance, reliability and easy installation. The flat-seam, field-assembled design eliminates leaky flange connections and lap gaskets in liquid tank applications. Using the latest sealant to replace all strip gaskets reduces bolted panel seam leaks. The tank design provides a smooth interior wall surface.



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Tanks are erected from ground level with a jacking system, improving safety. The system eliminates expensive equipment and improves the ability to work in confined spaces. Panels are finished with a thermal fusion-bonded powder coating. Advantages include speed and ease of manufacturing and erection and low environmental impact. The tanks can be relocated and expanded, improving residual value. **866/700-2500; www.usatanksales.com. tpo**

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By Scottie Dayton

Cross-linked polyethylene tanks resolve safety issue

Problem

Sodium hypochlorite began weeping from three 7,000-gallon high-density linear-polyethylene tanks at the Neenah (Wis.) Wastewater Treatment Plant after a year of use. The facility treats 10 mgd and uses 400 to 500 gallons of chemicals daily. Maintenance manager Jim Peichl tried different repair options before replacing the tanks.

Solution

Peichl ordered three 5,200-gallon cross-linked **polyethylene tanks from Assmann Corp. of America**. Cross-linked bonds in the polymer structure better withstand impacts and chemical attack.

RESULT

Assmann delivered the tanks in four weeks, resolving the plant's safety issue. **888/357-3181; www.assmann-usa.com**.



Density current baffle reduces TSS

Problem

In 2007, the Monclova (Mexico) Wastewater Treatment Plant was upgraded from 11.5 mgd to 15.5 mgd. As the flow reached the three 112-foot-diameter clarifiers, effluent TSS rose to more than double the 5 ppm limit. To remain compliant, the facility considered a fourth secondary clarifier at more than \$560,000, or some way to improve the operation of the existing units.

Solution

Before ordering the additional clarifier, plant officials contacted **NEFCO** to see if the **Stamford Baffle 2.0** could help reduce TSS. They bought one for \$22,000 and installed it on a clarifier. The density current baffle features a 30-degree inclination angle and an increased horizontal projection. Tests during summer 2009 showed a 78 percent reduction in TSS.

RESULT

The municipality installed baffles on the other clarifiers, saved more than \$500,000, and remained in compliance. **561/775-9303; www.nefcoinnovations.com**.



Process thickens waste activated sludge

Problem

The 0.5 mgd (design) Patchogue Wastewater Treatment Plant on Long Island, N.Y., upgraded its biological process to a 1.2 mgd integrated fixed film aeration system, increasing biosolids production and raising hauling costs to more than \$27,000 a month.

Solution

Operators retrofitted a **membrane thickening process from Ovivo** into two existing tanks. A Kubota flat-plate membrane prethickens waste activated sludge to 3 percent solids.

RESULT

The village saved more than \$327,000 in annual hauling fees. Based on those savings, officials will see a payback on their \$15 million investment in 4.5 years. **801/931-3000; www.ovivowater.com**.



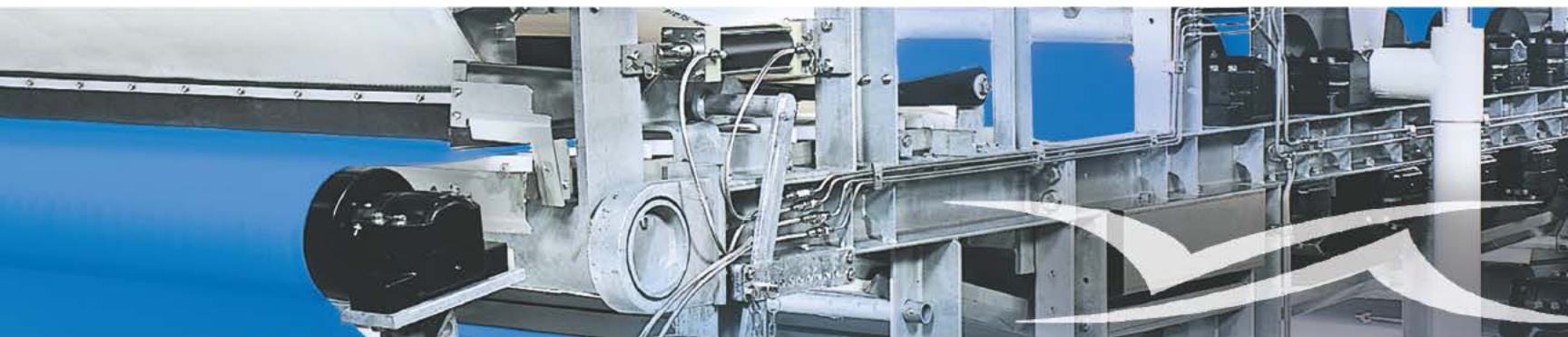
Custom building protects equipment

Problem

The Williamsburg (Ohio) Waste Water Treatment Plant needed fiberglass shelters to protect a grit washer and a mechanical bar screen. The bar screen enclosure had to sit on an existing concrete slab poured at two different elevations with an 18 inch difference in height. Roughly half the building would sit up on the higher portion. The grit washer enclosure was installed on a new concrete foundation with two elevations. The doorway dropped down below the bottom of the walls into a 10-inch-deep notch in the concrete.

(continued)

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Solution

Engineers at Burgess & Niple specified **field equipment shelters from Shelter Works**. Project manager Chuck Berry from Layne Heavy Civil worked with the engineers and village representatives through the shop drawing phase. The custom-made structure with an explosion-proof electrical package had some tall walls, some shorter walls, some standard-sized doors, and some short doors for access to both sides.

RESULT

"Installation was quick and we were done in a matter of hours," says Berry. 800/794-8037; www.shelterworks.com.



Storage tank enables water conservation

Problem

An irrigation expansion project by the City of Antioch and Delta Diablo (Calif.) Sanitation District included six miles of conveyance and distribution piping, a pump station, and a 1.1-million-gallon recycled water storage tank to be buried beneath the 14th tee at the Lone Tree Golf Course.

Solution

The district hired Psomas, a local engineering firm, to design the project. Engineers specified a pre-stressed concrete tank to withstand the weight of the concrete masonry station built on top of it. JMB Construction won the contract and subcontractor **DYK, a division of DN Tanks, cast the tank**.

RESULT

The city converted the golf course, four municipal parks, medians, and other green spaces along the pipeline from irrigation with potable water to recycled water. 855/368-2657; www.dntanks.com.



Cleaning tool saves \$11,000 for treatment plant

Problem

The 84 mgd (average) Metro Wastewater Treatment Plant in Syracuse, N.Y., faced high labor costs for cleaning sludge and grit from 22 tanks and outfall troughs, and handling spills.

Solution

The plant's mechanical maintenance coordinator tried **Waste Blasters heavy-duty squeegees from Way Cool Product Co.** During annual cleaning and maintenance inspections of the tanks, workers found the hybrid pusher-puller hand tool efficient, durable and easy to use. Aluminum rubber-edged blades sped up jobs and reduced physical effort. For cleaning outfall troughs and working in tight places, workers used units with 24-inch-wide blades.

RESULT

Tank-cleaning time was reduced by one-third, saving an estimated \$11,000 (\$500 times 22 tanks), and workers used one-third less water. The plant owns 11 of the tools and expects to purchase more. 315/569-9974; www.waycoolproduct.com.



Treatment packages increase capacity

Problem

The 0.5 mgd (design) Patchogue (N.Y.) Wastewater Treatment Plant was running out of capacity. To meet new discharge regulations, village officials hired an engineering firm to design a 1.2 mgd plant expansion and upgrade.

Solution

Engineers chose two **STM-Aerotor biological nutrient removal systems and two clarifier optimization packages from WesTech Engineering** for the 55-foot-diameter secondary clarifiers. Their addition increased capacity to 0.8 mgd.

RESULT

The technologies reduced CBOD, TSS and total nitrogen to well below the mandated levels, making the plant one of the most efficient in the state. 801/265-1000; www.westech-inc.com.



(continued)

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WEFTEC 2012, Booth 5639



Insulated cover controls algae and TSS

Problem

The Sanford (Fla.) Utilities Plant Division wanted to control algae and TSS solids in the chlorine contact chamber at one of its wastewater treatment plants.

Solution

Engineers at **Lemna Technologies** recommended a floating **LemTec modular cover** with R-10 insulation value and greater than 10-year UV stability.

RESULT

When installed, the cover immediately controlled algae, reduced TSS, and produced satisfactory effluent for private and commercial irrigation. 612/253-2000; www.lemnatechnologies.com.



Modular building solves multiple challenges

Problem

Operators at the Wadena (Minn.) Wastewater Treatment Plant wanted to remove the rotten wooden frame building covering the primary clarifier and replace it with a fiberglass structure. Enclosed secondary clarifiers on either side of the basin limited space and made it challenging to locate access points, stairs, doors and exhaust systems.

Solution

Engineers at **RM Products** designed a custom industrial straight-wall modular fiberglass building to fit the allocated space. Magney Construction in Chanhausen assembled the unit.

RESULT

The building fulfilled the needs of the site. 800/363-0867; www.rmfiberglass.com. tpo



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Getting Them Started

DAVID MOORE CREATED AN INTERNSHIP PROGRAM THAT FOR 10 YEARS HAS FUNNELED QUALIFIED YOUNG PEOPLE INTO WATER AND WASTEWATER CAREERS IN NORTHWEST ALABAMA

By Ted J. Rulseh

After high school, David Moore wasn't sure what he wanted to do. A mentor helped steer him into a job at the Muscle Shoals (Ala.) Utilities Board, and 20 years later he's still enjoying a career in wastewater treatment.

Today, Moore gives back by teaching classes in water and wastewater treatment at Northwest Shoals Community College and by running an internship program that has sent more than 40 bright young men and women to more than a dozen municipal and industrial treatment facilities and has helped many of them enter water-related careers.

Moore is a full-time operator at the Muscle Shoals Wastewater Treatment Plant, a 4 mgd activated sludge facility. He teaches one evening per week in fall and spring and does his best to keep in contact with the students who have gone through his programs.

Moore has Grade 4 wastewater and Grade 4 water certifications, and he has a bachelor's degree in public administration from Athens State University, in Athens, Ala. He talked about his career and about the 10-year-old internship program in an interview with *Treatment Plant Operator*.

"A lot of kids coming out of high school don't know what they want to do. The program at Northwest Shoals gives them an opportunity to get into the environmental field and see what it's all about."

DAVID MOORE

tpo: How did you find your way into the water business?

Moore: In 1991, I was working at Kmart in the home improvement center. A summer job came open at the Muscle Shoals Utilities Board in the water department. It paid \$4.25 an hour, and I was making \$7.50 at Kmart. My manager, George Echols, encouraged me to take the job. He told me he didn't want me to be a 'lifer' at Kmart, and he encouraged me to go on and better myself.

I turned in my two weeks' notice at Kmart and came to work here at Muscle Shoals on June 1, 1992. I started out flushing and servicing fire hydrants. Then I moved up to a position where I helped in distribution with reading meters and other tasks.

tpo: How did you make the transition to the wastewater side?

Moore: When a trainee job came open at the wastewater plant, [chief operator] Joe Underwood hired me, and later I was able to get my Grade 3 wastewater certification. I was already taking the water and wastewater classes at Northwest Shoals. I took a huge interest in the field. I moved to the water plant and got my Grade 4 certification in water, and then in 2000 I had the opportunity to move back to the wastewater plant.



David Moore (second from right) with interns (from left) Chanda Berryhill, Kelby James and Rodney Cox.

tpo: What motivated you to become a water and wastewater instructor?

Moore: It was in my blood. My mother was a teacher. My sister is a teacher. My brother has taught on the college level. I'm passionate about training other operators.

A lot of kids coming out of high school don't know what they want to do. Some just aren't cut out for college. They don't want to be tied down to a desk. They enjoy being outside. The program at Northwest Shoals gives them an opportunity to get into the environmental field and see what it's all about.

tpo: What led to the creation of the internships?

Moore: I started teaching in the water and wastewater management program in 1999. I started with eight students, and the program wasn't growing. I believe they used to have that program at a lot of community colleges across the state, but in 2001, Northwest Shoals was the only one that still had it.

I got together with the dean [Glenda Colagross] and told her I thought an internship would have a big impact on the program. The college supported me 100 percent and let me run with it. The internship revived interest, and now, without any advertising or other promotion, I'm running 19 to 25 students per class.

"The coolest thing is when I get a call from a former student saying they have a job interview, or they have a job in the field, or they just passed a certification exam. That is just an awesome feeling."

DAVID MOORE

tpo: What does the water and wastewater curriculum consist of?

Moore: I teach courses in water treatment, wastewater treatment, and sanitary chemistry and microbiology. Another instructor, Paul Dickerschied, teaches hydraulics, instrumentation and an introductory class.

The program is offered as an Associate in Applied Science degree, for which students also need to complete basic courses in English, math and other subjects. It's also offered as a certificate program: If they complete the six water and wastewater classes plus the internship, they receive a certificate of completion.

tpo: How does the internship program fit in?

Moore: It generally takes the students a year and a half to complete the full program — or two years if they take all the classes before they start the internship. The internship is offered as a class. During a semester, which is 16 weeks, they have to log at least 150 hours working on a treatment plant site. They have to keep a daily journal, and at the end they're evaluated by the operator they worked under. The program really helps put the book knowledge and the theory we learn in the classroom to work.

tpo: How do you find the sites where the interns work?

Moore: Working here at the city, I knew a lot of people in this field. Muscle Shoals Utilities and Russellville Utilities jumped on board right away to help get the program started. We've put students to work either at industrial or municipal water and wastewater treatment sites.

tpo: What do the interns' workdays look like?

Moore: They assist with everything an operator does — fixing pumps, performing maintenance, process control, lab work. They follow the same safety protocols. We don't have an operator-in-training program anymore in Alabama, so the internship helps fill that void. We've had interns log as high as 500 hours, and those hours count toward the work hours they need for certification.

The interns don't get paid, but what they learn and the relationships they build with the operators and other people in the field are priceless.

tpo: How have you gone about promoting this program?

Moore: When I was building the program, I would set up a booth at career days at schools and hand out little cards I had made. I would talk to the teachers at the vocational schools attached to the high schools. I would set up a booth at Earth Day events and at a local water festival.

I did that for about six years, but once my classes began to close out at the limit of 25, I no longer needed to do that. Here at Muscle Shoals, Joe Underwood and our manager, James Vance, are really supportive of tours. Every year the entire Muscle Shoals sixth grade comes and does a tour. I have the kindergarten classes come in, as well as the biology classes at the high school and Northwest Shoals.

tpo: What has been the impact on the career prospects of students who complete the internships?

Moore: When I started the internship program, my first five interns were hired before their internships were over, and they went to work where they interned. I've been privileged to see a lot of my former students get jobs in this field. Some have gone on to become chief operators, and operators in various locations.

The last time we hired an operator here at Muscle Shoals, the top five people we interviewed all had taken my classes. I had a call from a utility about a month ago asking me about two students I had taught in class. Both



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of them had taken the internship program, and they were number one and two for the job.

I tell students that when they go for a job, if they can show on a resume that they're taking water and wastewater classes, they will be looked at. If they can show a certificate of completion for these classes, they'll be looked at even more. If they have an associate degree and an internship, they'll be even more desirable. The more education and experience they get, the better off they're going to be.

"[The interns] don't get paid, but what they learn and the relationships they build with the operators and other people in the field are priceless."

DAVID MOORE

tpo: How do you see this increase in young people entering the field affecting the water and wastewater industry in your area?


Moore: For this area, I think it has a big impact in making trained people available for hiring. It's good for the municipalities because they get to meet the young people, observe their work habits, and see how interested they are in the field. They can get a good idea how the person is going to perform if they hire them.

tpo: How would you characterize the personal rewards of your teaching and the intern program?

Moore: I give all my students my cellphone number, and I help them with resumes and job applications if they need it. The coolest thing is when I get a call from a former student saying they have a job interview, or they have a job in the field, or they just passed a certification exam. That is just an awesome feeling. I get goose bumps just talking about it. **tpo**

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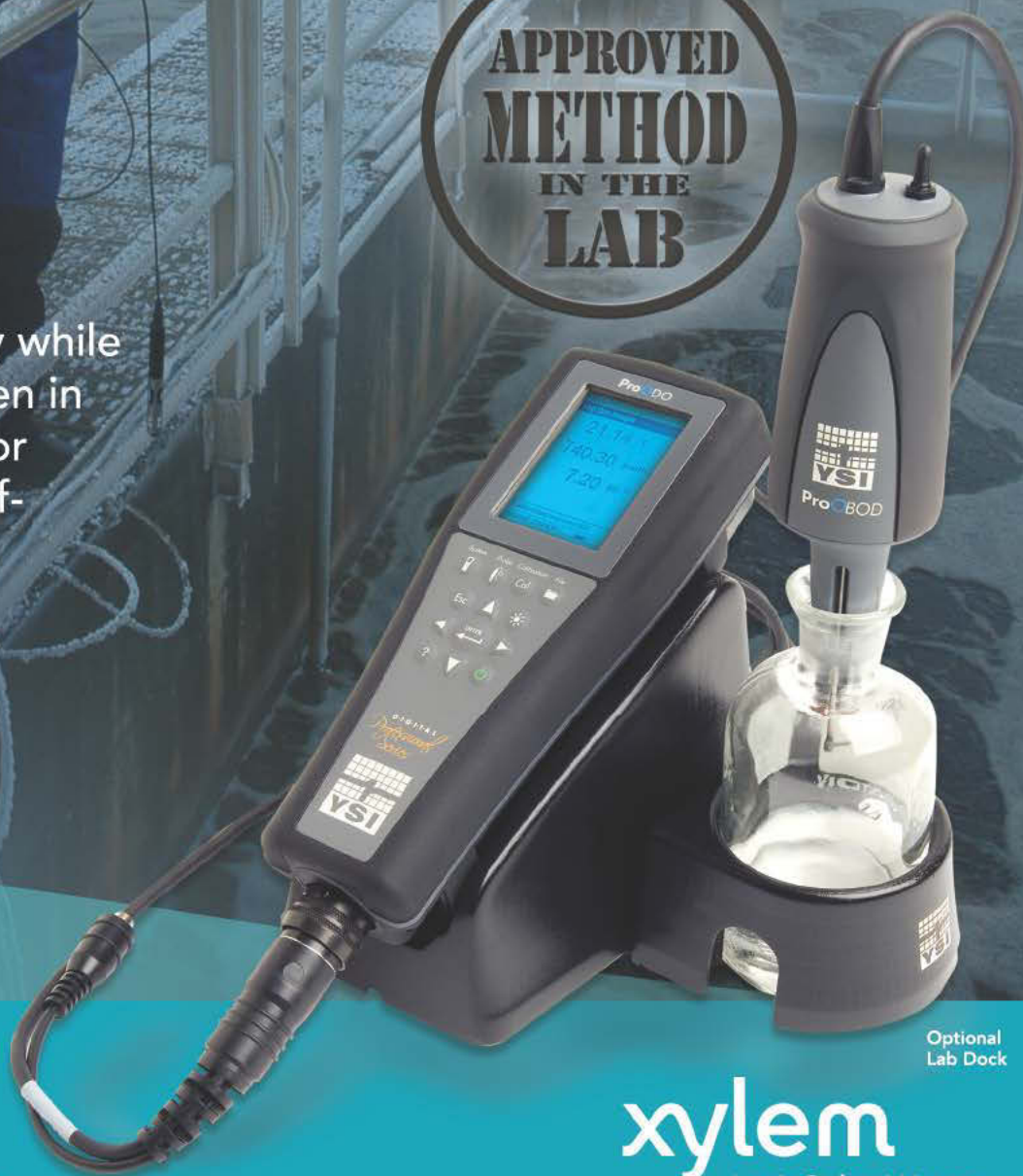
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Environmental engineer Boris Krizek uses a hands-on model to show students how processes work.

Learning in Motion

STAFF MEMBERS AT THE CITY OF BILLINGS TAKE EDUCATION OUT INTO CLASSROOMS AND EVENTS WHERE THEY GET THE MOST EXPOSURE

By Briana Jones

"I made up a dance for the water cycle," says Aura Lindstrand. Boris Krizek jokingly adds: "I don't do the dance!"

It's part of the water lessons delivered to schools by the Environmental Affairs Division at the City of Billings, Mont. In one-hour, in-class presentations, using data and information supplied by the wastewater and water treatment plant staff, students learn about water consumption, wastewater treatment and stormwater.

"The dance teaches kids about evaporation, transpiration and precipitation," says Lindstrand, environmental coordinator I.

"It's something where they can stand up and demonstrate how those processes work. It's basically just motions. To keep them

"We feel we get more exposure and more participation at events than with in-class presentations. We get more kids and we can get adults at the same time."

BORIS KRIZEK

engaged, we want them to stand up and sit down and raise their hands. We want them to repeat what we're saying." Kids bring their hands up above their heads to symbolize where the rain starts, then they wiggle their fingers down to show rain falling toward the ground.

TELLING THE STORY

Class presentations are geared for younger students. "We start

with third and fourth graders because that's where they're learning about the water cycle," says Lindstrand. "We've also found that they're the ones that are most likely to take the information home and be excited and ask questions."

After the water cycle, Lindstrand says, "We go into where our drinking water comes from and how we treat it, then we go to the wastewater side and what is used to clean our water. Then we go into the stormwater and end with conservation."

"Last May, on the rainiest day on record for Billings, water plant operators provided us with information on the river and finished water turbidity and increase in chemical dosage to clean up the Yellowstone River water. We get information from them and the wastewater operators, process it into graphs, and display it on visual boards for the community."

Susan Stanley, superintendent at the 26 mgd (design) wastewater treatment plant, adds, "We are eager to share our story. We help kids relate the wastewater process to everyday things, like comparing a primary sludge to vegetable soup, gravity thickened sludge to beef stew, so it makes sense to them. We also want them to understand that the treated water is clean, but not drinkable, and when we put it in the river, it is safe for the fish and for people to be around."

THE WATER LADY

Elementary kids are more eager than high school students to learn about what happens when they flush the toilet and how wastewater is cleaned. Lindstrand says: "The kids get excited when teach-

(continued)

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LEFT: Staff members bring a wastewater model to create a hands-on experience at venues. RIGHT: Environmental coordinator I Aura Lindstrand does an in-class presentation at Newman School in Billings, Mont.



ers say, 'The water lady is coming' or 'The water guy is coming.' That's why I like the third and fourth grade the most."

Krizek, environmental engineer, compares how the age groups respond to different teaching methods. "The questions aren't as tough from high school students," he says. "High school students are more reserved. We have a stepped up presentation for older students where we get into the water-quality aspects of regulations." He says the younger kids ask questions that keep them on their toes.

One student asked, "What do you do with the fish that get into the water plant," and Krizek replied, "We catch them and have a fish fry!"

The presentations for high school students include concepts that are too advanced for the younger students. "We talk about the turbid-

ity of the Yellowstone River," says Krizek. "We have a test tube that shows how much water the city treats compared to the flow of the river. The test tube is 99 percent oil with 1 percent color. It's a relative comparison visual to show how little water we take."

ON THE ROAD

The education program in Billings does not end in the classroom. With information from the plant staff to create graphics and display boards, Krizek and Lindstrand take their teaching to education events in and around the city of 104,000.

"We feel we get more exposure and more participation at events than with in-class presentations," says Krizek. "We get more kids and we can get adults at the same time. The bad thing is that we only have a few minutes to get our message across to the visitors. So how we lay out our display boards and our hands-on stuff is really critical."

One event they take part in is SaturdayLive, a daylong, fundraising carnival benefitting Billings' public schools. "Schools and educational groups have food and activity booths to raise money," says Krizek. "We are one of the only educational booths, so we need to make it entertaining also. They've allowed us a space to do our public outreach for the past five years. Typically we'll bring images of the bacteria from the wastewater operators and always a piece of equipment used by the department."

BRANCHING OUT

Bringing education to the venues generates further opportunities. "At SaturdayLive this year we were approached by the Girl Scouts. So we ended up doing the Girl Scout Expo," says Lindstrand. "The science fair last year lead us into Chicks in Science, so we're adding two new venues this year." Chicks in Science, sponsored by Montana State University, is an event aimed at girls in grades 4-8 that keeps them interested in math and science and encourages them to enter those fields.

Being proactive in classrooms and at public venues allows Billings to get the word out about clean water. "Public education is the only way we can reach the public to get our message out about water quality, water conservation, and that everything flows back to the river," says Lindstrand. "If we teach the adults, maybe their practices at home will change." **tpo**

What's Your Story?

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



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At Home on the Range

A LIME STABILIZATION PROCESS HELPS A TREATMENT PLANT ON MINNESOTA'S IRON RANGE RESOLVE WEATHER-RELATED ISSUES WITH BIOSOLIDS MANAGEMENT

By Larry Trojak

Though well past its boom times as a supplier of iron ore, the Iron Range area of northeast Minnesota enjoys a rich history and a fairly stable economy.

Three small Iron Range communities rely on the 0.5 mgd (design) wastewater treatment plant that bears their communities' names. The Coleraine-Bovey-Taconite Wastewater Treatment Facility nears its 25th anniversary having completed an expansion that includes a shift from Class B to Class A biosolids using a lime stabilization process.

The new process resolved a long-standing issue with meeting U.S. EPA standards for volatile solids reduction during the region's long, often frigid winters.

HISTORY OF BENEFICIAL USE

The CBT plant takes in wastewater at a main lift station with three Hydromatic pumps (Pentair) plus an overflow/bypass lift station with a Flygt pump (Xylem). From there, the flow enters an automatic bar screen (Parkson) and an aerated grit chamber that removes screenings and debris via a grit pump and classifier (Weir Specialty Pumps/WEMCO Pump).

Wastewater then passes through a Milltronics OCM III ultrasonic flowmeter (Siemens) to secondary treatment in two activated sludge tanks with Sanitaire fine-bubble diffusers (Xylem), and on to two secondary clarifiers (Walker Process). The waste activated sludge from the clarifiers is pumped to an aerobic digester with fine-bubble diffusers (also Sanitaire).

Secondary effluent is sent through a chlorine contact tank (Wallace & Tiernan), where chlorine and sulfur dioxide doses are fed automatically based on flow proportion. After dechlorination, the effluent travels to an effluent lift station (Hydromatic/Pentair)

that pumps it 3.5 miles to the Swan River.

After a 40-day retention time, the solids are pumped to a belt filter press (Parkson) for dewatering and then to a reactor (Schwing Bioset) to produce Class A biosolids.

Before the recent expansion, dewatered biosolids were simply land-applied on area farms. "That was what we did from the time we opened in 1987 until about 1997, when the Minnesota Pollution Control Agency (MPCA) adopted the U.S. EPA regulations and



Vernard Hawkinson, plant supervisor for the Coleraine-Bovey-Taconite Wastewater Treatment Facility.



Treated biosolids are pumped under pressure by a Schwing KSP-5 piston pump to an insulated reactor. The sulfamic acid feeder (stainless steel container) is mounted atop the pump.



In the insulated Bioset reactor, biosolids are kept at a constant 158 degrees F for at least 30 minutes to ensure that all pathogens are neutralized.

changed the way we managed our biosolids," says Vernard Hawkinson, plant supervisor.

PART-TIME TUNDRA

Iron Range winter temperatures can be challenging: In and around the town of Coleraine, average lows between November and Feb-

Share Your Idea

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

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ruary are near zero degrees F, and the thermometer once hit a record 51 below zero. For treatment plant operators like Hawkinson, that can be a logistical nightmare.

"The changes to federal EPA guidelines essentially made our whole biosolids process non-compliant during winter months," he says. "That process depends upon bacteria doing their job to reduce the volatile solids content in the biosolids to the level needed for producing a Class B biosolid."

"They do that just fine, except in extremely cold temperatures. When the rules were adopted, we had to meet the minimum 38 percent volatile solids reduction, or other options that were acceptable to meet the Vector Attraction Reduction rule. We were no longer in compliance during the winter, so we had to start taking steps to correct that."

One alternative approach CBT took was to stockpile the dewatered material during winter and then, when it thawed in spring, make it available to area farmers, who had to apply it to their land immediately and incorporate it into the soil. That too, had its problems, says Hawkinson.

"For one thing, because of the climate here, sometimes the biosolids piles would not thaw until the end of May, and most farmers wanted their planting to be done by then, not just starting," he says.

"Farmers in the area, who see the product as a great way to raise the pH levels of their soil, have agreed to take as much as we can produce. That's a far cry from having to actively seek a place where we could take it."

VERNARD HAWKINSON

"We did that for a few years before deciding it would be better to simply haul the liquid material to the Grand Rapids wastewater plant, or take the dewatered material to their landfill. Unfortunately, they were less-than-receptive to those plans on a long-term basis and we found ourselves back at square one."

TOWARD CLASS A

Hawkinson made other efforts to comply with the MPCA and EPA rules. Those included achieving the 38 percent volatile solids reduction using the approximate mass balance equation, and conducting a Bench Scale Analysis and Specific Oxygen Uptake Rate Analysis — all to no avail.

One solution that came to the forefront was to add a second digester. "That seemed like the only recourse we had at the time," says Hawkinson. "Adding a second tank would afford us the extra digestion time we would need to reduce the volatile solids. So we found an engineering firm to tackle the project."

"Their initial estimate came in at about \$700,000 for the second digester, and the design process was started. Unfortunately, as the project progressed, additional site work was determined to be necessary which, through no fault of theirs, escalated the cost to roughly twice the original estimate."

During that same time, Hawkinson attended a seminar put on by the Minnesota Rural Water Association at which representatives from Schwing Bioset presented their biosolids treatment process. Intrigued, Hawkinson spoke to a company representative at the show. After back-and-forth talks, Schwing Bioset estimated an installation at CBT would cost about \$700,000 — the same as the original estimate for the digester — and the end product would be Class A biosolids.

"That made good sense to us on many levels, so we cancelled the digester design project and committed to Bioset," says Hawkinson.

In a component fitted with an odor collection hood, biosolids are discharged from the reactor to a storage pad for delivery to area farmers.

JUST ADD LIME

The Bioset process mixes biosolids exiting the dewatering belt press (with a solids content of about 15 percent) with quicklime and sulfamic acid using a twin screw feeder. Then, using a Schwing KSP-5 pump, the mix is delivered under pressure through an insulated reactor. The enclosed process contains dust and odors while maintaining a constant temperature of 158 degrees F for at least 30 minutes to ensure that all pathogens are neutralized.

Working with the U.S. EPA Pathogen Equivalency Committee (PEC) through the Process to Further Reduce Pathogens (PFRP) treatment process in the 503 regulations, Schwing Bioset has obtained approval

for the Bioset process to operate at 131 degrees F, provided the ammonium concentration within the reactor is above 0.5 mg/g dry weight. This offers a significant reduction in chemical usage from the standard 158 degrees F operating regime and translates into

an approximate 30 percent reduction in operating costs.

The system at CBT also includes a recirculation feature in which biosolids that have not achieved the necessary temperature on startup are returned to the hopper for reprocessing. Upon exiting the Bioset process, now with a solids content in the 35 to 38 percent range, the Class A biosolids are discharged to a 48- by 75-foot storage building, constructed at the time of the biosolids upgrade. The plant produces about 35 dry tons of biosolids per year.

POPULAR WITH FARMERS

"We now have an excellent product with an effective acid neutralizing power of approximately 64 percent of pure lime," says Hawkinson. "Farmers in the area, who see the product as a great way to raise the pH levels of their soil, have agreed to take as much as we can produce."

"That's a far cry from having to actively seek a place where we could take it. Right now, we only need to rely upon the Bioset process for half the year — we get the volatile solids reduction we need in warmer weather. But it is an excellent alternative, and it has allowed us to create a Class A biosolid with the same outlay we would have incurred for the Class B product. It has really worked out well for us." **tpo**



Lime for the Bioset process is stored in a 1,560-cubic-foot silo next to the storage pad.



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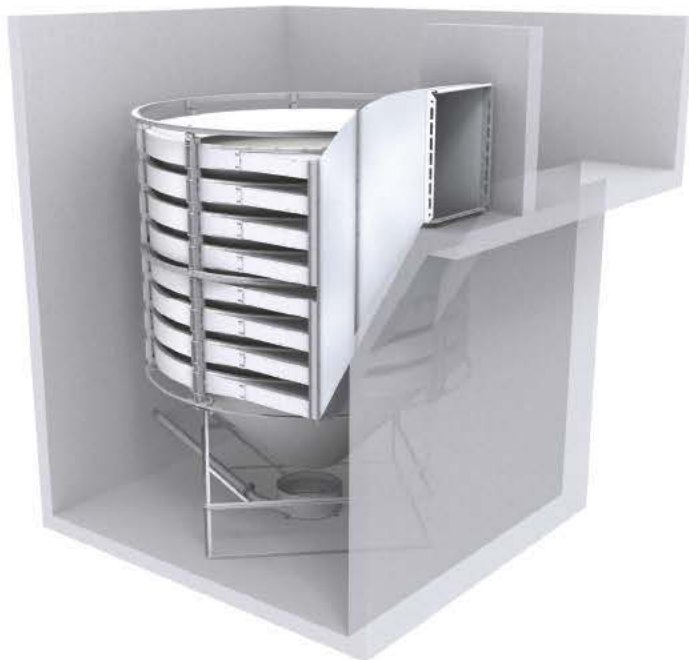
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In-Situ's RDO receives EPA approval

In-Situ received U.S. Environmental Protection Agency approval for its RDO (rugged dissolved oxygen) methods. The sensors measure DO using dynamic luminescence quenching. RDO sensors are available for process, laboratory and field applications.

IDEX adds Trebor to Warren Rupp platform, names platform leaders

IDEX Corp. added Trebor International to the Warren Rupp platform. Located in Salt Lake City, Utah, Trebor manufactures ultrapure chemical pumps and liquid heating systems. IDEX has also promoted John Carter to president of the Warren Rupp platform and Fenton Challengren to president of the Chemical, Food and Process platform.



John Carter



Fenton Challengren

Parkson consolidates Middle East operations

Parkson Corp. is consolidating the operation of its Middle East group into the international division. Parkson's international group in Fort Lauderdale will take over duties of the Dubai office. The shift allows for greater collaboration in the Middle East and elsewhere. The new unit will be led by Michael Lamminen.

Pumps Solutions Group launches website

Pump Solutions Group launched its new website, www.psgdover.com. The site is part of PSG's new "One Company-One Customer" brand image. The initiative demonstrates PSG's commitment to one common voice and image for all of its pump brands.



DSI offers webinar on benefits of eddy current drives

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

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

Gardner Denver Nash opens headquarters, operations facility

Gardner Denver Nash opened a new headquarters and North American operations facility in Pennsylvania. The 100,500-square-foot facility in Bentleyville, south of Pittsburgh, relocates the headquarters from Trumbull, Conn., and replaces the Nash manufacturing facility in Elizabeth, Pa. The Nash distribution center in St. Peters, Mo., also will relocate to Bentleyville.



LobePro Rotary Pumps adds managers

LobePro Rotary Pumps named Sanjeev Sonkar its India manager and Marcus Day as southeast regional manager. Sonkar's territory will be the country of India. Day's territories include Georgia, Florida and Alabama.

FCI provides FlexSwitch brochure

The FLT93 Series FlexSwitch brochure from Fluid Components International includes product information on the precision flow/level/temperature switch for process and plant engineers. The switch can be used in gas, oil and wastewater treatment applications.



Calgon Carbon names president, chairman of the board

Calgon Carbon named Randall S. Dearth president and chief executive officer, replacing John S. Stanik, who retired. The company also named Seth E. Schofield independent chairman of the board.



Jeffery Givens



John Graun



Judy Bridgewater



Doug MacKenzie

Vanair names VPs, analyst, technician

Vanair named Jeffery Givens vice president of Vanair defense systems and John Graun vice president of drill and gas suppression. The company also hired Judy Bridgewater as purchasing analyst and Doug MacKenzie as service technician.

Severn Trent names regional sales manager

Severn Trent Services named Gary M. Lohse regional sales manager for water treatment technologies. He is responsible for the sales of all disinfection, instrumentation, engineered products and packaged membrane systems from eastern Canada to northern Virginia and west to the Dakotas.

Xylem hosts wastewater operator training

Xylem held a wastewater operator recertification class at its Indianapolis branch. The Sewer Collection System Reliability course earned participants four continuing education units and covered portable pump usage in collection systems, temporary bypass system design, permanent installations, basic pump hydraulics and sustained high-efficiency pumping. A future course is planned on wastewater and dewatering.



DeZURIK acquires HILTON Valve

DeZURIK Inc., Sartell, Minn., acquired HILTON Valve, including all products and production capability. HILTON operations will continue as a stand-alone business in Redmond, Wash., including engineering and manufacturing. HILTON produces fabricated large-diameter and custom knife valves.

Fibergrate offers water, wastewater product brochure

Fibergrate offers an FRP product brochure for the water and wastewater industries. The brochure can be accessed at www.fibergrate.com. It includes information on scum baffles, troughs, launder covers, density current baffles, baffle walls and weir plates.

WILO USA receives equity investment, appoints director

WILO USA received an equity investment of \$61.6 million from its parent company, German-based WILO SE, in a combined effort to increase visibility and drive growth in the U.S. market. The pump manufacturer also named Chris Perkins director of operations at its manufacturing facility in Thomasville, Ga.



Chris Perkins

Downstream Defender receives TSS treatment certification

Downstream Defender by Hydro International has been certified for the use of TSS treatment in online applications by the New Jersey Department of Environmental Protection's Bureau of Nonpoint Control. In an online configuration, Downstream Defender treats all runoff flowing through the drainage line, eliminating the need for additional bypass or junction manholes required in offline configurations.

ROTEX Global redesigns website

ROTEX Global launched its redesigned website, www.rotex.com. The multi-language site provides information on screeners, OEM parts and service. It also links users to a trained representative.



WesTech acquires Microfloc and General Filter

WesTech Engineering reached an agreement with Siemens Industry to purchase the conventional water treatment business that includes Microfloc and General Filter. The agreement includes all active projects, associated assets and liabilities, inventory and associated patents and trademarks, as well as the facility in Ames, Iowa.

Dow plans China treatment facility

Dow Chemical Co. will build DOW FILMTEC, a reverse osmosis membrane plant, at the company's site in Huzhou, China. The facility will deliver technology for water desalination and wastewater reuse for potable, non-potable and industrial water in China. The facility will be online in 2013.

Badger Meter, Telog form partnership

Badger Meter entered into a strategic partnership with Telog Instruments, developer and manufacturer of remote data acquisition systems for water and energy utilities. The agreement allows Badger Meter to sell water distribution system monitoring products from Telog as value-added tools to complement its Advanced Metering Analytics in North America. **tpo**

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6. CHEMETRICS TOTAL PHOSPHATE TEST KIT

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ronmental Protection Agency methods 365.2 and 365.4. The test employs the persulfate digestion-ascorbic acid method to convert various forms of phosphate to orthophosphate. Results can be obtained using the CHEMetrics V-2000 photometer or a spectrophotometer capable of accepting a 16 mm cell. **800/356-3072; www.chemetrics.com.**

7. PEPPERL+FUCHS EXTA3 INDUSTRIAL KEYBOARDS

EXTA3 Division 2 industrial keyboards from Pepperl+Fuchs feature an antimicrobial and chemical-resistant design to withstand chemical cleaning and washdown environments. Available as industrial panel mount or standalone keyboards for use in Class I, Division 2, Groups A, B, C and D environments, the IP66-rated keyboards have a stainless steel desktop housing and anodized aluminum polyester foil faceplate. The keyboards offer multiple connectivity options with 5-foot cable and are available in mouseless, touchpad mouse, joystick mouse and optical trackball mouse versions. **330/486-0002; www.pepperl-fuchs.us.**

8. FLOWROX LPP-T4 HOSE PUMP

The LPP-T4 hose pump from Flowrox can move up to 440 gpm with pressure up to 150 psi. The pump's low-friction, rolling design enables it to operate continuously in 200 degree F temperatures. **410/636-2250; www.flowrox.us.**

9. ABB PROCESSMASTER MINIMAG FLOWMETER

The ProcessMaster Wafer (flangeless) FEM300 Minimag flowmeter from ABB's Measurement Products is available in 1/10- through 4-inch (DN3 through DN100) sizes with a Tefzel liner. Standard electrode choices include Hastelloy C, Tantalum and Platinum/Iridium. The transmitter can be integral with the sensor or remotely located. Advanced data storage within the sensor eliminates the need to match sensor and transmitter in the field. Factory-set parameters can be modified without opening the housing via the display and soft-key buttons. The unit rejects invalid entries. **800/752-0696; www.abb.com.**

10. OPTO 22 SNAP COMMUNICATION MODULE

The SNAP-SCM-CAN2B, high-speed I/O serial communication module from Opto 22 acquires data from generators, motors, sensors, actuators and other devices connected to a controller area network (CAN). The module, used with the SNAP PAC System, includes programmable automation controllers (PACs) and Ethernet-based I/O systems. The unit has one input for receiving data from devices on a CAN network. The module does not transmit. It is optically isolated from the equipment and devices it connects to, as well as from other modules on a shared I/O rack. **800/321-6786; www.opto22.com.**

(continued)

product spotlight

Sustainable Treatment System Eliminates Need for Chemicals

By Ed Wodalski

The **X-500 (500,000 gpd) wastewater treatment system from the Pasteurization Technology Group (PTG)** is a non-toxic process designed to replace chlorine-based or UV disinfection while generating on-site electric power. The combined heat and power system (CHP) takes the pasteurization process used in the food and beverage industry and applies it to wastewater for reuse in agriculture and other industries.

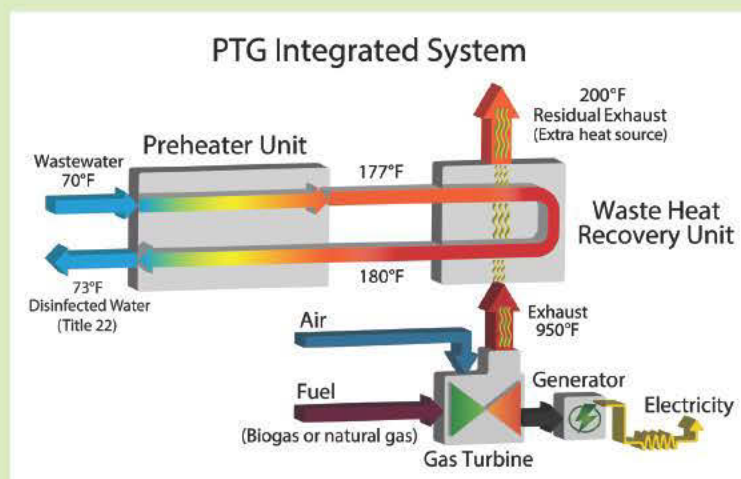
The modular component system uses biogas or natural gas to fuel a turbine that generates electricity and exhaust heat. Exhaust heat (950 degrees F) is captured and fed to an air-to-water heat exchanger that rapidly warms incoming wastewater to 180 degrees F.

Once pasteurized, the wastewater is sent to a water heat exchanger where incoming wastewater cools the disinfected water to 73 degrees F for output. In the process, incoming effluent is heated to 177 degrees F before entering the air-to-water heat exchanger. The looped system requires less than 3 percent of the energy typically needed to disinfect the wastewater. On a large scale, energy generated by the system can eliminate a plant's need for grid power and even generate excess electricity that can be sold back to the grid. The disinfected wastewater can be used for agriculture or irrigation.

Larger or smaller systems (as low as 100,000 gpd) can be configured according to need, with potential to treat more than 100 mgd. The system, for new plant construction or retrofits, works with any size of wastewater solids. "The unique thing about heat is our system doesn't really care about solids," says Greg Ryan, PTG co-founder and CEO. "We can actually disinfect secondary effluent. We don't need it to be tertiary, filtered."

PTG is now working with the Ventura (Calif.) Water Reclamation Facility to transition it from a chlorine-based process to the new technology. The goal is to discontinue the handling of chlorine, reduce costs and support expansion of the water reuse program to help preserve the local estuary and coastline.

Now in the optimization phase, the reuse system is estimated to generate enough energy to power itself and the entire facility for an annual savings of \$450,000 per year. Eliminating chlorine will save \$250,000 more per year. **510/357-0562; www.pastechgroup.com.**



X-500 wastewater treatment system from the Pasteurization Technology Group (PTG)



PARKSON LARGE-VOLUME AQUA WASHPRESS

The Aqua WashPress from Parkson is designed to meet the demands of special, large-scale applications, including sluiced flows with high water volumes. Water-driven sluices carry screenings to the press, replacing conveyor systems for a simpler system with fewer moving parts and less maintenance. The system ties in directly with the screen to operate only when the screen is active and as needed. The unit also incorporates a wash zone that uses water to separate organics, keeping them out of the screenings and inside the plant for additional processing. 888/727-5766; www.parkson.com.

11. GFG INSTRUMENTATION G460 ATMOSPHERIC MONITOR

The G460 portable atmospheric monitor from GfG Instrumentation offers up to six gas capabilities, including infrared for the detection of CO₂ and PID for the detection of VOCs. Features include watertight case and interchangeable battery packs. 800/959-0329; www.gfg-inc.com.

12. VACON AC DRIVES

Vacon 100, Vacon 100 X and Vacon 20 X AC drives from Vacon are designed to optimize efficiency. The Vacon 100 is a multipurpose drive with graphical multilingual display and extended built-in block programming for drive customization of pumps, compressors, fans and conveyors. Features include Safe Torque Off function, on-board Ethernet-based communication protocols as well as ATEX-certified motor over-temperature protection. The Vacon 100 X and Vacon 20 X are part of Vacon's new range of decentralized AC drives for situations where space is limited. Both feature IP66/Type 4X enclosures for harsh environments. 717/261-5000; www.vacon.com.

13. OMEGA DIFFERENTIAL PRESSURE TRANSMITTER

The PX5200 differential pressure transmitter from Omega Engineering is made for flow and tank level applications where reliable, low differential pressure measurements are required. The compact NEMA 4X

rated unit can measure a variety of wet or dry media. Features include backlit LCD for easy reading, rotating display in 90-degree increments, stainless steel, FKM and ceramic wetted parts, flow measurement totalization/square foot extraction function, min/max and hold functions, loop check function and program lock function. 800/826-6342; www.omega.com.

14. HYDRA-STOP 250 PSI INSERTABLE VALVE

The 16-inch IVP 250 permanent insertable gate valve from Hydra-Stop, a Division of ADS LLC, is rated for 250 psi working pressure and 375 psi test pressure. It has a 2-inch-diameter stainless steel valve stem for superior strength and reliability, interchangeable valve gate/paddle system to accommodate most types of pipe, double O-ring seal, true wedge style gate design, thrust washers, reinforced valve gate seal and loose stem nut design (aluminum bronze) for simplified operation and superior performance in severe conditions. 800/538-7867; www.hydra-stop.com.

15. ENVIRO-CARE FLO-SEPTAGE RECEIVING STATION

The Flo-Septage "Beast" receiving station from Enviro-Care and SAVI S.r.l. features a tank designed to eliminate sedimentation. A dual-drive system allows the screen basket and auger to run independently for better capture and faster removal of solids. The screen unit sits at a 25-degree angle of inclination that enables the screen to process more solids and shorten tanker unloading time. 888/805-5794; www.enviro-care.com.

16. BREDEL APEX PERISTALTIC HOSE PUMP

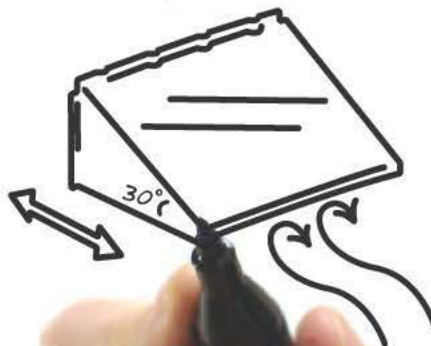
The APEX peristaltic hose pump from Bredel, a member of the Watson-Marlow Pumps Group, is designed for all dosing, metering and transfer duties between 0.7 and 317 gph. Offering pressures up to 116 psi, the low-maintenance pump features cast aluminum housing for heat dissipation and adjustable body to accommodate three hose sizes (10, 15 and 20 mm). 800/282-8823; www.wmpg.com. tpo

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projects & awards

Traverse City extends partnership with CH2M HILL

CH2M HILL recently renewed its contract for operation and maintenance of the Traverse City (Mich.) Regional Wastewater Treatment Plant for five more years. The partnership began in 1990, when the city faced enforcement action from the Michigan Department of Natural Resources. CH2M HILL developed an operational plan including aggressive computerized maintenance, and the enforcement action was resolved. The scope of work expanded to include a revised industrial pretreatment program and two plant upgrades.

Headworks wins million-dollar contract in Indianapolis

Headworks has been awarded a contract to design and fabricate five Mahr bar screens for the 100-year-old, 300 mgd Belmont Advanced Wastewater Treatment (AWT) Plant in Indianapolis, Ind., a project totaling nearly \$1 million. The multiple-rake bar screens will measure 21 feet high and 8 feet wide with 3/8-inch bar spacing and will withstand peak flows of 82.5 mgd. Headworks has partnered with Thieneman Construction to replace climber-type screens. Startup was set for August 2012.

JWCE wins headworks order for Rockaway Valley Sewerage Authority

The Rockaway Valley (N.J.) Sewerage Authority chose the JWC Environmental Monster Separation System for an upgrade to its wastewater treatment plant headworks. The order includes three Chain & Rake Monster units that screen out, grind, compact and dewater rags, trash and debris, and three Screenings Washer Monster units with a Smart Controller and triple zone spray wash to clean and compact debris. **tpo**

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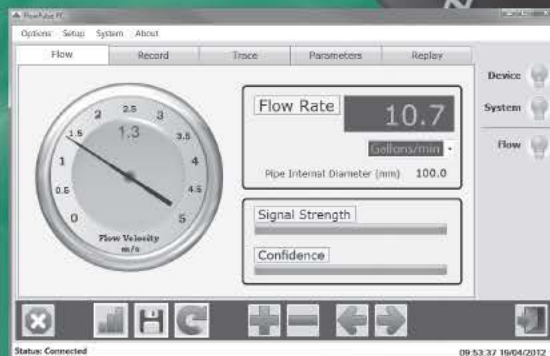
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people/awards

EnviroPAK Corp. received a Gold Industrial Wastewater Pretreatment Compliance Award from the Missouri Water Environment Association.

Cliff Natural Resources' United Taconite Mine received the Minnesota Pollution Control Agency's Wastewater Treatment Facility Operational Award.

The **La Center Wastewater Treatment Plant** received an Outstanding Wastewater Treatment Plant Award from the Washington State Department of Ecology.

The **Syracuse University Steam Station and Chilled Water Plant** both received Onondaga County (N.Y.) Industrial Achievement Awards for managing wastewater discharges.

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

The **City of Raleigh (N.C.) Public Utilities Department Wastewater Treatment Division** received three Platinum Peak Performance Awards from NACWA. Recipients were the Little Creek, Smith Creek and Neuse River Wastewater Treatment Plants.

Two **City of Newark Wastewater Treatment Plant** employees received awards from the Southeast Section of the Ohio Water Environment Association. **Randy McDaniel** received the F.H. Warning Award for significant contributions in industrial waste treatment. **Ed Nutter** received the W.D. Sheets Award for service in training and education for operation of wastewater facilities.

The **Knoxville (Tenn.) Utilities Board** biosolids program received certification for its Environmental Management System from the National Biosolids Partnership.

TPO welcomes your contribution to this listing. To recognize members of your team, please send notices of new hires, promotions, service milestones, certifications or achievements to editor@tpomag.com.

education

Florida

The University of Florida Center for Training, Research and Education for Environmental Occupations is offering the following courses:

- Oct. 9-11 – Process Control of Advanced Waste Treatment Plants, Gainesville
- Oct. 30-Nov. 1 – Activated Sludge Process Control and Troubleshooting, Gainesville

Visit www.treeo.ufl.edu/water.

Georgia

The Georgia Association of Water Professionals has a Fall Conference & Expo and Laboratory Symposium on Nov. 13 in Dalton. Visit www.gawp.org.

Illinois

The Illinois Water Environment Association has a Wastewater Biology and Process Control Seminar on Oct. 17 in Schaumburg. Visit www.iweasite.org.

Kentucky

The Kentucky Water and Wastewater Operators Association has a Wastewater Training Seminar Oct. 16-17 in Madisonville. Visit www.kwwoa.org.

Michigan

The Michigan Water Environment Association is offering the following courses:

- Oct. 30 – Health and Safety Seminar, East Lansing

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

CALENDAR OF EVENTS

Sept. 29-Oct. 3

Water Environment Federation Technical Exhibition and Conference, New Orleans Morial Convention Center. Visit www.weftec.org.

Oct. 1-5

International Activated Carbon Conference & Courses. Visit www.pacslabs.com.

Oct. 9-12

Wisconsin Wastewater Operators Association Annual Conference, Kalahari Resort, Wisconsin Dells. Visit www.wwoa.org.

Oct. 14-16

Atlantic Canada Water and Wastewater Association Annual Conference, Charlottetown, Prince Edward Island. Visit www.acwwa.ca.

Oct. 21-24

Pacific Northwest Clean Water Association Annual Conference and Exhibition, Boise Centre. Visit www.pncwa.org.

Oct. 23-24

New England Water Environment Association Northeast Residuals, Biosolids and Energy Conference, Amherst, Mass. Visit www.newea.org.

Oct. 29-Nov. 1

Alaska Rural Water Association Annual Training Conference, Sheraton Hotel & Spa, Anchorage. Visit www.arwa.org.

Nov. 14-16

Indiana Water Environment Association Annual Conference, Westin Hotel, Indianapolis. Visit www.indianawea.org.

- Nov. 7 – Process Seminar, East Lansing
Visit www.mi-wea.org.

Missouri

The Missouri Water Environment Association has a Fall Conference on Nov. 1 in Columbia. Visit www.mwea.org.

Nebraska

The Nebraska Water Environment Association is offering the following courses:

- Oct. 11 – Wastewater Training, Sidney
- Nov. 13-15 – Wastewater Certification Training, Lincoln
Visit www.ne-wea.org.

New York

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

- Oct. 3 – Nitrification/Denitrification, Rochester
- Oct. 24 – Nutrient Removal Technology and Process Optimization, Monticello
- Nov. 7 – Nutrient Removal Technology and Process Optimization, Lyons
- Nov. 28 – Pump Hydraulics, Selection, Sizing and Controls, Hazen and Sawyer
- Nov. 29 – Sustainability, Williamsville
- Dec. 5 – Fundamentals of Wastewater Asset Management, Hazen and Sawyer
- Dec. 12 – Sustainability, Hazen and Sawyer
Visit www.nywea.org.

Ohio

The Ohio Water Environment Association is offering the following courses:

- Oct. 24-25 – Plant Operations and Laboratory Analysts Workshop, Lewis Center
- Nov. 15 – Plant Operations, Cincinnati
- Dec. 6 – Biosolids Workshop, Lewis Center
Visit www.ohioweaa.org.

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MISCELLANEOUS

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POSITIONS AVAILABLE

Park City Municipal Corporation, Water Treatment Facilities Superintendent FTR: \$20.74/hr. - \$31.11/hr. depending on qualifications, excellent benefits, performance bonus & housing allowance potential. See www.parkcity.org for detailed job announcement. Open until filled EOE. (T09)

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Ontario

The Water Environment Association of Ontario is offering the following courses:

- Oct. 25 – Emerging Strategies for Collection Systems Workshop, Milton
- Oct. 29-30 – Residuals and Biosolids Seminar, Burlington

Visit www.wcao.org.

Wisconsin

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

- Oct. 1-5 – General Wastewater Treatment Intro and Advanced, Oconomowoc
- Oct. 15-16 – Tertiary Filtration Intro and Advanced, Oconomowoc
- Oct. 16 – "Competent Person" Safety, Madison
- Oct. 17-18 – Laboratory Advanced, Oconomowoc
- Oct. 22-23 – Activated Sludge Intro, Green Bay
- Oct. 24-25 – Activated Sludge Advanced, Green Bay
- Oct. 29-30 – Primary Treatment Intro and Advanced, Stevens Point
- Oct. 31-Nov. 1 – Ponds and Lagoons Intro and Advanced, Madison
- Nov. 5 – General Wastewater Treatment Intro and Advanced, Stevens Point
- Nov. 6 – General Wastewater Treatment Intro and Advanced, Oconomowoc
- Nov. 6 – Personal Protective Equipment, Baraboo
- Dec. 4 – Permit-Required Confined-Space Entry, Plover

Visit www.dnr.wi.gov.

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

Visit www.epdweb.engr.wisc.edu. tpo

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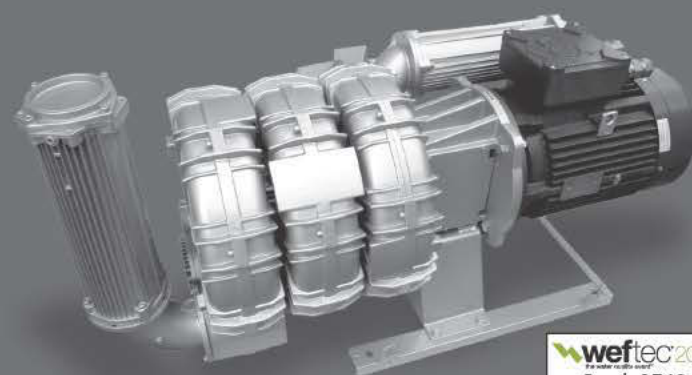
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