

TREATMENT PLANT OPERATOR

tpo™

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MAY 2009

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Louie

Village
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Waterville

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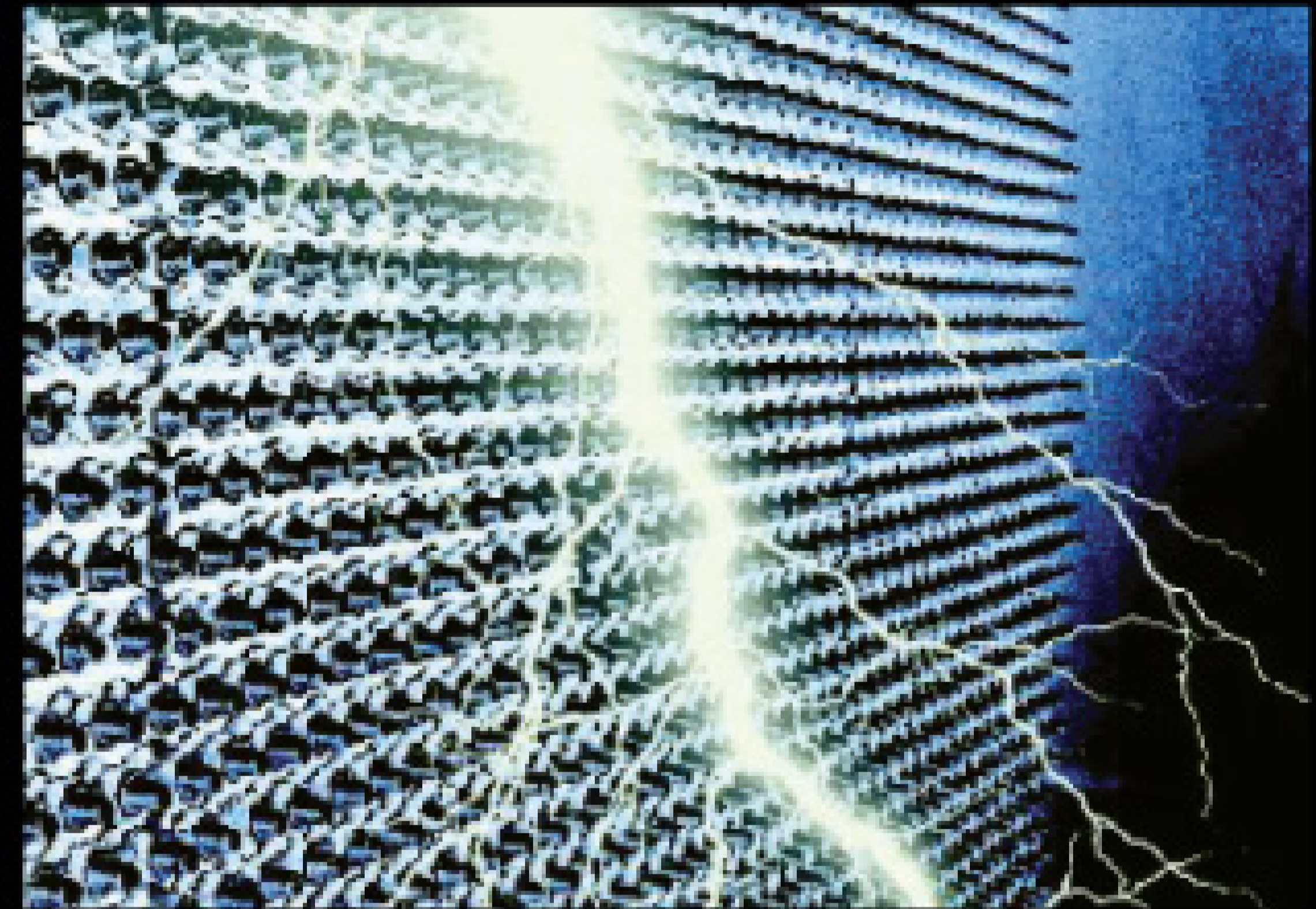
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CORRECTION

A story in the April issue of *TPO* about the Southern Ute wastewater treatment plant incorrectly referred to an oxidation ditch as a Baker Hughes Carrousel denitR system. Baker Hughes no longer holds the intellectual property related to the Carrousel or denitR technology. The related intellectual property is owned/licensed by **Eimco Water Technologies**, 801/931-3000; www.glv.com. We regret the error.

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How Do You Like It So Far?

AFTER FOUR MONTHS OF PUBLICATION, FEEDBACK ON *TREATMENT PLANT OPERATOR* HAS BEEN FAVORABLE. WHAT CAN WE DO TO MAKE THIS MAGAZINE MORE USEFUL TO YOU?

By Ted J. Rulseh

Before this year, there was no trade publication devoted solely to the needs of wastewater treatment plant managers and operators.

Now there is — you're holding the fifth copy of *Treatment Plant Operator* magazine, dedicated to helping treatment plant staff members meet permit obligations, achieve performance excellence, progress in their careers, share information and celebrate accomplishments.

The magazine goes to more than 60,000 licensed professionals working for municipalities, utility districts and private wastewater operations companies. After the first few months of publication, my colleagues and I have a simple question: How are we doing? So far, we've had great feedback from readers.



PUBLISH LETTERS?

Some have commented on pictures we have published and have pointed out potential safety issues

that the operator shown might have addressed (we always check our pictures and the people in them for compliance with safety regulations and practices).

Several readers have said they appreciate the magazine's focus on the operations point of view, as opposed to the perspective of design engineers and executives.

One subscriber suggested we add a section near the front of the magazine that includes letters from operators with comments, suggestions and operations tips, to which others could respond with their own ideas and perspectives.

This is an excellent idea, and we would be glad to incorporate it — I hereby invite readers to start the ball rolling by sending contributions.

A few readers have asked us to include drinking water treatment plant operators in the mix. Indeed, many operators are certified in both water and wastewater, and some have responsibilities in both areas. For the immediate future, though, we find it best to stay as focused as possible and will concentrate on the wastewater side.

Other areas where readers would like to see coverage include training and development, succession issues as veteran operators retire, laboratory challenges and energy management.

A few readers have suggested we devote attention in each issue to the specific challenges of water reclamation facilities. It's another worthy idea, as reclamation remains a growing technology.

KEEP IT COMING

The feedback we've received is helpful, and we will consider it carefully as the magazine evolves over its early months and years. As we said in the first issue: It's your magazine. So tell us how we can serve you best.

Here's a direct invitation: Write to me at editor@tpomag.com. Tell me what you like about *TPO* so far. Tell me what you'd like to see more of. Tell me what's missing that you think we should be covering.

Here's a direct invitation: Write to me at editor@tpomag.com. Tell me what you like about *TPO* so far. Tell me what you'd like to see more of. Tell me what's missing that you think we should be covering.

I don't need anything fancy. Just a simple paragraph in an e-mail will do. I promise to acknowledge every such message I receive, and the COLE Publishing team will use the collective comments as we make decisions about our coverage. We're here to serve the wastewater treatment industry and the great people in it. The more we know about what you need, the better we can serve you.

I look forward to hearing from you in the days and weeks ahead. **tpo**



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Clean Water Matters

FRESHWATER FREDDY HELPS A CLEAN-WATER AGENCY IN SOUTH CAROLINA ENGAGE PEOPLE OF ALL AGES IN HELPING TO PROTECT WATER RESOURCES

By John K. Thompson



The ReWa mascot gets a lot of attention.

Renewable Water Resources in Greenville County, S.C., makes its mission clear through its mascot frog, Freshwater Freddy.

“Our goal,” Freddy says on the agency’s Web site, “is to protect the community’s rivers and streams. We clean water from homes and businesses, making it safe to place back into our environment.”

Known locally as ReWa, the agency has taken cost-effective and creative steps to inform customers about clean water and engage them in the mission. The campaign was recognized with the 2008 Public Information and Education Award from the National Association of Clean Water Agencies (NACWA).

“Our name reflects our promise to protect, clean and renew the valuable environmental resources of our community.”

KIM MCDONALD

The “Re” in ReWA gets right to the point. “Our name reflects our promise to protect, clean and renew the valuable environmental resources of our community,” says spokesperson Kim McDonald. Freshwater Freddy puts a face on the name for young and old alike.

ReWa works diligently to educate people about everyday things they can do to help ensure a future of safe water resources. Staff members have found a number of successful ways to get kids engaged.

NAME THAT FROG

To capture the imaginations of school children, ReWa held a Name That Frog contest that drew more than 160 submissions. First graders at Hollis Academy in Greenville submitted the winning name. To put the mascot to work, ReWa developed *The Freshwater Freddy Ultimate Guide for Kids*, which NACWA specifically recognized.

The full-color guide includes a variety of facts about water, information about environmental concerns, games and kid-friendly experiments to help children understand why water treatment matters. It also helps customers understand the importance of ReWa services. Taking the concept a step further, ReWa gave Freshwater Freddy a blog that provides an interactive forum for questions and answers about water use and the environment.

By logging into Freddy’s Learning Blog, kids can find out creative ways to recycle, renew and reuse products that often end up in landfills or could pollute water resources. ReWa hopes Freddy’s friendly appeal encourages kids to take an active role in keeping water safe.

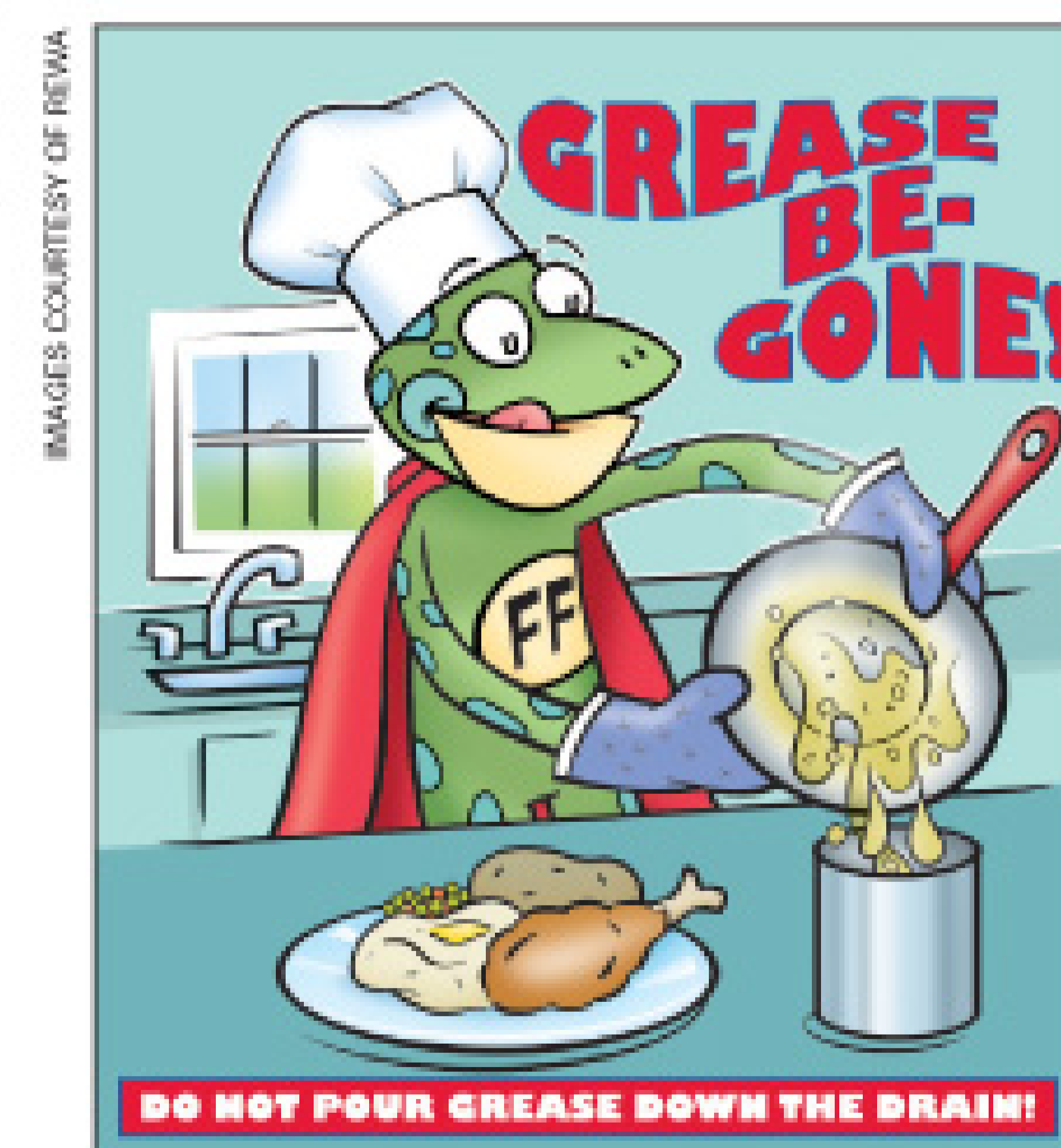
IDEAS FOR HOMEOWNERS

Freshwater Freddie also gives homeowners ideas on how to help ReWa keep its sewer system functioning smoothly. That includes tossing fats, oils and grease (FOG) into the trash instead of dumping it down the drain. Tips include pouring grease into a special Grease Be-Gone Can (or a disposable container) lined with a plastic bag, allowing the grease to harden, then putting the liner into the garbage.

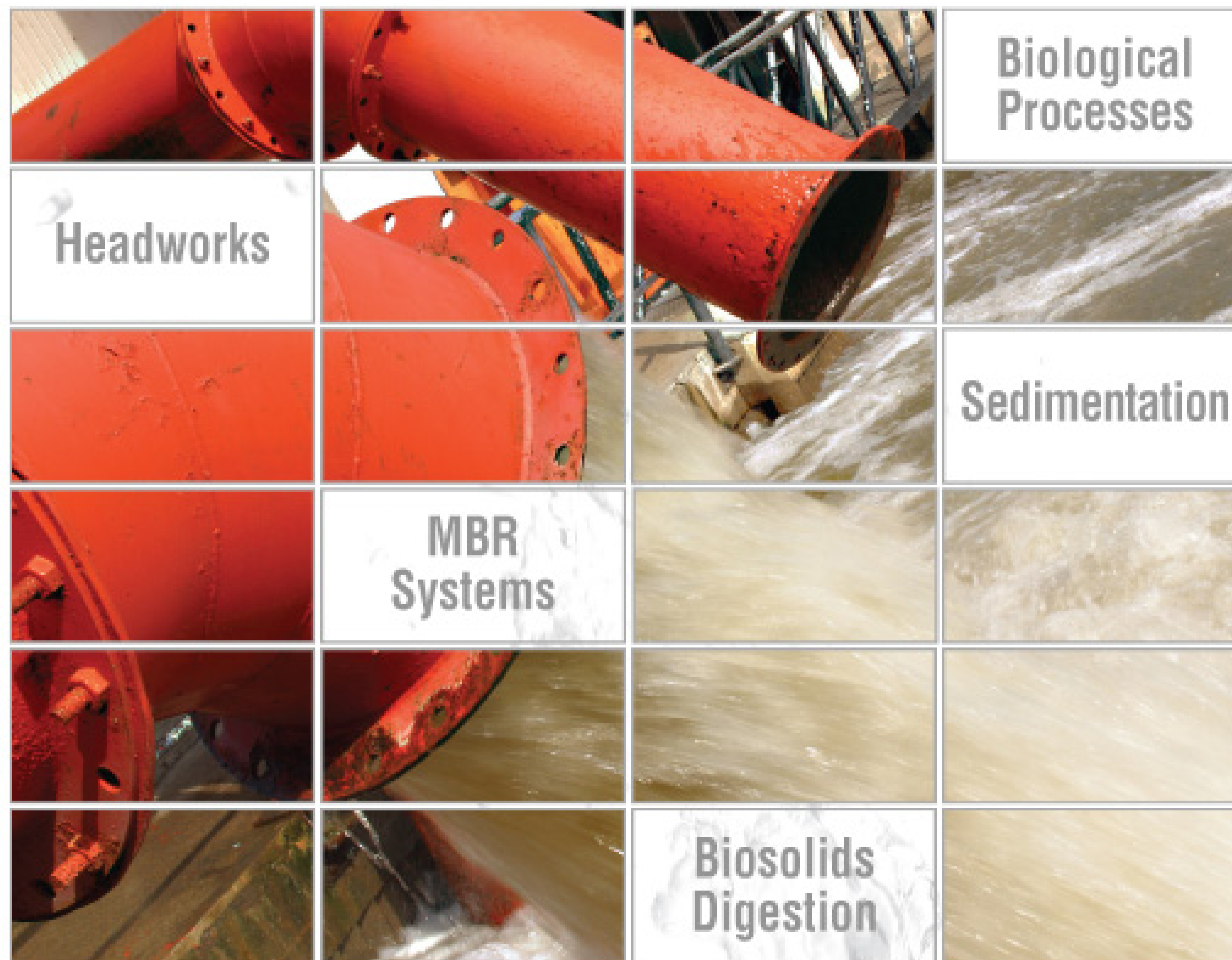
Freddie also advises against putting crumbs and food scraps down the sink drains by catching such items in a sink drain basket. The ReWa grease control inspector visits schools to explain the dangers of FOG.

At ReWa, every tip is one more opportunity to help prevent pollution and protect the community’s natural assets. Whether it’s river sweeps along riverbanks or contests for school children, the agency encourages community involvement. **tpo**

Among much else, Freshwater Freddy teaches children (and adults) about the dangers of introducing fats, oils and grease into the wastewater system.



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DEDICATION AND INGENUITY HELP A SMALL PLANT
IN NEW HAMPSHIRE ENHANCE PERFORMANCE
AND EARN RECOGNITION FROM THE U.S. EPA

By Mike Grennier

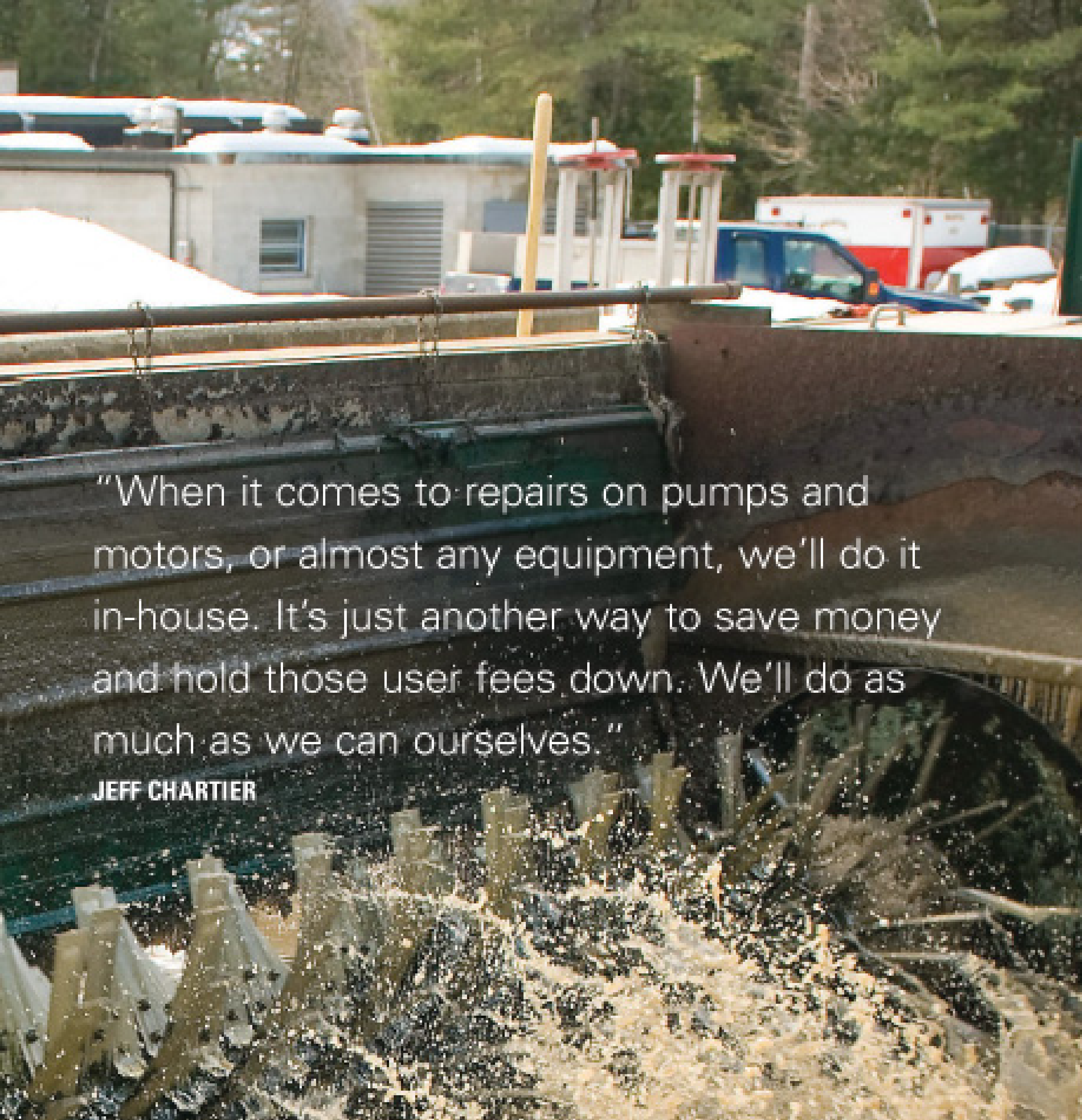
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**Bristol Wastewater Treatment
Plant, Town of Bristol, N.H.**



BUILT:	1969
TREATMENT LEVEL:	Secondary
TREATMENT PROCESS:	Extended aeration activated sludge
FLOWS:	0.5 mgd design, 0.19 mgd average, 0.509 mgd peak
POPULATION SERVED:	1,900
RECEIVING WATER:	Pemigewasset River
PLANT MANAGER:	Jeff Chartier, superintendent of sewer and water, grade II
OPERATORS:	Jesse Lamos, chief operator, grade II; Joe Sarto, assistant chief operator, grade I; Joel Furmanick, operator-in-training

An aeration rotor and oxidation ditch are retrofitted with a heated splash-guard at the Bristol (N.H.) Wastewater Treatment Plant. (Photography by Andy Duback)



"When it comes to repairs on pumps and motors, or almost any equipment, we'll do it in-house. It's just another way to save money and hold those user fees down. We'll do as much as we can ourselves."

JEFF CHARTIER



Jeff Chartier, superintendent of the Town of Bristol sewer and water department.

THE TOWN OF BRISTOL WASTEWATER TREATMENT

Plant has often found itself between a rock and a hard spot, yet it has come out on top through hard work, old-fashioned ingenuity, and the help of experts when needed.

The strategy has paid off for the plant since it began operations in central New Hampshire in 1969. It has helped the plant earn first place for 2008 as Most Improved Plant, in the U.S. EPA Clean Water Act Recognition Awards.

Indeed, the plant has made significant progress in recent years to overcome challenges with discharge permit violations and various mechanical and process difficulties. "We've cleared a lot of hurdles," says Town of Bristol sewer and water supervisor Jeff Chartier. "We're also proud that the plant is now easier to operate and that we've freed up our operators to spend time on more essential matters. And most important, we've improved effluent quality."

The job, he says, is never boring, especially when working on a limited budget. "You're always met with a new challenge each day," he says. "And we try to save money whenever possible by finding new ways to cut costs. It's an ongoing goal."

SHARING THE LOAD

The Bristol plant is a small (0.5 mgd design flow) secondary treatment facility serving about 1,900 people. Chartier's staff includes one dedicated operator, an operator-in-training and an office manager. Another operator focuses on the water operations and assists with wastewater treatment when needed. The plant's struggles with effluent were largely the result of a mismatched plant design and harsh winter conditions.

The plant was originally designed to handle an average of 250,000 gpd. By 1990, however, it had neared capacity. That led to installation of a large clarifier to augment a smaller clarifier. The large clarifier, along with a number of other upgrades, effectively doubled capacity. All was set for handling peak flows. That drove the need to use the smaller clarifier only for backup, resulting in longer detention time in the large clarifier.

Problems then mounted. During the coldest winter nights, several inches of ice would form on the large clarifier. The plant also encountered ongoing icing issues in the main oxidation ditch. There, a rotating aerator splashed water onto a catwalk as it passed under it. During winter, the splashing created a virtual ice dam that prevented the aerator from moving past the catwalk and locked it in place. Process upsets and permit violations resulted. For years, de-icing became a dreaded winter chore.

"We've spent a lot of time chopping and chiseling ice," says Chartier. "It's obviously not something we liked to do, but it became necessary." But whether it's ice removal, or any other less desirable job, Chartier says everyone on the staff at the plant appreciates the concept of teamwork and the need to share the load.

"If it doesn't involve specialty work like working on an electrical control panel, our operators handle it," Chartier says. "They chip ice, mow grass, tear down pumps, rebuild motors. Anything that needs doing, my guys will dive in and get the job done."

DO-IT-YOURSELF

In addition to wearing more than one hat, Chartier looks to his operators to come up with solutions to problems that will not only work, but also save money. It's an essential part of plant operations, since raising user rates isn't always an option.

"I'd have to say funding is one of our biggest challenges," says Chartier. Cost pressures force operators to think on their feet and hold down costs wherever possible.

"When it comes to repairs on pumps and motors, or almost any equipment, we'll do it in-house," Chartier says. "It's just another way to save money and hold those user fees down. We'll do as much as we can ourselves."

The way the staff tackled its winter-related problems personifies the approach to treatment. For example, the staff realized both clarifiers needed to be covered. But when the estimates for permanent covers came in at more than \$200,000, the team developed a temporary solution

A SPIRAC shaftless screw conveyor is used to load a dump container of dewatered biosolids.



A HELPING HAND

To help address violations at Bristol Wastewater Treatment Plant, the team turned to the New Hampshire Department of Environmental Services technical assistance provider. With the adviser's guidance, the team has implemented a host of upgrades since 2002.

A process and influent evaluation revealed low food-to-microorganism ratio, filamentous bulking, and an old, over-oxidized sludge. That led to TSS violations and indicated that the mixed liquor solids inventory was too high for the applied BOD load. Additionally, the plant was not operating its belt press enough to ensure wasting room in the solids holding tank.

Under the guidance of the trainer, the plant reduced mixed liquor suspended solids (MLSS) in the oxidation ditch from 4,000 mg/l to 2,000 mg/l and provided better chlorination to reduce filament production. The operators also improved solids wasting rates by installing a sight-tube on the outside of the holding tank to facilitate monitoring of the solids level.

Additionally, the plant increased belt press operation to keep a lower solids inventory, thus improving settling and helping to control filament production. Biosolids are also hauled off site at a faster pace, thanks to an arrangement with a new hauler.

The plant's cold-weather improvements include clarifier covers and the oxidation ditch's heated splashguard, which consists of heat trace wire, chicken fencing, polystyrene foam insulation and tin roofing. The team also excavated and reset the plant's solids pipeline to keep it from freezing. As part of the project, a second pipeline for future use was added. Other improvements include:

- Use of Allen-Bradley (Rockwell Automation) variable-frequency-drive motors in the oxidation ditches and sludge holding tank for better control.
- Replacement of an old "lumber conveyor" in the dewatering operations with a more efficient and reliable SPIRAC screw conveyor.
- Construction of an expanded, climate-controlled lab with updated equipment.

for the large clarifier until it could figure out a better plan.

They built a lumber framework over the clarifier and had a local marina install boat shrink-wrap over it. That solved the problem temporarily at a cost of \$1,500. In fall 2008, the team solved the problem permanently by installing a tension-membrane structure (Rubb Building Systems) on each clarifier for a total cost of \$80,000.

The staff also took matters in hand when dealing with the oxidation



Above, Joe Sarto, assistant chief operator, weighs a biosolids cake sample in an Ohaus Explorer balance. Left, a Hach turbidimeter is used to test effluent turbidity.



ditch. After a number of experiments, the team created a heated splashguard to prevent the ice dam from forming. The homemade guard also prevents ice from falling onto the aerator's rotor blades and damaging them. The cost? \$500.

"Basically, chipping ice for hours on end is not something we wanted to do," Chartier says. "Plus, we weren't able to concentrate as much as we should on the process.

Eventually, we put our heads together and solved the problem. It's all part of the job."

NOT LEARNED IN BOOKS

Common sense and creative problem-solving are strengths Chartier looks for in operators. Answers can't always be found in books. Instead, it's a matter of knowing the plant inside and out. "There's a lot of value in hands-on experience," Chartier says. "My two operators both started on the ground floor as shared laborers. That, combined with their certification, goes a long way toward ensuring our success."

At Bristol, the job of shared laborer means the person divides time between wastewater, water and highway work. A shared laborer who gets enough wastewater treatment experience can hire on full-time as an operator-in-training when a position opens up.

"It's how I started my career out of high school," says Chartier. "When I first came down to the plant, I thought water came in one end, chemicals were added to it, and then it went into the river. But when I joined the department in 1984, I found out there's a lot more to it."

Working in wastewater treatment, he says, isn't for everyone. "Once you get down here and you get involved with it, you realize you've got to get dirty," he says. "That's not a problem with my guys. They understand what's involved since they started on the ground floor."

Chief operator Jessie Lamos has been with the plant for nearly 10 years. He is quick to point out that the job isn't all about dirty work, or tackling projects that require a lot of physical labor. There's plenty of variety to make the job interesting.

Members of the Town of Bristol Wastewater Treatment Plant team, from left: Jeff Chartier, superintendent of sewer and water; Joel Furmanick, operator-in-training; Joe Sarto, assistant chief operator; and Jesse Lamos, chief operator.



BRISTOL WASTEWATER TREATMENT PLANT PERMIT REQUIREMENTS

CBOD Monthly average: 25 mg/l
Weekly average: 40 mg/l
Daily maximum: 45 mg/l

TSS Monthly average: 30 mg/l
Weekly average: 45 mg/l
Daily maximum: 50 mg/l

pH 6.0 to 9.0

Total residual chlorine Monthly average: 1.0 mg/l
Daily maximum: 1.0 mg/l

E. coli Monthly average: 126
Daily maximum: 406

“We take our jobs very seriously, and the key thing is knowing that we’re in compliance and not polluting our waters. I’m really proud of the teamwork that got us to where we are today. I also take pride in knowing we’ve addressed major problems without adding significant costs to our users.”

JEFF CHARTIER

“There are so many things that make you stop and think,” he says. “It’s not strenuous work, but it’s more about spending your time wisely.” The most important aspect of managing the plant, he says, is to follow the schedule religiously and to avoid any tendency to become complacent.

“We tackle whatever is on the schedule and get it done before moving on in case something else comes up that isn’t on the schedule,” he says. “You’ve got to stay ahead of it. If you don’t, you’ll be sorry.”

HELP AVAILABLE

The Bristol staff rarely gets behind, no matter what problems come up, because help is always available. To that end, the operators carry cell phones. A rotation schedule ensures the plant is manned seven days per week to minimize the potential for small problems to turn into big ones. When the going gets tough, the team pulls together.

“Whether it’s the sewer or water department, we’re all cross-trained, and that means we can rely on each other for just about everything,” Chartier says. “I have faith in my operators, and I don’t have to look over their shoul-

ders as I did when they started.”

Lamos adds that the team can rely on Chartier, who does much more than simply preach a hands-on approach. “Jeff works right beside each of us,” he says. “He definitely doesn’t sit in his office all day long. That’s something we all really appreciate.”

They also appreciated outside expertise, particularly advice provided by the New Hampshire Department of Environmental Services (NHDES). Chartier and the opera-

An effluent sample indicates the presence of residual chlorine.



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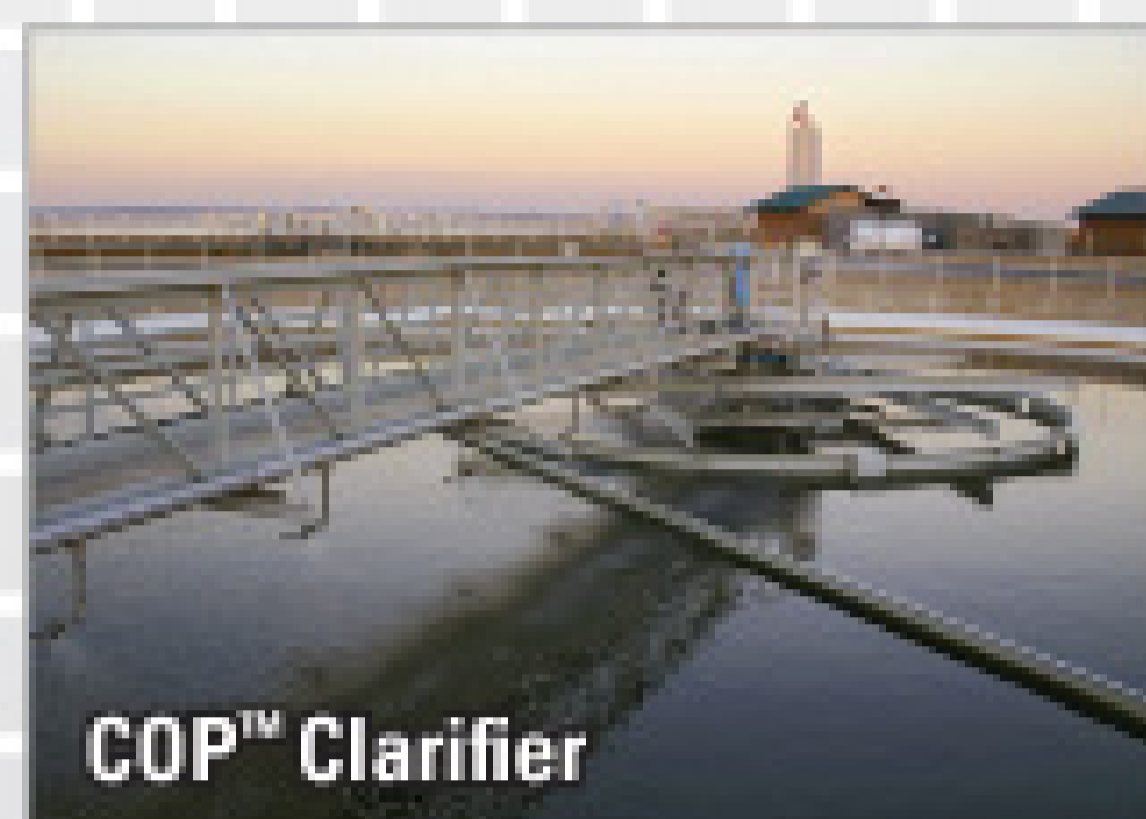
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Jesse Lamos, chief operator, incubates an effluent sample to test for *E. coli*.

tors worked closely with the department's technical assistance provider to pinpoint process control issues and implement a variety of changes to ensure compliance (see sidebar).

"Wes Ripple from the state will never hesitate to come here and help us troubleshoot a situation," Chartier says. "Wes has been a huge, huge help

and I don't know what we would have done without him. The department should be proud to have a trainer and a process control guy like him."

THE RIGHT THINGS

The Bristol team's dedication to getting the job done, combined with its knack for developing innovative solutions and its belief in working closely with NHDES, has proved beneficial on many levels. For Chartier, the most important benefit is the ability to process consistently high-quality effluent. In 2008, the plant reported one violation. That compares with 34 violations during a 16-month period in 2002-03.

"We take our jobs very seriously, and the key thing is knowing that we're in compliance and not polluting our waters," he says. "I'm really proud of the teamwork that got us to where we are today. I also take pride in knowing we've addressed major problems without adding significant costs to our users."

Lamos says the entire Bristol team looks forward to moving forward. "Now we're paying more attention to the process of the plant instead of always doing things to keep it going," he says.

The bottom line, adds Chartier, is continuous improvement: "Our focus now is to fine-tune the operation and find ways to make it even better." **tpo**

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Preserving the Best

THE YANKEE LAKE REGIONAL WASTEWATER TREATMENT FACILITY PROPERTY PROVIDES WILDERNESS PRESERVE AND HABITAT FOR THE ENDANGERED FLORIDA SCRUB JAY

By Mary Shafer

The Yankee Lake Regional Wastewater Treatment Facility is a state-of-the-art system along the St. Johns River in Sanford, Fla. Natural landscape features allow for wetlands effluent treatment and rapid infiltration basins (RIBs).

From its inception, the plant was designed to provide reclaimed water for external customers, including irrigation for farms and golf courses. Water reclamation helps offset demand on the public water system, which has been stressed by drought conditions in recent years.

The Seminole County Environmental Services Division now manages the property to enable preservation of a nearly pristine wildlife area. This includes a tract of more than 1,000 acres on the northern

“Though it’s a significant cost to run this program, it’s worthwhile to manage the land.”

RUTH HAZARD

half of the original site that has been turned over to the Seminole County Natural Lands Trust for hiking and nature trails, now called Black Bear Wilderness Area.

Of the remaining 1,000 acres, all but 40 reserved for the facility itself are being preserved as habitat for the endangered scrub jay, a Florida-only indigenous subspecies now found in very few sand ridge locations.

NATURAL FILTERS

Roughly the southern half of the property immediately around



ABOVE: Construction of the first rapid infiltration basin (RIB) for the Yankee Lake plant required disturbing Florida scrub jay habitat. Fish & Wildlife department regulations required mitigation. That was the genesis of a plan to manage the entire plant property as an environmental preserve. Four new RIBs were added in 1994, and the plant went online at the end of 1996. LEFT: Each spring, Fish & Wildlife department biologists visit Yankee Lake to perform banding, counting and health surveys of the scrub jay population. For the past 10 to 15 years, the property has become the only place where the scrub jays exist in Seminole County.

the facility is actively managed by the plant, which went online in late 1996. The site itself includes a 2.5 mgd advanced anoxic wastewater treatment plant. Effluent flows are split between the RIBs and the public-access reclaimed water system.

A wet-weather backup system of natural wetlands is used for additional discharge. Deep-bed filters are used upstream of chlorine contact chambers. Effluent is first directed to a storage tank for reclaimed water. Effluent is directed to the RIBs only when there is excess flow.

The RIBs are located on a high, sandy ridge that provides excellent scrub jay habitat. A small population of the birds occupied the area east and north of Yankee Lake when the property was purchased in 1985. This made it an endangered species habitat, requiring Seminole County to create a mitigation plan under Florida Fish & Wildlife Service regulations.

The RIBs were laid out in a circular array, leaving the middle area timbered in scrub oaks. This placement prevents surrounding, aggressive-growing sand pines from choking out these oaks, preferred by the jays for nesting.

HABITAT MITIGATION

The site was under construction from 1988 to 1991. Mitigation and oversight of the RIB site was handled by an outside contractor under Fish & Wildlife guidelines. No new planting was done. Instead, unwanted species were cut down and roller chopped, slashing heavy brush down to ground level without disturbing surface soil.

Part of a total property management strategy, this technique creates fire lines without encouraging weed growth. It also lowers some higher scrub to provide habitat without creating a hazard, and encourages production of acorns, a wildlife food source.

“Our biggest challenge has been managing the property to meet habitat requirements without using fire,” says Ruth Hazard, assistant utilities manager. Controlled burns are sometimes used to manage undergrowth, but a major road and homes to the east prevent burning unless wind and weather conditions are perfect.

To avoid safety issues, says Hazard, “biologists from our engineer-

ing firm perform some of this land management on a monthly basis. They go out with machetes to hand-cultivate, remove sand pine seedlings, spray for invasive species, and keep up the management plans." Plant staff take care of the broad maintenance duties.

Hazard was Seminole County's wastewater manager when the plant opened, helping plan oversight of plant and property management, the meeting of wetlands criteria, and required wildlife monitoring.

Other species benefit from Yankee Lake's preservation program. The endangered Florida black bear, threatened sandhill cranes, and gopher tortoises all find refuge there. "Gopher tortoises can't have their burrows disturbed, so we must move them if necessary," explains Hazard. "We have a lot of them on the property, so we have to make sure they don't get in the way of what we need to do." No specific permits are required for this work, as long as Fish and Wildlife regulations are followed.

MEETING REGULATIONS

To determine the original scrub jay management area, Fish & Wildlife biologists performed studies and surveys of nesting family sites, mapping their locations. They determined that a sand ridge area of 222 acres would be suitable for the birds, which don't like wetlands. Out of that acreage, Seminole hired a timber harvesting company to clear-cut sand pines in 1996 to make room for scrub oaks.

The county is required to do photographic site surveys each year at Yankee Lake that describe changes in vegetation from year to year. Biologists monitor breeding behavior and hatchlings during the March-to-May season. No construction is permitted during that time in or near the management area.

The first such survey was done in 1994, identifying six families. Now there are five families, but this indicates healthy migration of mature offspring into the adjoining nature preserve and wilderness area, as well as to another state preserve on the other side of the Wekiva River.

At summer's end, a biologist comes to identify individual nestlings with different-colored leg bands as they begin to fledge. Fish & Wildlife biologists use the bands to track the birds' movements. They also take blood samples to track DNA.

ENVIRONMENTAL PAYOFF

No public programs are offered on the site, but Yankee Lake does host some local groups for private activities. The Seminole County Sheriff's Department has used the facility several times to do search-and-rescue and night-vision training.

"It's a controlled site where they can stage the training without interfering with a lot of people," Hazard explains. Her staff has also worked with the county fire department and State Division of Forestry on practicing controlled burns.

Hazard occasionally takes members of the Audubon Society and The Nature Conservancy for weekend birding-spotting

field trips. "This has really made a nice working relationship," she says. "They know we're out there doing our best to protect the species. This area is now the only place in Seminole county where the scrub jays have existed for 10 to 15 years now."

She has one piece of advice for other municipalities who may be considering such projects: "Make sure you talk to state permitting people a lot in the very beginning, then keep them informed. We've found over the years that it becomes easier to share our ideas about ongoing management if we keep them in the loop."


Hazard is proud of the environmental program at Yankee Lake. "Though it's a significant cost to run this program, it's worthwhile to manage the land," she believes. "We have to do something to help these species." Positive public relations are a nice benefit, too — and a regular deposit into the karma bank never hurt anyone. **tpo**



The large tract of relatively isolated timber broken by the occasional sandy ridge is also ideal habitat for the endangered Florida black bear. Here, a mother forages with her two cubs.


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Weighing Redundancy

DO YOU NEED A BACKUP FOR YOUR PLANT AUTOMATION? THAT DEPENDS ON THE NATURE OF YOUR FACILITY, YOUR STAFF, YOUR BUDGET AND OTHER FACTORS.

By Grant Van Hemert, P.E.

Before considering how to best implement automation redundancy in a wastewater treatment plant, the first step is to ask whether it is needed at all. There are several factors to examine before making the decision.

What is the storage capacity or retention time of the facility?

If the plant has a large retention time or storage capacity, then a more basic level of redundancy may be the best solution. However, if the plant is on-line full-time and storage capacity is minimal, then full automated redundancy may be in order.

What economic, political and ecological effects might occur in the event of a full-scale automation system shutdown? If a plant is small and can operate reasonably well in manual, then the impact may be minimal. This might mean a basic level of redundancy is most appropriate. However, a larger facility, or a plant in a high-visibility or critical location (such as a tourist area) may want to have full redundancy for safety or political reasons.

What is the technical expertise of the staff? Many plant staffs have little or no ability to rapidly diagnose or correct automation anomalies — they rely on systems integrators as their primary means of support. For some facilities, the integrator might be a considerable distance away. These facilities may want automation redundancy as a way to remain functional while waiting for the integrator to respond.

Other plants have some level of expertise on staff and are less reliant on integrators.

These plants may have people who understand how to diagnose and maintain an automation platform, and may have spare parts in stock ready for service. Here, the decision to use redundancy may relate more to process issues than to staff expertise.

Assume that a wastewater treatment plant is using UV disinfection. If the control system becomes inoperative, the UV system could be shut down, allowing pathogens to leave the facility untreated. With

a redundant control system in place, the backup would immediately take over for the failed system and eliminate the possibility of a shutdown. Thus a redundant control system would help minimize the possibility of a system failure.

How easy is it to get technical support to the facility?

Could a snowstorm, hurricane, avalanche or other realistic disaster block the route that support personnel would take to the plant? If so, then a redundant system can increase reliability during these times.

What is being protected against? Sometimes reliable process quality is the deciding factor, while at other times the deciding factor may be data integrity. The answer to this question will dictate which type of redundant system is best for the facility.

For example, if operational data are kept on a single computer, then loss of that computer could lead to a loss of historical data. This may mean required reports would not be completed properly. If this possibility is of concern, it is important to use computers in a redundant configuration.

Could a snowstorm, hurricane, avalanche or other realistic disaster block the route that support personnel would take to the plant? If so, then a redundant system can increase reliability during these times.

What is the budget? It always costs more to make any given control system redundant. Redundancy adds a chassis, power supplies, communication cards and a processor. Furthermore, these additional devices require panel real estate, which may further increase system costs. The selection of a redundancy system must include a critical examination of the project budget.

Municipalities and wastewater agencies have different viewpoints on automation redundancy. Some believe the low level of risk does not justify an investment in redundancy. Others want to use every means necessary to protect their treatment capability. In most cases, the differing perspectives stem from the answers to these important questions.

Grant Van Hemert, P.E., is an application engineer with the Water and Wastewater Competency Center of Schneider Electric, a manufacturer of power and automation control systems with United States headquarters in Palatine, Ill. He can be reached at grant.vanhemert@us.schneider-electric.com. tpo



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Redundant programmable logic controllers can enhance process reliability. Reliable process quality can be the deciding factor for adding redundancy, while at other times the deciding factor may be data integrity.

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Working Toward a Goal

The City of Carmel, Ind., uses the BioPasteur process to treat biosolids and produce a Class A product. Valves are used to control the process heat exchanger during maintenance. (Photography by Doug McSchooler)

THE BIOPASTEUR TREATMENT PROCESS IS HELPING THE CARMEL (IND.) WASTEWATER TREATMENT PLANT IMPROVE BIOSOLIDS PRODUCT QUALITY AND GET OUT OF THE HAULING BUSINESS

By Diane Gow McDilda

TEN YEARS AGO OFFICIALS WITH THE CITY of Carmel, Ind., and staff at the wastewater treatment plant decided to change the solids handling system.

At the time, the plant used its anaerobic digester and centrifuge to produce Class B biosolids. The process was effective, but for final disposition the city was hauling 100 percent of its material 40 miles away for land application.

“Our goal was to produce a product that we wouldn’t have to haul,” says Ed Wolfe, manager of wastewater operations. “We wanted a product with value enough that people would come and get it. We still haul some, but we have broken a barrier.”

Besides wanting to get out of the hauling business, the city knew that regulations for Class B biosolids would only get more stringent: sampling requirements would be expanded, tracking made more detailed, and setbacks for land-application further restricted. All would increase costs and limit application sites.

“With Class B there’s a lot more record keeping unless it’s going to a landfill,” Wolfe says. “We knew we would have to handle the material cradle to grave.” In deciding what

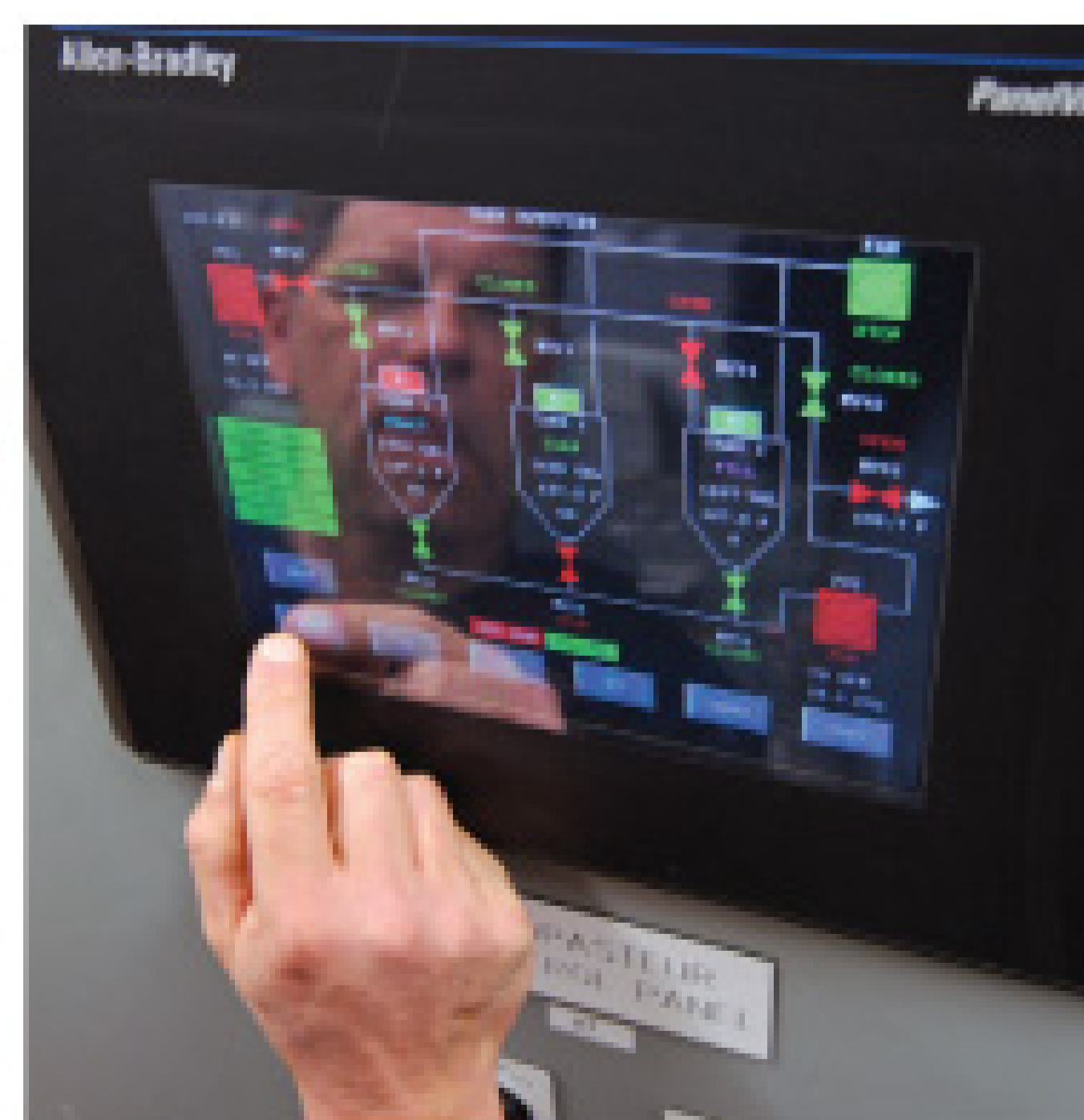
direction to take, the city performed a market survey, asking farmers what type of biosolids product would be most useful. Because soils in Indiana typically are not acidic, farmers weren’t interested in a product with a high pH. What they wanted was a nutrient source.

“We looked at different technologies to make a Class A solid,” Wolfe says. Most of the processes assessed required the use of cement kiln dust or quicklime to adjust the pH. The city wasn’t interested in buying, storing and handling more chemicals. Other processes took too much room or didn’t use equipment the city already owned.

AND THE WINNER IS

After careful consideration, the team chose the BioPasteur process, distributed by Kruger, a subsidiary of Veolia Water Solutions & Technologies. The process, which uses pre-digestion pasteurization, heats the solids to destroy pathogens, meeting the criteria for Class A biosolids.

Influent to the BioPasteur process starts with primary and waste activated sludge combined at a rate of 15,800 tons per day (tpd). The solids stream is thickened to about 3.5 percent solids using a belt filter press and then pumped to a 130,000-gallon mixing tank. The tank completely mixes the contents and provides a two- to three-day buffer for weekends and equipment maintenance.



An operator navigates through the controls on a touch-screen panel used to operate the BioPasteur system.



Jordan Kleinsmith, assistant plant manager – operations; unit process operators Norman Riley, Alton Chafin and Lonnie Patton; Ed Wolfe, manager of wastewater operations; and Ernest Carter, plant manager.

“Our goal was to produce a product that we wouldn’t have to haul. We wanted a product with value enough that people would come and get it. We still haul some, but we have broken a barrier.”

ED WOLFE

profile **City of Carmel (Ind.) Wastewater Treatment Plant**



BUILT:	1960s (last upgrade 2005)
TREATMENT LEVEL:	Secondary
TREATMENT PROCESS:	Activated sludge
FLOWS:	Design 12 mgd, average 9 mgd, peak 30 mgd
RECEIVING WATER:	White River (West Fork)
PLANT MANAGER:	Ed Wolfe, manager of wastewater operations, grade 4 wastewater operator
OPERATORS:	Ernest Carter, plant manager, grade 4; Jordan Kleinsmith, assistant plant manager, grade 4; Lonnie Patton, grade 3; Alton Chafin, grade 3; Norman Riley, grade 3; Pete Brennan, grade 2; and Ralph Gruwell, grade 1
BIOSOLIDS PROCESS:	BioPasteur, anaerobic digestion, centrifuge, solar dryer
BIOSOLIDS VOLUME:	2,300 dry tons/day from the solar dryer (75 percent solids) 2,300 dry tons/day from the centrifuge (22 percent solids)
BIOSOLIDS USE:	Applied to sod farm and local farms
WEB SITE:	www.ci.carmel.in.us/services/sewer.html



Ed Wolfe

nance. From the tank, solids are pumped to the BioPasteur process.

The BioPasteur system is composed of three 3,300-gallon tanks that operate in sequential batch mode, filling, reacting and drawing down, in that order. Solids are pumped in through the top of each vessel to keep the mixture homogenous.

Once full, the reaction vessel goes into react mode. A paddle mixer comes on and the solids are heated up to 160 degrees F. The chamber is then in lock-down mode for 45 to 60 minutes. Once the time and temperature requirements are met, the temperature is lowered. In winter it drops to 110 degrees F, and in summer to 95 degrees F. The solids are then pumped to the drawdown tank.

Pathogen-free sludge from the drawdown tank is pumped to an anaerobic digester and then to a centrifuge. The end result is 2,300 tpd of biosolids at 22 percent solids. The BioPasteur process was installed in 2005 with an equipment cost of \$900,000 and \$1.9 million for installation.

IT'S AUTOMATIC

The entire fill, react and draw process takes place without human intervention. Many wastewater treatment processes are automated with programmable logic controllers (PLCs),

“It’s fully automated, the pumping and the sampling. This process has no manual method. It’s PLC-based. All the valves and temperature sensors are controlled by the PLC. There are so many events in each sequence, it’s much more sophisticated.”

ED WOLFE

but the BioPasteur process takes automation to a new level.

“We’ve been taking steps toward a degree of automation,” Wolfe says. “We can repair equipment and fix things. For example, even though the primary clarifier is automatic, if something goes wrong, the operators can fix it.”

That’s not the case with BioPasteur, and Wolfe is all right with that. “It’s fully automated, the pumping and the sampling,” Wolfe explains. “This process has no manual method. It’s PLC-based. All the valves and temperature sensors are controlled by the PLC. There are so many events in each sequence, it’s much more sophisticated.”

When the BioPasteur process was first brought on-line, it ran on only one shift. As the staff’s familiarity and comfort level grew, the hours were extended to all shifts and weekends. “Once we got the bugs worked out, it’s been reliable for several years,” says Wolfe.

“The pasteurization process runs 24/7 for the most part, at a rate of 40 gpm, which translates to 56,000 gpd. If the holding tank starts to get too full, the process rate is increased, and the maximum is 60 gpm. If the tank gets very low, the rate can be slowed or the process suspended. The tanks are well insulated and will maintain temperatures above 160 degrees F for 16 to 24 hours, allowing an easy restart.”

EASY CLEANING

An advantage of the tube-in-tube, solids-water-solids configuration of the heat exchanger in the BioPasteur process is that cleaning can be done easily and without chemicals. When it’s time to clean the pipes, a pig (Pipeline Pigging Products Inc.) is forced through, scouring the solids from the inside wall.

“The pig is a bristled, flexible plug that’s forced through the pipe using preheated water and the positive displacement pumps that normally provide sludge feed and discharge,” explains Ed Wolfe, manager of wastewater operations. “This greatly reduces or eliminates the need for chemical cleaning of the heat exchanger.”



The solids treatment process is highly automated, although assistant plant manager Jordan Kleinsmith and colleagues keep track of process parameters.

CARMEL (IND.) WASTEWATER TREATMENT PLANT PERMIT REQUIREMENTS (MAIN EFFLUENT)

CBOD₅	16 mg/l monthly avg. (May-Nov.) 24 mg/l weekly avg. (May-Nov.) 25 mg/l monthly avg. (Dec.-April) 40 mg/l weekly avg. (Dec.-April)
TSS	22 mg/l monthly avg. (May-Nov.) 30 mg/l weekly avg. (May-Nov.) 30 mg/l monthly avg. (Dec.-April) 45 mg/l weekly avg. (Dec.-April)
Ammonia	1.5 mg/l monthly avg. (May-Nov.) 2.25 mg/l weekly avg. (May-Nov.) 3.0 mg/l monthly avg. (Dec.-April) 4.5 mg/l weekly avg. (Dec.-April)
Dissolved oxygen	5.0 mg/l daily min. (May-Nov.) 4.0 mg/l daily min. (Dec.-April)
E. coli	125/100 ml monthly avg. 235/100 ml daily max.
pH	6.0 - 9.0



ABOVE: Jordan Kleinsmith takes readings from gauges that monitor the BioPasteur process heat exchanger. LEFT: A pig from Pipeline Pigging Products is used to scour heat exchanger lines. RIGHT: The BioPasteur system uses three 3,300-gallon tanks that operate in a sequential batch mode.



THE HEAT IS ON

The BioPasteur system is designed to use excess heat. A heat exchanger recovers thermal energy and transfers it from solids to water and back to solids via a tube-in-tube system. The larger, outer tube contains only water

as the heat-exchange medium. The smaller, inner tube carries the solids from the first vessel to the reaction vessel.

Water is heated using excess heat from the reaction vessel and is pumped through the outer tube back toward the filling chamber. As the sludge in the inner tube is pumped in the opposite direction, from the filling chamber to the reaction chamber, it is warmed to about 120 degrees F.

In the reaction vessel, a boiler provides the boost to increase the temperature from 120 to 160 degrees F. The boiler is fueled mainly by digester gas but can burn natural gas if needed.

"The system is so efficient," Wolfe says. "It doesn't use a lot of biogas. Anaerobic digester gas is running the whole BioPasteur system, but we still have extra gas." There are plans to install an additional boiler that will burn more of the biogas. There are also plans to install additional biosolids equipment, using even more of the biogas.

THE FINAL STEP

Additional equipment under consideration is a second solar dryer. As it stands, solids treated using the BioPasteur process are run through the centrifuge and are stored in a covered storage area in one of three bays, associated with two different destinations.

"All digested material is dewatered in the centrifuges," Wolfe

says. "About 25 percent of the dewatered material is dried in the solar dryer. The other 75 percent is hauled by us or at our expense to the sod farm. The dried biosolids, for the most part, also goes to the sod farm, but they send trucks to pick it up at our location. A small portion of the dried material, at least so far, is given away to other users that pick it up at our site."

The solar dryer (Parkson Corp.) uses solar power and biogas to dry the biosolids to 75 percent solids. "It looks like a greenhouse," Wolfe explains. "It's about 40 by 200 feet. It has fans and vent flaps."

Like the BioPasteur process, the solar dryer is almost completely automatic. Although in Carmel the material is loaded from the storage area into the dryer using a front-end loader, conveyor belts can be installed for more automatic loading. Once the solar dryer is filled, a robotic mole periodically runs the length of the building, tilling the material.

"The front-end loader just dumps the material," Wolfe says. "The robot runs maybe three or four hours a day. The way the frequency is determined is proprietary, but it has to do with the temperature and humidity." Computerized algorithms determine when the flaps open and close.

During June, July and August, the process cycles every three weeks. In colder months, the process slows down. During winter, the solar dryer can literally come to a standstill if the biosolids are frozen, as they were last December. But once warmer temperatures thaw the biosolids, the process gears back up and trucks start removing material from the site.

By adding the BioPasteur process and the solar dryer, the City of Carmel has improved the quality of its biosolids and moved even closer to the goal of leaving the hauling business. **tpo**

more info:

Kruger Inc.
919/677-8310
www.krugerusa.com

Parkson Corp.
800/553-5419
www.parkson.com

Pipeline Pigging Products Inc.
800/242-7997
www.pipepigs.com

In Perfect Rhythm

THE RIVERSIDE (CALIF.) REGIONAL WATER QUALITY CONTROL PLANT MELTS A FUEL CELL WITH COMBINED HEAT AND POWER TO PERFORM A SYMPHONY OF AIR AND WATER PROTECTION

By Mike Grennier

With a mix of old and new technology, the Riverside (Calif.) Regional Water Quality Control Plant is like a green orchestra that plays a symphony of music in the form of water and air quality.

For this publicly owned 40 mgd tertiary treatment/reclamation plant, the main instruments include a combined heat and power (CHP) facility and a new fuel cell plant, both powered largely by digester gas, which is plentiful thanks to a highly successful fats, oils and grease (FOG) program.

As with any symphony, the quality of performance has a lot to do with how the orchestra is conducted. "It's a lot of balancing," says Chandra Johannesson, wastewater operations manager. "Ultimately, our efforts must have long-term benefit, not just for our facility, but also the environment and the people we serve. Riverside as a city is very green, and everyone is on board with green technology that gets us where we need to be. It's all about sustainability."

Thanks in part to the treatment plant's efforts, the California Department of Conservation recently designated Riverside as the first Emerald City in California. The status recognizes sustainable green initiatives and the city's commitment to help the state achieve multiple state environmental priorities.

"We have a fantastic source of power that allows us to operate our facility and keep water quality in check while emitting nothing into the air. It's a huge benefit. There is a learning curve, but we're happy with it so far."

CHANDRA JOHANNESON

AN EARLY START

The Riverside plant has had its eye on renewable energy for years. In 2000, it started a CHP facility to meet a large share of the electrical load and to provide process heat for three anaerobic digesters. The CHP exhaust heat also powers a chiller to cool the plant's administration facility.

The CHP facility can produce up to 3 MW with three Caterpillar engine-generator sets, each rated at 1.1 MW. All three operating at full capacity can meet the plant's entire power demand. However, because air-quality regulations prohibit running all three at once, the plant runs two at near capacity, around the clock, delivering about 2



The Riverside plant's combined heat and power facility includes three Caterpillar engine-generator sets, each rated at 1.1 MW. The plant runs two units at near capacity around the clock, and the third serves as a backup. The strategy is to fuel the units with 95 percent digester gas and never more than 5 percent natural gas.



Two 10,000-gallon holding tanks store grease that will be fed into the digesters to increase methane production. Grease delivery trucks hook up here and pump the grease into the tanks, where it is circulated before being sent to the digesters.

MW. The third unit serves as a backup.

Two specialists oversee the cogeneration facility, which is tied into the plant's SCADA system. The strategy is to fuel the units with 95 percent digester gas and never more than 5 percent natural gas. Wastewater operations cogeneration specialist Ted Crehan says the two-man team spends most of its time monitoring engine emissions and working to ensure the proper blend of fuel to the units.

PHOTOS COURTESY OF RIVERSIDE REGIONAL WATER QUALITY CONTROL PLANT



A 1 MW fuel cell cogeneration system, manufactured by FuelCell Energy Inc., went on-line in 2008. The fuel cell runs on 75 percent digester gas and 25 percent natural gas.

"A lot of systems are designed to run in automatic mode, but we run it manually so we can make adjustments and keep us well in compliance," Crehan says. "You need a dedicated IT administrator to maintain the SCADA system and a dedicated and knowledgeable instrument technician so that you have all the data you need," he says.

He says the team also has a good mix of plant operations engineering expertise that has led to smooth CHP system operation for the past nine years.

"We've got almost 40,000 hours on the engines and we haven't had to do a major rebuild yet even though they're running on biogas," he says. "They continue to run well, and they're very forgiving in terms of emissions and being able to fine tune them."

FUEL CELL FILLS THE GAP

Most recently, Riverside has set its sights on other ways to capitalize on digester gas and protect the environment. The newest green technology is a 1 MW fuel cell cogeneration system. The fuel cell, which went online in August 2008, is the first unit of its size in California that is designed with the capability to operate on 100 percent biogas.

The idea is to operate the fuel cell at near peak capacity to supply one-third of the plant's energy needs. The engine-generator sets supply the rest. The combination lets the plant meet its total electric power needs and operate well within air regulations. The plant also taps the fuel cell's exhaust to heat the digesters through the existing CHP heat loop.

The fuel cell runs on 75 percent digester gas and 25 percent natural gas. The plant contracts with the fuel cell manufacturer, FuelCell Energy Inc., to operate and maintain the unit through 2012. The operators keep a close eye on digester gas production and notify FuelCell Energy to make the adjustments to the fuel mix when necessary. The company does that remotely through the SCADA system.

The fuel cell's fuel pretreatment system has posed some challenges. "If you don't have a good pretreatment system, your fuel cell isn't going to last," says Warren Huang, the plant's principal engineer.

The fuel cell as a whole requires a watchful eye because it is a new technology. Uptime to date is approximately 80 percent. Early indications also show that the fuel cell is an economical energy source. As of early 2009, it cost 5.8 cents per kWh for biogas power. That compares with 7.0 cents per kWh for natural gas (based on a rate of 84 cents per Btu) and 9.0 cents per kWh for utility power.

The plant staff is still learning about the realities of the fuel cell but welcomes the technology. "We have a fantastic source of power that allows us to operate our facility and keep water quality in check while emitting nothing into the air," says Johannesson. "It's a huge benefit. There is a learning curve, but we're happy with it so far."

GOOD AS GOLD

Whether it's new technology or the tried and true, Riverside decision makers know on-site power generation depends on an ample supply of biogas. That's why it's full steam ahead with an aggressive FOG program.

The program began in 2005 with a pilot project that involved construction of a grease receiving station and digester injection system. The plant also contracted with a hauler to collect grease and deliver it to the plant. Originally, the hauler supplied untreated and unheated grease, and 27,000 gpd was loaded directly into one digester.

The pilot showed that FOG is as good as gold. The average increase in gas production from April 2006 to March 2007 was more than 90 percent. The average methane delivered to the engine-generator sets increased 8 percent, and gas heating value increased from 575 Btu to 649 Btu per cubic foot.

As a result, the plant saves \$80,000 to \$85,000 a month on natural gas. Biosolids production also dropped by 25 percent, saving an additional \$48,000 per month. The FOG program also helps reduce discharges of restaurant grease into sewers. In the past, 30 percent of calls to the public works department for sewer overflows were associated with blockages caused by restaurant grease. That figure has dropped to 1 percent.

The Riverside plant now accepts only rendered FOG to avoid potential mechanical problems. Additionally, the plant built two 10,000-gallon heated storage tanks to recirculate the grease and allow for controlled dosing to two digesters. It now receives 35,000 gallons of rendered grease per day. The grease is injected into the two digesters at 180 to 200 gpm around the clock.

Based on the success of the program, the plant has waived its grease tipping fee of 1 cent per gallon. The plant is also studying biogas storage options so it can operate its CHP and fuel cell systems on biogas more consistently. "What we've learned from the big-picture point of view is that all of us need to take a closer look at things we consider to be waste," Johannesson says.

BEING NEIGHBORLY

Johannesson says the treatment plant staff takes pride in protecting the environment. "These are really exciting times, and it really makes you proud to be a part of it," she says. "It's really a good-neighbor issue. After all, we don't want to protect the water without protecting the air. It's really about having a good balance and being a good environmental steward in every regard." **tpo**

more info:

FuelCell Energy Inc.
203/825-6000
www.fuelcellenergy.com

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.

Breakfast of Champions

AEROTOR SYSTEM HELPS A TREATMENT PLANT ACCOMMODATE A SHARP INCREASE IN INFLUENT STRENGTH WHILE IMPROVING TREATMENT AND CUTTING POWER USAGE

By Scottie Dayton

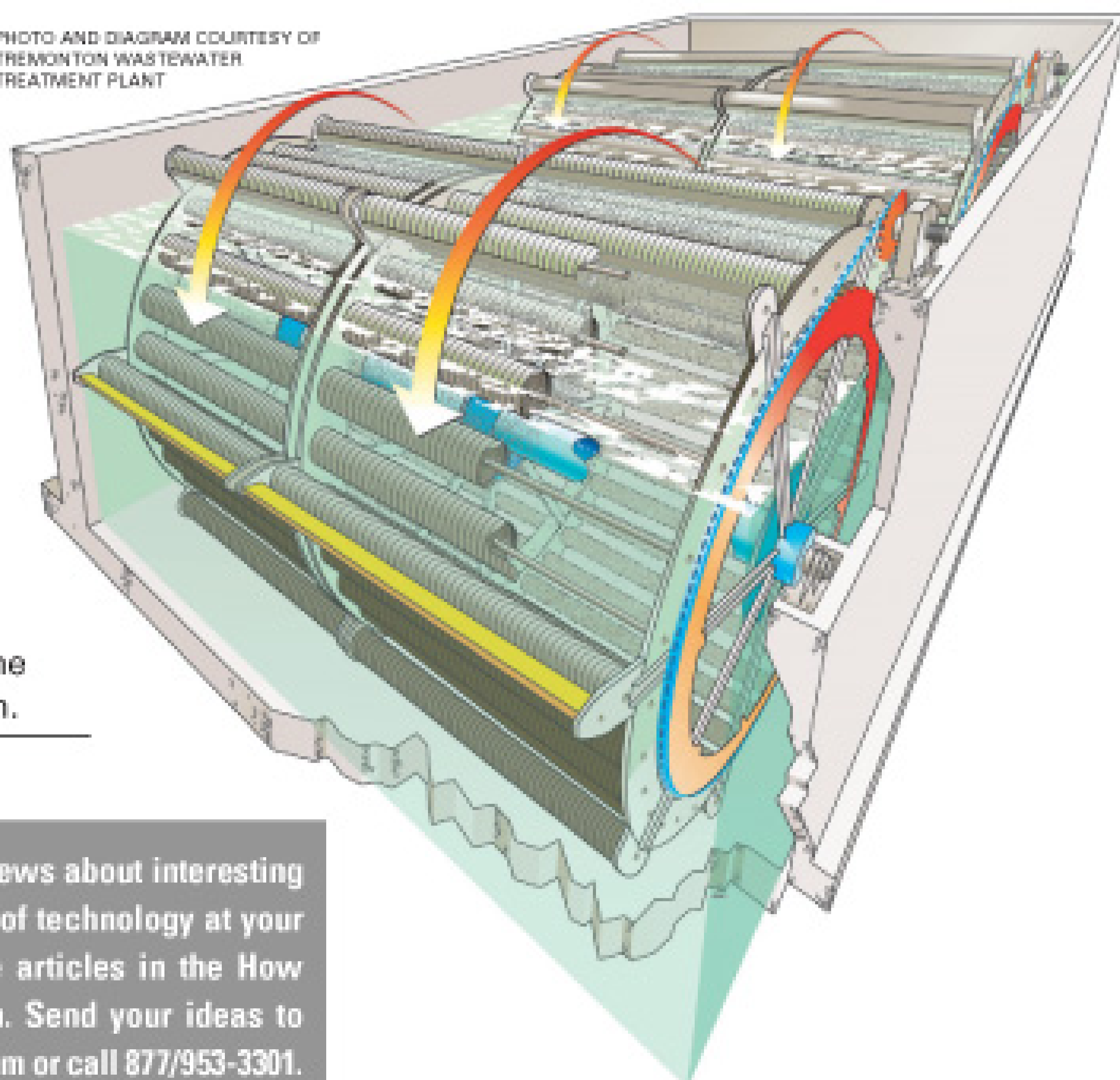
Sugars, starches and wheat pulp from a breakfast cereal plant relocating to Tremonton City, Utah, would cause the wastewater treatment plant to exceed its discharge permit limits of 25 mg/l BOD and TSS. The added loading was equivalent to 550 new homes.

Public Works director Paul Fulgham and plant superintendent Jon Miller considered rehabilitating an unused 0.5 mgd trickling filter to handle the load. However, Scott Rogers and Brad Rasmussen, engineers at Aqua Engineering Inc. in Bountiful, Utah, suggested a system another local community used to handle additional loadings from a cherry processing plant. That community was using the STM-Aerotor technology from WesTech Engineering Inc.

"We liked what we saw," says Fulgham. "We could replace the trickling filter and 1 mgd oxidation ditch with the basin for the Aerotor system. Its footprint was much smaller, yet we would have better treatment and increase our capacity from 1.5 to 1.9 mgd. We would use less electricity, because eight 7.5-hp motors would replace the two 50-hp aeration motors on the brush air rollers in the oxidation ditch."

When the cereal plant started production, influent BOD and TSS shot from 168 and 185 mg/l to 350 mg/l. The new treatment system produced effluent containing less than 6 mg/l BOD before discharge to the Malad River. It also enabled the city to attract more business without expanding the wastewater treatment plant.

PHOTO AND DIAGRAM COURTESY OF TREMONTON WASTEWATER TREATMENT PLANT



This diagram shows how the STM-Aerotors operate inside the processing basin.

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



The two 22- by 84- by 17-foot-deep basins containing the STM-Aerotors replaced a 0.5 mgd trickling filter and 1 mgd oxidation ditch.

BUSINESS ATTRACTION

The Tremonton Wastewater Treatment Plant serves 1,800 residential and 250 commercial, industrial and institutional accounts that generate 1.2 mgd. Those accounts now include a fast-food meat packaging supplier that relocated to the city in part because of the success of the STM-Aerotor system. The Aerotor installation gave the treatment plant extra capacity, enabling the municipality to reduce the impact fee as an incentive for the company to relocate.

The oxidation ditch removed 1,500 pounds of BOD/TSS per day, but the STM-Aerotor system removes more than 5,600 pounds per day. "Without it, we would have needed another clarifier to handle the solids from the meat packaging supplier," says Miller. "Instead, we kept the old 45-foot clarifier and converted the newer 55-foot peripheral-feed clarifier to a center feed."

WesTech designed a clarifier optimization package (COP) for the retrofit that improved the mixed liquor, with higher settled solids in the underflow and lower solids in the effluent. The package included an energy-dissipating inlet, flocculating feed well, effluent weir baffling, efficient scum removal, and customized spiral rake blades.

The 44- by 84- by 17-foot-deep concrete basin for the STM-Aerotor system is divided in half lengthwise, and each side operates independently as a separate train. An Aerotor resembles a paddle wheel. Eight mixing paddles reach deep into zones where oxygen is limited.

A continuous series of polypropylene discs attached across the periphery of the wheel provides surface area for fixed-film growth, while optimizing the captured air volume and release depth for efficient aeration.

Based on oxygen demand, coarse-bubble aeration is controlled using a variable-speed drive connected to the rotor. During rotation, additional cascade aeration elevates the dissolved oxygen in the upper layer of the basin. "Slow rotation and increased air release ensures thoroughly mixed liquors," says Miller.

BETTER SETTLING

The fixed-film growth, supplying 15 to 25 percent of the total treatment, increases the effective sludge age and improves sludge settling characteristics. The microorganisms react quickly to shock loads or an increased food source to eliminate discharge violations.

Each side of the basin has four Aerotors. Separate dissolved oxygen meters run the front two and back two units. "The wheels are 16 feet tall and are anchored at the midway point in the basin, so about 14 feet of each wheel is submerged," says Fulgham. "When the DO is low, the unit speeds up to match the oxygen demand. At full speed, the wheels make just over one rotation every minute."

Return activated sludge is recirculated to the head of the basin, where it combines with raw influent. Waste activated sludge is diverted to the digester. Effluent is UV-disinfected and discharged to the river.

"The aerators added years to the life of our treatment plant," says Fulgham. "Without them, we were facing a \$2.2 million expansion within five years because we were running out of capacity. Now, looking at normal projected growth, our next major upgrade is around 2020." **tpo**

more info:

Westech Engineering
801/265-1000
www.westech-inc.com

"The aerators added years to the life of our treatment plant. Without them, we were facing a \$2.2 million expansion within five years because we were running out of capacity. Now, looking at normal projected growth, our next major upgrade is around 2020."

PAUL FULGHAM

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Essential Employment

LONG-TIME OPERATOR ARNIE BEVINS SEES RECOGNITION FOR THE TREATMENT PROFESSION AS PART OF THE SOLUTION TO RECRUITING THE NEXT GENERATION

By Ted J. Rulseh

Arnie Bevins was among the early waves of wastewater treatment operators who joined the profession in 1971, soon after passage of the original Clean Water Act. Trained by the U.S. government, he recalls going to school full-time, six and a half hours per day, for six months before starting work.

His first job was at the Town of Vernon (Conn.) Water Pollution Control Facility, and that's where he remains. He worked his way up the ranks to assistant director of the town's Water Pollution Control Department, and in that role he functions as plant manager for a 4.7 mgd regional treatment facility. The plant is one of few in the country that uses a Powdered Activated Carbon Treatment (PACT) process — for removing color imparted by dye mill effluent.

Along the way, Bevins has been an advocate for the industry, joining the New England Water Environment Association (NEWEA) in 1980, serving for three years as state director, then as Professional Wastewater Operator Representative, and ultimately moving up to president in 2007.

Today, Bevins is among the wave of long-time treatment operators nearing retirement. Looking ahead, he sees a critical need to attract young people to infuse the profession with new talent. One key to meeting that challenge, he says, is creating more respect and recognition for people in the field. He spoke about those matters recently in an interview with *Treatment Plant Operator*.

tpo: In your opinion, why doesn't the wastewater treatment profession get the recognition it deserves?

Bevins: I think the biggest thing is that treatment plants are victims of their own success. That's because if we do our job, ideally no one knows we are here. All we do is put clean water into the river. In the 1970s, the river used to run the color of the dye the local textile mill was running that day. Today, downstream of my plant,

"You can't tell people you work in crap for a living if you want to be recognized as a professional — you just can't do that."

ARNIE BEVINS

there's a trout management area where we've got a natural holdover population of trout.

It also has to do with the way we ourselves refer to what we do. You can't tell people you work in crap for a living if you want to be recognized as a professional — you just can't do that. In my

comments when I became president of NEWEA, I said we should stop speaking in hushed references to our influent and instead speak in glowing terms about our effluent quality. A lot of people in this business don't do that.



Arnie Bevins

tpo: What do you observe about how people perceive wastewater treatment?

Bevins: Especially to young people, the environment is what it is today. They don't know where we've come from. They don't know how much good work we've done and how much things have changed. One of the comments I make when I talk to groups is that when you work in a water pollution control facility, you do more environmental good in one day than most people do in a lifetime.

It's amazing how many people I talk to who don't realize that we discharge to rivers. I've had people say, "Don't you take the water out of the river and treat that?" Well, no, not exactly. I've seen people amazed when we mention that we have a lab. "You have a laboratory in a treatment plant? What for?" Many people don't understand what it is we do. As a consequence I think they don't necessarily view our work as a profession.

tpo: How hard is it to change those perceptions?

Bevins: If I can get people to come through the plant, I've got friends for life. We were going through a construction project in the early 1990s. Our plant is 28 feet off the lot line of a 175-unit apartment complex. We had some issues with them related to the construction. We took members of their association through on a Saturday, and by the time the tour was over, they wanted to know when our budget hearing was, so they could come and support us.

One of the neatest things we ever did — we had a mayor who did a weekly public information show on TV. For one show, he did a tour of the plant during the construction. We gave him a microphone and a list of questions that we provided. He walked through the plant and interviewed my boss and me. We talked about what we were doing, how the process worked, and why we were changing it. I can't tell you how many people saw that show and said, "I had no idea — that's pretty cool stuff you guys do."

tpo: It's well known that the industry is facing a shortage of operators. How has that affected your plant?

Bevins: We have a very experienced team. My youngest staff person is in his early 40s. My second least senior operator is 51. I

“I also stress that this is incredibly interesting work. When I walk a young person through the plant, I get away from all the ‘humor’ the kids grew up with and sell the science and the engineering. The reality is that we are managing a huge microbiological population and putting it to work for us.”

ARNIE BEVINS

have an operator who at 57 put in his retirement letter last week. I have probably three more who will go this year or early next year. I have a total of eight operators, and I’m going to lose half of them in the next year and a half.

A lot of plants are also having trouble on the management side. In Connecticut, we have nitrification requirements. We have denitrification. We’re going to have phosphorus requirements. These plants are really huge biochemistry sets. You don’t walk in the door and learn how to operate a plant in one or two years.

The other big thing — when I started out, we were called operators. Now I’m sitting on a \$58 million facility. We’re facility managers now. My budget line item for energy is \$1.3 million. We have to try to manage electrical consumption and bring that number down. That’s another skill set that not necessarily everybody has.

tpo: What are you doing at your facility to help replace the people who will be leaving?

Bevins: One thing we’ve done, pending approval by our town council, is to create an operator-in-training position. We’ll require someone to have a state Class 1 operator-in-training certification in hand before we even interview them — that will tell us they’re sincere in wanting to come here. We’ll advertise for that position, as well as for a Class 2 operator. We recognize that we need to start bringing younger people in and start moving them up through the system.

tpo: What is it about wastewater treatment that should make it attractive as a career choice for young people?

Bevins: Usually the first thing that attracts them is the money. Salaries here are in the mid-\$50,000s to \$60,000 to start. It’s a great way for a young person to get a foothold financially. Also, in today’s world you absolutely have to stress that this job is going to be here in five years, in 10 years, and 20 years down the road — it’s just not going away.

Another thing, and I remember hearing this in class 38 years ago, once you get your license and certification, you can go anywhere you want. That has proven very true. I happen to have stayed here, but if I wanted to pick up and move to, say, California, my license probably would be recognized through reciprocity.

I also stress that this is incredibly interesting work. When I walk a young person through the plant, I get away from all the ‘humor’ the kids grew up with and sell the science and the engineering. The reality is that we are managing a huge microbiological population and putting it to work for us. Every day we use the tools and skills that kids are taught in school — the math, the computer skills, the science. We are a career path where they can use those skills every day.

tpo: Beyond efforts at your own facility, what’s being done to attract people to the treatment profession?

Bevins: We’re doing a lot to get the word out there. A couple of years ago, the operators association in Maine did a careers DVD. Our state operators association is talking about doing something similar and putting it on public access TV.

NEWEA has a Careers Outreach Task Force, and not too long ago

they did a day-long Environmental Careers Day at Springfield (Mass.) Technical Community College, in conjunction with the New England Water Association. They had a panel with a public works director, an environmental scientist with a consulting engineering firm, a wastewater superintendent and a water facility superintendent. They invited teachers, guidance counselors and students from all around the region. At the end, they took a tour of the Springfield Water Pollution Control Facility. About 40 or 50 people attended.

Five years ago, the National Science Teachers Convention came to Hartford and NEWEA had a booth there, staffed by our public education committee. We participate in the Connecticut science fair every year. NEWEA judges water and wastewater projects, and some of those kids have gone on to become Stockholm Junior Water Prize winners.

“With each passing year, what we do is going to become more and more significant. Just because of the number of people who are going to populate this planet and their need for water, we’ll ultimately start to get more attention.”

ARNIE BEVINS

tpo: What’s being done to earn more recognition for the profession?

Bevins: NEWEA holds a two-day planning session every year. One topic this year is professional recognition: How can the association promote the positive things we do, by way of the news media and other methods?

It seems the Teacher of the Year is always in the paper. That’s not so with us. The NEWEA annual conference always ends with an awards luncheon. Our media relations committee sends press releases to the recipients’ hometown newspapers. Sometimes they get published, but more often than not, they don’t.

When I was named NEWEA president, we sent a press release, and my local paper, they never published it. Yet I got a congratulatory citation from my local mayor and council, and from my state legislature. This is something we need to change.

tpo: Are you optimistic that the profession will gain respect in the future?

Bevins: Yes. With each passing year, what we do is going to become more and more significant. Just because of the number of people who are going to populate this planet and their need for water, we’ll ultimately start to get more attention.

People need to understand that they’re not making any more water. It’s not as if we can go to some big Poland Springs in the sky and get more of it. When people start to appreciate that, they’ll understand a little better what it is we’re doing. **tpo**

Smith & Loveless Names Rebori President

Frank J. Rebori, formerly vice president and legal counsel, has been promoted to president of Smith & Loveless Inc. He succeeds his father, Robert L. Rebori, as the company's sixth president. Robert Rebori will serve as chairman of the board of directors.



Frank J. Rebori

Sartell Acquires Remainder of DeZURIK Valves

Sartell Valves Inc., manufacturer of DeZURIK municipal valves, has acquired the remainder of the DeZURIK valve product line and business from SPX Corp., including its manufacturing plant in Cambridge, Ontario; sales offices in Edmonton, Alberta, and St. Cloud, Minn.; and service center in Atlanta, Ga. SVI will continue to operate the combined company from its Sartell, Minn., headquarters and will operate the combined business under the DeZURIK company and brand name.

SEL President Discusses Smart Grid Challenges

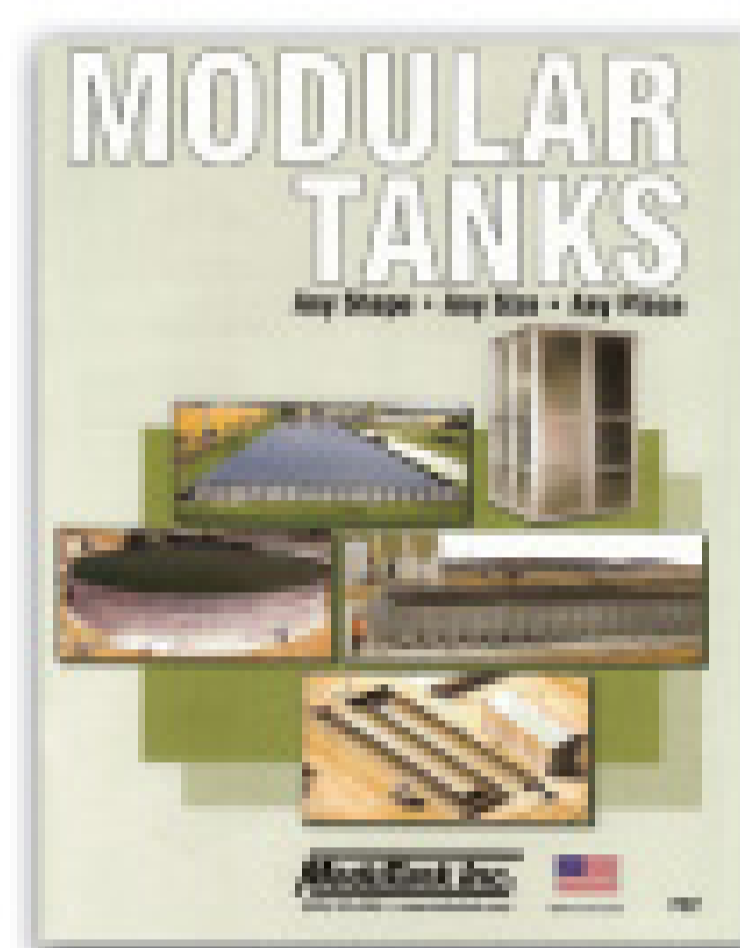
Dr. Edmund O. Schweitzer, Schweitzer Engineering Laboratories Inc. president and CEO, participated in the keynote discussion, "Putting the Smart Grid into Action," at the National Rural Telecommunications Council annual meeting. Schweitzer's comments focused on electric power industry advances made in the area of smart technology. Topics ranged from digital protective relays to local processing facilitated by synchrophasors. He also highlighted challenges that the industry faces as well as his vision for the future of smart technology.

Staco Energy Partners with Thomas & Betts

Staco Energy Products Co. has partnered with Thomas & Betts Global Services to provide service and support for its entire FirstLine three-phase uninterruptible power supply lineup. In addition to start-up and commissioning services, Thomas & Betts will provide preventative maintenance, emergency repair and warranty service.

Dresser Roots Adds Engineering Resources to Web Site

Dresser Roots has added engineering resources to the product detail pages of its Web site, www.dresser.com. Features include pressure and vacuum curves, assembly drawings and parts list, as well as dimensional drawings. Other features include a new product navigational tool, product overview, downloadable product literature and manuals, enhanced contact information and trade show calendar.



ModuTank Releases Latest Catalog

The latest ModuTank catalog includes bolt-together containment systems for environmental, municipal, industrial, governmental and general liquid storage. The catalog also describes secondary containment and available chemical-resistant membrane liners, as well as specialized leak detection, covers, piping connections and fittings. For a copy, call 718/392-1112.

Industrial Scientific Oldham Achieves ISO Certification

Gas monitoring equipment manufacturer Industrial Scientific Oldham has achieved ISO14001:2004 certification, completing a three-day audit by AFAQ AFNOR of France. Throughout the audit, Industrial Scientific Oldham demonstrated compliance with environmental laws and regulations. In addition, the company exhibited a systematic approach to setting environmental objectives. Industrial Scientific Oldham also achieved renewal of its ISO9001:2000 certificate, which it has held since 2001.

Flowserve Names Rosene Chief Sustainability Officer

Lars E. Rosene has been named chief sustainability officer and vice president of public affairs for Flowserve, a provider of flow control products and services. Rosene is responsible for driving the implementation and management of the company's sustainability and social responsibility efforts, while continuing to maintain oversight of the company's internal communications, global reputation, government affairs and corporate brand management initiatives.

In-Pipe Technology Forms Agreement with PMC BioTec

In-Pipe Technology Co. LLC, a provider of wastewater treatment solutions, has formed a co-marketing agreement with PMC BioTec LLC designed to reduce operating expenses for municipal wastewater treatment plants. **tpo**

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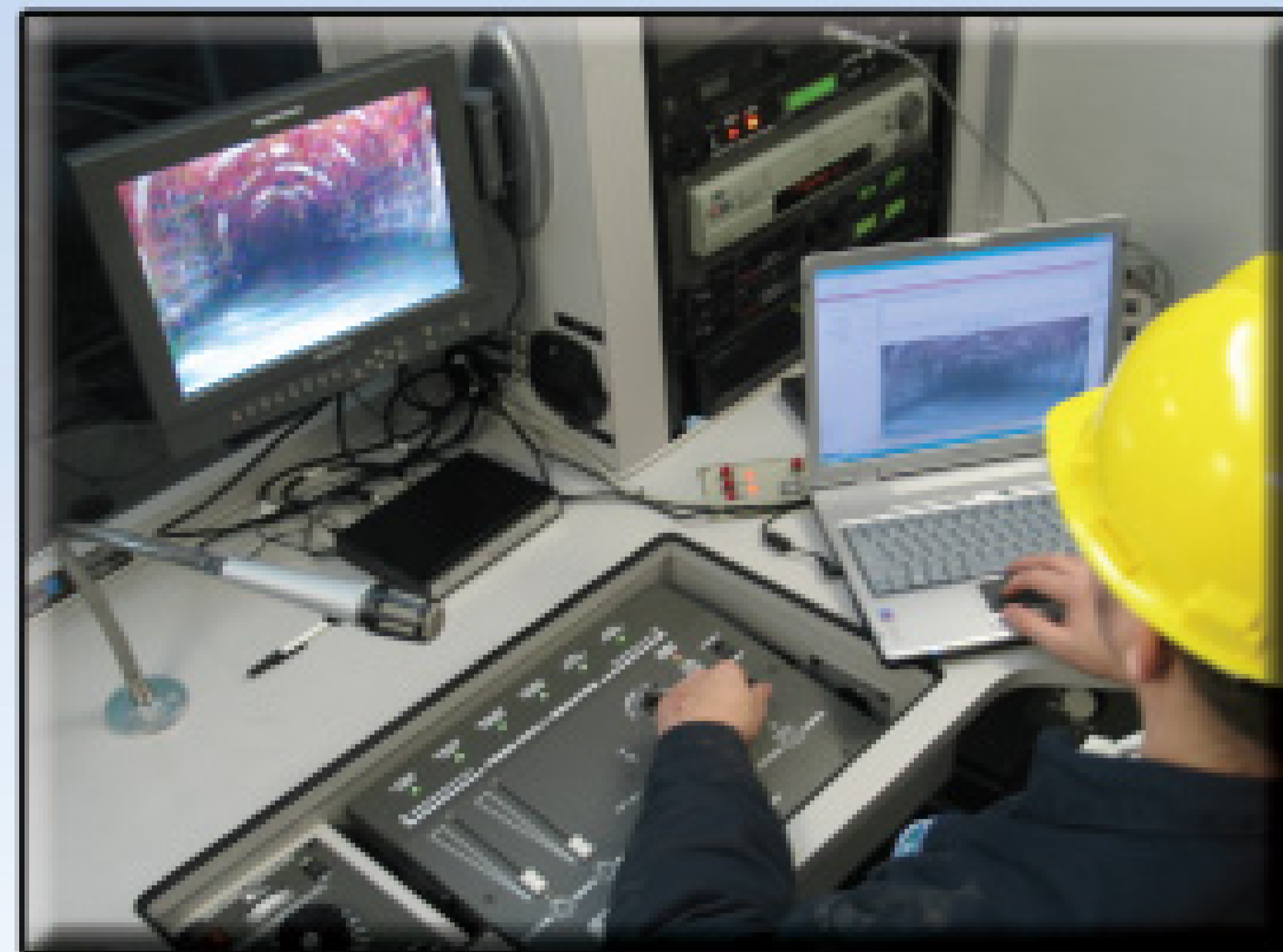
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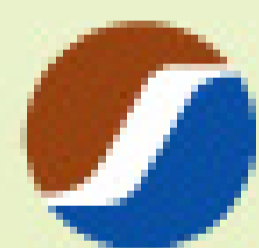
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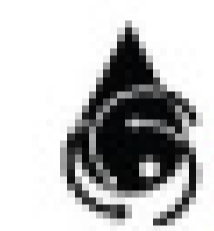
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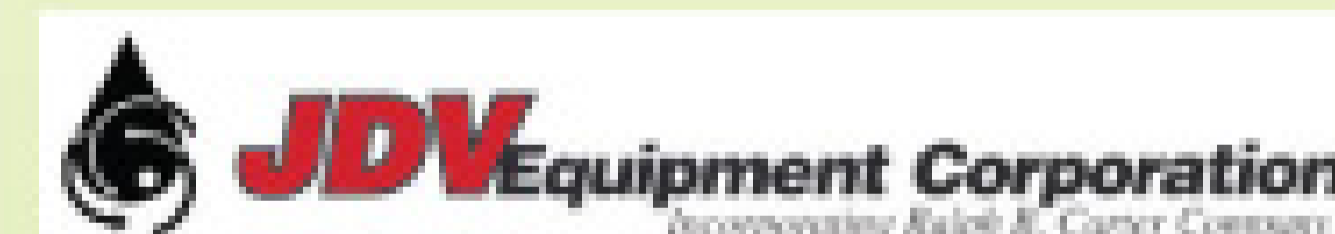
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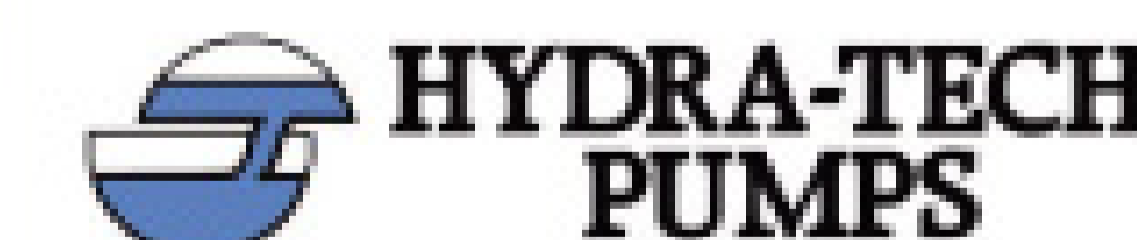
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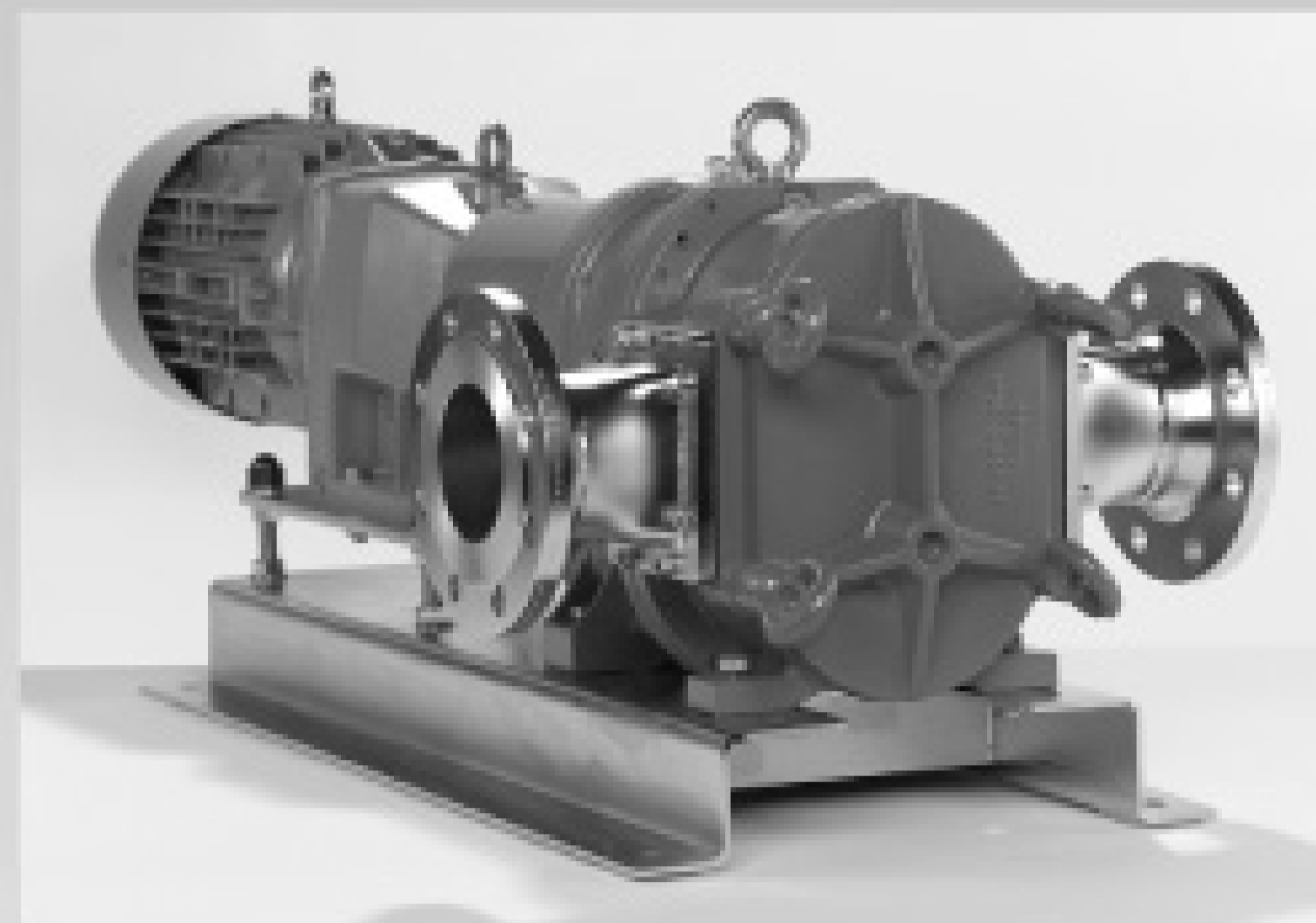
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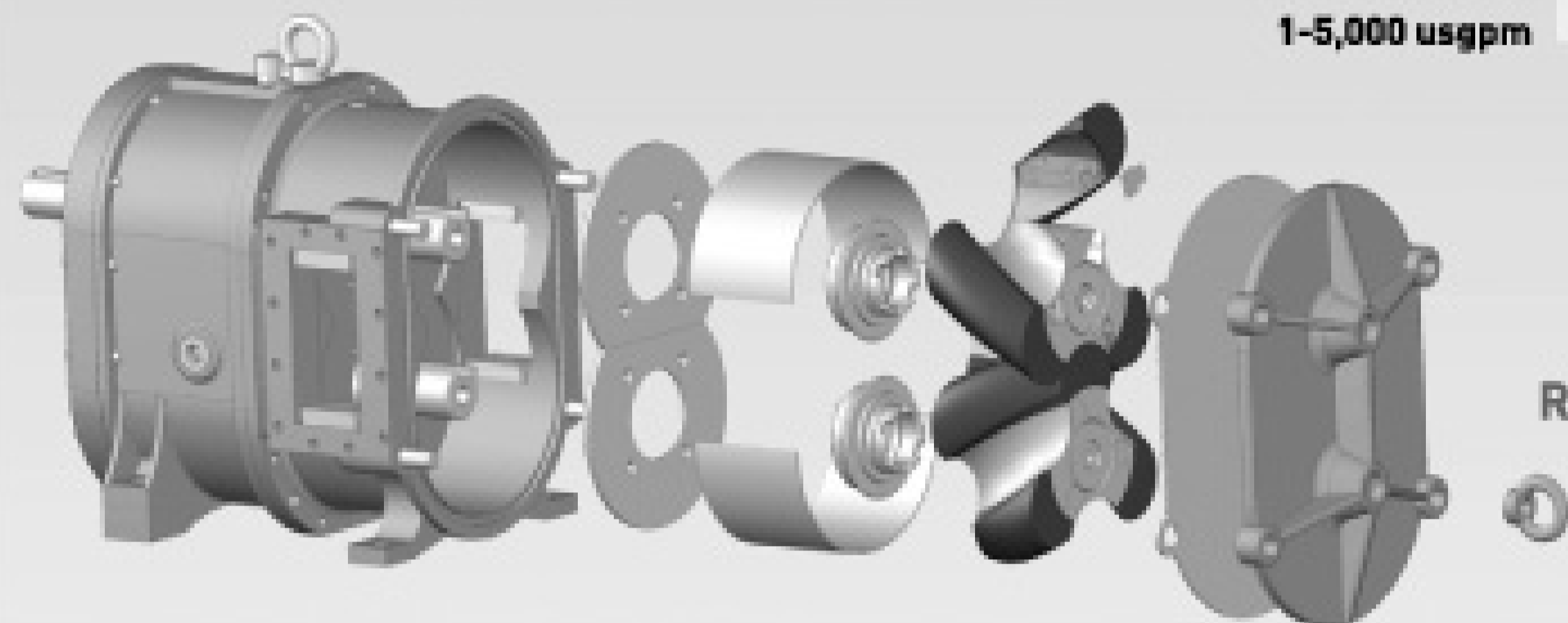
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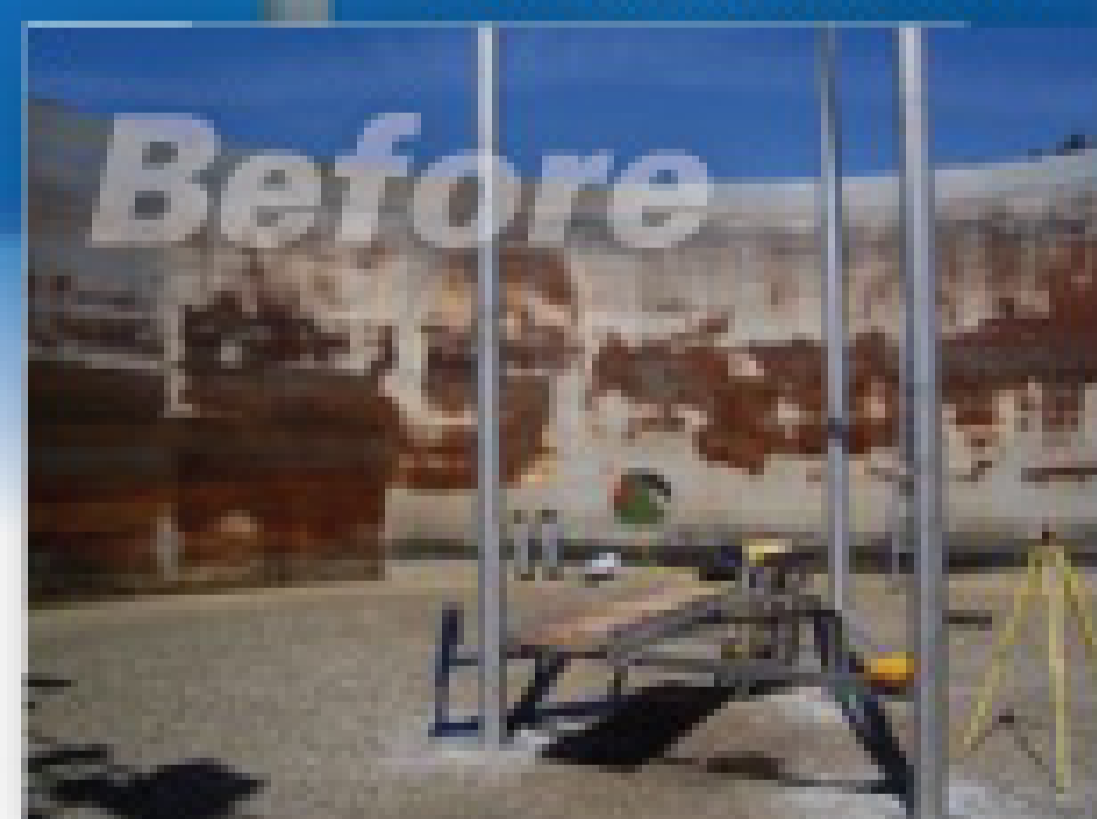
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LIFE'S WORK

DILIGENT CARE FROM CHIEF OPERATOR LOUIE LANGONE MEANS A SPOTLESS APPEARANCE AND EXCELLENT PERFORMANCE AT THE WATERVILLE (N.Y.) WASTEWATER TREATMENT PLANT

By Jim Force

HARDLY ANYONE NOTICED THE WATERVILLE (N.Y.) WASTEWATER Treatment Plant until head operator Louie Langone started offering free compost.

"I had people say they'd driven past the plant for years and didn't even know we were here," says Langone, 55, who pretty much operates the 0.3 million gallon per day extended aeration facility by himself. "But now they come in to pick up compost for their gardens or yards, and they can't believe how clean and well-kept the place is."

Langone started composting the plant's biosolids in 2000, and a brief article in the local newspaper kicked off a wave of interest. More than 200 people pick up compost every year, and when they do, they see a municipal facility where the grounds are tidy, paint is fresh, and everything is in its place.

"I really enjoy mowing the yard and keeping the plant looking nice," says Langone. "You have to make improvements. I get great support from the village. They encourage and support me, and never question any painting and cleanup."



Village of Waterville Wastewater Treatment Plant operator Louie Langone checks slides made from samples from the aeration tank under a Reichert-Jung Series 150 phase contrast microscope in his laboratory. (Photography by Dave Londres)

The reputation of Langone's facility has spread beyond local circles. Waterville has garnered numerous awards from New York water and wastewater associations as the best of New York's 370 plants in its size category. And last year, Waterville earned the EPA Clean Water Act Recognition Award for Operations and Maintenance in the category for small advanced plants.

"It's one of the nicest plants for its size in the state," says Brian Romeiser, chief operator of the Manchester-Shortsville treatment plant near Rochester, whose presentation on composting at a professional meeting got Langone interested in the practice. "What you see is what you get with him. His plant is spotless — it's perfect. He's received many awards and he deserves them all."

PRIDE AND PASSION

Langone's pride and passion for his operation can be attributed to the fact that this is his life's work. He has been at the plant since 1983, when the New York Department of Environmental Conservation required the village to staff the facility

Waterville Wastewater Treatment Plant PERMIT AND PERFORMANCE SUMMARY

	INFLUENT	EFFLUENT	PERMIT
BOD	278 mg/l	4.9 mg/l	30 mg/l
TSS	271 mg/l	5.3 mg/l	30 mg/l
Ammonia	—	0.50 mg/l	3.5-12.1 mg/l

A panoramic view of the Waterville Wastewater Treatment Plant, built in 1970 and significantly upgraded in 1996-97.



with a full-time operator. The public works director approached Langone, who was then working for Conrail in the summer and plowing snow for the Town of Marshall in the winter.

"He said, 'It's yours if you want it,'" remembers Langone, who has taken classes and worked his way up the operator certification ladder over the years. He mans the plant alone 99 percent of the time, getting assistance from the public works department as needed.

The original plant dates to 1970 and originally consisted of a 60-foot-diameter Walker Process contact stabilization tank followed by polishing lagoons. A major upgrade took place in 1996-97, when Langone worked closely with Mike Harrington of Lamont Engineers, Cobleskill, N.Y., to improve both treatment performance and energy efficiency. "The old process had served us well," Langone says, "but it was time to replace most of it."

The renovation project replaced or rebuilt the comminutor, bar screen and grit removal system at the headworks, which receive about 170,000 gpd from Waterville's gravity-flow sanitary sewer system. The Parshall flume was equipped with an ISCO ultrasonic flow meter. Centrifugal lift pumps were refurbished.

Langone and Harrington supervised installation of Aercor (ITT Water & Wastewater - Sanitaire) full-floor membrane disc diffusers in the aeration sections of the package plant, plus new valves, and the addition of a scum beach and a divider wall to create a selector zone to control filamentous growth. "We've had filamentous issues only once since then," says Langone. "Before that, we had to chlorinate frequently." The 243,000-gallon, 16-foot side wall tank was completely sand-blasted and repainted.

Perhaps anticipating the energy crisis that would come 10 years later, Langone improved the plant's energy efficiency in several ways. To reduce power consumption, he installed a variable frequency drive (VFD) unit on the blower. He added a dissolved-air monitoring system (ITT Water & Wastewater - Royce Technologies) in the aeration tank so he can select the target dissolved oxygen level and match blower output with influent loading demand.

"Those units, plus our membrane diffusers, probably save us \$500 to \$600 a month in electricity costs," reports Langone. The project also incorpo-



Langone levels a pile of wood chips on an air pipe while preparing a new pile of compost in the compost building.

"I receive wonderful support from the village. We produce good effluent, we don't cost too much, and the village and regulators are happy. That's the bottom line."

LOUIE LANGONE



profile

**Louie Langone,
Waterville (N.Y.)
Wastewater Treatment Plant**

POSITION:
Plant operator

CERTIFICATION:
3A wastewater plant operator

TENURE:
25 years

WORK AREA:
Manages and staffs the complete operation

GOALS:
Maintain a neat, clean facility that runs and looks above standards, meets permit limits, with no discharge violations



A SHELF FULL OF AWARDS

Over the years, the Waterville Wastewater Treatment Plant has earned a number of awards, in addition to the EPA Clean Water Act Recognition Award received last year. The honors include:

- 1998 – Wastewater Operator of the Year (New York Rural Water Association)
- 2002 – Wastewater System of the Year (New York Rural Water Association)
- 2003 – Region 6 Operation and Maintenance Award (New York State Department of Environmental Compliance)
- 2006 – Uhl T. Mann Award for operational excellence (New York Water Environment Association)
- 2007 – Andrew M. Weist Award for Operation and Maintenance (New York State Department of Environmental Compliance)

“His plant is spotless — it’s perfect. He’s received many awards and he deserves them all.”

BRIAN ROMEISER

rated a new motor control center, new wiring to all process units, and a rebuilt emergency power system and automatic transfer switch.

The two 750,000-gallon settling ponds at the west end of the plant, each equipped with floating aerators, now serve as a backup in case of a malfunction in the main plant. Effluent flows to Big Creek, a classified trout stream.

SERENDIPITOUS MEETING

The Waterville composting operation is the only one in the central New York State Region 6, but it might not have existed at all except for a meeting between Langone and Romeiser a few years ago.



Louie Langone collects photos of various plantings that have come from the facility's compost.

Romeiser's help, the composting process at Waterville took shape and became operational a year later.

A progressive cavity sludge pump transports waste biosolids from the digester to a pole building. A PolyBlend polymer feed system (Siemens Water Technologies) adds polymers to the material which then passes to a belt press (ALRick Press Co. Inc.). Langone mixes cake at about 12 to 14 percent solids with a pre-calculated ratio of woodchips that ranges from 50 to 80 percent solids. The village public works department, town highway crews, and the local power utility provide the chips from green waste.

“I went up to a Rural Water Association training session in Rochester and heard Brian’s presentation on his composting operation at Manchester-Shortsville,” recalls Langone. He was interested, and Romeiser suggested he stop in at the Manchester-Shortsville plant for a visit on his way home from the meeting.

“I had my boss with me,” remembers Langone, “so it was good for him to see the operation, as well.” They both were sold: “We said, ‘There’s no reason we can’t do this.’” With



Langone checks the aeration tank with a YSI model 54A portable oxygen meter.

“Once the proper mix is done, the compost mixture needs to be between 38 and 42 percent solids, in order to start the biological process,” explains Langone. The mix is dumped on top of a plastic-covered drainage area, and a perforated 6-inch ABS pipe distributes air evenly throughout the pile. “A typical pile is 10 feet wide, 33 feet long, and 6 feet high,” says Langone.

Additional wood chips placed on top of the pile provide insulation and even heating without blocking the flow of air. The compost stays in this aerated static pile for 21 days; a temperature probe coupled with an air blower monitors and controls pile temperature. “The pile must be at least 55 degrees C for three consecutive days, and over 40 degrees C for 11 days,” says Langone.

Curing is next. Langone breaks up the static pile and moves the material into a nonaerated curing pile where the bacteria continue to stabilize the compost. “Curing takes 30 days — no exceptions,” says Langone. “We break it up every five to seven days to allow oxygen to circulate completely.”

Finally, screens remove and recycle about 75 percent of the wood chips, and enable the material to meet New York state Class 1 compost standards. The finished material is brown, granular, and has a natural earthy smell with very little or no ammonia present. “We then sample and analyze the compost according to our permit,” says Langone, “and it’s ready for use.”

NOT GOING ANYWHERE

In the winter, Langone stores the compost, and makes it available in the spring. He has no trouble getting rid of all the compost he can produce, reserving most of it for village residents. "Once the word got out," he says, "word-of-mouth took care of the rest. I have people who say they don't want to tell anybody else in case we run out."

"It's so much better to manage biosolids this way. We used to spread it on farmland, but that wasn't really an appealing practice to our neighbors." Now, the neighbors applaud Waterville's biosolids beneficial reuse project, especially Brian Sharing, a local gardener. He used the compost on his pumpkin patch and produced a 700-pound winner.

As for the future, Langone has no plans to leave his post at the Waterville Wastewater Treatment Plant. "I receive wonderful support from the village," he says. "We produce good effluent, we don't cost too much, and the village and regulators are happy. That's the bottom line."

"This is a great job, and a great field. I would think young people would do well to go into it." A day at Langone's pristine, efficient treatment plant might inspire them to do so. **tpo**

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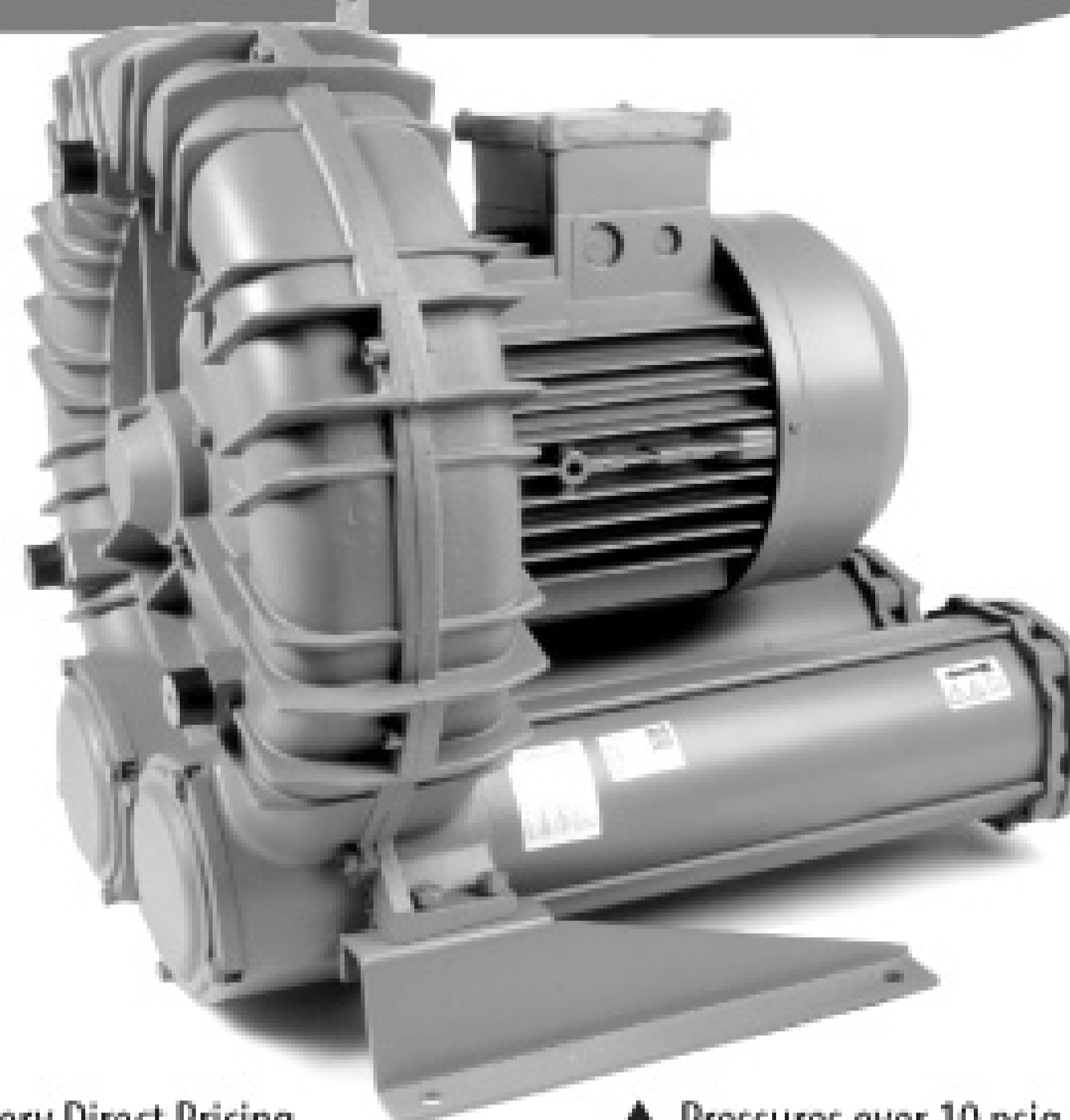
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By Scottie Dayton

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ELIMINATES CONTAMINATION

The **InLine+ disinfection system from Aquionics Inc.** uses computational fluid dynamics (CFD) software and performance verification biological data to optimize efficiency for all wastewater applications. An improved UV monitor provides accuracy and longer life between factory recalibrations.

The cleaning mechanism removes difficult deposits on the quartz sleeves and monitor probe. The chamber has a compact footprint and minimizes head loss. The improved, optional UVTronic allows remote factory diagnostics of on-site problems. It controls energy consumption by monitoring the dose based on flows, ultraviolet intensity, and transmission of wastewater. The closed-vessel medium pressure lamp design limits photoreactivation and microbial regrowth. **859/341-0710; www.aquionics.com.**

MICROWAVE UV TECHNOLOGY

The **MicroDynamics Series OCS 660 open-channel wastewater system from Severn Trent Services** meets all dose, log reduction, and water quality requirements. The technology uses microwaves to energize low-pressure, high-output lamps. The lamps have no electrodes for longer life, increased efficiency, safety and flexibility in design. They light instantly and switch on and off to match flow. The quartz sleeve remains the same temperature as the water, resulting in less fouling. **866/646-9201; www.severntrentservices.com.**

CHLORINE ANALYZER

The **RPH-250, a reagentless probe-style residual chlorine analyzer from Hydro Instruments**, measures free chlorine, total chlorine or chlorine dioxide. The unit has temperature compensation, two selectable 4-20mA outputs, a 4-20mA input for flow meter signal, an alarm relay, and a complete proportional-integral-derivative control program that technicians enable or disable in the field.

Other features include transparent flow cells, a sample-water pressure relief valve, pressure gauge, sample flow rate valve, graduated meter tube, and 25 feet of sample water tubing. The analyzer has automatic pH compensation software for free chlorine. The pH probe is optional. **888/384-9376; www.hydroinstruments.com.**



RPH-250 chlorine analyzer from Hydro Instruments

OPERATOR-FREE PERFORMANCE

OSEC on-site hypochlorite generation systems from Siemens Water Technologies produce sodium hypochlorite on-site and on-demand through the electrolysis of a brine solution. Standard unit capacities are 12 to 2,000 pounds of equivalent chlorine per day, and they require minimum maintenance.

Adding more units increases system capacity. Generators eliminate dependence on commercial chemical supplies and the concerns inherent in the transport, handling and storage of chlorine gas and purchased hypochlorite. Since the system produces hypochlorite on-demand, it does not degrade in storage. The generators have safety alarm interlocks and flexible configurations to fit available space. **856/507-9000; www.water.siemens.com.**



OSEC on-site hypochlorite generation systems from Siemens Water Technologies

NO HAZARDOUS CHEMICALS

On-site hypochlorite generators from Miox Corp. are designed to lower operating and maintenance costs. Operators set a specific dosage rate and only the rate of injection varies with the flow, reducing chlorine-dosing

requirements. A stabilized dechlorination feed rate eliminates constant monitoring and adjustment.

The system reduces total coliforms and produces a maintainable chlorine residual for reuse applications, keeping long pipelines free of biofilm. The discharged effluent has lower chlorine levels, and since no hazardous chemicals are used, facilities do not need a special risk management plan or safety program. **505/343-0090; www.miox.com.**

EFFECTIVE ALTERNATIVE

The **Constant Chlor Plus Model MM-1S feeding system from Arch Chemicals Inc.** is an alternative to liquid bleach and chlorine gas. The feeder uses NSF Standard 60-listed dry calcium hypochlorite briquettes and spray technology to automatically deliver an accurate dose of 40 pounds of liquid available chlorine (AVCL) per day.

The fresh-made reservoir is filled with 1.7 percent AVCL solution, and volume is maintained by an electronically controlled spray manifold. A recirculation pump and nozzle mix the solution and keep solids in suspension. A positive displacement chemical metering pump then injects the fresh liquid hypochlorite solution.

The unit, operating at normal atmospheric pressure, is refilled and cleaned while in service. The feeder has a footprint of less than 20 inches in diameter and requires no storage tanks or secondary containment. **800/478-5727; www.archwaterworks.com/municipal.**

ON-SITE, ON-DEMAND

Klorigen generators from Electrolytic Technologies Corp. safely and cost-effectively produce chlorine gas, sodium hydroxide and sodium hypochlorite at the point of use in systems with output volumes of 100 to 2,500 pounds per day. Chlorine gas is generated on-demand at ambient (1 bar) pressure.

Units simultaneously produce chlorine gas, sodium hydroxide and sodium hypochlorite up to 12 percent. NSF-certified components require less than one hour per day of operator involvement. The generator's

modular design facilitates future expansion, and units are easily fitted with or adapted to SCADA control systems. **305/655-2755; www.electrolytictechnologies.com. tpo**

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How We Do It: Interesting uses of equipment or technology.

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1. PRIME SOLUTION INTRODUCES SMALLER DEWATERING SYSTEMS

The 10- and 18-inch Rotary Fan Press USA dewatering systems from Prime Solution Inc. are designed for wastewater treatment plants with limited space, smaller flows and fewer man-hours. The units have a maximum flow capacity of 3 and 7 gpm, are completely skid-mounted with controls, sludge feed pump and polymer feed/blend ready to operate with utility connection. The systems also feature continuous operation and low maintenance. They are totally enclosed and deliver high cake solids. **269/673-9559; www.psirotary.com.**

2. MSA OFFERS GASGARD CONTROLLER

The Gasgard XL controller from MSA is designed to monitor toxic and combustible gases and oxygen deficiency. It can be configured to accept up to eight remote gas sensors. **800/672-2222; www.msanet.com.**

3. ATLANTIC OFFERS GERMICIDAL ULTRAVIOLET LAMPS

Ster-L-Ray germicidal ultraviolet lamps from Atlantic Ultraviolet Corp. are short-wave, low-pressure mercury vapor tubes that produce ultraviolet wavelengths that are lethal to virus, mold spores, bacteria and other micro-organisms. The lamps have a rated life of 10,000 hours and can be used in both air and water disinfection applications. **631/273-0500; www.atlanticuv.com.**

4. MACROS OFFERS HSTAR 750 SERIES SENSORS

HSTAR 750 Series hermetically sealed position sensors from Macros Sensors are designed to provide feedback of different control valves in harsh environments and output to remote electronics and/or control systems, signaling an operator if something is not working properly. The stainless steel sensors are offered in several standard options, including metric threaded cores, smaller diameters and low mass cores. **856/662-8000; www.macrosensors.com.**

5. THERMO SCIENTIFIC INTRODUCES OPTICAL RDO SENSORS

RDO Pro dissolved oxygen sensors from Thermo Scientific-AquaSensors feature luminescent technology for wastewater monitoring. Using no membranes or conditioning, the sensors are designed to resist both photo bleaching and abrasion. **262/255-4459; www.thermo.com.**

6. BW TECHNOLOGIES OFFERS GasAlertMax XT

The GasAlertMax XT multi-detector from BW Technologies by Honeywell simultaneously monitors hydrogen sulfide, carbon monoxide, oxygen and combustible gases, and displays them in a multi-language LED. The unit has a nonintrusive integrated sampling pump, one-button operation and tamper-proof, user-adjustable options. **888/749-8878; www.gasmonitors.com.**



SMARTGAS OFFERS INFRARED DETECTION SYSTEM

The smartMODUL infrared gas detection and measurement system from smartGAS Mikrosensorik is designed to measure hydrocarbons and detect carbon dioxide, carbon monoxide and sulfur hexafluoride as well as acetylene, butane, ethane, ethylene, methane and propane. The unit, about the size of a matchbox, uses infrared radiation to measure and detect the gas. A helical filament provides a broadband infrared source, while a filter selects the specific wavelength. An external watchdog monitors the sensory system. **800/746-4467; www.smartgas.eu.**

7. GfG INTRODUCES G460 GAS DETECTOR

The G460 gas detector from GfG Instrumentation Inc. is designed to simultaneously detect up to six gases. Installed sensor options include infrared for CO₂ and PID for VOC measurements. The unit offers completely automatic calibration, one-button operation, top-mounted display and interchangeable battery packs. Other features include a concussion-proof boot and dust- and water-resistant housing. Data logging and event logging are standard. **800/959-0329; www.gfg-inc.com.**

8. ECD INTRODUCES TRITON DO8 SENSOR

The Triton DO8 dissolved oxygen sensor from Electro-Chemical Devices features a fluorescence quenching sensing element and intelligent microprocessor-based electronics. The self-monitoring DO8 stores calibration data within the sensor, which has a maximum error rate of less than 2 percent, repeatability of plus or minus 0.5 percent and reso-

lution of 0.01 ppm or 0.01 percent saturation. The sensor operates over a wide measurement range with three different outputs from 0 to 20 mg/l (0-20 ppm), 0-200 percent saturation or 0-500 hPa (0-6 psi). Designed to withstand ambient temperatures from -20 to 60 degrees C (0-140 F), it records measurements at temperatures from -5 to 50 degrees C (20-120 F) and can withstand up to 145 psi. **800/729-1333; www.ecdi.com.**

KATHABAR DESIGNS DEHUMIDIFICATION SYSTEMS

The Kathabar liquid and dry desiccant dehumidification systems are designed to deliver energy-efficient temperature and humidity control to water treatment facilities in pumping stations, pipe galleries, water filtration areas and chemical storage rooms. Made of fiber reinforced plastic, the liquid systems can handle airflows from 750 to 84,000 cfm, while dry systems, when less cooling is needed, can handle up to 60,000 cfm. **732/356-6000; www.kathabar.com.**

9. SERFILCO INTRODUCES MEGA-FLO FILTRATION SYSTEMS

Mega-Flo filtration systems from Serfilco offer flow rates of 8,500 to 21,000 gph and are available in PVC for temperatures to 140 degrees F or in polypropylene for applications to 180 degrees F. Systems are available with a single or double mechanical seal pump or with a magnetic coupled polypropylene pump. Oversize ports on the filter chambers result in low pressure differential, providing long periods of high flow and continuous dirt removal between cartridge changes. **800/323-5431; www.serfilco.com.**

10. WICHITA OFFERS AQUAMAKKS WATER-COOLED CLUTCHES

AquaMaKKS water-cooled clutches and brakes from Wichita Clutch are air, hydraulic or spring-set actuated and feature nonmetallic composite water jackets and heat-dissipating copper wear plates, optimized for heavy-duty continuous slip tension applications in water and wastewater applications. Available in sizes from 19 to 36 inches (friction lining O.D.), the units provide up to 3,400-hp heat absorption. **262/547-3357; www.wichitaclutch.com.**

11. BIRD-B-GONE INTRODUCES MISTING PEST DETERRENT

The Bird-B-Gone Mist hazing system from Bird-B-Gone Inc. releases a fine mist into the air to deter pest birds from flocking in large open spaces. The unit distributes methyl anthranilate, a grape extract that irritates birds' nerve and mucous membranes through entry in the eyes, nose or mouth, causing them to take flight. Nontoxic and environmentally friendly, the extract is used for flavoring in soda and candy. The system has an LCD touch screen for programming up to 64 control units individually. Each drop station covers from 6,000 to 8,000 feet. **800/392-6915; www.birdbgone.com.**

12. RAVEN DESIGNS WASTEWATER CORE SAMPLER

The floatable Wastewater Core Sampler from Raven Environmental Products Inc. is made of clear polycarbonate 1.25-inch O.D. tubes. The couplers and automatic check valve are individually machined from black UHMW plastic with internal O-rings. One thumbscrew holds the two-piece, 16-foot unit together. A three-piece, 24-foot unit is available. The sampler's bright yellow lanyard makes it easy to find if dropped in the tank, while a hard-plastic handle makes it easy to grip. **800/545-6953; www.ravenep.com. tpo**

product spotlight

Megatron UV System Provides Chemical-Free Disinfection

By Ed Wodalski

The Megatron ultraviolet water disinfection system from Atlantic Ultraviolet Corp. is made to treat wastewater without heat or chemicals. Available in four size models (M50, M90, M150, M250), the system's germicidal lamps produce short-wave radiation that is lethal to bacteria, viruses and other microorganisms.

Water quality recommendations for wastewater application are 30 mg/l of biological oxygen demand (BOD) and 30 mg/l total suspended solids (TSS) or less, says Greg Boehme, applications engineer. "We can treat worse water quality, but these are standards for the sizing that we have put in place for the system with a minimum 65 percent UV transmission through a 1-centimeter cell."

With flow rates ranging from 70 to 335 gpm (multiple units can be plumbed for higher flow rates), wastewater enters the stainless steel disinfection chamber and passes between the quartz sleeves and chamber walls where suspended microscopic organisms are exposed to intense germicidal ultraviolet radiation.

Front panel indicator lights and a translucent sight port provide lamp operation feedback. The digital ultraviolet monitor also displays germicidal ultraviolet energy intensity within the disinfection chamber. All electronics are accessible through either of the system's access doors.

"A critical component is the monitoring system," Boehme says. "The system comes with an LED indicator, which notifies you that the lamps are operating properly. Ultraviolet lamps can be in operation for quite a bit longer than the rated life of the lamp, but not producing the appropriate wavelength to kill the bacteria," he says. "We offer monitoring devices as a standard item."

Manual and automatic wiping mechanisms are designed to clean the quartz-sleeved lamps without having to disassemble or shut down the system. Once programmed, the optional automatic wiper permits unattended cleaning.



Megatron ultraviolet water disinfection system from Atlantic Ultraviolet Corp.

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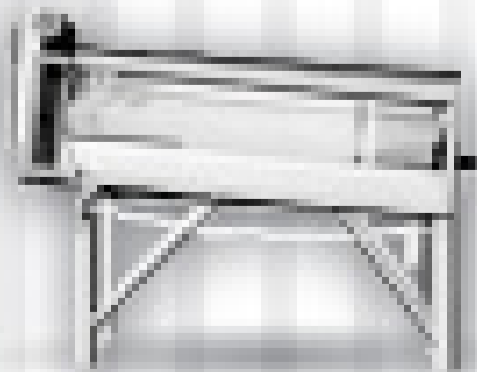
Belt Press

- ▲ Compact Design
- ▲ Configuration can be changed for space limitations
- ▲ Stainless Steel Construction

- ▲ Easy Installation and Operation
- ▲ Low Power Consumption
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- ▲ Standard Replacement Parts

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"There's a handle for the manual wiper, or you can program it to operate up to seven times a day with the automatic wiper feature," Boehme says. The lamps and sleeves also are made to be replaced on site.

An ultraviolet sensor probe mounts to the disinfection chamber, while ports on the inlet/outlet enable inline sample gathering and monitoring.

Each Megatron system is self-contained, although multiple units can be interconnected to comply with nearly any flow requirement.

Maintenance generally consists of yearly replacement of lamps, Boehme says. "The sleeves within the system don't necessarily need to be changed if the cleaning is kept up. Gasket fittings and O-rings typically can be in place for two to five years."

Models range in size from the four-lamp, 70-gpm clear wastewater M50 to the 19-lamp, 335-gpm M250. Unit dimensions range from 100 to 102 inches long, 16 to 21 inches wide and 14 to 26 inches high. **For more information: 631/273-0500; www.ultraviolet.com. tpo**

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people

Aaron Nelson of Virginia Beach, Va., is the new president of the Chesapeake Water Environment Association and Water and Waste Operators Association of Maryland, Delaware and District of Columbia.

Amanda Withers, P.E., is the new president of the Illinois Water Environment Association. She works in the Water and Wastewater Department at Crawford, Murphy & Tilly Inc. in Springfield. The president-elect is Dennis Priewe, an industrial waste surveillance supervisor for the Rock River Water Reclamation District in Rockford, Ill.

Melissa Beard, former executive director of the North Carolina Society of Surveyors, joined the North Carolina AWWA-WEA as its executive director.

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

associations

Nutrient Reduction Specialty Conference

The Kansas Department of Health and Environment and the Kansas Water Environment Association (KWEA) hosted the first Nutrient Reduction Specialty Conference at the Topeka Capitol Plaza Hotel last August.

Experts from multiple consulting engineering firms presented papers on various aspects of the nutrient removal process design, followed by two presentations on the experiences of operating nutrient removal facilities. The second day focused on process design and operations. Regulators from Iowa and Missouri attended to learn of the successes achieved in Kansas.

Clean Water Act Awards Suspended

The EPA Office of Wastewater Management suspended the 2009 Clean Water Act Recognition awards to focus on redesigning the program so that it aligns more closely with its sustainable infrastructure goals and to the water industry through broader applicability. Updates on the program are at www.epa.gov/owm/mtb/intnet.htm.

Fake Inspectors

The Illinois EPA reported that two treatment plants were contacted by people falsely claiming to be EPA inspectors. They cited the plants for potential algae violations and penalties. Shortly thereafter, a salesman for a chemical firm arrived, offering products to address the violations. One community made a \$15,000 purchase and the other made a \$10,000 purchase. The Illinois Attorney General Consumer Fraud Division, Illinois EPA Division of Legal Counsel, and other agencies are investigating.

awards

Chesapeake Water Environment Association

- William D. Hatfield Award – Paul Brennan, Washington Suburban Sanitary Commission
- Burke Award – Seneca Wastewater Treatment Plant
- 5S Society – Ted DeBoda and Ray Schulte
- Golden Manhole Award – Laurie Terry and John Fletcher
- Tri-Association Special Award – David Kappe

Chesapeake Water and Waste Operators Association of Maryland, Delaware and District of Columbia

- Wastewater Collection Systems Distinguished Service Award – Tony Arch and Michael Crowe

- W. McLean Bingley Award for Wastewater Treatment – Jason Newman, Swan Point; William Albrittain, Blue Plains; Robert Wood, Seneca; and Jeff Van Horn, Parkway
- Wastewater Collection Systems Distinguished Service Award – Tony Arch, Charles County; Michael Crowe, Seneca
- Distinguished Service Award for Laboratories – Danny Coates, D.C. Water and Sewer Authority

North Carolina AWWA-WEA

- William D. Hatfield Award – Ken Vogt
- Outstanding Service Award – Tony Dubois
- Wastewater Lab Analyst Award – Tamika Black
- Raymond "Red" Ebert Award – John Greene
- Municipal Operator of the Year – Dan Dougherty, Gastonia
- George Burke Safety Award – Greenville Utilities Commission
- Courman Safety Award – Mt. Pleasant Wastewater Treatment Plant, Water & Sewer Authority of Cabarrus County
- Wastewater Collections Operator of the Year – Troy Perkins
- 5S – David Wagner, Lynda Elliott, Ken Vogt, Andy Brogden, Steve Drew
- Golden Manhole Award – Andy Brogden, Greg Wells, Marie Doklovic, Tony Dubois
- Treatment Plant Operation & Maintenance Excellence Awards – East Region: Mt. Olive Pickle; Central Region: City of Oxford; West Region: CMUD McDowell Creek

education

Focus on Energy Manual

The Wisconsin Focus on Energy program helps municipal wastewater plants identify, assess and implement energy-efficiency projects. Modifications have involved aeration systems, pump systems, lighting, heating and solids management. The program offers the *Water/Wastewater Energy Best Practice Guidebook*. Download it at www.focusonenergy.com/Business/Industrial-Business/Guidebooks/default.aspx.

Wastewater Branding

The California WEA and affiliates published a 52-page manual about elements related to branding the state's wastewater industry. By branding, utilities can improve how they communicate about their roles, services and the value they provide. Building the Wastewater Utility Brand is a free download to members at www.cwea.org.

British Columbia

- The British Columbia Water and Wastewater Association offers these classes:
- June 1-5 – Water & Wastewater Operations, Kamloops
 - June 11-12 – Supervisory and Leadership Skills, Richmond.
- Call 604/433-4389 or visit www.bcwwa.org.

North Carolina

The North Carolina AWWA-WEA has these classes at the State University McKimmon Center in Raleigh unless stated otherwise:

- June 4 – Biological Nutrient Removal, Hickory Crowne Plaza
- June 9 – Construction Specifications, Blueprints and Shop Drawings for the Operator (site to be determined)
- July 13-17 – Western Biological Wastewater Operators School, Morganton. Call 919/784-9030 or visit www.ncsafewater.org. **tpo**




CALENDAR OF EVENTS

- May 3-6**
WEF Residuals and Biosolids Specialty Conference, Doubletree Hotel-Lloyd Center, Portland, Ore. Call 800/666-0206 or visit www.wef.org.
- May 5-7**
Alaska Water Wastewater Management Association Training Conference, Dena'ina Civic and Convention Center, Anchorage. Call 907/561-9777 or visit www.awwma.org.
- May 6-8**
Arizona Water & Pollution Control Association Conference & Exhibition, Renaissance Hotel & Spa, Glendale. E-mail Debbie Muse at musegroup@aol.com or visit www.awpca.org.
- May 10-13**
Nutrient Recovery from Wastewater Streams International Conference, Westin Bayshore, Vancouver, British Columbia. E-mail mmori@venuewest.com or visit www.nutrientrecovery2009.com.
- May 10-15**
New Jersey Water Environment Association Conference, Bally's, Atlantic City. Call Jack Lagrosa at 201/296-0021 or visit www.njwea.org.
- May 18-21**
Central States Water Environment Association Conference, Marriot Resort, Lincolnshire, Ill. Call Eric Lecuyer at 815/954-2714 or visit www.cswea.org.
- May 18-22**
Central States Water Environment Association Annual Meeting, Marriott Resort, Lincolnshire, Ill. Call 815/954-2714 or visit www.cswea.org.
- June 2-6**
Mississippi Water Environment Association Conference, Hollywood Casino and Convention Center, Bay St. Louis. Call 662/562-5314 or visit www.mswea.org.
- June 7-10**
PennTec, the Pennsylvania Water Environment Association Conference and Exhibition, Lancaster Host Hotel, Lancaster. Call 570/549-2204 or visit www.pwea.org.
- June 10-12**
Iowa Water Pollution Control Association Annual Meeting, Wild Rose Resort, Clinton. Call 515/232-4952 or visit www.iawpca.org.
- June 19-21**
Indiana Water Environment Association Wastewater Challenge, Mishawaka Utilities, Mishawaka. Call 317/328-2151 or visit www.indianawea.org.
- June 21-25**
Michigan Water Environment Association Conference, Boyne Mountain Resort, Boyne Falls. Call 517/641-7377 or visit www.mi-wea.org.
- June 22-25**
Ohio Water Environment Association Conference, Hyatt Regency Downtown, Cincinnati. Call Tim Shaw at 513/871-9970 or visit www.ohiowea.org.
- June 25-28**
Stockholm Junior Water Prize National Competition, University of Alaska, Anchorage. Contact Stephanie Costello at scostello@wef.org or visit www.wef.org.
- June 28-July 1**
WEF Nutrient Removal Conference, Omni Shoreham, Washington, D.C. Call 800/666-0206 or visit www.wef.org.


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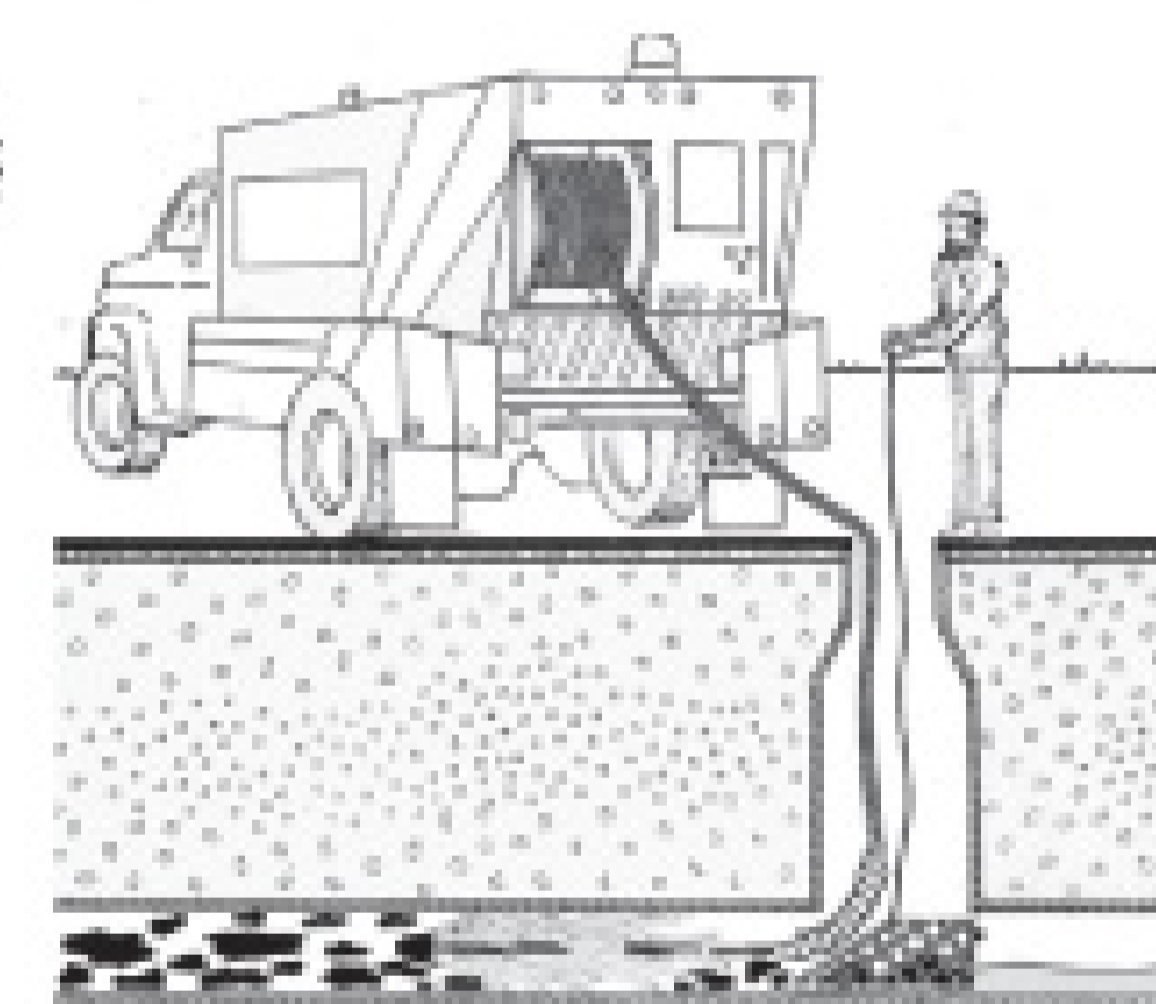
Manhole Tools

Debris Catchers
Use Debris Catchers with Jet instead of Combo. Ideal where small amounts of debris are expected. Standard MDC-6 model Comes with 20' of Poly Rope. Available from 6" to 24".




Grit Catchers
MDC-6CW are similar but have half moon bottom around sides and back to stop finer grit and black sand from flowing through. Fills with material faster.






Debris Catchers and Grit Catchers both can be used with any length of Fiberglass Poles. Provides for positive action of positioning, raising and/or lowering these catchers in manholes.


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24' pole set used with above Tools and Debris Catchers. Each set Includes 3 ea. 6' male x female and 1 x 6' end pole. These are Light, Strong durable poles with positive lock Aluminum quick couplings. Other lengths available. Use with Debris and Grit Catchers and assortment of tools below




MGLC-1
Grease Log Chopper. Blade cuts thru heavy pieces.




M3PG-1
Three Prong Grabber. Great for Rocks and Roots.



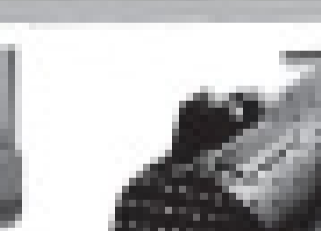
MHG-2
Horse-Shoe Grabber. Great guiding hose in and out of sewer lines.




MDS-6
Debris Scoopers Heavy duty construction For 6", 8" and 10" Pipe sizes.




MCG-6
Grit Basket. For use with poles or rope. In sizes from 6" to 24".



MCLAW MAX-CLAW 7'-15' Telescopic Extendable Claw with fiberglass pole extensionspring loaded end Claw for Heavy duty retrieval. Jaws stay open and positive rope pull locking systems assure you won't lose your debris.

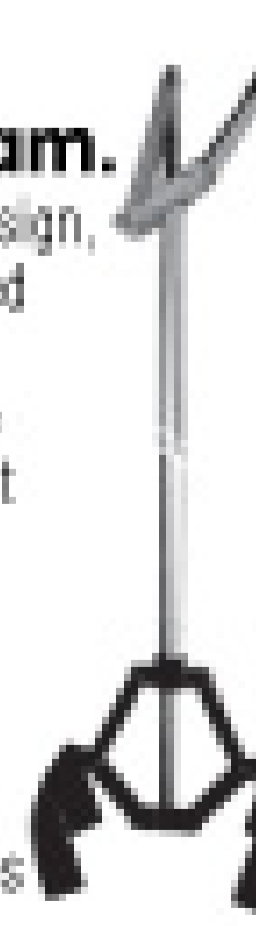


MDG-1 DEBRIS GRABBER 5'-15' Telescopic Extendable Debris Grabber with Steel body construction and articulating end fork. Rope opens and closes jaws for positive grabbing.



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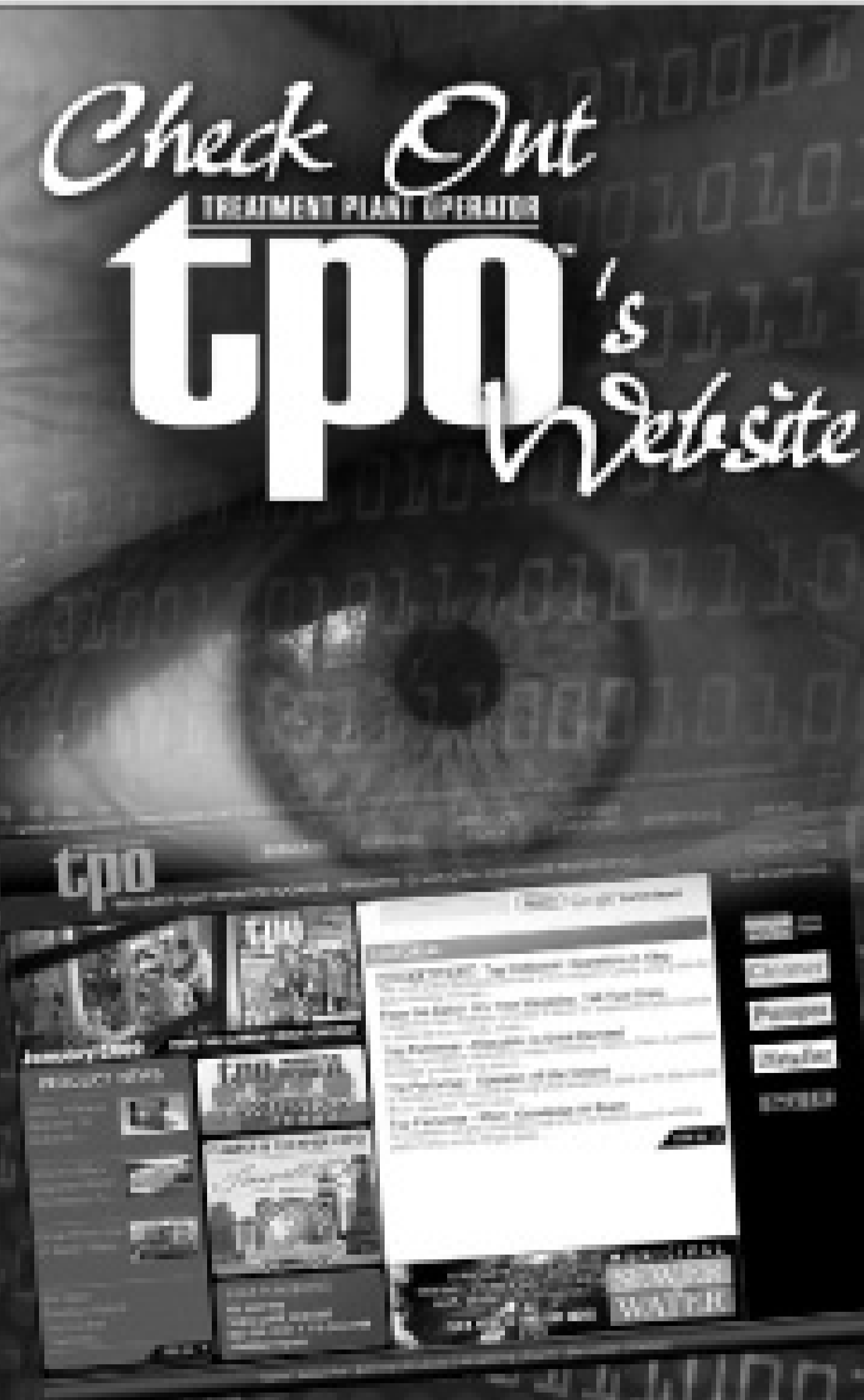
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Quiet, sound-attenuated shell muffler inside the Warrior letter carrier tool to reduce operating noise.



The Warrior letter carrier Spartan tool is shown in a quiet mode. Photo courtesy of Spartan.

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Spartan Tool Company
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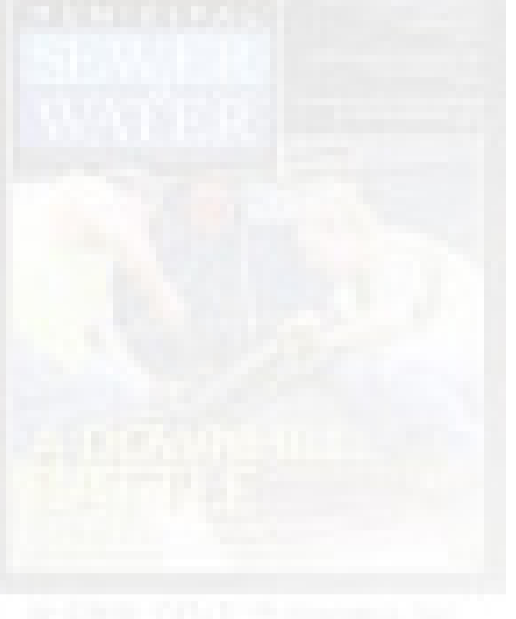
Operations Photo and Video: Michael DeLong and crew. The team of background...



Spartan Tool president Tom DeLong is shown here with the Warrior letter carrier tool. Photo courtesy of Spartan.



Photo courtesy of Spartan. The Warrior letter carrier tool is shown in a quiet mode. Photo courtesy of Spartan.



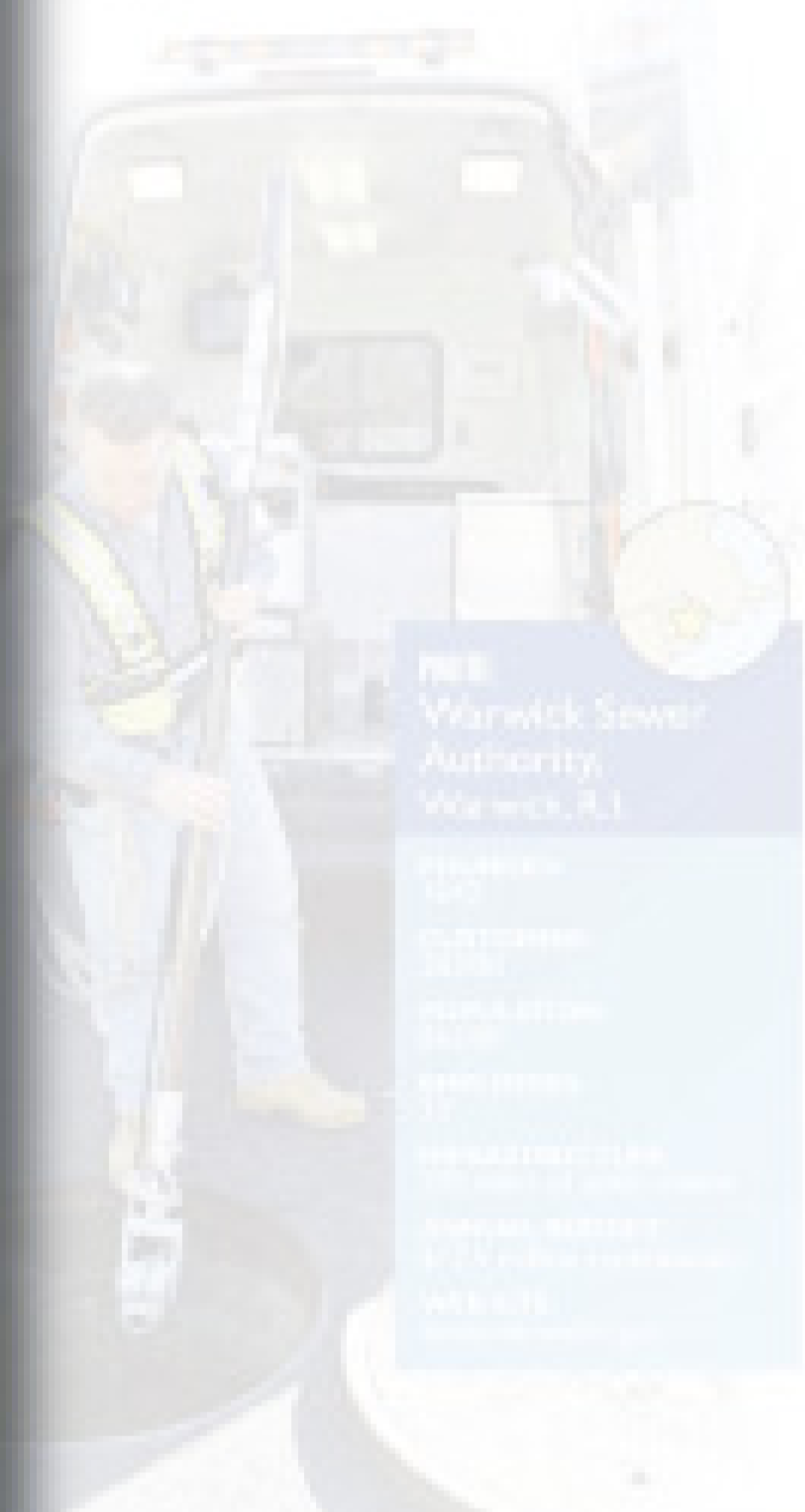
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Photo courtesy of Spartan. The Warrior letter carrier tool is shown in a quiet mode. Photo courtesy of Spartan.

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EVERYTHING UNDER CONTROL

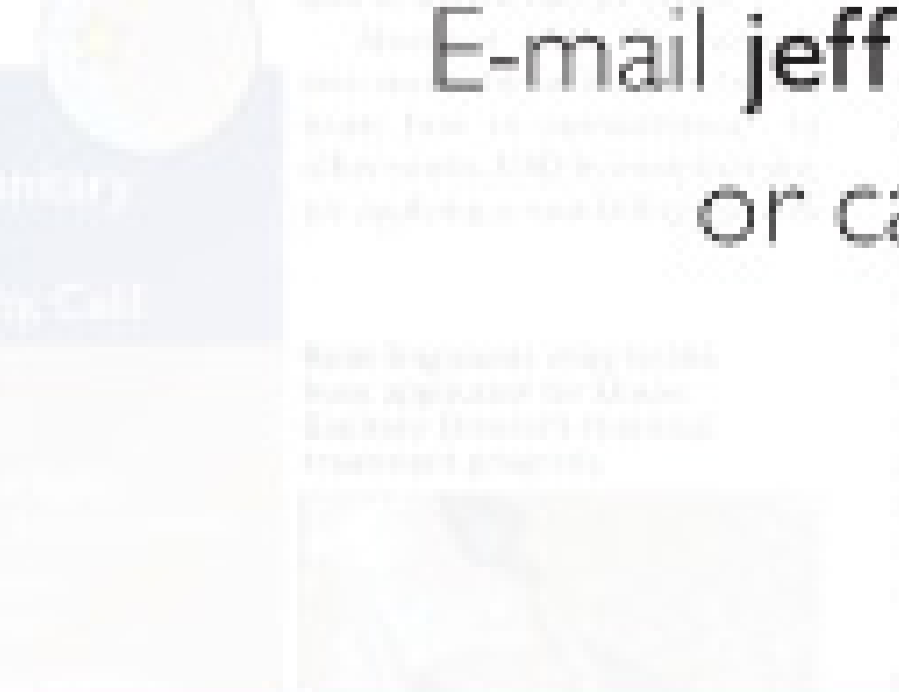
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RIS
Union Sanitary District
Union City, Calif.
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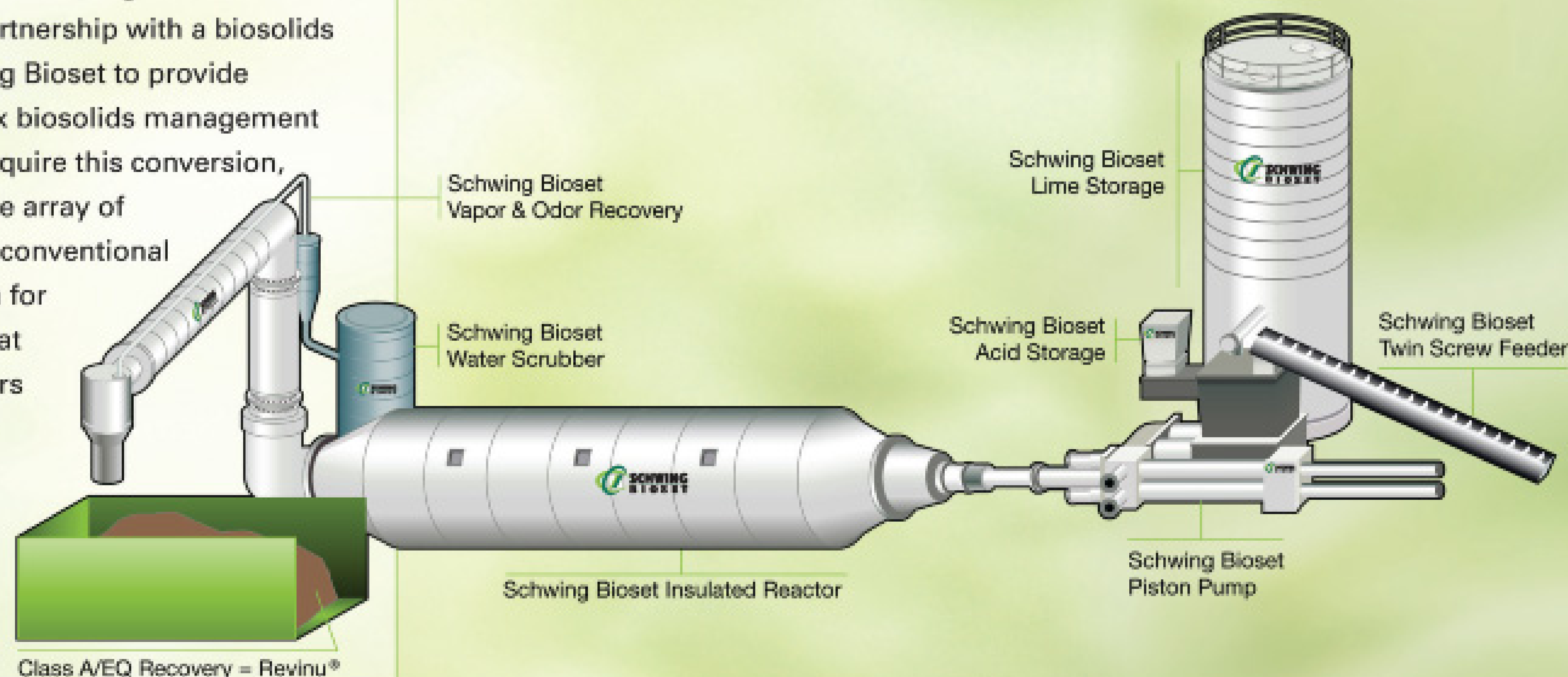
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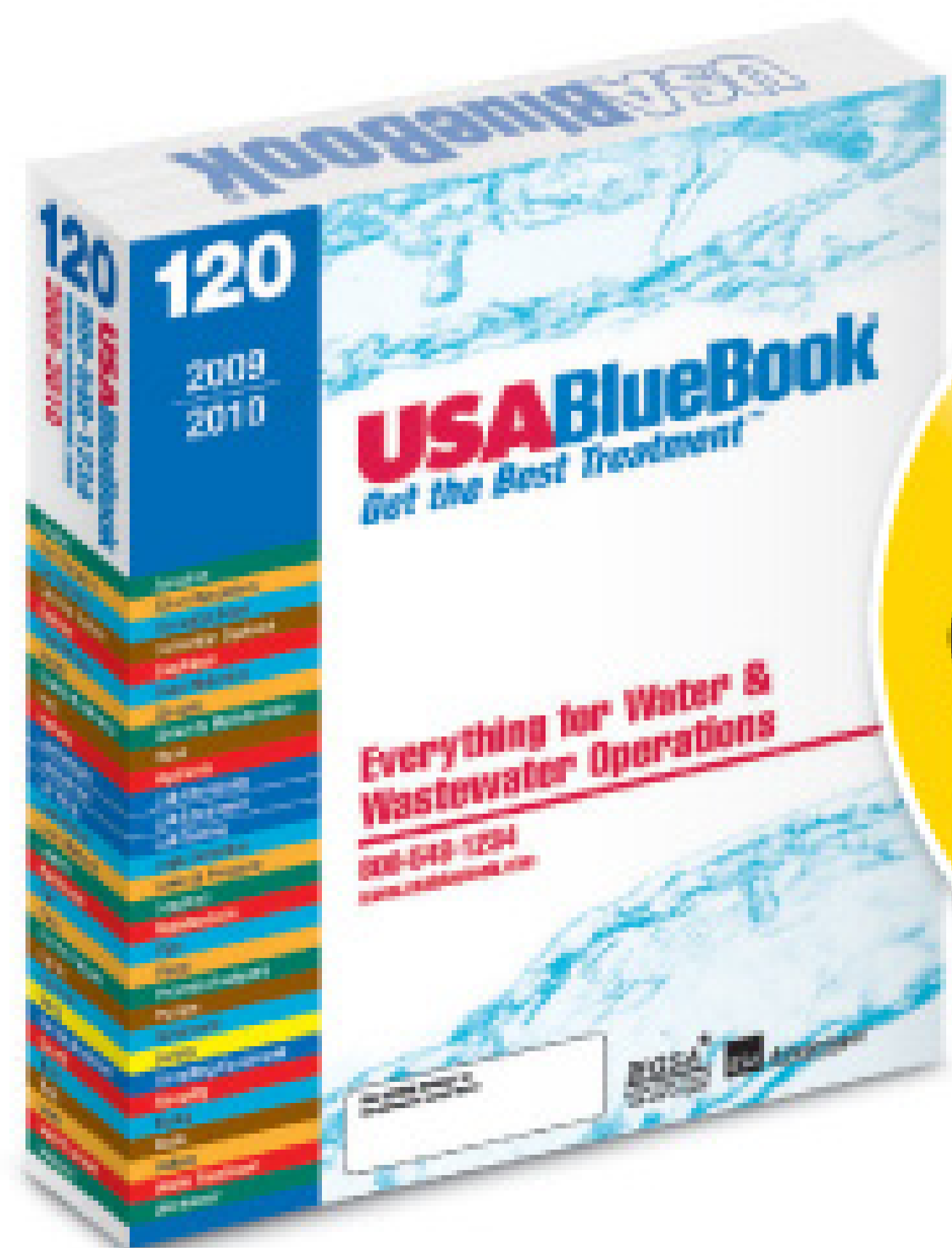




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