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MARCH 2009

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**BOZEMAN TREATMENT PLANT
MEETS NEW NUTRIENT STANDARDS
AND PREPARES FOR EXPANSION**

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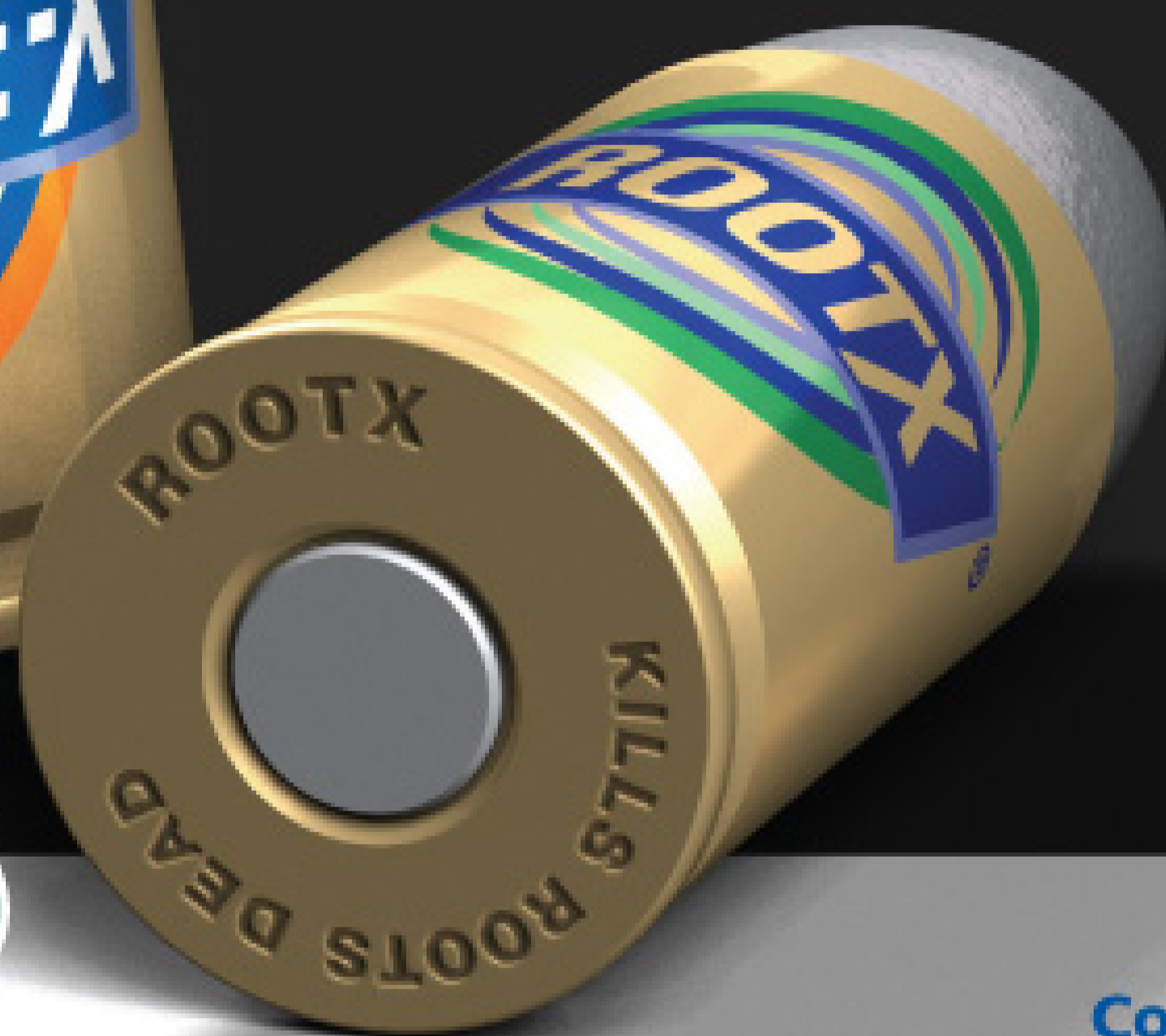
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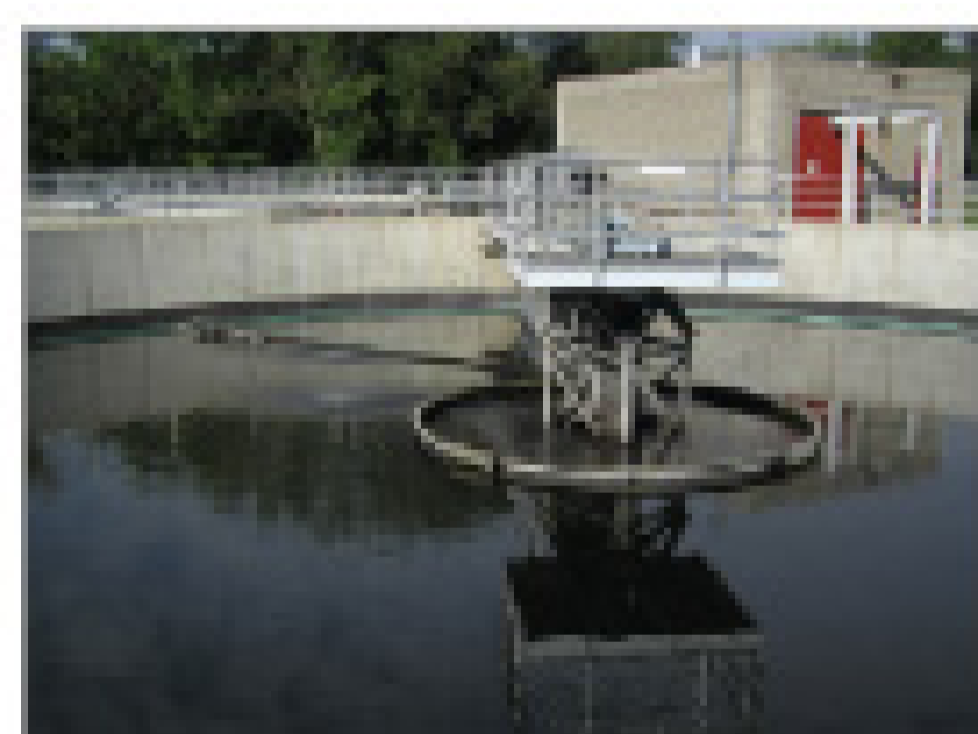
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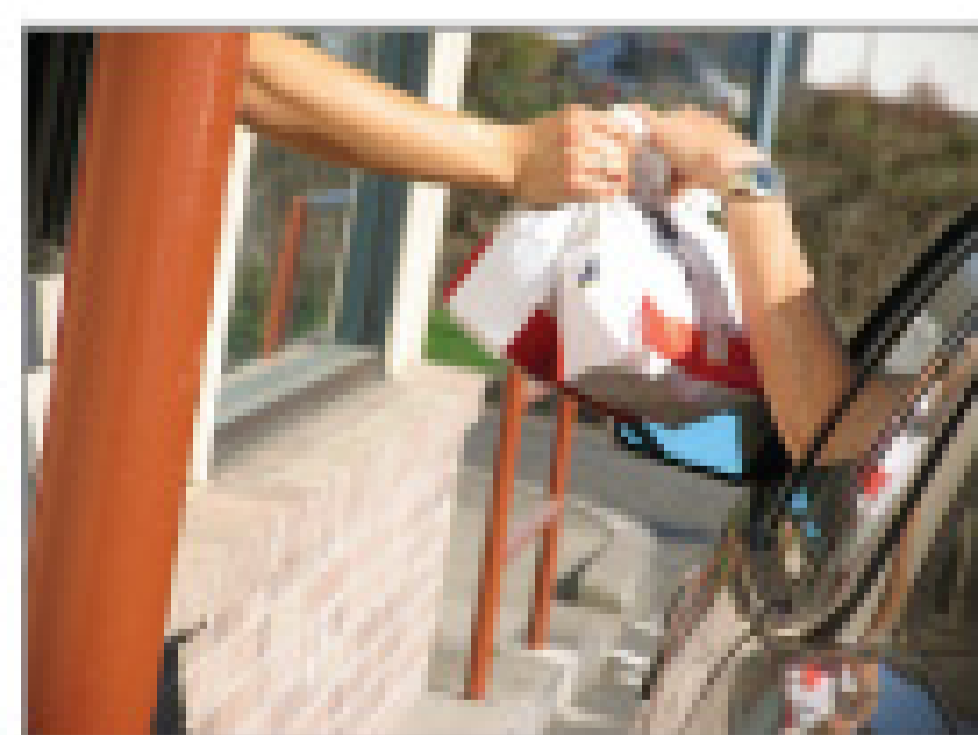


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THE WORK YOU DO WITH WASTEWATER IS IN FACT MIRACULOUS, AND UNDERSTANDING THAT FACT CAN BE A KEY TO EFFECTIVE COMMUNICATION WITH YOUR PUBLICS

By Ted J. Rulseh, Editor

Sometimes it's hard to see things that are right in front of us. That includes some truly remarkable things that we've come to consider ordinary.

Take wastewater treatment. Pretend for a moment that you don't know anything about the business — that you're basically Joe or Jane Citizen. Stand at the inlet to your treatment plant and watch the water flow.

You might wonder: How in the world can they make anything useful out of this filthy, smelly water? And yet, what comes out of your treatment plant? First, clean water — clean enough to protect your receiving stream, maybe clean enough for irrigation. Second, biosolids, a great soil conditioner and fertilizer.

From a hopelessly dirty river of waste, two wholesome products. It's amazing, isn't it? At least you would think so if you didn't know exactly how all the mechanical, biological, physical and chemical processes work.



TRUE APPRECIATION

Instilling that sense of amazement — of wonder — is important to winning the public acceptance and appreciation your facility needs, especially when it comes time for that plant expansion or upgrade, and you need to ask people to spend money.

There's a big difference between wastewater treatment and most other city services. Take fire protection, for example. Many boys (and some girls, too) at some point dream of being firefighters.

It's obvious what firefighters do. They help people. They save homes and possessions. They save lives. When they go to work, sirens sound and lights flash and traffic parts and everyone knows something great is happening.

Then there's wastewater treatment. People flush the toilet and forget it. Great things happen at the end of the pipe where you work, but people don't think about it, or care,

unless there's an odor problem, or until there's a permit exceedance and a story about it appears in the local paper.

STANDING TALL

These differences matter at budget time. In my days as a news reporter, I attended a town budget meeting where a few citizens stood up to complain about a planned increase in spending for the volunteer fire department.

"Chief," the town chairman said, "would you like to respond to that?"

The fire chief walked up to the front of the room wearing his official shirt and badge. He explained exactly what the increase was for — mainly a new truck and equipment needed to protect the community in the face of growth.

But he didn't stop there. "Remember," he said, "that we're here to protect this town anytime, day or night. We've got 30 volunteers in our department. Every one is a fully certified

Instilling that sense of amazement — of wonder — is important to winning the public acceptance and appreciation your facility needs, especially when it comes time for that plant expansion or upgrade, and you need to ask people to spend money.

firefighter. And they are all emergency medical technicians. We're on call 365 days a year, around the clock. I think you're getting by real cheap with a real good service."

That discussion was over. The department's budget passed without another word — not just because of what the chief said but because of what the people already know about the fire department and its importance.

NOW IT'S YOUR TURN

Now, how would the discussion go if you had to get up in public and defend your plant? Could you talk about it in terms as compelling as that fire chief did? What might you talk about? How you've met your permit for three years running? Sure. About your people and their qualifications? Of course.

But what about the miracle? Everyone already knew about the fire chief's miracles. How about yours? You might tell what sanitation would be like in your community if your plant weren't there. And how people catch smallmouth bass a quarter-mile downstream from your outfall, where 30 years ago they could only catch carp. And how your biosolids help farmers raise healthy crops and replenish their soil.

That's why your plant is really there — to make your community and surroundings clean, safe, beautiful and healthy. You do that by making valuable products from that filthy water. It's recycling at its best and most effective.

It may seem like just a day's work to you. But to your friends and neighbors, it looks an awful lot like a miracle. A miracle makes a great story. So tell it — every chance you get. **tpo**

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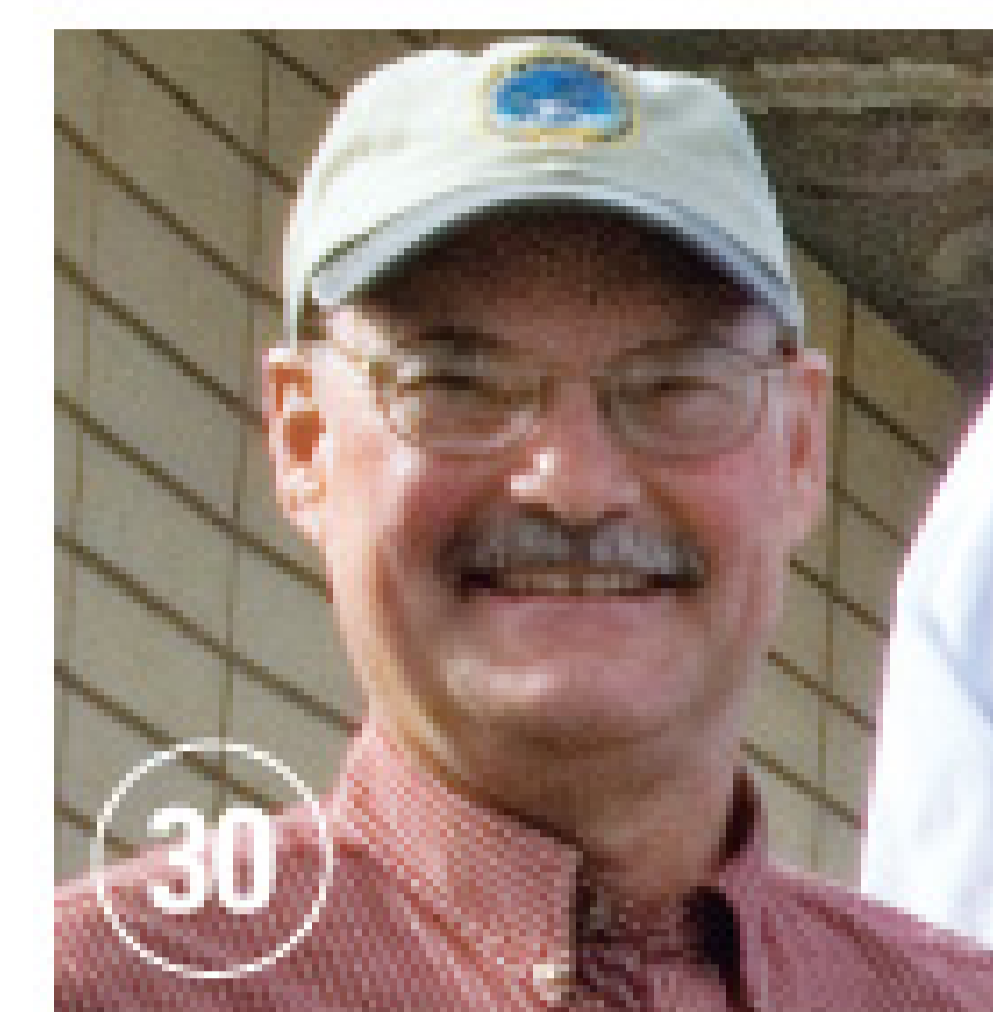
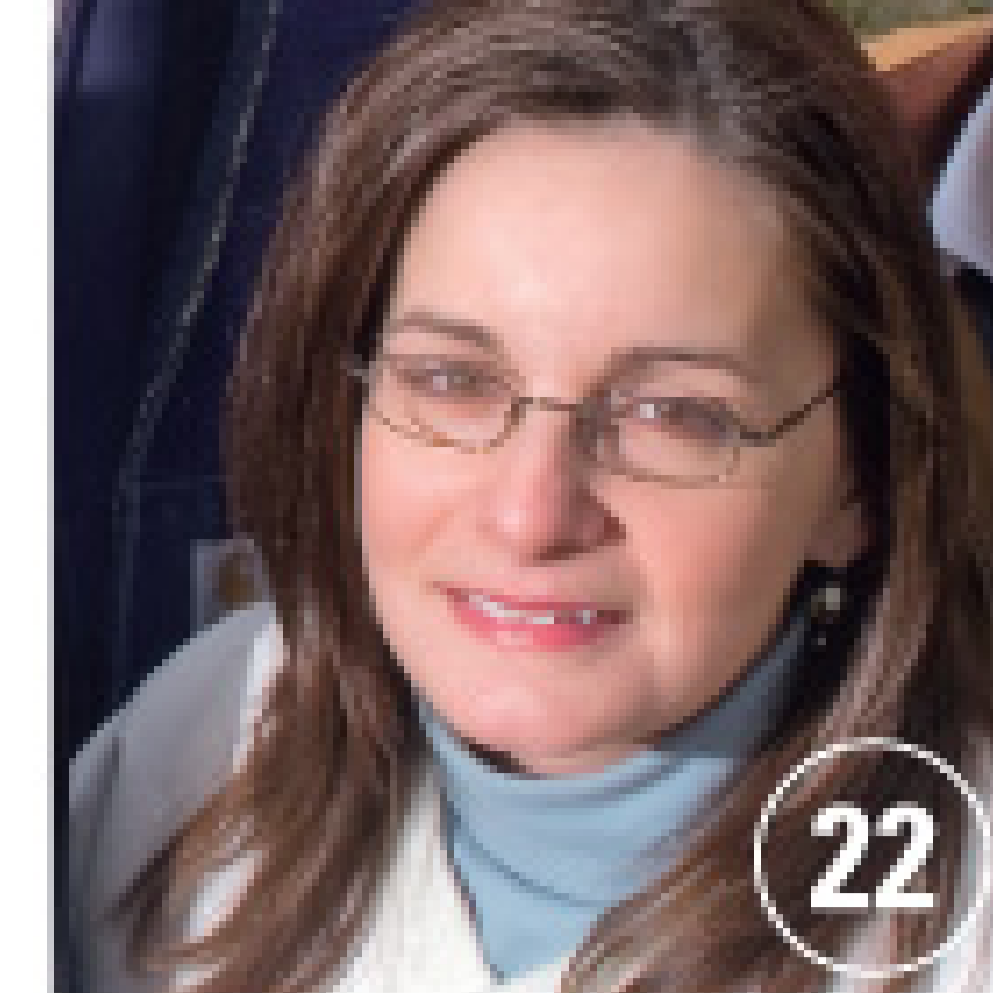
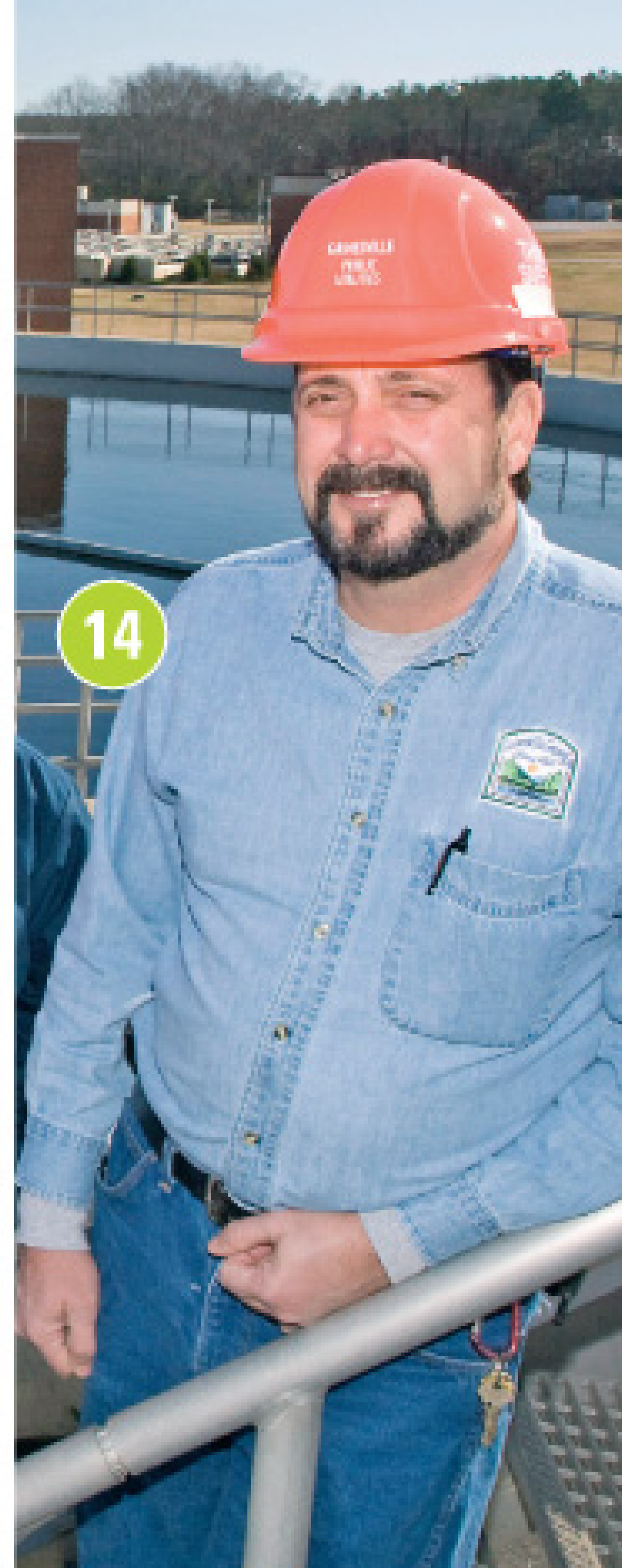
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on the cover

Tom Adams, superintendent of the Bozeman (Mont.) Wastewater Treatment Plant, leads an exemplary team that has met the challenge of tough nutrient removal standards while getting ready for a significant expansion, from 5.8 mgd design capacity to 13 mgd. (Photography by Carmen Daye Irish)

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CORRECTION

Incorrect information was printed for Roediger Pittsburgh Inc. in the February issue in an article featuring the Dane-Iowa Wastewater Treatment Facility in Mazomanie, Wis. **Roediger Pittsburgh Inc. is now Charter Machine Company.** Their correct contact information is below:

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Sedums, native grasses and other plants grow on a 2,400-square-foot green roof at the Empire treatment facility. The roof captures stormwater and reduces air conditioning costs. It also will last twice as long as a conventional roof.

Setting an Example

LOW-IMPACT DEVELOPMENT FEATURES, INCLUDING A GREEN ROOF, PUT A TWIN CITIES WASTEWATER TREATMENT PLANT ON THE FOREFRONT OF EARTH-FRIENDLY LANDSCAPING

PHOTOS COURTESY OF METROPOLITAN COUNCIL ENVIRONMENTAL SERVICES

By Scott Bestul

It started with the trout — the big trout, living in the Vermillion River, a Mississippi River tributary that flows through several fast-growing suburbs of Minneapolis, Minn. It's the same river to which the Empire Wastewater Treatment Plant used to discharge treated wastewater effluent.

The brown trout were a key reason the Empire Plant is now home to a variety of low-impact development features: pervious pavements, rain gardens, infiltration basins fed by vegetated swales and — perhaps the greatest source of pride — a green roof on one of the plant buildings.

SECRET NO LONGER

But it all began with the fish. “The trout were kind of a best-kept secret until the Minnesota Department of Natural Resources (DNR) did a stream survey about 15 years ago,” says Karen Jensen, environmental engineer with Metropolitan Council Environmental Services (MCES). “There were not only some very large trout, but they were reproducing naturally and doing very well.”

Staff at MCES, which operates a wastewater collection system and seven treatment plants serving communities in the seven-county Twin Cities metro area, weren't the only ones surprised by the survey. But plant manager Pat Oates, Jensen and their colleagues realized those trout presented a call to action.

Besides discharging into the trophy trout water, the Empire Plant faced the challenges of treating an increasing volume of wastewater for four rapidly expanding communities. “At the time of the stream

survey, our plant was contributing about 20 percent of the flow volume to the Vermillion, depending on the season,” Jensen notes.

The plant's service area was projected to grow to 200,000 residents by 2030, and regulators and downstream citizens were concerned about the impact that increased stormwater would have on the water volume, temperature and quality of the river. A series of public meetings and hearings was held to gather input, and that helped in crafting a long-term solution for the plant and its increasing effluent discharge.

“After the meetings, we decided that a smaller, nearby treatment plant would be shut down and the Empire facility would be expanded,” says Cammy Johnson, an assistant business unit manager for the Empire Plant.

“We decided that discharging to the Vermillion River was no longer a suitable option, so construction began on a 12-mile outfall pipe that would carry effluent to the Mississippi, where it would be more readily absorbed.”

The outfall system consists of large pumps that push effluent to higher ground north of the plant. From there, the effluent flows by gravity — through pipes ranging from 54 to 66 inches, some in tunnels as deep as 100 feet — toward Old Man River.

MANAGING STORMWATER

The Vermillion got help in other ways, too. “The citizens group Friends of the Mississippi River helped develop a management plan that included stream restoration and habitat work on the Vermillion,”

Jensen notes. “They did some bank improvement projects that included installing ‘lunker’ structures that create trout habitat.

“They also helped us restore a 50-acre wetland on our property. The Empire Plant site encompasses 460 acres. A portion of the plant area is former marginal farmland that is now left wild, while much of the upland acreage outside of the actual physical treatment plant site is spread with the plant’s biosolids and leased to local farmers.”

In addition, MCES incorporated innovative stormwater management features into the plant’s design for expansion. “These features all fall under a Low Impact Development (LID) philosophy that incorporates techniques where most of the stormwater is allowed to soak into the ground where it falls,” Jensen says.

“Traditional practices that involve piping stormwater as quickly as possible to settling ponds may cause downstream flooding, do little to improve water quality, and actually cause warming of the stormwater, which is detrimental to the trout. LID methods are a cost-effective, environmentally friendly alternative, and they have worked well for us. They involve a little more effort to construct and establish, but they are more environmentally effective in the long run.”

KEEPING IT GREEN

There are four major LID improvements on the Empire Plant site. Three rain gardens (also known as infiltration basins) allow stormwater to soak slowly into the rich loam beneath them, filtering out pollutants and reducing runoff. The gardens, ranging in size from 0.3 to 1.2 acres, are depressed basins planted with native grasses.

“They’re in the ‘baby stage’ right now,” Jensen says. “They consist of a loose layer of fluffy soil, not compacted by heavy equipment, followed by a thin layer of compost, organic soil and sand that allows a good root base for the native grasses.

“This layer filters out potential pollutants like metals and nutrients, and the native plants take up the water. Even better, these plants require no fertilizer or pesticides to maintain, and they create wildlife habitat.”

In addition, a series of 10 vegetated swales (grassy ditches) convey stormwater toward the rain gardens. “Like the rain gardens, these ditches help absorb water and reduce flow, while collecting potential pollutants,” Jensen explains. “We let nature treat as much of the water as possible.”

Jensen’s pride and joy is a green roof of sedums, native grasses and other plants growing on a specially engineered roof on the

“[Low-impact development] methods are a cost-effective, environmentally friendly alternative, and they have worked well for us. They involve a little more effort to construct and establish, but they are more environmentally effective in the long run.”

KAREN JENSEN

ABOUT THE PLANT

The Empire Wastewater Treatment Plant, operated by Metropolitan Council Environmental Services, is located in Dakota County, Minn. It was built in 1979, and a major redesign and renovation was completed in 2007.

The plant has a design flow of 24 mgd and now treats 9.4 mgd. Major treatment components include an influent pumping station, three mechanical fine screens, two vortex grit removal tanks, six primary clarifiers, five anaerobic/anoxic selector basins, five activated sludge aeration basins, eight secondary clarifiers, three UV disinfection units, and an effluent pumping station.

Three primary and two secondary digesters process primary and secondary waste sludge. Two belt filter presses produce cake that is spread on nearby farm fields twice per year.

plant’s Reverse Activated Sludge (RAS) Pump Building. The 2,400-square-foot roof does more than capture stormwater that would otherwise drain away — it naturally cools the building and reduces air conditioning costs. Additionally, the green roof should last twice as long as a typical hot-applied membrane roof.

“This roof is a thing of beauty in the summer,” Jensen says. “The grasses and blooms are visited by birds and butterflies, and it’s wonderful to look at. We wanted to install it as an example of what can be done to reduce stormwater flows in future suburban and urban construction projects.

“Our green roof is one of the most innovative and interesting features of the plant. And because the building is below grade, the roof is easily viewed from ground level. During drought periods we do water the roof, but we use treated effluent rather than groundwater.”

PERVIOUS PARKING

Another innovation at Empire is a parking lot constructed with pervious pavers — paving bricks separated by gravel-filled spaces that allow rain to soak in and reduce runoff. Several parking areas on the site use these pavers, which Jensen says are surprisingly tough and easy to install and maintain.

Jensen and Johnson both point with pride to the Empire plant’s earth-friendly features. “We’ve given several tours of the plant since adding these features, and people are excited to see these practices in use,” Johnson says. “We can experience a 2-inch rain event and hardly a drop of water leaves this facility. It’s all absorbed.

“I’m really proud that we took the leap to install these features, and I hope that they’ll inspire other organizations, private citizens and builders to consider them as an environmentally friendly way to build and expand.” **tpo**



Three rain gardens allow stormwater to soak slowly into the rich loam, filtering out pollutants and reducing runoff. The gardens, ranging from 0.3 to 1.2 acres, are depressed basins planted with low-maintenance native grasses.

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

On the Bus

THE WHEELS TO WATER PROGRAM IN KING COUNTY, WASH., MAKES IT EASY FOR STUDENTS TO GET TREATMENT PLANT TOURS AND CLEAN-WATER EDUCATION

By Greg Northcutt

Students in and around Seattle have a compelling reason to see what their local wastewater treatment plant does and how it works.

“We make it impossible for students not to come. The transportation is free and the tours are free,” says Casey Plank, an outreach educator with the Wastewater Treatment Division of King County, Wash.

Plank directs the agency’s Wheels to Water program, a partnership between the division and Metro Transit, the county’s public transportation agency. It enables schools to send students in grades 4-12 on wastewater treatment field trips at no cost. It provides free bus rides from the schools to the treatment plants or to biosolids soil-study sites.

“Wheels to Water helps many schools in the area that don’t have funding for buses,” Plank says. The program enables the students to view up close what many people seldom see, much less think about — what happens to water after they drain the kitchen sink or flush the toilet. At the same time, the tours open students’ eyes to possible careers in treatment plant design, operation and maintenance.

A POPULAR PROGRAM

“The tours are really fun for the kids,” says Plank. “They experience the sights, sounds



The county’s Wheels to Water program is free to schools and makes environmental education more accessible to teachers and students across the Greater Seattle area.

“It’s easy to connect the activities at the plants to a wide variety of subjects that the students are learning in the classroom.”

CASEY PLANK

and smells of the plant. Then, they go home that night and tell their family all about what they’ve learned. This helps to increase awareness of our wastewater treatment system and to build long-term public support for it.”

Wastewater field trips have also proven popular with the teachers. “Once a teacher has taken a tour, they are usually sold on the program,” Plank adds. “In fact, the program is maxed out. A number of teachers return with a class every year. Others participate based on word-of-mouth.”



PHOTOS COURTESY OF WASTEWATER TREATMENT DIVISION OF KING COUNTY, WASH.

“Good” bacteria takes center stage as students peer into West Point Treatment Plant’s secondary clarifiers to learn about the biological wastewater treatment process.

A total of about 1,300 students, representing about 40 groups, take Wheels to Water tours each year. Funded through the Wastewater Treatment Division’s operating budget, it is part of the agency’s public education program, which explains the role of treatment plants in protecting health and the environment. The Division serves some 1.4 million residents in a 420-square mile area that includes Seattle and many suburbs.

CLASSROOM CONNECTION

The students visit either of two treatment facilities — the West Point Treatment Plant (133 mgd) or the South Treatment Plant (115 mgd). Wheels-to-Water also serves the Mountains to Sound Greenway forests and soils education programs.

Plank works with the teachers to schedule buses and treatment plant tours. Two part-time college interns help conduct the actual tours. Each tour group is limited to about 20 people per tour guide, including the teacher and chaperones.

The tours begin with a half-hour presentation that describes the plant’s operations in terms of recycling. It explains how the water is brought to the plant, how it is treated and how biosolids and energy are recovered. During the 90-minute walking tour of the facility, students see how water is treated from start to finish.

“It’s easy to connect the activities at the plants to a wide variety of subjects that the students are learning in the classroom,” Plank

explains. "Students in science classes can see how biology, chemistry and environmental sciences are being applied. Math students can learn about the various numbers and percentages involved with the quantities and sources of water treated and the byproducts produced at the plant. We also cover the social science connections and the area's history of wastewater treatment."

THE PAYOFF

With younger students, the tour guides ask questions to get them thinking about how the treatment plants protect the quality of water in the area's lakes and Puget Sound.

"By the time they get to high school, the students themselves are asking really good questions, like how to handle overflow situations or remove certain types of chemical pollutants in the water," Plank says. "We also point out the career opportunities available to them in keeping water clean and protecting the environment."

Recruiting teachers who aren't familiar with wastewater treatment can be a challenge. "Touring a treatment plant doesn't seem as attractive as visiting a museum or aquarium," Plank notes. So she distributes brochures at the schools, works with school staffs, and networks with environmental education groups to promote the program.

Judging by comments she receives from students and teachers, she is confident the program is paying off. "I hope the tours are causing some people to change their behavior about what they put in the water," Plank says. "However, at the least, I know that we're increasing their awareness of the role of treatment plants." **tpo**

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

"I hope the tours are causing some people to change their behavior about what they put in the water."

CASEY PLANK

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Living Proof

A BIOMONITORING PROGRAM AT THE MADISON METROPOLITAN SEWERAGE DISTRICT'S NINE SPRINGS TREATMENT PLANT YIELDS EVIDENCE OF WATER-QUALITY IMPROVEMENT

By Scottie Dayton



Madison Metro research biologist Jeff Steven takes samples of aquatic macroinvertebrates on Badger Mill Creek. A Wildco D-Frame net and bottles are used to collect samples that will be returned to the biology lab for analysis. (Photos courtesy of Madison Metropolitan Sewerage District)

The Madison (Wis.) Metropolitan Sewerage District has monitored the chemistry of the effluent leaving its Nine Springs Treatment Plant since the early 1940s. In 1983, the staff research biologist began shocking fish and looking at aquatic insects in the receiving streams as another way to monitor the discharge and protect the environment.

The district's effluent quality always met EPA and Wisconsin Department of Natural Resources (DNR) standards. In 1986, the district doubled the size of the plant, increasing retention time to lower BOD and TSS, adding nitrification, and switching from chlorination to UV disinfection. As effluent quality improved, pollution-intolerant aquatic insects and fish began moving upstream.

Jeff Steven joined the district biomonitoring program in 1981 while finishing his master's degree in entomology at the University of Wisconsin. Today, as district research biologist, he is in charge of the biomonitoring program, but also takes monthly water samples at the

two receiving streams, then has them analyzed in the lab for 18 parameters ranging from metals and nutrients to sulfates and alkalinity.

The scientific water chemistry data is indisputable evidence that the district meets or outperforms EPA and DNR limits for point-source discharge. Its biomonitoring program puts the cork in the bottle.

AQUATIC SAMPLING

Two watersheds affect the Nine Springs plant. Initially, it discharged to Badfish Creek in the Yahara River watershed. As the city expanded, the plant accepted wastewater from the city of Verona, 10 miles west in the Sugar River basin. To return some of that water, Nine Springs discharges 40 mgd to Badfish Creek and returns 3 mgd to the Sugar River via Badger Mill Creek.

April and October are the prime months for sampling receiving streams for aquatic insects. Steven does it all in one day through qualitative "kick" samples. He looks for fast-moving water over riffle (rocks and gravel). "I stand upstream, kick the streambed, and hold

"Quality water attracts a diverse population of predators and minnows. We like to see northern hog suckers and mottled sculpin because they are pollution-intolerant species.

JEFF STEVEN

my D-frame net downstream," says Steven. He takes three kick samples per sample site. There are four sample sites on Badfish Creek, two on Sugar River, and three on Badger Mill Creek.

Collected material is rinsed within the net, put into bottles, preserved, and brought back to the laboratory for sorting and identification. Steven selects 150 insects from each sample, then puts them under a microscope to identify the species. "I'm always happy to see species that are more sensitive to pollution, as they confirm the quality of our effluent," he says.

FISH SAMPLING

There are three fish sampling sites on Badfish Creek, two on Sugar River, and two on Badger Mill Creek. The team shocks four 100-yard sections per site, using a walk-along stream-shocking boat. One person pulls the 6-foot-long flat-bottom craft, and two walk in front shocking with electric probes on 6-foot-long fiberglass poles. Direct current from a gasoline-powered generator pulls fish toward the probes. All floating fish

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Fish shocking in the Sugar River involves a boat, generator, wet well, fish shockers and probes used to deliver the electric current to the water.

within the 100 yards are scooped up and put in the boat's wet well to recover.

In Badfish Creek, Steven has collected 45 species since shocking began in 1983. He collected 27 species in Badger Mill Creek and 32 species in the Sugar River since shocking began in 1994.

"We identify species, weigh and measure some, and release most of them," says Steven. "We keep a few minnows for positive identification." He also checks for lesions, skin problems, and deformities, but is interested mostly in the types of fish.

"Quality water attracts a diverse population of predators and minnows," he says. "We like to see northern hog suckers and mottled sculpin because they are pollution-intolerant species. Brown trout are good, too, as the DNR stocks them in Badger Mill Creek."

TANK TESTING

Another way Steven monitors effluent is by pumping it through two 55-gallon fish tanks, one in his office and the other next door in the public education display room. Bluegills and green sunfish in the tanks appear to be doing well. The tanks even served as a visual alarm once, when Steven noticed the water a turbid brown. Looking outside, he saw a broken sweep arm on a clarifier. At about the same

time he called the director of maintenance, the plant's SCADA system identified the problem.

Steven initially did toxicity testing for the plant's NPDES permit. "The process involved raising water fleas and fathead minnows," he says. "Eventually, we discovered that sending the water samples to independent laboratories was less expensive."

Nine Springs has a solid relationship with the state Department of Natural Resources, sharing data and working together. "I am able to show how the plant meets EPA and DNR standards by what we collect in the field," says Steven. "Those agencies are always looking for different ways to regulate point-source discharges, and we feel they will use aquatic insects and fish a lot more in the future."

Should the time arrive, Steven recommends that smaller communities use a consulting firm to monitor their receiving streams. "The cost of the biomonitoring program is minimal, but you need a biologist on staff," he says. "I don't know of many treatment plants except ours that has one." Steven's other role is public education.

The Nine Springs biomonitoring program is in a long-term mode. No changes are anticipated unless regulations require them. Previous data clearly show how changes in the plant's treatment process have produced a positive effect on fish, aquatic insects and water quality. **tpo**



The sewerage district's research biologist Jeff Steven places a "kick" sample into a bottle at Badfish Creek.

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top performer: **PLANT**

Shown at the Flat Creek secondary clarifier area, from left: Danny Ingram, wastewater treatment operations superintendent of Gainesville Public Utilities; Jerry Cagle, GPU maintenance manager; Randall Hulse, assistant manager; Velma Woods, dewatering trainee; Brett Buffington, dewatering trainee; Tommy Smith, operator; Kent Kilby, shift supervisor; and Michael West, plant manager. (Photography by Harris Hatcher)



Leveling the *Flow*

AN INNOVATIVE FLOW EQUALIZATION SYSTEM HELPS THE AWARD-WINNING FLAT CREEK WASTEWATER RECLAMATION FACILITY KEEP A STABLE PROCESS AND CUT ENERGY COSTS

By Jim Force



Flat Creek Wastewater Reclamation Facility, Gainesville, Ga.

POPULATION SERVED: 33,000

TREATMENT LEVEL: Advanced

FLOW: 12 mgd design, 5 mgd to 6 mgd average

PROCESS: Dissolved air flotation (primary); oxidation ditch (secondary); DensaDeg (tertiary); deep-bed sand filtration; UV disinfection (advanced)

BIOSOLIDS: Filter press dewatering, land application

PLANT MANAGER: Michael West

STAFF: 12 operators, one maintenance worker

WEB SITE: www.gainesville.org

THEY REALLY “GO WITH THE FLOW” IN GAINESVILLE, GA.

For one thing, the community closely monitors conditions in Lake Lanier, the source of its drinking water, which has fallen to historic low levels after a prolonged drought.

For another, the Flat Creek Wastewater Reclamation Facility operates an innovative in-line flow equalization (EQ) system to cope with high volumes of industrial wastewater from local poultry and food processing plants.

“Our operators have enough experience with the EQ system to know when to cut back or release wastewater into our treatment system,” says Michael West, plant manager. “This maintains a nice even flow throughout the plant.”

The Flat Creek operational team also optimizes power consumption and maximizes contaminant removal at the 12 mgd (design) plant. That’s important, since the plant uses high-end advanced treatment processes and discharges into a tributary that directly feeds Lake Lanier.

“The city made a point of involving treatment plant operators in the design of our facility expansion in 2000. They worked closely with our design consultant.”

MICHAEL WEST

PLANT PROCESSES

At Flat Creek, preliminary treatment steps include bar screens and grit traps, before an influent pump station lifts wastewater to a distribution box feeding two pairs of dissolved air flotation (DAF) units. This is a bit unusual for primary treatment, explains West.

“Years ago, our poultry industries delivered wastewater that was high in fats and oils that wouldn’t settle in conventional basins,” he says. Industrial pretreatment and monitoring has eliminated much of the grease and oil, but the DAF units augment grit and sand removal and help his staff do a better job in controlling solids.

For secondary treatment, Flat Creek relies on activated sludge treatment via a three-stage Carrousel oxidation ditch supplied by Eimco Water Technologies, followed by secondary clarifiers.

To meet the high effluent quality requirements (3-log removal of coliform, according to the most recent permit), the plant operates deep-bed, continuous-backwash sand filters; tube settlers; and ultraviolet light treatment. The DensaDeg units are from Degremont Technologies; the UV supplier is Aquionics Inc.

A pair of 1.5- by 2.0-meter plate-and-frame filter presses manufactured by US Filter (now Siemens Water Technologies) dewater biosolids. A private contractor, EARTH Products LLC of Peachtree City, Ga., takes the filter cake and has it hauled to Plains, Ga., where it is mixed with pecan and peanut shells and converted into compost.

The Flat Creek treatment train is heavy on innovations, many derived with input from operators when the plant was expanded earlier this decade. West’s team includes assistant manager Randall Hulsey; day shift supervisors Kent Kilby and Ron Carver; night shift supervisors Van Couch and Bomba Satterfield; and operators Tommy Smith, Dewayne Cooper, Billy Duncan, Jimmy Rogers, George Parks and trainee Joey Odell. Trainees Velma Woods and Brett Buffington operate the dewatering equipment. Gene Brown is the maintenance specialist.

“The city made a point of involving treatment plant operators in the design of our facility expansion in 2000,” explains West. “They worked closely with our design consultant [Jordan, Jones and Goulding Inc. of Norcross, Ga.]”

MAINTAINING A SMOOTH FLOW

The in-line EQ system is one of the most important of the new ideas. “Our SCADA system allows the operators to control the flow of water to either set of DAF units or both with the click of a mouse,” explains West.

Since the DAF units are the heart of the solids removal system, the SCADA system enables operators to set the amount of waste activated sludge flow to the DAF and/or the recycle clarifier. Each of the waste lines use electrically operated modulating valve actuators that are controlled through PID loops provided through the SCADA software.

The overflow from the DAF trains goes into two EQ tanks, where operators control the valves and regulate flow into the remainder of the treatment

Flat Creek Wastewater Reclamation Facility PERMIT REQUIREMENTS

TSS	10 mg/l
CBOD	2.5 mg/l
Ammonia	0.5 mg/l
Phosphorus	0.13 mg/l
Fecal coliform	23/100 ml
Turbidity	NTU

HOW TO WRITE AN O&M MANUAL

The Flat Creek WRF staff has “taken the book by the horns” when it comes to O&M manuals. “Usually, a municipality will pay a large sum for an O&M manual that makes a fine doorstop because it is so huge but not very useful,” says plant manager Michael West.

The Gainesville gang took a different approach. “First, we described the plant, the flow, the operation, all in detail,” West explains. “Then we added a section that listed individual O&M manuals for each process and designated specific locations where these separate books would be maintained.”

The end result, says West, was a much smaller manual that is useful and was not costly to publish. “We’ve repeated the procedure for the last three plant upgrades, and each of the revised operation manuals carries the official stamp of approval from the Georgia EPD [Environmental Protection Division],” says West.

More than 10 years ago, West also started a standard operating procedures manual specific to every major process operation at the plant. “We laid out step-by-step procedures and valve lineup instructions for almost every major plant evolution, such as switching aeration trains, tertiary trains and UV trains,” West says. “Each individual SOP would give instructions for normal operations, abnormal operations and troubleshooting.”

After the original hard copy was completed, the team converted the SOP to PDF format and loaded it onto the server so multiple users could access it from many computer locations.

“We worked specifically with each of the various system integrators to design the controls for the UV automatic dosage system, the recirculation PID loops for the tertiary system, the RAS loop for the activated sludge system, and all of the PID loops that control the WAS system,” West says. “We’ve been afforded a good deal of latitude in our participation with our engineers and system integrators on each plant upgrade since 1995.”



Gary Ford, lift station technician from the maintenance division, checks chemical pump operation on a Pulsafeeder hydraulic diaphragm metering pump at lift station 14.

system. Three tethered surface aerators (from Ecodyne and Lightnin [an SPX brand]) aerate the contents of the tanks.

“Generally, we save up on flow during the week, and then release flow for treatment on Saturdays and Sundays when the flow into the plant is reduced,” explains West. “The normal routine is that the EQ basin should be empty on Monday morning. The relatively low flow typical of the weekend starts to pick up on Monday mornings as the industries begin production. An operator will close back a little on

the flow-control valve that is just downstream of both EQ basin drain valves to start the weekly accumulation process.”

When the level in the EQ basin activates at least one of the floating aerators, the operator opens the flow-control valve to set the flow through the plant. The goal of in-line equalization is to maintain a seven-day mean flow of 5.5 mgd to 6 mgd, except in wet weather conditions.

“Our operators know from years of experience how much should have accumulated in the EQ basins during the course of the week, and they can adjust the plant flow to ensure we stay on track,” West says. “Wastewater plants tend to run smoothly when a consistent linear flow is applied all of the time, and the EQ basin allows us to provide that. In addition, in-line equalization provides an excellent buffer against shock loads or toxic influent

streams by allowing for a substantial dilution factor before the condition is allowed to pass to the biological train.”

SMART POWER

The Flat Creek EQ system also enables smart power use through a real-time pricing agreement with the plant’s electrical power provider, Georgia Power, a Southern Company, Atlanta. “The power company has established a baseline power supply that we need to operate at a minimum level,” West says. “When local power demand increases, the per kilowatt-hour rates start to rise. We can access the Georgia Power company Web site and see a chart that will project power demand one full day in advance.

“If we know that the price of power will go up between 3 p.m. and 9 p.m. the next day, we will make provisions to cut back the flow during those hours and allow the excess water to accumulate in the EQ basin.”

For example, staff can shut down a 200-hp aerator due to reduced oxygen demand, or turn off several other high-volume electrical loads for short periods based on flow reduction through the plant. The Web site also provides the actual kilowatt usage by the hour and snapshots of historical data for almost any timeframe the plant wants to see. The end result is a power reduction of more than 20 percent, according to West.

PREVENTING OVERFLOWS

Flat Creek also has a proactive program of preventing sewer overflows. According to West, the utility simply practices thorough and careful monitoring of the sewer system and the 54 lift stations on the lines.

“We have several teams involved in inspecting and monitoring the system,” West says. “We hardly ever experience an overflow.”

One team monitors lift stations on a regular basis to detect potential problems before they occur. The city’s collections and distribution crews constantly check sewer lines for blockages and other issues. They maintain a database, monitoring flows with portable flow meters. In addition, utility “creek walkers” are out in the field every day inspecting pipes and outfalls.

In this way, the plant and collection system work together to protect water resources in a drought-sensitive community. **tpo**



Ford observes gauges at a lift station to check pump efficiency.



Tommy Smith, operator, takes dissolved oxygen measurements from the Carrousel oxidation ditch.

Danny Ingram, wastewater treatment operations superintendent for GPU, and Michael West, Flat Creek plant manager, display one of the facility's EPA awards.



MAJOR HONOR

The U.S. EPA presented the Flat Creek Wastewater Reclamation Facility with the 2007 EPA Region 4 Clean Water Act Operations & Maintenance Award in the Large Advanced Wastewater Treatment Plant category.

Because of the plant's ability to respond to stringent requirements through innovative system design, the EPA national office has also recognized the facility with a Second Place Award for Operations & Maintenance in the Large Advanced Plant category of the National 2007 Clean Water Act Awards.

Under the Clean Water Act, the EPA gives awards to facilities that demonstrate outstanding and innovative waste treatment and pollution abatement practices. The program aims to educate the public about the contributions public treatment facilities make to clean water and to recognize communities that go beyond the minimum requirements of the Clean Water Act.

The EPA called Flat Creek a great example of a plant that meets stringent requirements and effluent limits with innovative technology. "Staff have developed and implemented unique and innovative ideas to optimize their treatment process with the use of in-line flow equalization," the EPA award summary said. The agency also recognized the plant's intensive monitoring and inspection program as a proactive approach to keeping wastewater overflows from reaching public waters (in this case, Lake Lanier).

"Even with the plant's recent design modifications and expansions," the EPA said, "the Flat Creek Wastewater Reclamation Facility is consistently able to meet Georgia's water quality goals for protecting one of metro Atlanta's largest drinking water sources."

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Beyond the Basics

THE DUBLIN SAN RAMON SERVICES DISTRICT LOOKS TO FUEL CELL TECHNOLOGY AND PHOTOVOLTAIC SYSTEMS TO ACHIEVE SELF-SUFFICIENCY WITH CLEAN ENERGY

By Erik Gunn

At the Dublin San Ramon Services District, green operation has become a top priority — and second nature. The district, headquartered 30 miles east of San Francisco, Calif., has undertaken a long list of green initiatives, and more are on the drawing board.

The district goes well beyond the basics of generating its own power using digester gas and saving energy with cogeneration. It has invested in power generation with fuel cell technology and photovoltaic cells. “If green projects are economically viable and they show some promise, our board likes to tackle projects that will show the district as a leader in the industry,” says Dan Gallagher, operations manager for the district, including its regional wastewater treatment facility. “We consider ourselves environmentalists.”

FUELING UP

The district lies in California’s San Ramon Valley, sandwiched between the San Francisco Bay area and the agriculturally rich Central Valley. Green operations are nothing new for the DSRSD, but with advances in technology and forward thinking, they’ve taken some twists.

The newest program is a pair of 300-kW fuel cells the district acquired a year and a half ago, thanks to a \$2.7 million grant from the

“We’re going to use those solar panels to put power back onto the utility grid. We’re exploring cooperative ventures with other agencies around the area.”

DAN GALLAGHER

local utility, Pacific Gas & Electric. The fuel cells are installed at the district’s treatment plant, located in Pleasanton, Calif.

“Fuel cells are like a battery,” says Gallagher. The difference is that conventional batteries generate power from chemical reactions involving materials inside them. Fuel cells continuously take in fuel from an outside source and turn it into electricity. The DSRSD’s fuel cells are DFC300 models from FuelCell Energy Inc., based in Danbury, Conn. They’re powered by methane from the plant digesters.

The fuel cells consist of an anode and a cathode, both made of nickel, with an electrolyte sandwiched between them. FCE’s cells use molten carbonate for the electrolyte.

The hydrogen-rich methane and water are applied to the anode, where they react to separate the hydrogen from the methane. The hydrogen then reacts with carbonate electrolyte ions, producing



The Dublin San Ramon Services District installed a pair of 300-kW fuel cells at its plant in Pleasanton, Calif., through a grant from Pacific Gas & Electric, the local utility.



Thanks to land application of the district’s biosolids, a 55-acre site next door to the treatment plant includes a wildflower meadow and nesting ground for Canada geese.

PHOTOS COURTESY OF DUBLIN SAN RAMON SERVICES DISTRICT

water and electrons. The electrons from the anode side of the cell cannot pass directly through to the positively charged cathode. Instead, they traverse an electrical circuit to reach the other side of the cell, creating a DC current.

While the fuel cell does give off some carbon dioxide (along with water), its carbon footprint is much lower than that of an internal combustion engine.

SUN POWER

Along with the fuel cells, the district is exploring solar energy. A new maintenance building, under construction, will be equipped with photovoltaic panels to collect sunlight and convert it to electricity.

The solar project is a small-scale test. Gallagher doesn’t expect it to produce a great deal of electricity, but if it works, bigger projects could be in the offing. “We’re going to use those solar panels to put power back onto the utility grid,” he says. “We’re exploring coopera-

GETTING CERTIFIED

With its extensive commitment to green operation, it was only a matter of time before the Dublin San Ramon Services District decided to get part of its operation certified under the Alameda County (Calif.) Green Business program.

That task fell to Stefanie Olson, clean water programs specialist. In 2005, and again in 2008, Olson led an effort to get the district administrative offices certified. First, she reviewed a program checklist to see where the building qualified and where it needed to improve.

To meet all the standards, the district undertook projects such as replacing toilets with water-saving models and replacing incandescent light bulbs with energy-saving fluorescents. Hot-water pipes were insulated and timers were put on light switches. Employees were happy to cooperate.

"It was fairly easy to get the staff to get on board with this," Olson says. "Pollution prevention has always been a big issue here at the district."



The Dublin San Ramon district distributes static-cling labels that encourage water conservation.

tive ventures with other agencies around the area." One possibility is a photovoltaic "farm" that would place an array of solar panels out over a stretch of land.

The solar and fuel cell projects build on earlier projects to generate electricity in-house for the district.

These innovations fit perfectly with more traditional ventures in green operation. The district installed a cogeneration system 20 years ago, and today, the plant boasts three 500-kW Waukesha Engine generator sets fueled by natural gas and digester methane. Heat drawn from engine coolant is used for heat and air conditioning.

The district still is hooked up to the local electric utility, "but we're generating most of our own power here within our own fence line," says Gallagher.

Indeed, the amount of electricity generated in-house is enough so that the district could sell some back to the utility, but Gallagher says that so far there is no financial incentive to do so.

That power costs about 8 to 10 cents per kWh to generate, versus 22 to 23 cents per kWh to purchase from PG&E, Gallagher says. But under state regulations, the district can only sell back excess power at 8 to 9 cents per kWh — meaning the district would lose money on the sale.

The solar project could change that: Unlike other self-generated power, solar power can be sold back to utilities at the full time-of-use market price — a strong incentive to undertake that project.

GIVING BACK THE WATER

The solar and fuel-cell projects and the cogeneration initiative join other green projects at the district. Gallagher says the district's

use of recycled wastewater grew out of a project that dead-ended because of public opposition.

"Back in the late 1990s, the agency was trying to construct and operate a project that would have treated wastewater and then injected it back into the ground for groundwater recharge," Gallagher says. But just before it was to be implemented, public concern led to its cancellation.

However, the district had already built the tertiary treatment system for the project, consisting of reverse osmosis (RO), micro-filtration (MF) and ultraviolet (UV) disinfection. Instead of offering treated water as a groundwater recharge, the district mothballed the RO equipment and used the MF and UV portions to produce recycled water for irrigation.

A few years ago, the district teamed with the East Bay Municipal Utility District to expand recycled water distribution and increased the output from 3 mgd to 9 mgd. "We still had to do some public education and outreach to explain that this wasn't going to harm the environment, that people didn't have to worry about their kids playing on the school field after it had been irrigated with recycled water," Gallagher says.

"Wastewater treatment plants around the country take waste that we as human beings produce on a continuous basis and clean it up to the point where it can go back in our rivers and streams and the ocean without causing gross pollution."

DAN GALLAGHER

Demand is growing, though. "A lot of developers that move into the area say, 'We will not develop this unless you can provide recycled water to us,'" he says. "Not only are the economics more favorable to use recycled water for irrigation, but a lot of developers want to do those kinds of things because of the way the public perceives the importance of being green."

BACK TO THE LAND

Another traditional program involves land application of the district's biosolids to a 55-acre former military site next door to the treatment plant. The site includes a wildflower meadow that also serves as a nesting ground for migrating Canada geese.

"We adjust our operations so we don't disturb them while they're raising their young," Gallagher says. "It's a very environmentally friendly process — one that means we don't export our biosolids out of state. We take care of the material we produce right here, with a facility that's fully permitted and very environmentally friendly."

While the in-house land application program is "very cost-effective," the district is exploring other options, including offering the biosolids to Central Valley farmers as a soil amendment or pelletizing the material for fuel.

To Gallagher, it all fits in perfectly with the district's mission. "Wastewater treatment plants around the country take waste that we as human beings produce on a continuous basis and clean it up to the point where it can go back in our rivers and streams and the ocean without causing gross pollution," he says.

In short, going green isn't just about saving money or doing the right thing: It's a natural extension of the district's basic reason for being. **tpo**

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

Reaching Out

THE FLORIDA WATER ENVIRONMENT ASSOCIATION SETS AN EXAMPLE IN HELPING ITS MEMBERS BUILD EFFECTIVE PUBLIC INFORMATION PROGRAMS

By Ted J. Rulseh

The nation's wastewater infrastructure desperately needs attention. Experienced plant managers and operators are nearing retirement, and the treatment profession needs new blood. There is a growing need to recycle both end products of treatment: biosolids and clean water.

A key to meeting all these challenges is communication with the treatment industry's publics. Nearly all industry associations make communication a priority, but few do so with the vigor shown by the Florida Water Environment Association.

The FWEA Public Communications and Outreach Committee has been widely recognized for its efforts, most of which focus on helping member organizations do a better job of getting key constituencies on their side.

Last October, the FWEA received a Water Environment Federation Public Education Award for supporting WEF public education programs and for local community involvement.

In particular, the Florida group earned the recognition for hosting the 2008 National Stockholm Junior Water Prize competition, organizing local involvement in World Water Monitoring Day, developing a biosolids outreach program that includes a comprehensive

"I believe we need to be passionate professionals. We are all passionate about what we do. We work hard. We get results. But the most passionate among us are also engaged in talking to our friends, our families, our acquaintances and other professionals about the need for continued focus on the water environment."

JOHN GIACHINO

teacher's guide, conducting public education workshops, and committing to host WEFTeach 2009 at next October's WEFTEC conference in Orlando.

John Giachino, former chair of the FWEA outreach committee, shared his thoughts with *Treatment Plant Operator* on communication in a recent interview. Among his many other credits in communication, he has chaired the California WEA Public Education Committee and the WEF Public Communications and Outreach Committee. He is now vice president of FWEA and works as senior business development director for Parsons Water & Infrastructure.



John Giachino

tpo: Why does your association make public education such a priority?

Giachino: It's essential to our mission. Our mission statement says: "FWEA serves and unites water-quality professionals responsible for protecting a clean-water environment through education programs, professional development and promotion of sound public policy." Public education is a very key element of all three of those facets of our organization's mission.

tpo: As a practical matter, what makes public education so essential?

Giachino: First, the key to successfully protecting the water environment and the health of the people we serve is to engage them at the grassroots level, so that they understand and support our mission. If they support our mission, then local utilities and the state government are empowered to provide appropriate funding for our operations.

Second, our industry is faced with a body of professionals who are nearing retirement, and we need to engage young people and spark their interest in pursuing careers in this area. We need to promote the fine work our water professionals do, and so encourage youngsters to enroll in environmental science and related course curriculums, so that ultimately they take positions from operations and maintenance to engineering and on up to utilities management.

We also need to make the public aware who wastewater treatment professionals are and what they do on a day-to-day basis. Our operators work very hard, and they maintain a high level of education for certification. We need to show why they deserve fair and decent wages and benefits for their contributions.

tpo: Toward building public support, Penn State Public Broadcasting has released the "Liquid Assets" program, dramatizing the need to invest in water infrastructure. How does that program figure in FWEA outreach?

Giachino: We've made our members aware of the program through our Web site and directly through e-mails, and we've encouraged them to obtain copies. We've purchased copies for loan to our members through our public education materials library. We also encourage members to purchase copies for themselves if they can afford to.

Finally, one element of our committee's program is science teacher education, which includes attendance each year at the Florida Association of Science Teachers annual conference. In 2009,

we may focus our presentation there on the availability of high-quality programs like "Liquid Assets."

tpo: What are some of the keys to effective communication at the community level?

Giachino: Utilities need to make sure they budget for continual public outreach. Many larger utilities are already on the cutting edge with fabulous programs, but outreach remains a challenge for smaller agencies.

My preferred approach to this issue is to work at the grassroots level. Everyone from utility managers down to operations and maintenance staff needs to talk frequently with public officials about why public education is so important and why it needs to be part of the budget.

Invite members of your elected or appointed board to tour the treatment plant. Show them what you're doing. Take them out into the environment and show them how the natural resources are being protected. Show how processes like wastewater reclamation and beneficial use of biosolids help the environment. Get them engaged on a one-to-one basis. More and more managers are doing this today. And as a result we see much less resistance to investments in public education.

tpo: Wastewater professionals are busy people who often wear many hats. What can they do on an individual level to contribute to public understanding?

Giachino: I believe we need to be passionate professionals. We are all passionate about what we do. We work hard. We get results. But the most passionate among us are also engaged in talking to our friends, our families, our acquaintances and other professionals about the need for continued focus on the water environment.

There are many ways for an individual to engage the community. Don't just join your state or local association. Get active. Join a committee. Staff a booth at a local environment fair or civic event. Beyond that, join a speaker's bureau. Judge a science fair. Speak on Career Day at a school. Join a watershed improvement organization. Organize a beach cleanup or a storm drain stenciling project.

tpo: Technical people in the wastewater profession don't sign up for these kinds of public roles — getting out in front of people can be hard for them. Why should they do it?

Giachino: It's legitimate to ask, "What's in it for me?" And what's in it for them lies in what I call the "P Words." The respect of your peers and the profession. The power and prestige you attain by becoming more involved. And the pride that comes with your achievements in the public arena.

Sometimes it's difficult for plant operators to find the time for public education. But often, the public is invited to special events like Clean Water Days where the plant is open for tours. That's a great way for operators to engage the public in what they do.

tpo: Where do you see needs for improvement in public outreach and education?

Giachino: People need to understand more about the value of recycling and reusing treated effluent, especially in water-scarce areas like Florida, Southern California and Las Vegas. Many communities are now building additional capacity for producing and distributing reclaimed water. At the same time, we need to do more to promote efficient use of water, such as natural landscaping and drought-resistant plantings.

In Florida, 40 to 50 percent of the water we use goes to water yards and lawns. We need continuous efforts to educate the public and elected officials on the importance of using reclaimed water. Critical work also needs to be done in the area of biosolids. In Florida, for example, one of our challenges is to work with the regulatory agencies and water management districts to enable beneficial reuse of high-quality, Class A products.

tpo: Now that your committee has earned high-profile recognition, what will you do next?

Giachino: We will continue to focus on educating the general public about wastewater and other water-quality issues, with an emphasis on reaching elementary, middle school and high school

"People need to understand more about the value of recycling and reusing treated effluent, especially in water-scarce areas like Florida, Southern California and Las Vegas."

JOHN GIACHINO

students and public- and private-school science teachers. We will also remain a resource for our members' public education efforts.

One of our best achievements is an infusion learning unit on biosolids that we hope to introduce into at least one school this year. Infusion learning means taking a topic, in this case biosolids, and infusing it into the classroom so that it touches on all aspects of the student's education — math, science, computers, English, social studies.

The program is based on a book, *Residuals, Biosolids, Sludge: What's in a Name?*, written by Dr. Phil Kane of the Florida Department of Environmental Protection. It won a first place U.S. EPA Clean Water Act Recognition Award in 2006 and a Florida DEP special achievement award in that same year. We offer it at low cost to teachers to use as a guide to the basics of biosolids and the benefits of reuse.

In the WEF Teach program we'll be hosting at the 2009 WEFTEC conference, we'll include a full-day train-the-trainers workshop where teachers from around the state will learn innovative ways to engage youth in real-life water problems and solutions. We'll tailor the content to the specific water challenges of our member communities.

We have a committee of very passionate professionals who are really engaged in efforts to raise awareness of water-quality issues and their importance to our society. **tpo**

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Making a Good Thing *Better*



profile



Morris Forman Water Quality Treatment Center (Louisville & Jefferson County Metropolitan Sewer District)

SERVICE AREA: City of Louisville and Jefferson County, Ky.
FLOW: 120 mgd dry weather, 350 mgd wet weather
TREATMENT LEVEL: Secondary
POPULATION SERVED: 1 million
BIOSOLIDS VOLUME: 82 million dry tons per day
BENEFICIAL REUSE: Sold as agricultural pellets
BIOSOLIDS STAFF: 30
BIOSOLIDS BUDGET: \$5 million
WEB SITE: www.msdlouky.org

AN ENVIRONMENTAL MANAGEMENT SYSTEM HELPS THE CLEAN-WATER AGENCY IN LOUISVILLE, KY., IMPROVE EVERY FACET OF THE PROCESSES FOR MAKING ITS SIGNATURE BIOSOLIDS PRODUCT

By Jim Force

WHEN LOUISVILLE & JEFFERSON COUNTY METROPOLITAN Sewer District received the National Biosolids Partnership (NBP) seal last summer, it was as if the staff of the Morris Forman Water Quality Treatment Center itself had received a badge of honor.

"It meant a lot," says Sharon Worley, senior technical services engineer. NBP certification validated the biosolids process and Environmental Management System (EMS) to district management and the public, while acknowledging and rewarding a major staff effort.

Louisville received NBP certification on July 31, after two-and-a-half years of meticulous work on its EMS, and successful completion of a detailed third-party audit. The certification signifies that the biosolids production process is dependable and safe for its customers and the environment, and that the 82 tons per day of Class A Louisville Green pellets, which are spread on farm fields in 11 states, unquestionably deserve their EQ (exceptional quality) status.

"The most valuable lesson learned throughout the implementation of our EMS is that if you can effectively measure something, be it quality or performance, you can then begin to study it and eventually control it," says David Coe, Louisville EMS coordinator. "We've seen it happen in numerous situations, and it will continue to happen throughout our biosolids value chain as our EMS continues to develop."

Coe says the biosolids program is now more focused, with goals and objectives for maintenance, pretreatment, operations, marketing and public participation. "Our focus was always to produce exceptional quality biosolids and encourage beneficial reuse," he says. "However, establishing clear goals and objectives has encouraged several improvements in the quality of Louisville Green, as well as stronger efforts in public participation." He reports that demand for Louisville Green exceeds the supply.



THE PATH TO PELLETS

The Morris Forman facility can treat a dry-weather flow of 120 mgd and 350 mgd during wet weather. It is the largest of six treatment facilities serving Louisville and Jefferson County — indeed, the largest treat-

AT LEFT: Pellet samples of the finished fertilizer made from biosolids at the Morris Forman facility.

OPPOSITE PAGE: From left, Morris Forman treatment facility staff members Alex Novak, P.E., operations manager; Sharon Worley, senior technical services engineer; David Coe, EMS coordinator; Joe Flalleri, process project coordinator; Robin Burch, process support technician; and Robert Bates, wastewater process manager-biosolids. The group stands on a hillside overlooking the primary sedimentation tanks at the treatment plant in Louisville, Ky. (Photography by Pat McDonogh)



Secondary clarifiers at the Morris Forman treatment facility in Louisville.

"The most valuable lesson learned throughout the implementation of our EMS is that if you can effectively measure something, be it quality or performance, you can then begin to study it and eventually control it."

DAVID COE

ment plant in Kentucky — and serves as the biosolids processing center for the entire metropolitan district. Solids from the outlying plants are either trucked or pumped to Morris Forman.

Solids from the Morris Forman plant's primary process are anaerobically digested. The plant's waste activated solids and the imported solids are thickened in Komline-Sanderson dissolved air flotation units. All the solids streams — about 720,000 gallons per day — are blended to a solids content of about 3 percent. The material passes to dewatering wet wells and then to a bank of five Alfa Laval DS 706 centrifuges.

The machines, each designed to process 2.5 to 3.0 dry tons of solids per hour, spin the material into a 22 percent solids cake before the drying and pelletization step. Four Andritz natural-gas-fired rotary drum units make up the drying system. Each dryer train can evaporate up to 1,900 pounds of water an hour.

Pellets are then cooled, segregated and placed into final-product silos for loading into trucks. "We believe this is the largest-capacity rotary drum direct drying system in North America," observes Morris Forman biosolids processing manager Robert Bates.

The pellets have a minimum dry solids content of 94 percent and range from 1.5 to 2.5 mm in size. The nutrient value is 5-3-0 (NPK), but the pellets

contain other nutrients, minerals and organic matter that commercial fertilizers lack. They qualify as Class A, exceptional quality biosolids by EPA standards.

Louisville performs regular testing of the pellets every 90 minutes, assuring proper pellet size and density. Every truckload is tested, as well, before the truck shoves off for rural areas. "If the pellets are too large, they won't break down quickly enough," says Bates. "If they're too small, they won't broadcast properly out of the spreader."

Bates' crew uses an oil mixture to control dust during transportation and application. Regenerative thermal oxidizers are used to control odors from the dryer trains. Under an agreement with a private marketing contractor, AJ Inc., Louisville sells nearly all of the material to farmers. Home use accounts for less than 1 percent. Area golf courses and metropolitan parks consume another small portion.

The Morris Forman plant captures methane produced by the digestion process and uses it to fuel the drying furnaces, saving some \$3,000 per day. "About 80 percent of the heat requirements of one dryer train can be met with our digester gas," says Bates. While revenue from biosolids amounts to more than \$120,000 per year, the money is not in the sale of pellets but in the savings from "landfill avoidance." Bates says that number exceeds \$500,000 a year.

EMS EXCELLENCE

By definition, an Environmental Management System is a validated process of organizing, monitoring and controlling a biosolids process from pretreatment through to final disposition of the end product. In reality, it amounts to hard work and dedication, starting with unwavering support from top management.

Says Worley, "Our director, Bud Schardein, was the driving force toward certification of our biosolids process. He had the vision." Coe explains that when the Morris Forman plant began using dryers to pelletize biosolids, staff personnel had a lot to learn.

"The end-product quality was not as good as it is today because we didn't fully understand the needs of end-users, and we had little experience with the technology," Coe says. Tighter specifications and better quality-control equipment markedly improved the situation.

"We developed a product that exceeded the EPA standard for exceptional quality and controlled pellet size through the use of a sieve capture test," Coe observes. "That helped us produce a product that was much more desirable to the end-users."

Louisville signed a letter of commitment with the NBP in 2004 and began aggressively pursuing EMS certification in April 2006. "We struggled with it at

THE EMS PROGRAM

The National Biosolids Partnership established its Environmental Management System (EMS) to help clean-water agencies improve their biosolids processes and public acceptance of beneficial use of their products. To be admitted and become certified to the EMS Program, an organization must meet five requirements:

- Document its responsibility for the biosolids value chain, including pretreatment, treatment and final use.
- Commit to the 10 principles in the NBP Code of Good Practice.
- Operate a biosolids EMS that meets all NBP requirements.
- Commit to make continual improvements in the EMS for environmental performance, regulatory compliance, public participation, and quality biosolids management practices.
- Successfully complete a fully independent audit of the EMS by an NBP-accredited auditing company.


Find out more about the National Biosolids Partnership and the EMS program at www.biosolids.org.

first," says Worley. But what at first appeared to be a paperwork nightmare has become a much more practical, smooth-operating process, as NBP has made improvements to the certification procedures.

Right away, Louisville management saw the need to have a single person in charge of the EMS process. Coe, who had more than 20 years of experience in wastewater plant design and operation, was hired to lead the EMS effort. First item of business: set up the team.

STAFFING UP

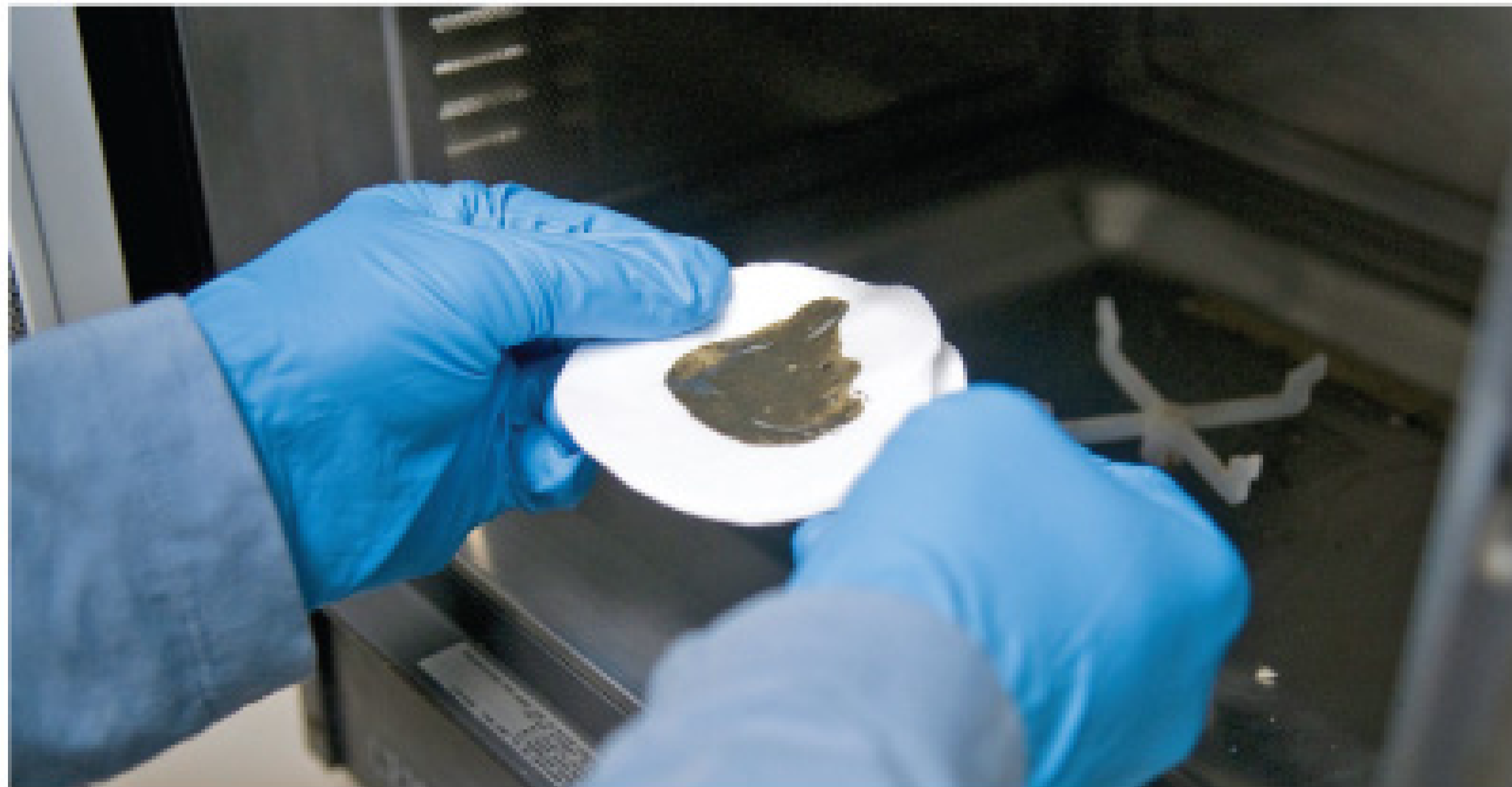
"For years Louisville had used a management team to guide the production of the biosolids, but the team was not necessarily focused on all of the EMS principles," Coe says. "Once I was hired, we established an EMS core team to follow the biosolids value chain. It consisted of the operations manager, the wastewater process managers, the maintenance manager, a senior engineer, a technical specialist, in addition to the EMS coordinator."



Tim Wierwille uses a Nasco Sludge Judge from Preiser Scientific to measure sludge accumulation on the bottom of a secondary clarifier.



Robert Bates, wastewater process manager-biosolids, inspects a centrifuge that has been dismantled for repair.



A sample is placed into a CEM Corp. Labwave microwave oven. The sample will be heated as part of the process to measure the solids content. This step occurs midway through the biosolids process at the Morris Forman treatment facility.

Later, Coe explains, the pretreatment manager, laboratory manager and operations supervisor were added to the team as essential members. The team began meeting regularly to discuss progress toward meeting the NBP requirements and prioritizing efforts in areas where the biosolids process needed strengthening.

The meetings have been a key to success and have been expanded to three levels: a weekly meeting to review goals and objectives, a second meeting every other week to review the plan, and a third to address public participation.

The result, Coe says, is that each team member has become more conscious of the efforts and problems facing the others. "The accountability and effort of the team improved," he says. That has led to improved product quality and increased public acceptance of it, to the point that over the last two-plus years, almost 100 percent of the material made available for distribution has been beneficially reused; none has been landfilled.

TANGIBLE BENEFITS

Another important facet in success has been the incorporation of existing practices into the EMS. "That's been one of the biggest accomplishments — rolling existing training programs and SOPs [standard operating procedures] into our EMS program," Coe says. He believes the training programs have produced tangible benefits: increased competency and professionalism among plant staff, and an appreciation by upper management that training programs really do make a difference and warrant the investment.

And it's more than just competency. "Incentive and motivation, working conditions, feedback, performance measurement, clear work standards or standard operating procedures, and an individual's learning capacity are directly related to individual performance," Coe says.

There are process benefits, too. "Attention to controlling the biosolids processes has contributed effectively to the liquid side of the Morris Forman

plant," says Coe. "We've had no permit violations since October 2006."

Another development: The EMS process has brought into focus how important the pretreatment program is to biosolids quality. Louisville's EMS mandates relentless monitoring and measurement of all the steps associated with biosolids processing — a complete inventory of every critical operations point.

This is cross-linked with all internal and external requirements for the operation, particularly legal and regulatory requirements. "EMS forces you to get all these requirements together, and monitor performance

"We developed a product that exceeded the EPA standard for exceptional quality and controlled pellet size through the use of a sieve capture test. That helped us produce a product that was much more desirable to the end-users."

DAVID COE

against them," Coe says. The natural follow-on, of course, is implementation of specific corrective actions as needs arise.

Finally, says Coe: "None of the progress could have been made without the professional efforts of our maintenance department. In addition to their typical workload, the maintenance and operations team set as an objective the modification and improvement of the digester gas collection system, so that the gas is now used to fuel the drying system. They also developed the oiling system that controls pellet dust.

"They've always done a great job keeping the Morris Forman plant operational even under the most adverse conditions."

LESSONS LEARNED

What else did Coe, Worley, Bates and the rest of the team at the Morris Forman plant learn from the EMS process? For one thing, don't commit to it until you're ready. For another, once you've committed, there's no backing out.

Still, the team believes the audit was highly beneficial. "Going through the third-party audit was a great experience for us," says Coe. Senior management became very involved in operations and in developing public acceptance. And we were challenged by the audit.

"We got a much better understanding of the improvement process and how goals and objectives, audits, and a good corrective action plan all provide performance measures and understanding," Coe says. "These can be demonstrated in a program performance report that then becomes the link between the biosolids program and director-level management.

"As an organization becomes more conscious of the improvement process, only good things can come from it — a better plant, a better product and better people." **tpu**

more info:

Alfa Laval Inc.
866/253-2528
www.alfalaval.com

Andritz Separation Inc.
817/465-5611
www.andritz.com

CEM Corp.
<http://cem.com>
800/726-3331

Komline-Sanderson
800/225-5457
www.komline.com

Nasco
800/558-9595
www.enasco.com

Preiser Scientific
800/624-8285
www.preiser.com

people

Rebecca Rose, vice chair of the Illinois Water Environment Association Laboratory Committee, was promoted to sanitary chemist II at the Metropolitan Water Reclamation District of Greater Chicago.

Don Rea of the St. Louis Water Division is the new chairman of the Missouri Water and Wastewater Conference Inc. **Todd Baslee** from the city of Boonville is the chairman-elect.

Rebecca West, from Spartanburg, S.C., and former vice president of the state Water Environment Association, is its new president. **Paul L. Freeman, P.E.**, from Ann Arbor, Mich., is the president-elect.

Steve Brubacher of Urban Sytems is the new director of the Canadian Water and Wastewater Association.

Tony Brcic, P.E., was appointed project manager for the Core Area Wastewater Management Program in British Columbia's Capital Regional District.

Doug Simons, independent training contractor with Northern Alberta Institute of Technology, is the new training manager for British Columbia Water and Wastewater Association.

associations

Cooperative Effort

The Kansas Water Environment Association (KWEA) reports that the Mutual Aid Program for utilities is finalized. It coordinates assistance between neighboring utilities in large-scale emergencies such as tornadoes,

floods and ice storms. The program also supports statewide emergency preparedness and disaster response. To participate, visit www.ksmap.org.

Nominations for KWEA Golden Manhole Award Society and Collection Systems Award nominations are due March 1 and June 15, respectively. Visit www.kwea.net for application forms.

Sustainable Biosolids Management

The North Shore Sanitary District (NSSD) recycling plant in Zion, Ill., is the first in the world to convert municipal biosolids into glass aggregate using the GlassPack System from Minergy Corp. in Neenah, Wis. The facility integrates the closed-loop, oxygen-enhanced combustion process and a thermal energy recovery system to handle up to 187 tons of biosolids at 17 to 20 percent solids per day. Heat energy, required by a fluidized bed dryer to generate up to 35 dry tons of granulate per day, is recovered from the melter flue gas using a thermal oil heat transfer system.

NSSD sells the environmentally safe glass aggregate for use in asphalt pavement and road bed construction, cement and concrete products, blasting media, structural fill applications, and utility trench fill. Contact Bob Paulson, manager of business development, at 920/727-1919 or visit www.minergy.com.

WEFTEC Rain Garden Template

The WEF Students and Young professionals, with the Center for Neighborhood Technology and the Metropolitan Water Reclamation District of Greater Chicago, raised \$7,000 to build a 200-square-foot rain garden in Chicago's Pulaski Park as part of WEFTEC 08. The inaugural event will serve as a template for future shows, where the Students and Young Professionals will host similar community service events to promote water quality. The Illinois WEA student chapters and young professionals committees will clean up and maintain the garden.

Numeric Effluent Limitations

The Natural Resources Defense Council petitioned the U.S. EPA to revise its secondary treatment regulations to include, for the first time, numeric effluent limitations for discharges of TN (total nitrogen) and TP (total phosphorous). If granted, all NPDES permits for publicly owned sewage treatment plants would have to be revised.

The NRDC petition to EPA asserts that 0.3 mg/l TP and 3.0 mg/l TN are attainable through available technology, and that 1.0 mg/l TP and 8.0 mg/l TN are attainable only if biological processes are considered. The petition also says that phosphorus levels of 0.25 to 0.50 mg/l are being achieved.

Alaska Hosts SJWP

The Alaska Water Environment Association has selected the Alaska Water Wastewater Management Association to host the Stockholm Junior Water Prize (SJWP) National Competition on June 25-26 at the University of Alaska in Anchorage. Member associations interested in learning more about bringing the SJWP competition to local high schools should contact Angie Monteleone, executive director, at 907/561-9777.

awards

Missouri Water and Wastewater Conference Inc. 2008 Awards

- R.S. Miller Award – Todd Baslee, city of Boonville
- A.V. Graf Award – Chris Brake, Columbia Water & Light Dept.
- Merit Award – William Pecord, Alliance Water Resources, Cape Girardeau

TREATMENT PLANT OPERATOR

tpo

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Hearts and Minds: Your public education and community outreach efforts.	Greening the Plant: Improvements at your facility that help the environment.
PlantScapes: Interesting features of your facility's grounds, signage or buildings.	How We Do It: Interesting uses of equipment or technology.

**Send your ideas to editor@tpomag.com
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- W Victor Weir Award – Jerry Wallace, retired MDNR/NERO
- Water Operator of the Year – Brad Morse, city of St. Charles, east central section
- Special Service Award – Jim Baylor, Cape Girardeau; George Rausch, Monett
- Young Operator Award – Anthony Dahl, Tri-County Water Authority; Shelby Perkins, Columbia Water & Light Dept.
- Kramer Award – Elmer Wright, City of Archie; Shirley Shiflett, City of Meadville; Bob Johns, University of Missouri-Columbia Power Plant

education

British Columbia

The British Columbia Water and Wastewater Association is offering April CEUs at Courtenay.

- April 22-23 – Managing Small Wastewater Systems
 - April 20-24 – Wastewater Treatment I
 - April 20-24 – Wastewater Collection I
- Call 604/433-4389 or visit www.bcwwa.org.



CALENDAR OF EVENTS

March 2-4

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

March 3-4

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

March 10-13

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

March 16-19

Illinois Water Environment Association Conference, Crowne Plaza, Springfield. Call Dennis

Priewe at 815/387-7634 or visit www.iweasite.org.

March 21-25

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

March 22-25

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

March 22-26

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

March 29-April 1

Missouri Water Environment Association and the Missouri Section of the American Water Works Association Conference, Tan-Tar-A Lodge and Resort, Osage Beach. Call Clara Haenchen at 573/634-6566 or visit www.mwea.org.

April 1-2

South Dakota Water and Waste-

California

The California WEA has these workshops:

- April 28 – SSMP Requirement 1: Developing Your Plan, Palm Springs
 - April 28 – SSMP: Map, Maintain, Measure, Modify, Palm Springs
 - May 14 – Electronic Reporting Requirements & Tips, San Diego
 - May 19 – How to Avoid Sticker Shock, Fresno
 - May 20 – How to Avoid Sticker Shock, Berkeley
 - May 21 – How to Avoid Sticker Shock, Los Angeles
- Call 510/382-7800 or visit www.cwea.org.

North Carolina

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

- May 4-8 – Biological Wastewater Operators Eastern School
 - May 5-8 – Physical and Chemical Wastewater Operators School
 - May 12 – Microscopic Examination for Wastewater, Charlotte
- Call 919/784-9030 or visit www.ncsafewater.org. **tpo**

water Association Wastewater Operators Seminar, Highland Conference Center, Mitchell. E-mail rob.kittay@pie.midco.net or visit www.sdwwa.org.

April 5-7

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

April 5-7

North Carolina AWWA-WEA Spring Conference, Sheraton, New Bern. Call 919/784-9030 or visit www.ncsafewater.org.

April 15-16

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

April 19-22

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

April 19-22

WEF Collections Systems Specialty

Conference, Kentucky International Convention Center, Louisville. Call 800/666-0206 or visit www.wef.org.

April 20-23

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

April 25-29

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

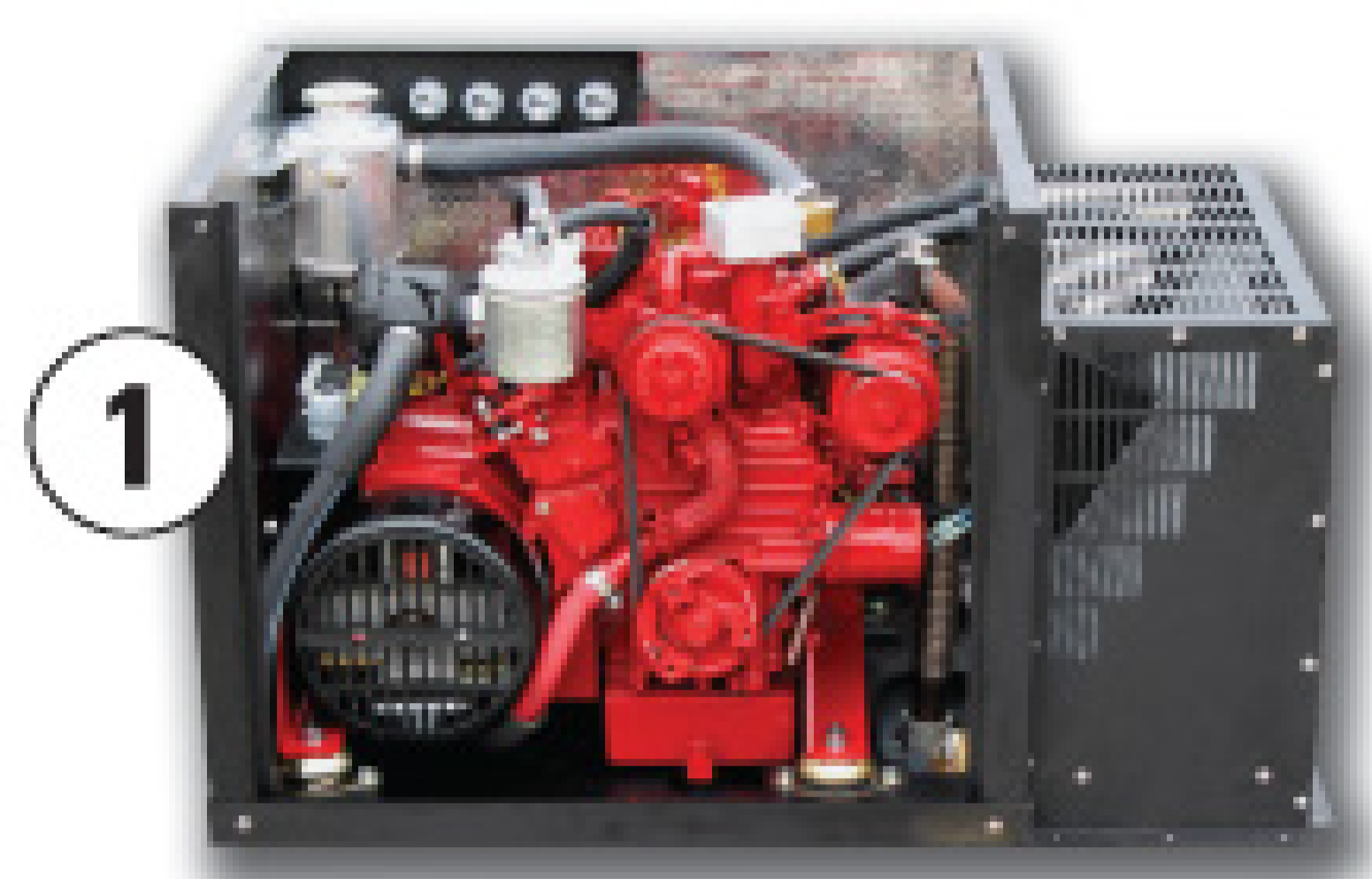
April 26-29

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

April 28-May 1

California Water Environment Association Conference, Palm Springs Convention Center, Palm Springs. Call Marci Chase at 510/382-7800, ext. 120, or visit www.cwea.org.

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



1. NEXT GENERATION OFFERS LIGHTER, QUIETER DIESEL GENERATOR

The Ultra Compact Industrial 5.5-kW diesel generator from Next Generation Power is 23 inches long, 20 inches wide, 21 inches high and weighs 240 pounds. Powered by a heavy-duty, water-cooled, two-cylinder Kubota diesel engine, the generator runs at 2,800 rpm to minimize noise and vibration. Features include a remote-start panel, hour meter, and oil pressure and water temperature shutdown. **888/463-9879; www.nextgenerationpower.com.**

2. HYDRO-DYNE OFFERS MECHANICAL FILTER SCREEN

The Hydro-Flo Screen from Hydro-Dyne Engineering Inc. is an efficient mechanical screen for filtering water and wastewater. It is available with openings from 1 mm to 3 inches in stainless steel laced links, woven mesh, or perforated panels. Very low head losses and all-stainless-steel grids make these center-entrance, side-discharge screens suitable for a number of applications, including protection of membranes. Several models are designed to handle low to high flows and can be incorporated into the company's Septage Receiving Station. **813/818-0777; www.hydro-dyne.com.**

3. ITW INTRODUCES VORTEC COOLING SYSTEM

The Vortec cooling system from ITW Air Management keeps electrical control panels cool, clean and protected. The noise level, about 62 dBA, is 73 percent less than conventional, vortex-type cabinet coolers. Models deliver 900, 1,500, 2,500, and 5,000 Btu/h of refrigeration at a fraction of the size and cost of air conditioners, but run just as quietly. An integral mechanical thermostat conserves energy, maintains enclosure

temperatures at 80 to 90 degrees F, and is suitable for NEMA Type 4- and 4X-rated electrical cabinets.

Requiring only a compressed air supply to operate, the maintenance-free units mount on the top or side of enclosures and quickly install in a 1.5-inch knockout hole. Vortex tube technology converts filtered compressed air into a low-pressure, refrigerated, dry air stream distributed throughout the enclosure. Refrigerated air entering the cabinet provides a light positive purge to seal out contaminants, while a relief valve expels hot air. The weatherproof, corrosion-resistant models withstand extreme conditions and operate in environments up to 175 degrees F. **800/441-7475; www.vortec.com.**

RAVEN OFFERS WASTEWATER PROCESS CONTROL PACKAGE

The Process Control Package from Raven Environmental Products Inc. is designed for activated sludge treatment plants to obtain operational information in wastewater treatment operations. The package enables operators to determine operational parameters, analyze sludge settling characteristics, sludge detention times, return sludge flow rates and waste sludge quantities. The package includes a laboratory bench-top centrifuge designed specifically for wastewater process control, one Coretaker core sampler, three Settleometers and a 14-page user's manual. **800/545-6953; www.ravenep.com.**

4. STAFFORD INTRODUCES METRIC SHAFT COLLAR LINE

Metric shaft collars from Stafford Manufacturing Corp. are made from aluminum, steel and stainless steel in one-piece and two-piece clamp and hinged styles. Standard sizes range from 3 to 80 mm I.D. Collars also can

be machined from Teflon, nylon and other thermoplastics in one- or two-piece styles from 6.35 to 102 mm. Special sizes up to 400 mm I.D. and optional treatments such as wrench flats, holes and knurls are available. **800/695-5551; www.staffordmfg.com.**

5. ALLMAX RELEASES MAINTENANCE MANAGEMENT SOFTWARE

Antero v4.10 maintenance data management software from AllMax Software Inc. features a work order request function, enabling users to submit a request for a specific task or piece of equipment as well as listing equipment downtime. Requests can include date, time priority, equipment, description and other information. It also will show any changes to the status and notes that might have been added. The latest upgrade is compatible with Access 2007. Users also can link to Antero through a GIS interface. **800/670-1867; www.allmaxsoftware.com.**

6. STACO ENERGY EXPANDS UNINTERRUPTIBLE POWER SUPPLY LINE

The 35.5-kVA model FirstLine, three-phase uninterruptible power supply from Staco Energy Products Co. has a standard battery run-time of six minutes, with optional batteries for virtually unlimited run-time. Transformerless power technology provides blackout protection and power conditioning. Front-end harmonic correction eliminates the need for additional filtering, while double-conversion technology protects the connected load from sags, swells, harmonics, noise and voltage imbalances without going to battery operation. **866/261-1191; www.stacoenergy.com.**

ENVISTA ROLLS OUT INFRASTRUCTURE PROJECT COORDINATION SYSTEM

Envista 1.1 infrastructure project coordination system from Envista Corp. is a Web-based software that enables utilities and government agencies to share and coordinate construction and maintenance project schedules online. Features include the Project Cluster, used to group multiple projects into one icon on the user's area map, Spatial Filter that allows users to locate projects on a single street, as well as Project Start and Completion Notification capability, which sends e-mails to project contacts prior to the start or end date of a project. The system also stores a complete record of notifications and replies. **978/232-6300; www.envista.com.**

7. HACH OFFERS REFRIGERATED SAMPLER CABINET

The Sigma all-weather, refrigerated sampler cabinet from Hach Co. is designed to maintain temperature control, protect sample quality and provide security in remote operation. Made of a linear, low-density polyethylene with UV inhibitors, the cabinet resists corrosion and ultraviolet light and features a top-mounted compressor that dissipates heat into the air. The insulated lid protects the controller, pump and pump tubing. **800/277-4224; www.hach.com.**

8. METROHM INTRODUCES 855 AUTOMATED ANALYZER

The 855 automated environmental analyzer from Metrohm is designed for testing wastewater samples in accordance with EPA standards, including conductivity, pH, alkalinity, total hardness, fluoride, ammonia, residual chlorine and more. The unit has built-in electrode input with temperature compensation and can process up to 100 samples. Its intuitive software features a database for raw data storage, control charts, titrant solution and electrode calibration monitoring, results printing, exporting to LIMS and network backup. **800/727-6768; www.metrohmusa.com.**

product spotlight

Chlorine Tester Requires No Special Training

By Ed Wodalski



ChloroSense portable water tester from Palintest

Designed to provide a quicker and less technique-dependent way to measure chlorine than the DPD tablet method, the ChloroSense reagent-free portable water tester from Palintest enables untrained personnel to produce accurate chlorine results on the first try. Once the sample is collected and inserted into the tester, it automatically produces a result in less than a minute. The tester then records and stores all chlorine analysis and temperature results, which can be reviewed on the display or exported to a PC via a waterproof USB port.

Developed in-house at the company's facility in Gateshead, England, the tester is an extension of its field portable test for lead in water, paint, dust and ceramics, says George Belarski, regional sales manager. And while the technology is similar, it is different from the EPA-approved methodology of the SA-1000 lead and copper analyzer.

"A survey of water utilities indicated a need for an extremely easy-to-use, foolproof, technique-independent, accurate, fast and cost-effective method for measuring free and total chlorine," Belarski says. Total test time is approximately 50 seconds. And because of its range and auto-ranging ability, no retesting should be required.

To use, test water is placed in the removable sample tray and a disposable sensor is inserted. Testing begins as soon as the lid is closed, with progress indicated on the display screen. Once the test is completed, results for free chlorine, total chlorine and temperature are displayed. Up to 500 test results can be time- and date-stamped and stored in memory for later recall. To begin another test, the sample tray is emptied and new water is added. One disposable electrode is required for each sample.

In development for four years and on the market since March 2008, the chlorine tester was first released in the United Kingdom and is being used in water facilities there, as well as in France and Canada.

"The industry in the U.S. is just becoming aware of its technology, advantages and availability," Belarski says. **For more information: 800/835-9629; www.palintestusa.com. tpo**

top performer:

PLANT

Mike Huschle of the Bozeman treatment plant staff removes algae buildup from the baffles of a final clarifier using a long-handled brush. (Photography by Carmen Daye Irish)

"The new plant will be welcome and necessary to meet future needs. But this old plant has performed exceptionally well. We're proud of it."

TOM ADAMS

Hitting the Curveball

THE BOZEMAN WASTEWATER RECLAMATION FACILITY RESPONDS TO A STRICT NUTRIENT REMOVAL STANDARD, MAINTAINS EXEMPLARY OPERATIONS, AND READIES FOR EXPANSION

By Jim Force

WHAT WOULD YOU DO IF YOUR STATE REGULATORY agency hit you with a stringent nutrient removal standard three years before your plant was due to be upgraded to biological nutrient removal (BNR)?

If you're the operating staff in Bozeman, Mont., you put on your thinking cap and make process changes to your activated sludge system and cut total nitrogen discharges by 45 percent.

"We appealed the new standards, basing our case on the lack of a compliance schedule, and won an extension," explains Tom Adams, plant superintendent. "But we asked ourselves, 'What could we do quickly to reduce our nitrogen discharge?'"

The answer was a \$150,000 adjustment to the plant's complete-mix activated sludge system that has led to a decrease in total nitrogen discharged from 800 pounds per day to just over 400 pounds. "We call it our PNDN (phased nitrification-denitrification) system, and it has given us a lot of bang for the buck," says Adams.

HARD-WORKING SYSTEM

The Bozeman Wastewater Reclamation Facility treats more than 5 mgd and serves a population of about 35,000. The treatment train is over 30 years old and is at design capacity, but it performs like a system half its age. BOD and TSS removal rates average 98 to 99 percent, despite very cold winters.

Preliminary treatment includes an Auger-Monster screener-grinder (JWC Environmental) for trash and rags. Grit is collected, washed, and disposed of in the county landfill.

Wastewater then undergoes primary treatment followed by activated sludge and disinfection. Chlorination occurs in an 80-minute retention system; sulfur dioxide is added to the chlorine residual before discharge.

Biosolids are removed, gravity thickened, anaerobically digested, and then injected as a liquid into area farm fields and ranches. The biosolids program has won both state and U.S. EPA awards (see sidebar on following pages). Effluent passes to the East Gallatin River, which supports a healthy fish population as it flows into the headwaters of the Missouri River.

A SCADA system built around Allen-Bradley (Rockwell Automation) control logic and a sophisticated Wonderware operator interface controls the entire operation. This system displays real-time process control data including dissolved oxygen, pH, oxidation reduction potential (ORP), and the status of more than 450 other plant components.

MAKING ADJUSTMENTS

Originally, the activated sludge system consisted of four square basins, operated in parallel as a complete-mix system. Sluice gates connected three of the four basins, though the gates were not used.

Working with the plant's consulting engineers, HDR Inc. of Omaha, Neb., Adams and his operations team came up with the idea of opening the sluice gates, and running the units as a plug flow system — all four basins operating in series.

"We experimented and tried running the first two basins in an aerobic-anoxic mode, turning the air on for two to three hours, then turning it off for one-and-a-half to two hours," explains Adams. The plant installed Wilo submersible mixers (Wilo EMU USA LLC) to keep the contents circulating when the air was turned off.

Modifications along the back walls of the basins prevent overflows, and Adams' staff reprogrammed the plant's SCADA system ladder logic to accommodate the new aeration cycles. Meanwhile, continuous aeration takes place in the final two basins. "It's a little like running a sequencing batch reactor, cycling air on and air off, except that the flow is continuous," says Adams.

"It was a simple process change that altered the metabolic pathways of the micro-organisms, and we weren't really sure it would work," Adams explains. "But we felt it was worth a try, so we went ahead and made the change. The results have been really exciting."

Today, with an average daily ammonia nitrogen limit of 1.52 mg/l, the plant actually discharges an average of 0.2 mg/l or less. This is in addition to lowering total nitrogen levels by 45 percent.

profile



Bozeman (Mont.) Wastewater Reclamation Facility

POPULATION SERVED: 35,000

FLOW: Design 5.8 mgd, average >5.0 mgd

TREATMENT LEVEL: Secondary

PERMIT: 30 mg/l TSS, 25 mg/l BOD

BIOSOLIDS: Thickened, digested, injected into farmland

STAFF: Tom Adams, superintendent; Paul Layton, assistant superintendent; Herb Bartle, operations foreman; Goldie Chapman, maintenance foreman; Tom Radcliffe, Stephanie Clark, Mike Huschle, Jack Kurk, Scott Weamer, Jimmie Byler, operations; Shane Leum, Daryl Feenstra, Karl Dagel, maintenance

WEB SITE: www.bozeman.net



PICTURED FROM LEFT: Members of the Bozeman treatment plant operations team: Herb Bartle, Tom Radcliffe, Tom Adams, Mike Huschle, Goldie Chapman, Karl Dagel, Daryl Feenstra and Scott Weamer.

MEASURES OF EXCELLENCE

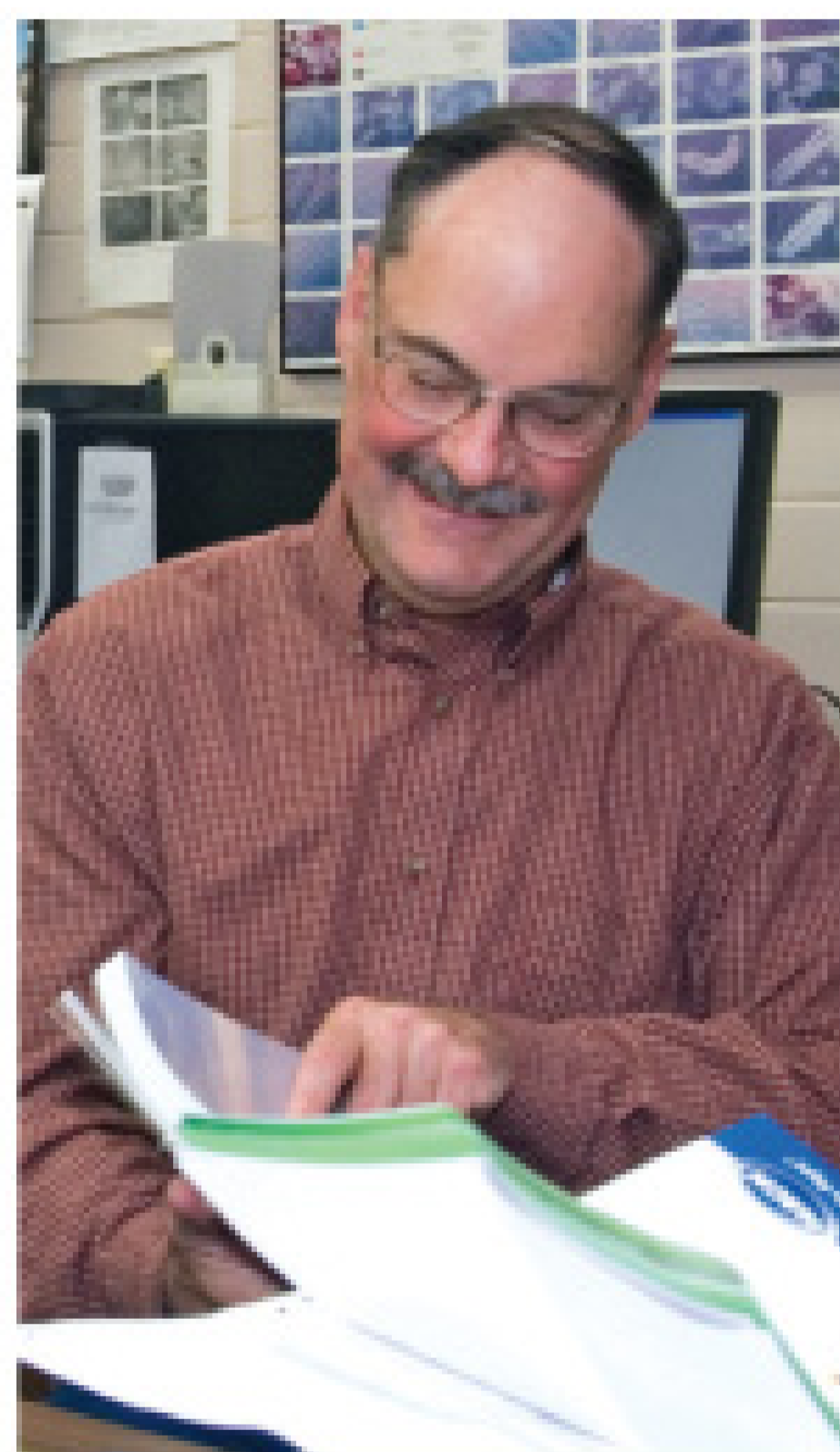
A variety of other operational measures contribute to the outstanding performance at the Bozeman plant. The facility recently received the George W. Burke Facility Safety Award from the Water Environment Federation, recognizing a consistently outstanding safety program and safety record.

The plant uses an ORP system supplied by Hach Co. to monitor performance in the biological treatment system. Voltages generated via metal probes placed into the water indicate the ability of the oxidizers in the wastewater to oxidize or reduce contaminants.

Adams' staff relies on a computerized maintenance management system called JOB Cal from OPS



A scale from Force Flow Inc. is used to measure the chlorine gas in cylinders.



Herb Bartle

ONE METICULOUS OPERATOR

"Our operations foreman is one meticulous guy," says Tom Adams, superintendent of the Bozeman Wastewater Reclamation Facility. That would be Herb Bartle.

A 25-year veteran of the Bozeman operation, Bartle indeed keeps a close eye on treatment operations and seems to have figured out the habits of the bugs through experience, common sense and judicious use of reference materials.

"It also helps that we have a very conscientious laboratory staff," Bartle says. He feels the switch to the phased nitrification-denitrification (PNDN) process at Bozeman represented a "whole new ballgame."

An example is the aerobic-anoxic cycle in the process. Originally, the plant's SCADA system turned air on and off according to a preset timed sequence. With the addition of the oxidation reduction potential (ORP) probes, however, Bartle now can closely watch ORP and pH values change

until they appear to reach a plateau.

"We assume, and our consultants agree, that within 10 to 15 minutes at this plateau we're achieving complete denitrification, and we can turn the air back on," Bartle says. "By cycling the air according to ORP as opposed to timed cycles, we are operating more efficiently and getting improved nitrogen reduction."

Bartle also pays attention to filamentous growth and sludge blankets. "With the PNDN setup, we get less filamentous than we used to, but we still get some, and it's a different kind," he explains. "But we're able to use a lot less chlorine than we used to in keeping it down."

In the plant expansion, Bartle will oversee on-site generation of volatile fatty acids, which will feed phosphorus-accumulating organisms, and a biological odor control system. And of course, much of his attention will be focused on fine-tuning the new Bardenpho process. "I've checked the maps," he says, "and I'm pretty sure ours will be the northernmost Bardenpho operation in the U.S."



An aeration valve actuator from AUMA Actuators automatically opens and closes air valves to control the release of air into the aeration tanks.

Systems Inc. (now Hach Co.). A calendar displays all the scheduled work, completed work, overdue work, and skipped work for a 52-week period. Using the calendar, staff can close jobs or reschedule, create or delete them. An OPS SQL system from the same company enables the laboratory staff to collect and manage analytical data.

Bozeman staffers pride themselves on avoiding the use of chemicals in the treatment process, although chlorine is sometimes used to knock down filamentous growth in the return activated sludge.

"This plant has a habit of producing filamentous organisms," says Adams. "We keep a close eye on the clarifiers. One of the most practiced eyes belongs to operations foreman Herb Bartle. He's meticulous in monitoring and controlling our biological process." (See sidebar on opposite page.)

UPGRADE ON THE WAY

Still, the plant is at hydraulic capacity and faces recently mandated stringent limits for phosphorus as well as nitrogen. That has led to the largest capital project in the city's history: a \$52 million expansion of the treatment facility to 13 mgd.

Contractors broke ground in January for new headworks facilities and a five-stage Bardenpho process, which combines anoxic, anaerobic and aerobic treatment in five stages for effective biological nutrient removal.

The plans also include UV disinfection for advanced treatment, and energy efficiency measures throughout. New ABS blowers will operate on 30 to 50 percent less electricity than the existing ones. The primary effluent pumping station will be below grade level to save on heating costs, and will be lit by skylights.

"The new plant will be welcome and necessary to meet future needs," says Adams. "But this old plant has performed exceptionally well. We're proud of it." **tpo**

more info:

ABS USA Inc.
203/238-2700
www.absgroup.com

AGCO Corp.
888/989-8525
www.agcocorp.com

AUMA Actuators
724/743-2862
www.auma.com

Force Flow Inc.
800/893-6723
www.forceflow.com

Hach Co.
800/227-4224
www.hach.com

JWC Environmental
800/331-2277
www.jwce.com

Rockwell Automation Inc.
www.rockwellautomation.com

Wilo EMU USA LLC
866/476-0323
www.wilo-emu-usa.com

Wonderware
949/727-3200
www.wonderware.com



A TerraGator vehicle from AGCO Corp. injects biosolids into cropland. The four tines till the soil

EXCEPTIONAL BIOSOLIDS PROGRAM

The Bozeman treatment plant's biosolids are "exceptional quality" by U.S. EPA standards, and the operation itself has been judged exceptional by both the EPA and the Montana Water Environment Association. Both organizations have given the Bozeman facility their top biosolids operations awards in the past couple of years.

The beneficial reuse operation is managed entirely by city personnel. Liquid biosolids are thickened and digested, and then transported by a fleet of utility-owned Freightliner tanker trucks (Daimler Trucks, North America) to 530 acres of EPA-approved fields on farms and ranches within five miles of the treatment plant.

There, city personnel use a TerraGator injector (AGCO Corp., Duluth, Ga.) to plow the material into the earth on a daily basis. Last year, Bozeman land-applied about 10 million gallons. In the winter months (November through March) the liquid material is stored in a 5-million-gallon lagoon at the treatment plant.

"Our biosolids have no metals or other industrial input, so we produce a very clean product," says Tom Adams, plant superintendent.

"This plant has a habit of producing filamentous organisms. We keep a close eye on the clarifiers. One of the most practiced eyes belongs to operations foreman Herb Bartle. He's meticulous in monitoring and controlling our biological process."

TOM ADAMS

A biosolids lagoon at the Bozeman plant stores the material for later application to farmland.

ALWAYS GIVING EXTRA

AWARD-WINNING OPERATOR ANDREW KNIGHT BRINGS ENERGY AND INNOVATION TO THE BIOSOLIDS PROCESS AT PORTLAND'S COLUMBIA BOULEVARD TREATMENT PLANT

By Ted J. Rulseh

FOR ANDREW KNIGHT, EVERY DAY AT WORK IS DIFFERENT. WHAT NEVER changes is his enthusiasm for his job as an operator II at the 200-mgd (design) Columbia Boulevard Wastewater Treatment Plant in Portland, Ore.

Knight, an eight-year employee of the plant, works as a lead operator in the biosolids area, which processes some 40 dry tons per day. His passion for doing a quality job grows in part from his love for the plant's receiving stream, the Columbia River, where he fishes for salmon and sturgeon.

Knight's dedication has earned him not only the respect of his peers and managers but also recognition from the Pacific Northwest Clean Water Association (PNCWA), which named him Oregon Operator of the Year for 2008.

"You need to have personal drive," says Knight. "You need to have some personal motivation. For me it's the environment. It's definitely a priority of mine to keep the river clean. I want my daughters to be able to fish it, and I want to continue to have a good, healthy river for myself.

"I want to go home at the end of the day and feel good about myself. I want to feel at the end of the day that I earned my paycheck, and that I did the best job I could."

'CAN-DO, CAN-CHANGE'

His supervisor, Tuong Nguyen, observes that Knight is full of ideas and likes challenges. "Andrew has a great approach to his work," Nguyen says. "He has a can-do attitude, a can-change attitude, that is really refreshing. Everybody has ideas, but when you want somebody to take an idea and do something with it and make it work, that would be Andrew."

Knight is responsible for optimizing performance in the biosolids area at Columbia Boulevard. His primary job is to operate gravity belts and the polymer control system, but he has also been involved in operating belt presses, lagoon dredging equipment and batch systems, and in laboratory analysis.



Andrew Knight, a lead biosolids operator at the 200-mgd (design) Columbia Boulevard Wastewater Treatment Plant in Portland, Ore., was named Operator of the Year for 2008 by the Pacific Northwest Clean Water Association. (Photography by Caryl Young)

In its award summary, the PNCWA cited his service on a plant safety committee and his handling of several job hazard assessments. His group at Columbia Boulevard achieved certification under Oregon OSHA's Safety & Health Achievement Recognition Program (SHARP).

"Andrew is frequently asked to participate on teams and committees where his operational viewpoint is valuable," the award summary said. "He has exceptional communication skills, takes pride in his work, and sincerely cares about the effectiveness of his efforts."

PURSuing AN INTEREST

Knight's interest in the outdoors and the environment led him to enroll in the Natural Resources program at Oregon State University after high school. After three years there, he saw a weak job market and fierce competition for the few jobs available.

"I had a friend who was in the wastewater business, and he told me a little about it," Knight says. "I transferred to Linn Benton Community College [in nearby Albany] and entered the Water and Wastewater Technician program there." He received a two-year associate's degree in 2000.

After graduation, he won a summer internship at Columbia Boulevard, where he did mostly general housekeeping and got an introduction to

the plant and the industry. At the end of the internship, he accepted a trainee position. Two years later, he moved up to an operator II slot in the biosolids area.

After six months there, he joined the Special Operation Group (SOG) as a member of a quick-response team handling maintenance tasks, emergencies and special projects. A few years later, he transferred back to the biosolids area to get a work schedule more conducive to spending time with family. He and wife Kristin have two daughters: Adrienne, 3, and Lindsey, 6 months.

Along the way, Knight has earned continuing education units (CEUs) in



Knight, shown measuring the sludge blanket in a clarifier, draws part of his motivation from his attachment to the Columbia River and the need to keep it clean.

"You need to have personal drive. You need to have some personal motivation. For me it's the environment. It's definitely a priority of mine to keep the river clean. I want my daughters to be able to fish it, and I want to continue to have a good, healthy river for myself."

ANDREW KNIGHT



profile

**Andrew Knight,
Columbia Boulevard
Wastewater Treatment
Plant, Portland, Ore.**

EXPERIENCE:
8 years

POSITION:
Operator 2

WORK AREA:
Biosolids

DEGREE:
Associate's, water and
wastewater technology, Linn
Benton Community College,
Albany, Ore.

GOALS:
Finish four-year college
degree; gain state certification;
advance into management



Knight sees a bright future and high career satisfaction in the wastewater treatment industry.

short-school classes at Clackamas Community College in Oregon City, in a program sponsored by the Water Environment Federation.

PART OF A TEAM

Knight's team consists of half a dozen operators on rotating shifts. On a given day, two operate the dredge that draws biosolids from a 37-acre lagoon to be fed to two holding anaerobic digesters, and one operates the four belt

"Andrew has a great approach to his work. He has a can-do attitude, a can-change attitude, that is really refreshing. Everybody has ideas, but when you want somebody to take an idea and do something with it and make it work, that would be Andrew."

TUONG NGUYEN

presses (Ashbrook Simon-Hartley). Knight or a colleague functions as lead operator, running the three gravity belts (also Ashbrook Simon-Hartley) and controlling the polymer system.

The lead operator is also the first point of contact for any plant employee who interacts with the biosolids group. "We deal with maintenance people and electricians and facilitate when they can come in and shut down equipment for maintenance or repairs," Knight says.

Because the equipment is old, workdays can be somewhat unpredictable, but the biosolids area is still a more stable workplace than the wet side, where flows can range from 15 mgd at night to 300 mgd during a daytime rainstorm.

ENHANCING THE PROCESS

In the biosolids treatment process, waste activated sludge (WAS) is thickened up to 5 percent solids using gravity belts and polymer before being sent to two of eight digesters (1.3 million to 2.4 million gallons/each, capacity).

After 20 days, about 80 percent of this digested, thickened WAS is sent to the lagoon for further aging and conditioning. The remaining 20 percent is

ADDING INNOVATIONS

The Columbia Boulevard Wastewater Treatment Plant in Portland, Ore., protects the Columbia River with a design capacity of 100 mgd. Built in 1952, this secondary treatment plant has been expanded or upgraded six times, most recently in 2000 with the addition of new dry-weather primary clarifiers.

These covered, concrete tanks include two chemical scrubbing towers that control sewage odors with filtering capacity of 33,000 cfm. Among other innovations, an anoxic flow process was added to the secondary treatment phase in 1993, making the plant one of the largest in the country to convert to that process. This addition minimized the need for additional chlorination while increasing secondary treatment flow.

A new headworks building added in 1997 is totally enclosed and also uses chemical scrubbers. Landscaping features native plants, a pond and wetlands.

The year 2000 saw completion of the Columbia Slough Consolidation Conduit, which keeps combined sewage and stormwater from overflowing to the Columbia Slough. An influent pump station with three motor-driven pumps delivers up to 30 mgd from the conduit to the plant headworks during dry weather. During heavy rains, six larger pumps can deliver an additional 135 mgd.

The plant uses sodium hypochlorite for disinfection. A dechlorination facility on the banks of the Columbia River reduces chlorine residual to no more than 1.0 ppm. The facility uses liquid sodium bisulfite to dechlorinate the effluent.

The treatment plant staff is committed to eliminating odors beyond the plant boundaries, and the city Bureau of Environmental Services has invested more than \$5 million toward that goal.

Columbia Boulevard Wastewater Treatment Plant NPDES PERMIT REQUIREMENTS

BOD	30 mg/l monthly avg.; 45 mg/l weekly avg.
TSS	30 mg/l monthly avg.; 45 mg/l weekly avg.
Total Residual Cl ₂	Not to exceed 1.0 mg/l
pH	6.0-9.0
Coliform	126/100 ml monthly (no sample to exceed 406/100 ml)

mixed with digested primary sludge and dredged sludge from the lagoon before being sent to the belt presses. "This 'soup du jour' blend is where the skills of Andrew's team show through, as they produce the best possible biosolids cake, consistently north of 20 percent dry solids," Nguyen says.

After digestion, finished biosolids are dewatered on the belt presses to a cake containing about 20 percent solids. A contractor then hauls the material to the land application site, a privately owned farm and ranch operation outside Portland.

When a large digester was recently taken down for several months for installation of a new mixing system, a solids-handling problem arose that Knight helped to remedy. "Because one of our two main digesters was down, we were working with one digester," Knight says. "We were pulling solids out of that digester while also pumping dredge material into it.

PITCHING RIGHT IN

When Tuong Nguyen took over responsibility for the biosolids area at the Columbia Boulevard Wastewater Treatment Plant, he quickly noticed Andrew Knight's willingness to take ownership of projects.

As a public works supervisor 2, Nguyen oversees a total of 24 operators. His first impression of the biosolids area was that it badly needed a facelift. "The building had been neglected," he says. "It was operational, but not very clean. I took it on myself to improve the workplace, and Andrew was one of the first to jump on board.

"One of the first things I did was ask Andrew to see what he could do about the office floor, which was in very poor condition. I told him, 'If you can find a way to improve this floor, I'll get the money.'

"Right away, Andrew started checking around for prices, and he worked with our storekeeper to get bids for repair," Nguyen says. "The contractor ripped the old flooring out and replaced it with new linoleum. Andrew moved the equipment and cleared the room out so the contractor could go in and work."

Next came the process lab, where Knight washed the walls and prepared them for painting. "Soon co-workers took after him and pitched in," Nguyen says. "A positive attitude can be infectious. The facility now looks spotless. Every time I walk in there, I feel good, and the operators who work there feel good."



Knight's supervisor, Tuong Nguyen (right), praises him for his positive attitude and willingness to take on challenges.

he hopes in time to further his education. He planned to take his state certification exam in March.

"I studied three years at Oregon State, but didn't finish my bachelor's degree," he says. "I'd like to go back and do that, especially to set a good example for my daughters. Eventually I'd like to get into the management team here. I think we have a real strong team, and it would be nice to be a part of that.

"I think I have a solid career here in an industry with a very strong outlook," Knight says. "I earn good pay and decent benefits. I have job security and a place I can come to and feel as if I'm doing something for the environment. There aren't many young people in the wastewater field. There's a whole lot of opportunity for those of us who are here." **tpo**

more info:

Ashbrook Simon-Hartley
800/362-9041
www.ashbrookcorp.com

"The way our piping was set up at the time, the line we were pulling out of to feed the belt presses was the same one our lagoon dredge line pumped into. So we were mixing the flow and sending direct lagoon flow over the belt presses. You need a fairly uniform flow over belt presses in order to run proper polymer ratios. If your feed is highly variable, you can't set the belt presses right to get good-quality cake."

Knight and colleagues found a way to split the flows, isolating the pump flow to the presses from the flow entering the digester from the dredge. "It sounds simple, but it really wasn't," Knight says. "It saved us a lot of headaches."

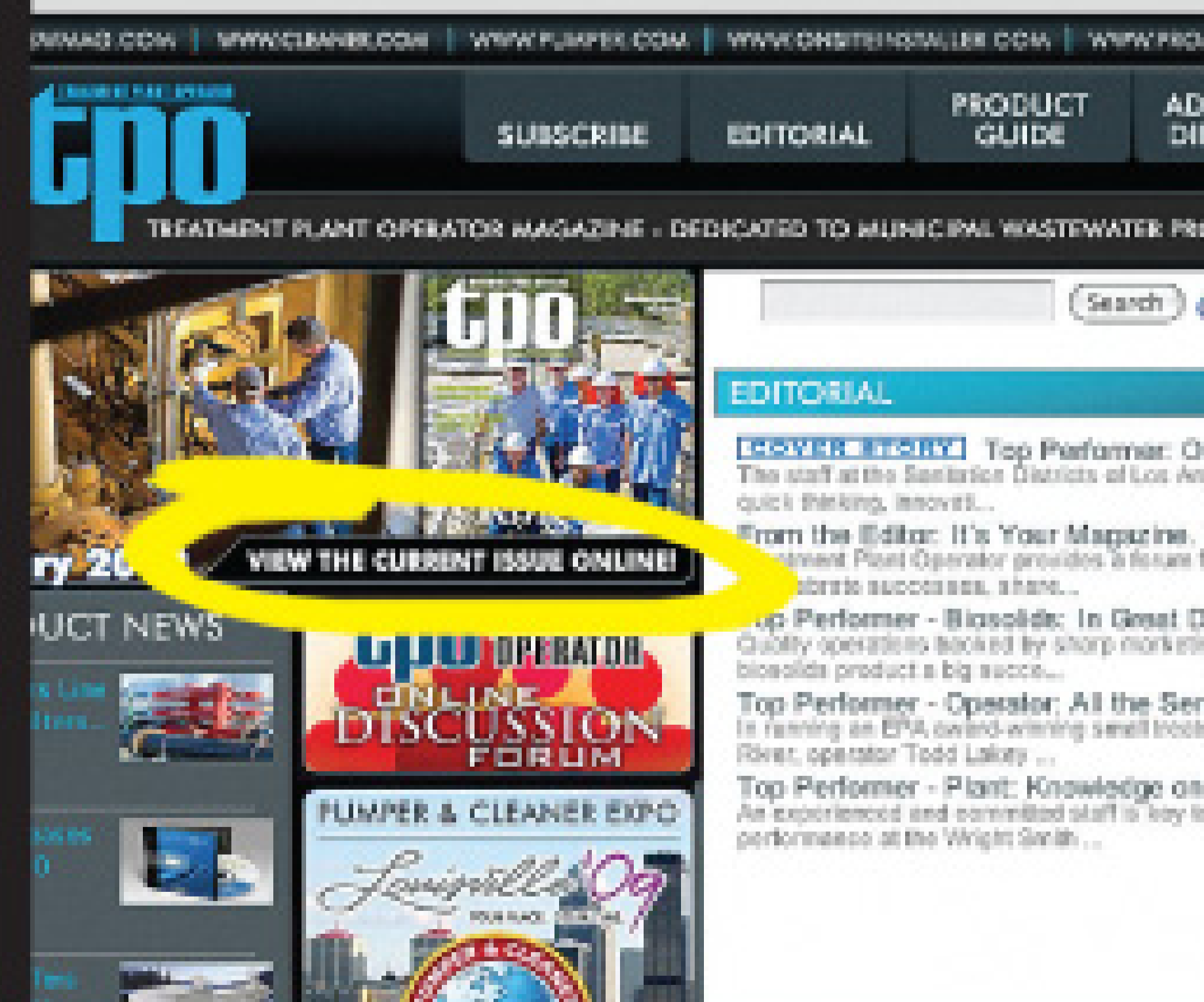
LOOKING AHEAD

Challenges like that help keep Knight enthusiastic. He's especially interested in the technology coming into the field. "Things are changing constantly," he notes. "Operators need strong computer skills today. Maybe 15 years ago, everything was push-button manual start. Now everything is on a SCADA system. Without computer skills, you're going to be in a world of hurt.

"I spend a lot of my time looking at trend charts. That alone gives us a wealth of knowledge," Knight says. "Before, when something unusual happened, you reacted from experience, or from memory. Now, I can look through a dozen trend charts and see that at 2:38 p.m., this spike occurred. Why did it happen? I can look at other trend charts and see what might have triggered it. Did a pump go out? Did a pump turn on? Did our pH go up? It's a lot easier to troubleshoot now with the advent of computers."

As one who thrives on change, Knight sees a bright future at Columbia Boulevard and in the profession. While his main focus now is on his family,

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click away.**



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Detective Work

LAB ANALYSIS TOOLS AND INSTRUMENTS HELP TREATMENT PLANTS KEEP PROCESSES ON TRACK AND STAY IN COMPLIANCE WITH PERMITS

By Scottie Dayton

The real work of treatment gets done in the aeration basins and clarifiers, but there's no discounting the importance of the laboratory. Here's a look at an assortment of tools and technologies that help treatment plant teams keep a handle on their processes and keep their effluent in compliance with NPDES permit requirements.

ONE-HAND METER

The portable **Ultrameter II from Myron L Co.** simplifies and streamlines testing in the lab or in the field. Technicians merely fill the cell cup, push a parameter key, and take the reading. The unit monitors conductivity, TDS, resistivity, ORP (REDOX), pH and temperature in wastewater.

The memory, storing 100 date/time-stamped readings, downloads to computers using a uDock accessory package for data entry, analysis and reporting. Four-electrode conductivity cell technology, pH/ORP sensor, and microprocessor-based circuitry deliver performance of ± 1 percent of reading. **760/438-2021; www.myronl.com.**

OXYGEN DEMAND MONITOR

The PLC-controlled **Oxygen Demand Monitor (ODM-100) from Challenge Technology** operates in continuous or sequential batch mode for optimum oxygen demand information. The continuous mode is for toxicity detection and trend monitoring, and the sequential batch mode is for OUR fingerprint analysis. The rail-mounted unit installs easily or moves from location to location.

The monitor has a 1/2-hp submersible sewage pump and a peristaltic feed pump for directly determining the effect of trucked in waste on mixed liquor. Information feeds to SCADA systems via 4-20ma output. Simple touch-screen control allows operators to customize test parameters. **479/927-1008; www.challenge-sys.com.**



Ultrameter II from Myron L Co.



Oxygen Demand Monitor (ODM-100) from Challenge Technology



Sample Master Pro LIMS from Accelerated Technology Laboratories Inc.

INFORMATION SYSTEM

The **Sample Master Pro Laboratory Information Management System (LIMS) from Accelerated Technology Laboratories Inc.** helps users manage data, resources and complex infrastructure challenges.

The feature-rich modules enable laboratory managers to address each area from sample login, tracking, data entry and QA/QC to Web reporting with Result Point, an Internet and Intranet portal to real-time LIMS data, status and permit information. Users also can access Web reports and download files in common formats. The application integrates with the NPDES discharge monitoring reporting software and numerous pretreatment software packages. **800/565-5467; www.atlab.com.**

HYBRID TESTING

PACS Testing, Consulting and Training tests sorbents with ASTM and GRPD to help wastewater plants determine which one is best for their applications. This hybrid approach maximizes unit performance and testing by helping operators select the best activated carbon for applications such as adsorption of pesticides, endocrine disruptors, industrial chemicals, oil and grease, and chemical reduction of effluent chlorine to acceptable regulatory levels. GRPD testing differentiates total pore volume, and ASTM testing provides only the total pore volume. Combining the two distinct technologies achieves maximum efficiency. **800/367-2587; www.pacslabs.com.**

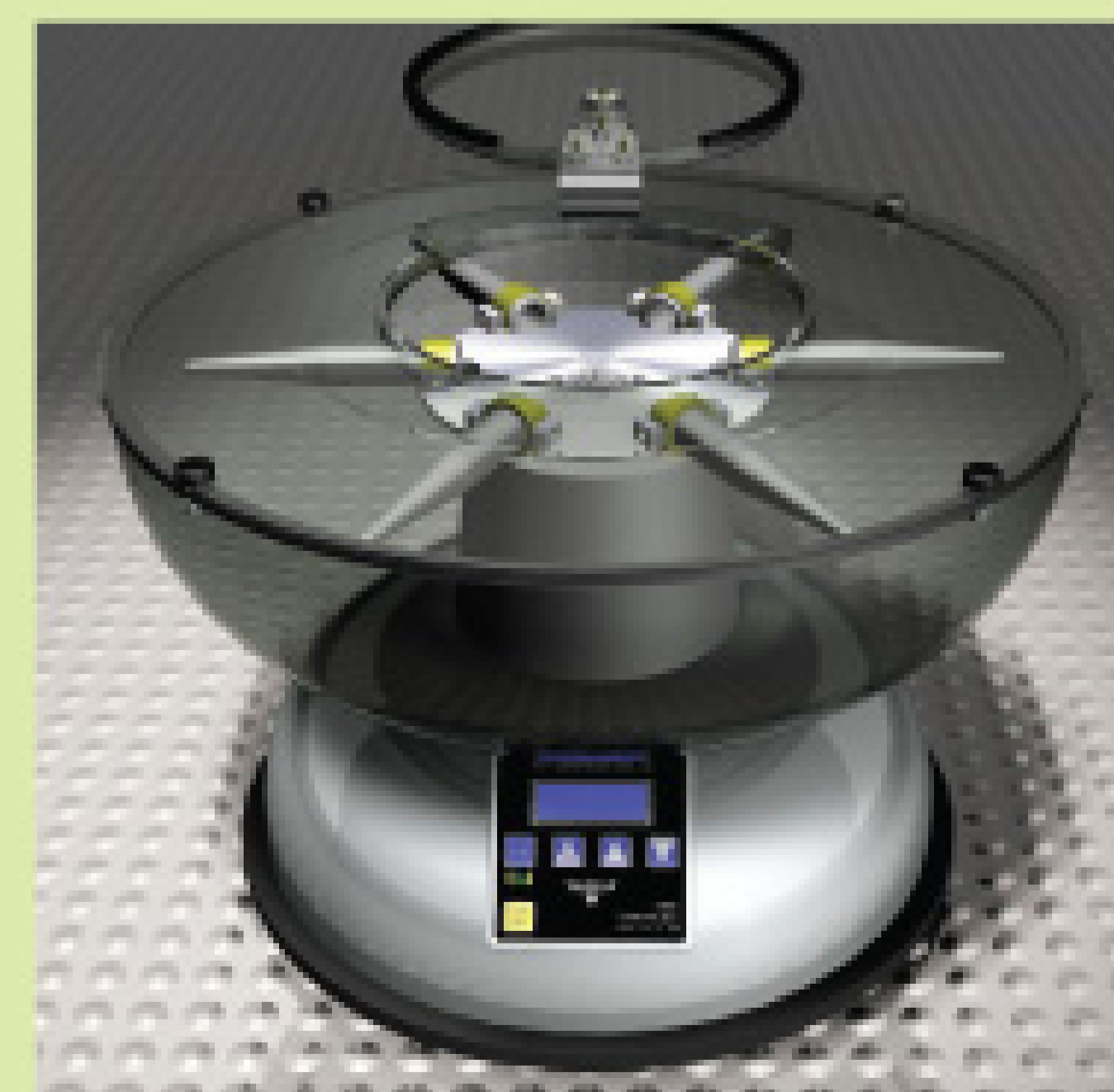
SOLIDS PROCESS CENTRIFUGE

Analysts in activated sludge plants can make process control decisions using the stainless steel **bench-top process centrifuge from Raven Environmental Products Inc.** A 15-minute spin in the centrifuge with samples from the aeration tank, secondary clarifier, or even the thickener establishes a baseline solids level and notes daily fluctuations.

For example, if sludge levels are growing, it may be time to waste (WAS). After wasting, solids should decrease. Another quick sample spin will confirm that assumption or indicate wasting too frequently. The centrifuge also enables analysts to relate the solids content among all the tanks in the plant. **800/545-6953; www.ravenep.com.**

CONDUCTIVITY INSTRUMENT

The **Model 4083 EC meter from Amber Science Inc.** measures conductivity, resistivity, total dissolved solids, salinity and temperature of aqueous solutions. The instrument has a user-friendly interface with auto range, two-line backlit display,



Bench-top process centrifuge from Raven Environmental Products Inc.



Model 4083 EC meter from Amber Science Inc.

and RS-232 output with PC software for data logging.

Operating on a 9-volt battery or 115-volt AC adaptor, the nonvolatile memory allows set points to remain when the power is off. Options include a remote audible alarm box that buzzes when measurements fall above or below user-set limits. **541/345-6877; www.amberscience.com.**

CHLORINE TEST KIT

The **FAS-DPD chlorine test kit (K-1515-C)** from **Taylor Technologies Inc.** does not require matching the pink color that develops in the treated water sample to a set of color standards, or use of an electronic colorimeter to determine if chlorine is present.

Analysts simply add ferrous ammonium sulfate (FAS) drop by drop to a sample containing DPD indicator. They then multiply the number of drops needed to turn the sample from pink to colorless by the chosen drop equivalency — one drop equals either 0.2 or 0.5 ppm — to determine the chlorine concentration. FAS-DPD titration is less expensive than using a meter, and full color development is immediate. Even color-blind users can see the endpoint of the reaction. The test determines free chlorine, combined chlorine, and total chlorine from 0.2 to 20 ppm. **800/837-8548; www.taylortechnologies.com.**

PIPE-MARKING SOFTWARE

MaxiSoft PipeMarker V.2 labeling software from K-Sun Corp. now runs on the Windows Vista operating system. The application has more than 500 preformatted ANSI, OSHA, IIR, CGA, NFPA and ASME compliant pipe and valve markers in English, Spanish and bilingual formats. MS Word templates provide greater flexibility in wide-format, in-house label production. Users can create warehouse rack and bin labels, banners, product labels, safety identification labels and more.

Although the software uses any Windows-based printer, it works best with the company's 9200XXLL thermal transfer printer and adhesive-backed Polydurable film media to print pipe markers 50 inches long. Users can customize markers and labels by adding or importing multi-line text, symbols and logos, service and emergency contact numbers, temperature and pressure information, signal words, flow arrows, chevrons and more. Wrap-around arrow tape and custom pattern barrier tape print on continuous marker materials in various ANSI colors. **800/622-6312, ext. 214; www.ksun.com.**

NITROGEN/PHOSPHORUS ANALYZERS

The **TNPC-4110 series of online automatic water analyzers from Shimadzu Scientific Instruments Inc.** measures total nitrogen (TN) and total phosphorus (TP). The system can sample, pretreat, digest and analyze samples automatically, saving time and labor, and eliminating potential



FAS-DPD chlorine test kit (K-1515-C) from Taylor Technologies Inc.

preparation errors.

Technicians can analyze multiple streams and parameters without bringing samples to the laboratory, and the optional Sample Thief eliminates expensive filters when analyzing particulated sample streams. The models have automatic calibration using standard on-board solutions, and user-defined calibration checks and measurement conditions. Measurement ranges from ppb level to thousands of ppm for TN, TP and TOC. **800/477-1227; www.ssi.shimadzu.com.**

INFORMATION MANAGEMENT

MSC-LIMS from Mountain States Consulting LLC is a flexible, powerful, secure and stable GALP-compliant laboratory information management system for wastewater labs processing up to 75,000 samples and 300,000 analyses per year. It integrates smoothly with hand-held PCs or PDAs to import data recorded in the field.

With Excel interface, users can create analyte-specific calculating data entry screens and import operations data and results from instruments. The interface also allows labs to use their existing Excel regulatory report formats. The system supports basic statistics, trend graphs and control charts. Versions include single user, multi user, and workgroups of up to 20 concurrent users. The software also has an integrated audit trail, archiving, messaging and access controls. **307/733-1442; www.msc-lims.com.**

COLIFORM TESTING

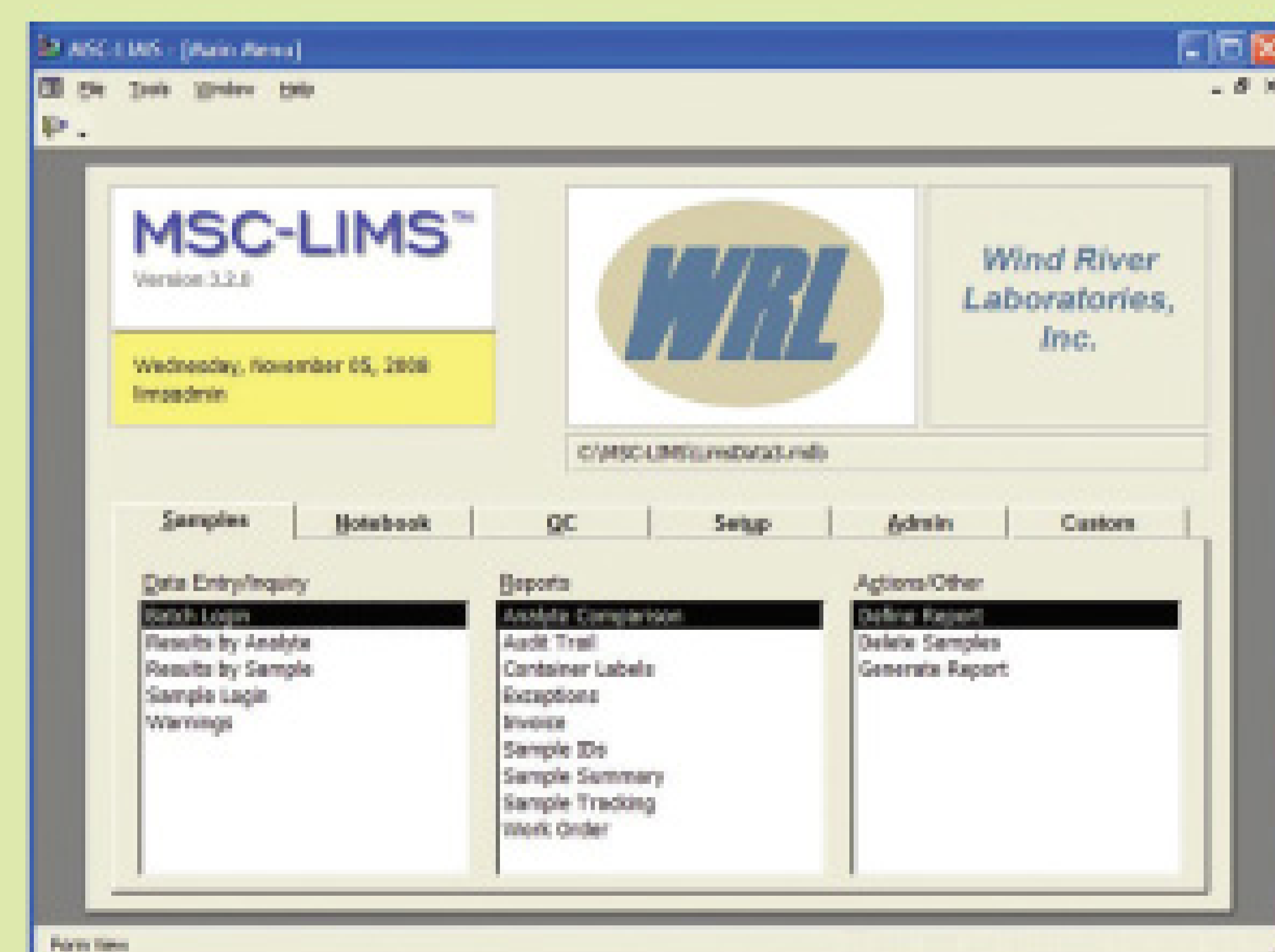
The **Model 8306 circulating water bath from PolyScience** sets easily at the 44.5-degrees C temperature required for APHA, AWWA, WEF and EPA fecal coliform and E. coli testing. Three preset, one-touch buttons permit rapid temperature setpoint changes. The model has an ambient temperature range of 5 to 150 degrees C,



TNPC-4110 water analyzers from Shimadzu Scientific Instruments



MaxiSoft PipeMarker V.2 labeling software from K-Sun Corp.



MSC-LIMS information management system from Mountain States Consulting LLC



Model 8306 circulating water bath from PolyScience



Microbial Communication Service from RespirTek Inc.



G7883 glassware washer from Miele Professional

temperature stability of ± 0.05 degrees C, 28-liter reservoir, and bright LED readout.

Standard features include integral over-temperature and low-liquid level safeties, hinged see-through bath cover, temperature readouts in Celsius or Fahrenheit, and a two-speed inlet and outlet pump. All wetted parts are corrosion-resistant 300 series stainless steel. **800/229-7569, www.poly-science.com.**

MEETING CHALLENGES

The **Microbial Communication Service from RespirTek Inc.** environmental consulting laboratory can help optimize plant efficiency and minimize operational costs. Laboratory studies can evaluate increased influent rates, qualify new waste streams, and provide third-party validation of operating conditions or upsets.

The service includes assistance in interpreting the results and an easy-to-read report. Whether the problem is routine or out of the ordinary, the staff can design a test protocol to help address most operational issues. Testing can be as simple as biological analysis or as complex as laboratory scale wastewater treatment plant models. **228/392-7977; www.respirtek.com.**

TURBIDITY AND SOLIDS CONTROL

The **SOLITAX sc Sensor and sc100 Controller from Hach Co.** apply a color-independent measurement technique that eliminates repetitive calibration for accurate, efficient on-line particulate and solids measurements. The controller has full data communication capabilities to help improve process control and reduce treatment costs associated with polymer use, digester volume and solids handling.

The sensor's dual-beam infrared/scattered light photometric detection technology has immunity to color interference and excellent correlation to

primary and secondary sludge laboratory analysis. The self-cleaning sensor wipers reduce erroneous values and maintenance caused by



SOLITAX sc Sensor and sc100 Controller from Hach Co.



2020e turbidity meter from LaMotte Co.

biological growth, while eliminating extraneous cleaning and air purge systems. With no potted components, the fully serviceable unit delivers twice the typical sensor life. Ready-to-install sensor kits mount in tanks or pipes. **800/227-4224; www.hach.com.**

BOD BOTTLE WASHER

Coupled with upper and lower BOD injector baskets, the **G7883 glassware washer from Miele Professional** provides a simple, automatic way to clean 67 BOD bottles in a single load. The powder door cup detergent dispenser opens at the proper time during the cycle for accurate dosing. An automatic liquid detergent dispenser is optional. The 106-gpm circulation pump and low spray pressure clean gently yet effectively. Hold-down screens are unnecessary.

Wash and rinse temperatures are adjustable up to 93 degrees C. During each wash cycle, an automatic pump dispenses acid neutralizer to completely remove detergent residues. Other features include a water softener that uses 50 percent less salt than previous models, a heat-exchanger-type steam condenser that uses 4 liters of extra water per cycle, and gravity convection drying. **800/991-9380; www.labwashers.com.**

ALKALINE CLEANER

Micro-90 concentrated cleaning solution from International Products Corp. is an environmentally friendly, mild free-rinsing alkaline that cleans labware, metal parts, glass, process equipment and filter membranes. Its formulation of chelants, ionic and nonionic ingredients produces cleaning actions that lift, disperse, emulsify, sequester, suspend and decompose.

Targets include oil, grease, wax, tar, flux, particulates, hard water stains and biological debris. The cleaner is especially effective at defouling filter membranes and can be validated in critical cleaning applications. It also helps improve the overall effectiveness and safety of many cleaning operations. **609/386-8770; www.ipcol.com.**

PORTABLE TURBIDITY METER

The **2020e turbidity meter from LaMotte Co.** meets method 180.1 EPA design criteria and is suitable for high-turbidity applications (autorange 0-4,000). The multi-detector optical configuration assures long-term stability and minimizes stray light and color interferences.

The meter has six user-selected languages, a 4,000-data-point log that downloads through the RS232 port, and the option to choose NTU, FNU, FAU, ASBC and EBC units of measure. Meters come with three AMCO calibration standards and operate on a 9-volt battery. An AC adapter is optional. **800/344-3100; www.lamotte.com. tpu**



Micro-90 cleaning solution from International Products Corp.

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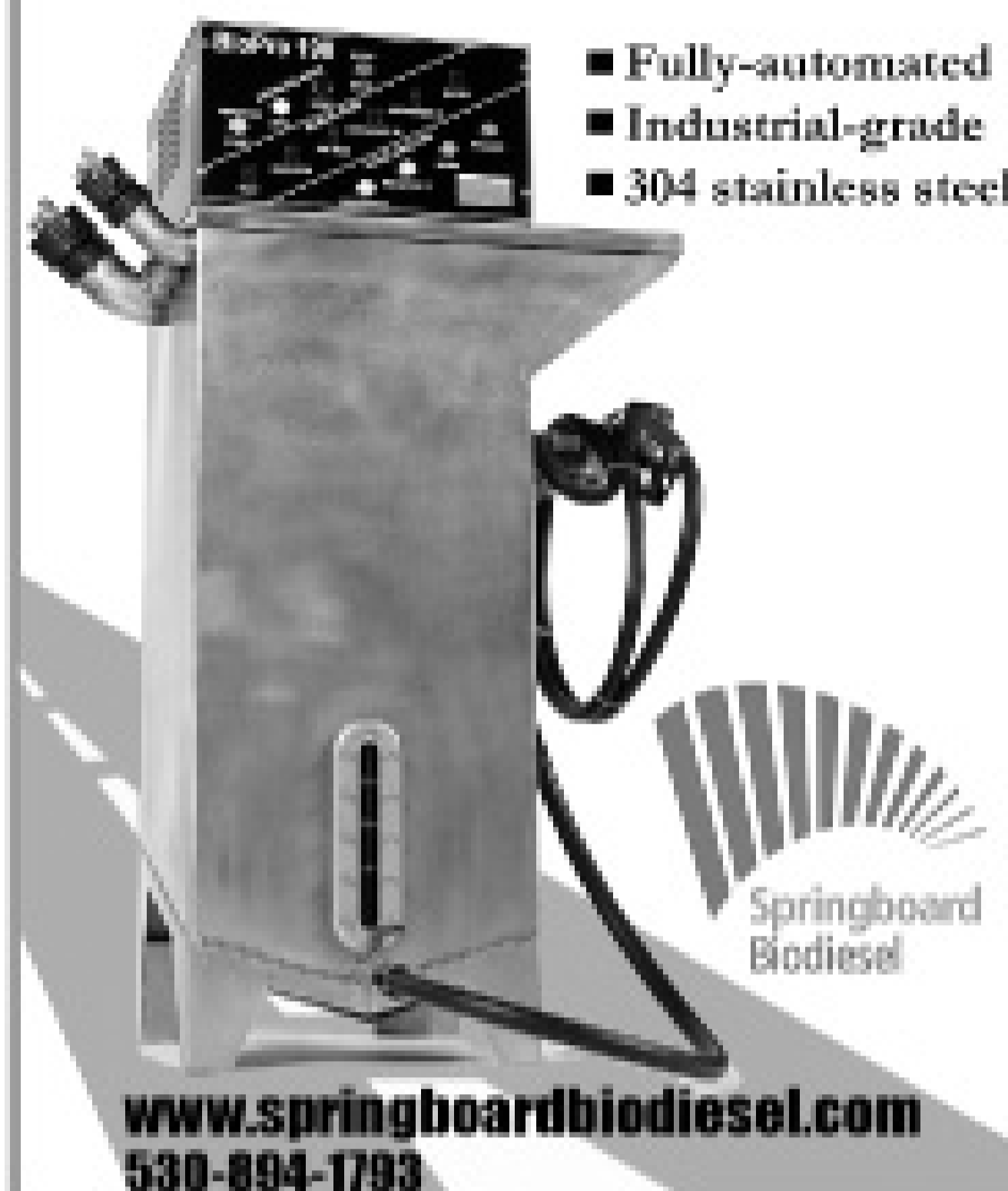
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Q2 Technologies Acquires Adapco Environmental

Odor control company Q2 Technologies LLC has acquired the assets of Adapco Environmental Solutions (AES), manufacturer of chemistries and instruments for the municipal odor control market. As part of the transaction, Q2 acquired Adapco's odor control scrubber patents and its Vulchur line of products. The Vulchur brand will be expanded to include new Q2 product offerings. The former AES operation will become the new Environmental Solutions Division within the Q2 Technologies organization.

Bord na Mona Awarded \$2.5 million in Odor Control Contracts

Bord na Mona has been awarded contracts to install nearly \$2.5 million in odor control treatment solutions in Italy and the United Kingdom. The company recently completed a fourth \$1.5 million installation in Rome and is now treating 1 million cubic meters per hour of air in four wastewater treatment plants. The United Kingdom contract, awarded by British Steel, is to provide air-cleaning systems for solvent emissions from its paint plants. Other recent projects include the installation of a large pumping station in Hong Kong, a large Monashell installation in Barcelona, Spain, and a number of installations with SIAPP, the body responsible for operating wastewater treatment plants in France.

Schneider Electric, Dessoat Reach Reseller Agreement

Schneider Electric has reached an agreement with Dessoat Systems to resell its Delmia 3-D simulation software, enabling Schneider to assist customers with the design, testing and operation of manufacturing processes in a virtual environment prior to implementation.



Altra Launches Industrial Couplings Web Site

Altra Industrial Motion has launched a Web site (www.altraglobalcouplings.com) dedicated to its industrial coupling products. The site includes product groupings, features, capabilities and typical applications.

Serfilco Releases 2009 Product Catalog

Serfilco has released its latest product catalog, featuring corrosion-resistant pumps, filtration systems and fluid-handling equipment. To obtain a copy, call 800/323-5431 or e-mail sales@serfilco.com.

Fluid Metering Receives Metering System Patent

Fluid Metering Inc. has received a patent on its Chloritol valveless metering system for the maintenance-free injection of sodium hypo-chlorite in the purification of municipal drinking water.

Pump Systems, Hydraulic Institute Offer Guidebook

Optimizing Pumping Systems: A Guide to Improved Efficiency, Reliability, and Profitability from Pump Systems Matter and the Hydraulic Institute is a 250-page reference based on the collaborative efforts of 22 industry experts. The book covers a range of topics, including pump fundamentals, pump and system interaction, calculating cost of ownership, improving the performance of existing pump systems, optimizing new designs and pumping system economics. For more information, call 973/267-9700 or visit www.pumps.org. **tpo**



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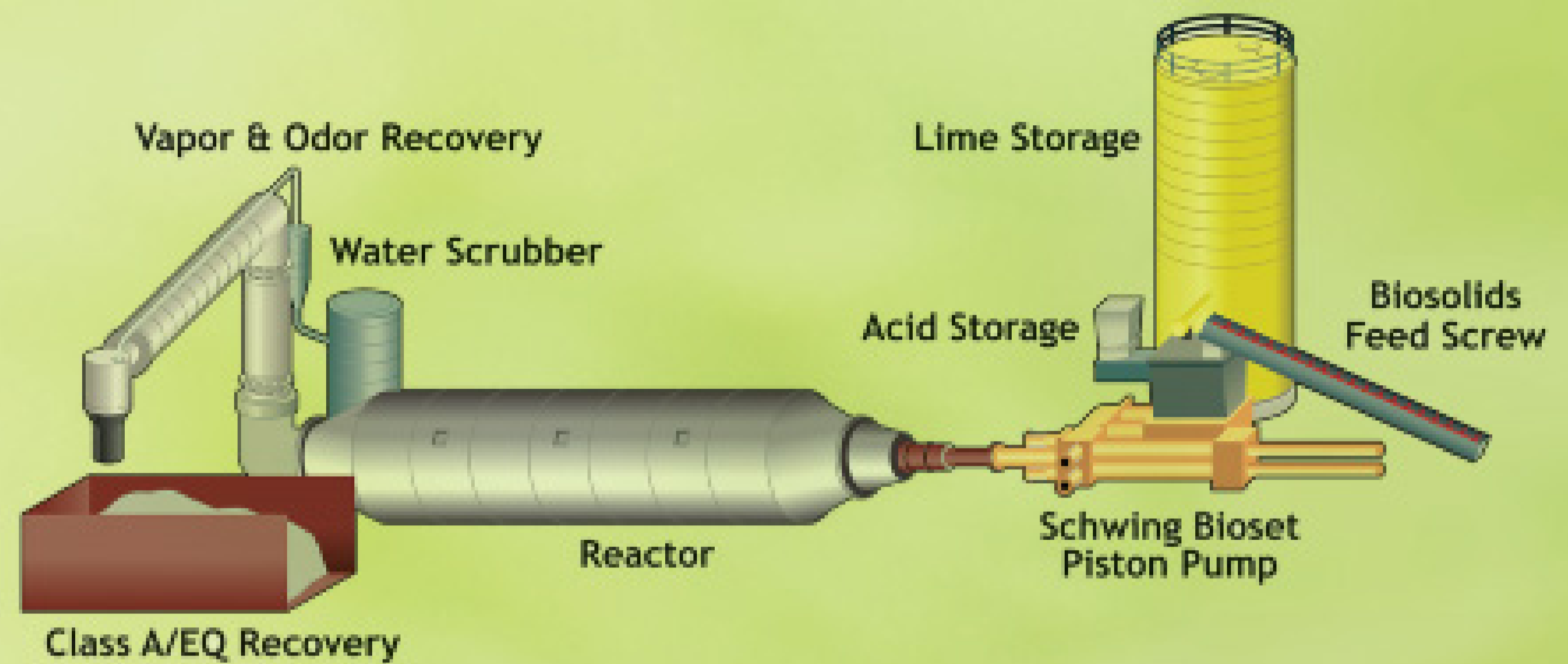


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