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APRIL 2009

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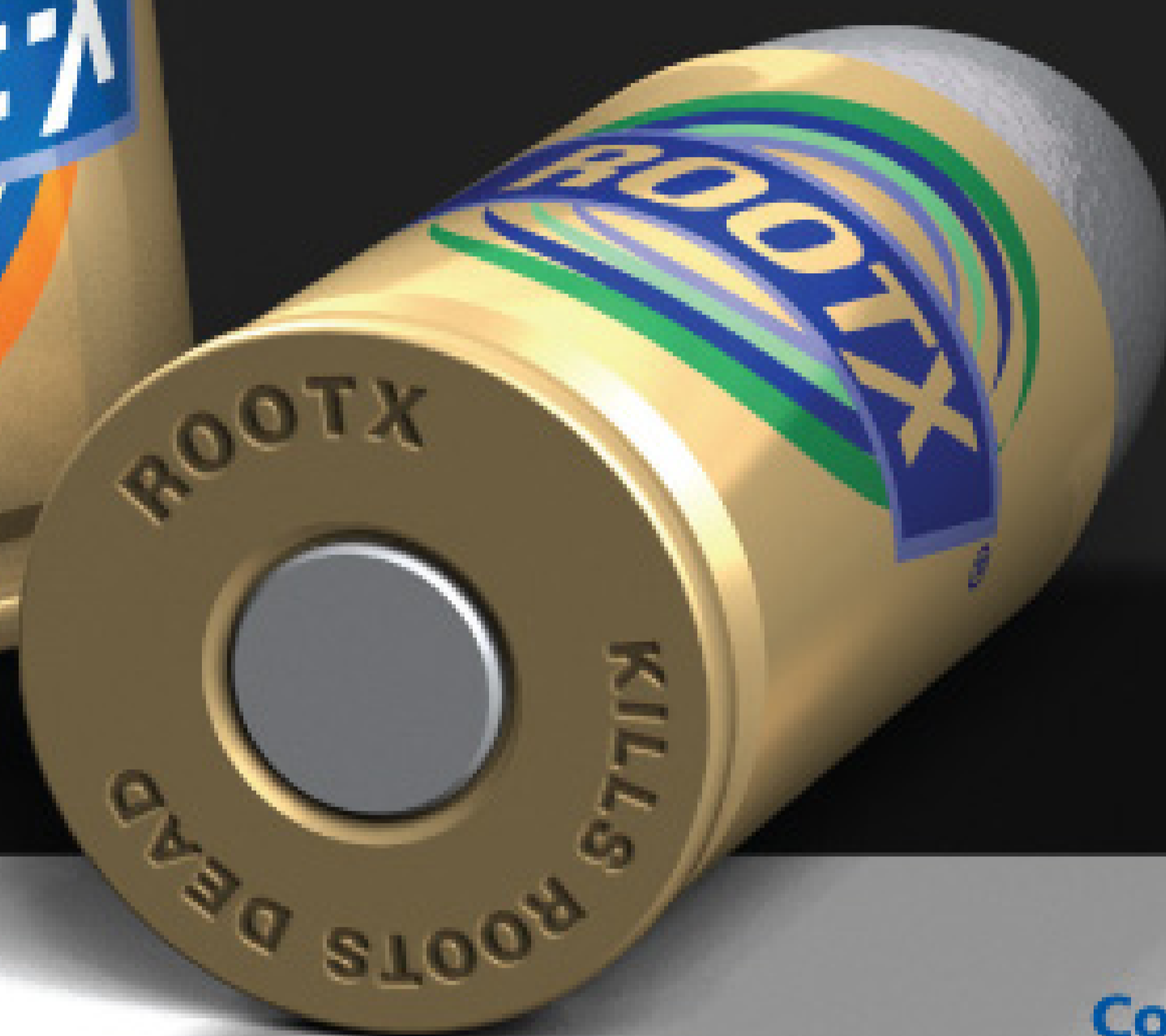
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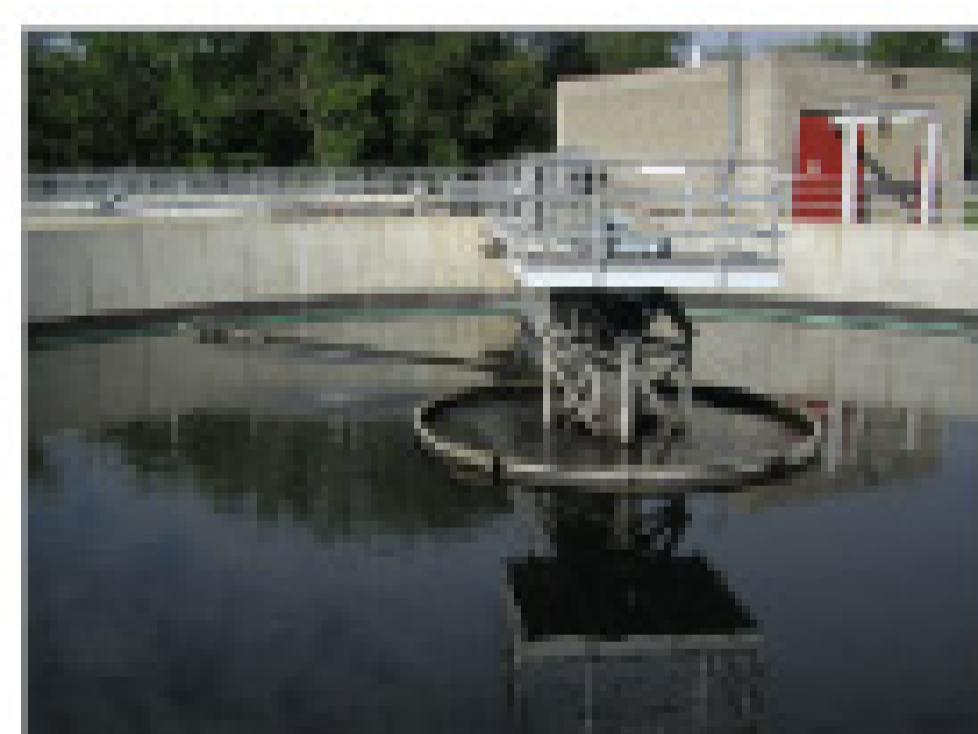
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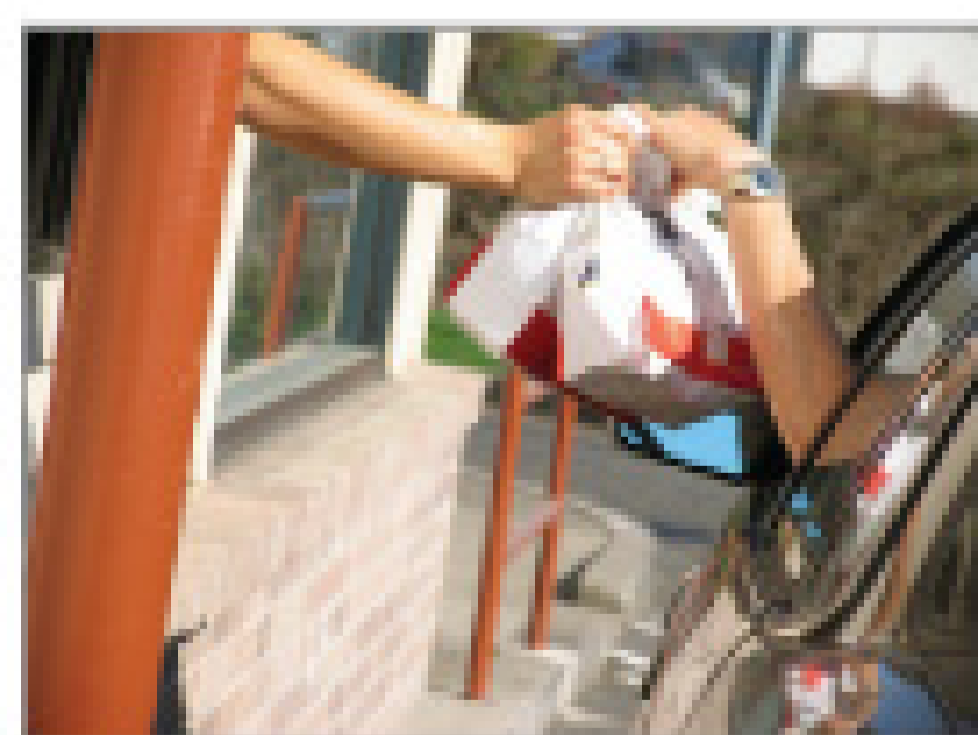
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A Delicate Subject

DO YOU GET UNCOMFORTABLE OR NEGATIVE REACTIONS WHEN YOU TELL SOMEONE YOU WORK IN WASTEWATER TREATMENT? AND IF SO, WHAT CAN BE DONE TO CHANGE THAT?

By Ted J. Rulseh, Editor

I have never worked in a wastewater treatment plant, but I have worked in and around the wastewater industry for a fair number of years, as a community relations consultant, as a marketing adviser to equipment manufacturers, and as a magazine editor.

Back in the early 1980s, I spent one full year leading a metropolitan clean-water agency's effort to win public acceptance for a biosolids land application program. During that year I found that my line of work did not make for good cocktail party conversation.

In fact, I ended up thanking the stars that I had met and married my wife before I took on that project. I imagined what it would have been like if an appealing woman asked me what I did for a living, and I would have to answer, "I handle community relations for land application of sewage sludge" (which is what we called it back then).

PERSONAL REACTIONS

This is a roundabout way of raising a delicate subject: Just how do people react — I mean initial, immediate reaction — when a person in the profession reveals his or her line of work?

This issue doesn't apply only to wastewater treatment professionals. It applies as well to garbage collectors, septic system pumpers, septic system installers, sewer and pipe cleaners — anyone in an occupation that deals with waste in one form or another.

We approach this in part by finding different, more positive, and in most cases more appropriate labels. For example, what used to be the Association of Metropolitan *Sewerage* Agencies is now the National Association of *Clean Water* Agencies. Many treatment plants call themselves water pollution control or water reclamation facilities. In both cases, the terminology better describes the work being done.

In a similar vein, people who install septic systems belong to an organization called the National Onsite Wastewater Recycling Association.

But what about those initial, personal interactions? Does working in a waste treatment or waste management profession still carry a hint of negative perception?

WHAT YOU REALLY DO

I know wastewater operators and treatment plant managers are, as a class, extremely proud of what they do. Rightly

so. But then there are those introductions to someone new. No such concern faces someone who says: I'm a doctor. Or teacher. Or city clerk. Or computer programmer. Or police officer. Now, what about you?

When asked what you do, have you ever felt tempted, even now and then, to dodge the subject a little? I confess that while working on that land application project, there were times I simply said I worked in "community relations," and saved the details for later, when there was a chance to describe in detail what I did and what it meant.

The project was plenty interesting, I enjoyed the work, and I was proud of what we were accomplishing. But I was inclined to talk about it mostly in settings where I got to say more than a sentence about it.

Maybe that was wrong. Maybe in the end it's all about how you really feel about your profession — how much pride you take in it, and how deeply you believe in it. Perhaps when asked what you do for a living, you simply say, "I'm a wastewater treatment operator for XYZ City."

Maybe in the end it's all about how you really feel about your profession — how much pride you take in it, and how deeply you believe in it. Perhaps when asked what you do for a living, you simply say, "I'm a wastewater treatment operator for XYZ City." The pride just bursts through, and any negativity is defeated, then and there.

The pride just bursts through, and any negativity is defeated, then and there. Or if not — if the other person has an unfavorable reaction — that's his or her problem. Or do you instead say, "I'm in the clean water business"? And then go into the details?

YOUR EXPERIENCE?

As I said, this is a delicate subject. If you are a manager or superintendent, is this ever an issue for you? Is it a concern for people on your team, especially newer people? If so, how do you deal with it?

I would be interested in hearing about experiences, perceptions, reactions and remedies related to this issue. If there is sufficient response, we'll devote an article to the topic in a future issue of *TPO*. Send me a note at editor@tpomag.com. **tpo**



Working Together

A REGIONAL PLANT PARTNERS WITH A UTILITY AND STEPS UP GREEN INITIATIVES IN A COUNTYWIDE EFFORT TO TAP RENEWABLE ENERGY AND REDUCE THE CARBON FOOTPRINT

By Mike Grennier

It's all about working together to protect the environment in Sacramento County. The Sacramento Regional Wastewater Treatment Plant (SRWTP) does virtually everything possible to supply the county with renewable energy and help minimize its own carbon footprint.

That's not to say this pure-oxygen activated sludge treatment plant (165 mgd average, 392 mgd peak) hasn't been environmentally conscious for decades. Instead, the county and state of California have looked to the plant as an increasingly important partner in the effort to go green.

SRWTP is happy to oblige, says Stan Dean, the former plant manager, recently named manager of the Sacramento Regional County Sanitation District (SRCSD), the plant owner. "We view ourselves as environmental stewards because we're treating wastewater, and by so doing, protecting the environment," Dean says. "We ought to take a broader stewardship role whenever we can if it helps the community in the long run."

"We ought to take a broader stewardship role whenever we can if it helps the community in the long run."

STAN DEAN

a pilot test of adding fats, oils, and grease to the digesters to increase gas production, to a tentative plan to reduce energy consumption with solar aerators in solids storage basins.

COGENERATION EVOLVES

When the treatment plant became operational in 1982, it took advantage of digester gas from the start. The plant used 50 percent of the methane to fire boilers, which produced steam to heat the anaerobic digesters. The steam also powered chillers to meet the operation's vast environmental cooling requirements. Still, some methane was flared.

SRWTP's green initiatives include a partnership with the local utility that creates a renewable energy source for area residents. Through the partnership, SRWTP provides methane gas to an independently operated cogeneration plant located on the treatment plant grounds.

The cogeneration plant, in turn, provides the SRWTP with low-cost steam for anaerobic digestion and cooling. The cogeneration effort is combined with a host of other initiatives underway, ranging from

PHOTOS COURTESY OF THE SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT



Among green initiatives at the Sacramento Regional Wastewater Treatment Plant is a water-recycling program that provides 3.5 mgd of water for nonpotable purposes, such as landscape irrigation and environmental restoration. Shown here are the motor control center and the water reclamation facility storage tank for recycled water.

Sacramento Regional Wastewater Treatment Plant, Sacramento, Calif.

BUILT: 1982

TREATMENT LEVEL: Secondary

TREATMENT PROCESS: Activated sludge

FLOWS: 165 mgd average, 392 mgd maximum

RECEIVING WATER: Sacramento River

PLANT MANAGER: Prabhakar Somavarapu, SRCSD chief

TOTAL FULL-TIME EMPLOYEES: 364

TOTAL OPERATORS: 80

As the 1990s approached, the Sacramento Municipal Utilities District (SMUD) looked to alternative sources of energy to meet growing demand for electricity. It needed other energy sources after decommissioning its nuclear plant years earlier.

At the same time, the SWRTP needed a reliable source of backup power for utility power outages. To satisfy both needs, a funding structure, known as the Central Valley Financing Authority, built a cogeneration plant on the existing plant's grounds.

The cogeneration plant, operated under contract by Carson Energy, is rated to produce up to 106 MW of peak power. On average, it supplies 40 to 45 MW per day. Key components include gas-fired combustion turbines (GE Energy), a heat-recovery steam generator equipped with duct burners (Deltak LLC), and a steam turbine generator (ABB).

Under the SRCSD-SMUD agreement, digester gas is sold to SMUD and piped to the cogeneration plant next door. The power generated at the facility is fed to the SMUD grid. The steam is sold back to the SRCSD and piped to the treatment plant. There, it heats the plant's eight digesters and powers absorption chillers (Trane Co.)

A WIN-WIN ARRANGEMENT

The SRCSD-SMUD partnership has been a win-win arrangement since the cogeneration plant became operational in 1995. By tapping



DOING IT ALL

Green initiatives at the Sacramento Regional Wastewater Treatment Plant don't stop with cogeneration. The plant is involved in a number of other initiatives, including:

- A pilot test project to evaluate the feasibility of injecting fats, oils and grease (FOG) directly into the plant's digesters to increase biogas production.
- Tentative plans to replace 40 25-hp brush aerators used in the 20 solids storage basins (SBBs) with solar-powered aerators, which could save as much as \$2.35 million in electrical and lifecycle costs over 20 years.
- Periodically reducing run times for the 40 brush aerators in the SBBs by two hours per day, which could save as much as \$1.4 million in electrical costs over 20 years.
- A water-recycling program that provides 3.5 mgd of water for nonpotable purposes, such as landscape irrigation and environmental restoration.
- Processing of 26,000 dry tons of biosolids each year as part of a diversified biosolids management program.
- A community outreach program to educate the public and community leaders about the benefits of biosolids recycling.
- Reducing energy consumption throughout the plant, whether that means keeping light levels low or keeping the plant warmer in summer and cooler in winter.

SRCSO also partners with the City of Sacramento Department of Utilities and the Sacramento County Department of Water Resources on a major watershed education program jointly sponsored by a consortium of water agencies in Sacramento County.



Another green initiative is management of the Bufferlands, the 2,650-acre wetlands next to the treatment plant. It is home to many species of wildlife including birds and even coyotes.

digester gas, SMUD adds a renewable source to its broad mix as it supplies power to a 900-square-mile service area with a population of 1.4 million. The practice coincides with SMUD's global reputation for innovative programs and services, especially in renewable energy generation, including wind and solar.

For SRCSD, the cogeneration plant provides financial and environmental benefits. The agency buys steam from SMUD at a much lower cost than the revenue from selling the methane. Since 1995, the arrangement has netted SRCSD approximately \$6.6 million. "That's money we never made before," says Michael Donahue, SRWTP operations support. "Making money off of gas we used to flare is a really good thing."

With cogeneration, SWRTP has also greatly reduced flaring of methane. That is critical given stringent state and local emission limits and permitting requirements. The treatment plant produces 1,500 cfm of digester gas, all supplied to the cogeneration plant.

When that plant is offline, gas is routed to holding tanks and the plant's three boilers from Keeler Boiler Works (now Metso Power). That ensures a sufficient supply of steam to heat the digesters, as well as

"Why not use the byproduct of the treatment plant process for energy savings? It makes a lot of sense."

TOM CHEW

the plant's three absorption chillers, at all times. Only a nominal amount of gas is flared when the treatment plant's gas management system exceeds capacity.

Another major benefit of the cogeneration arrangement is the availability of backup power for SRWTP. In the event of an area-wide power outage, the cogeneration plant is contractually obligated to supply enough power to meet SRWTP's 10-MW peak load. As such, the facility continues to process wastewater at all times.

"It's a credit to SMUD that they took advantage of an industrial source of renewable energy here," says Donahue, who is also part of SRCSD's Capital Improvements Group. "I personally think the reduction in pollution is the biggest benefit to the cogeneration plant."

SUPPLYING CLEAN GAS

The solids residuals team manages the gas-supply side of the operation. A large part of the job is making sure the digesters operate at peak performance. The team also services other gas management system components, such as gas scrubbers, ground flares, compressors, heat exchangers and storage spheres.

"On and off, there are two to three people devoted to the gas management system," says John Bailhache, a solids residual team member and plant operator supervisor. Other employees with specific skills, such as electricians and control technicians, work with the system when needed. Operators spend a great deal of time monitoring systems. "We basically do a lot of preventive maintenance to ensure everything is working well," Bailhache says.

That maintenance ranges from ongoing checks for leaks on virtually every aspect of the system to changing out media in the plant's nine gas scrubbers (Marcab Co. Inc.). The task of supplying clean gas is the most time-intensive and costly aspect of the

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system. "With the amount of gas we put through the scrubbers, it takes its toll on them," Bailhache says.

Each month, team members take a number of scrubbers offline for maintenance and rotate them back online. They change out proprietary scrubber media quarterly.

Bailhache says there are few bumps in normal operations, thanks to the fine-tuning that went into the plant's highly automated gas management system.

PUTTING STEAM TO GOOD USE

SRWTP's facilities maintenance team manages the steam processes at the treatment plant. The main focus with cogeneration operation is to ensure the boilers are ready to go and functioning properly whenever the cogeneration plant is offline, whether planned or otherwise. That means at least one operator is dedicated to the boiler room, 24/7. The boilers are warmed up and tested each shift.

"When the cogeneration plant crashes, it crashes hard and usually without warning," says Tom Chew, senior stationary engineer, who oversees the facilities maintenance team. "We have to maintain that ready-to-go status because we have to come back up. When cogeneration is down, we'll have two operators on a shift for safety purposes and to have another set of eyes and ears."

Another carefully controlled operation involves ramping up the 1,500-foot underground steam line between the cogeneration plant and the treatment plant after the cogeneration operation shuts down. In 2008, the volume of steam sent to SRWTP totaled 186,000 MMBtu.

"Although seamless, the biggest challenge is steam line warm-up," says Chew. "It has to be done slowly and carefully, and we have to make sure all of the condensate is purged out of the lines before we bring it up to full temperature, pressure and flow."

Aside from planned or unplanned cogeneration shutdowns, the facilities maintenance staff prepares the boilers for inspection and routine maintenance once each year. The process takes two to three days per boiler. Together, boiler room and cogeneration plant personnel perform quarterly mechanical safety inspections of steam traps and condensate drain lines.

In addition to managing the steam side, the facilities maintenance staff oversees the air conditioning systems that provide cooling throughout the vast SRWTP complex.

ALL GREEN

Since the cogeneration plant operates with relatively few glitches, Chew and Bailhache say it's well worth the time and effort in holding up the treatment plant's end of the bargain.

"We were using methane and boilers long before the cogeneration came on board, and why not continue to do so?" says Chew, who has been with the treatment plant for 21 years. "Why not use the byproduct of the treatment plant process for energy savings? It makes a lot of sense."

As SRCSD implements green initiatives across a wide range of fronts, Dean says the district will continue to look to SRWTP as a prime example of environmental stewardship. "That's the main message," he says. **tpo**

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Published monthly by:



CELEBRATING 30 YEARS OF PUBLISHING
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1720 Maple Lake Dam Rd., PO Box 220
Three Lakes WI 54562

www.tpomag.com

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Office hours Mon.-Fri.,
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ADVERTISING RATES: Call 800-994-7990 and ask for Phil, Kim, Jim or Winnie. Publisher reserves the right to reject advertising which in its opinion is misleading, unfair or incompatible with the character of the publication.

EDITORIAL CORRESPONDENCE: Address all editorial correspondence to Editor, *TPO*, P.O. Box 220, Three Lakes, WI, 54562 or e-mail editor@tpomag.com.

REPRINTS AND BACK ISSUES: Visit www.tpomag.com for options and pricing. To order, call Jeff Lane at 800-257-7222 (715-546-3346) or e-mail jeffl@colepublishing.com.

CIRCULATION: Circulation is controlled at 60,000 copies per month except for the Annual Company Directory issue (May) which receives a bonus distribution of 25,000 copies (U.S. and Intl.).

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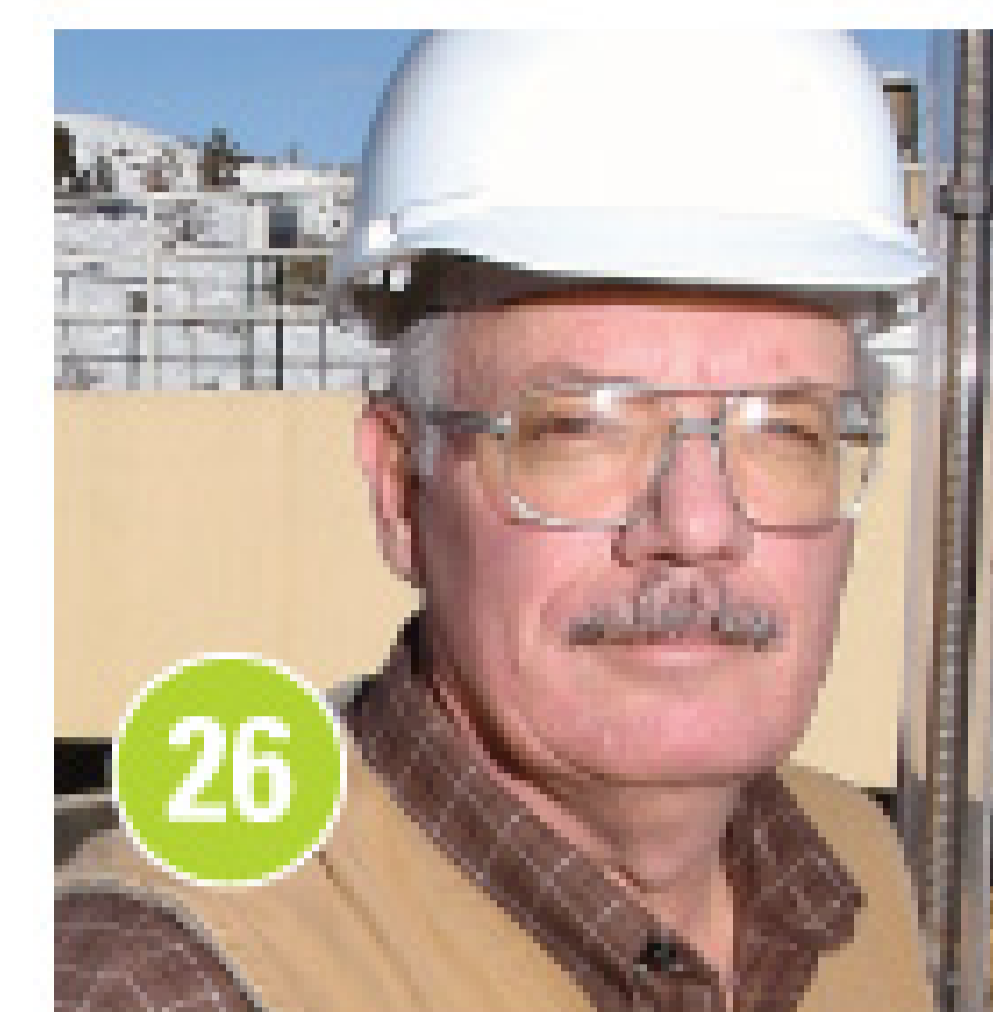
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The Kalispell (Mont.) Wastewater Treatment Plant ranks as one of the top 10 biological nutrient removal (BNR) plants in the country and perhaps the world. Water resource manager Joni Emrick (pictured) and treatment plant manager Curt Konecky promote excellent staff chemistry. (Photo by Carmen Daye Irish)



An Outdoor Classroom

A RAIN GARDEN AND NATIVE PLANTINGS AT THE JOHNSON CREEK (WIS.) WASTEWATER TREATMENT PLANT HELP TEACH VISITORS ABOUT BASIC ENVIRONMENTAL VALUES

By Ellen Rulseh

Wastewater treatment plants defend the health of communities by protecting water resources. The facilities themselves are often protected by measures such as gates and locks. The Village of Johnson Creek Wastewater Treatment Plant is unique in being defended by its own air force — all equipped with stingers.

A 3,400-square-foot rain garden at the plant, created three years ago, has become an outdoor classroom with tall, thick drifts of native flowering plants and grasses. Besides its bio-diverse populations of birds, spiders, grasshoppers, leopard frogs, turtles and snakes, it is visited by thousands of honey bees.

“On a summer’s day, sometimes if you go out there and just focus, you can see literally thousands of them,” says Peter Hartz,

ing the first two years, the drought-resistant plants, with roots that can grow 5 feet or deeper, mostly take care of themselves.

Hartz enjoyed seeing the population of critters grow in the native plantings. He practices catch and release with his discoveries, occasionally taking home a newly discovered resident to share nature’s wonder with his wife, Heidi, and his sons: Isaac (5), Silas (3) and Luke (1).

“It’s our family rule that we always put them back where we found them, or return them to a better place,” Hartz says. He also shares his appreciation of the natural world with a bigger audience: visiting students who come from nearby Johnson Creek Elementary School by way of the Rock River Coalition, a nonprofit organization that creates environmental education partnerships with schools.

“We wanted it to look nice for the residential development that has grown up nearby, and I’m not much of a lawn-mowing guy. It would have been a waste of time and energy to mow all this lawn.”

PETER HARTZ



PHOTOS COURTESY OF JOHNSON CREEK WATER UTILITIES

Peter Hartz, Johnson Creek water and wastewater superintendent, holds seeds of native Wisconsin plants. Native wildflowers and grasses cover the rain garden near the wastewater treatment plant, providing habitat for wildlife and eliminating the need for mowing.

water and wastewater superintendent. The bees come from eight hives set up by a beekeeper; they harvest the nectar from the native wildflowers.

LOW MAINTENANCE

The village board and administrator Paul Moderacki planned the rain garden (also known as bio-swale) as a natural infiltration system to improve the appearance of the grounds and capture stormwater. The garden, designed and planted by Margaret Burlingham of LanDesign and Hope Ocsdik of Dutch Design, lies in a swale created to capture runoff from the plant’s buildings, roadways and other impervious surfaces.

In addition to the rain garden, Hartz estimates that more than one-third of the plant grounds are devoted to native plants. “We wanted it to look nice for the residential development that has grown up nearby, and I’m not much of a lawn-mowing guy,” Hartz says. “It would have been a waste of time and energy to mow all this lawn.”

Once established, after seasonal weed-

MAKING THE CONNECTIONS

“Once I found a snake skin,” says Hartz, leaning back in a chair at the wooden desk near the entrance to the plant office. “It was this long!” he says, opening his arms wide. A find like that from the rain garden can help young students,

and even grownups, begin to make connections from water to plants to animals to humans and how all are linked and interdependent in the natural world.

“I like to start out by telling them about the food chain,” says Hartz, who in addition to his training as a wastewater treatment operator, has completed coursework in ecology at the University of Wisconsin-Stevens Point. The snake eats the frog, the frogs and fish eat the insects, the insects eat the plants, and plants feed on sunlight and water.

And whoosh! Down swoops an owl to eat the snake. The owl droppings then nourish the soil in the rain garden, and the whole natural cycle of life, death, decay and rebirth repeats itself. “It’s all about predator and prey,” Hartz says.

PRODUCTIVE DAY

Johnson Creek grade school teacher Ellen Klaus brought 45 third-graders to the plant and its garden for a workshop lasting several hours. “We started with Pete’s tour of the treatment plant and his talk about the water cycle — how water that falls here in Johnson Creek goes on to the Mississippi and then on to the Atlantic,” Klaus says.

Next the students looked for insects and macrobiotic invertebrates in the weeds and under the rocks of a nearby pond on the grounds. After that, they drew pictures of the native plants. Finally, Hartz talked about the variety of life the native plants attract in the rain garden, and its role in supporting biodiversity.

After that, the young visitors played a game of tag called Predator



The solids dewatering building and lime silo at the Johnson Creek Wastewater Treatment Plant form a backdrop for a rain garden with wildflowers. Bees from eight nearby hives set up by a beekeeper come to the rain garden to harvest nectar from the wildflowers.

and Prey. They divide into groups of amphibians, insects and fish. Each group got a stack of sticky-notes to use in a chase game. Once the predators caught all the prey, the groups reversed roles.

Klaus says the workshop was part of a five-month enrichment program based on a workbook provided by the University of Wisconsin. She spoke about how she used the hands-on approach to learning in an outdoor classroom at the Wisconsin Association of School Boards Convention in January.

"The experience at the treatment plant was the culmination of the unit," says Klaus. "It was much more effective than just sitting with books in a classroom."

"ALL WE'LL EVER GET"

Hartz's page on the village Web site (www.johnsoncreek.gov/office2.com) tells about the water cycle and provides the same simple message he gives visitors: "Water is a finite resource; we have all that we will ever get. It is used over and over again, and its purity must be protected."

"Your public wastewater treatment plant stands at a critical point in this water cycle. It helps nature's way of cleaning water and is a last defense against the polluting of our water supplies."

Hartz welcomes visitors to tour the Johnson Creek Wastewater Treatment Plant. "Anybody could come at any time the gate's open," he says. "I would welcome more visitors; it would be great to have more tour groups come here."

Ellen Rulseb was community outreach coordinator and program manager for the Rock River Coalition's "A Rain Garden in Every Community Program" at the time the Johnson Creek treatment plant installed its garden. She is president of Earth & Water Works LLC (www.earthwaterworks.com) which designs and installs rain gardens and other earth-friendly projects. tpo

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The boardwalk provides a walkway for visitors, but also supports effluent discharge piping.

A Walk in the Park

A FLORIDA TREATMENT PLANT TRANSFORMED A MOONSCAPE INTO A NATURAL WONDERLAND. A BOARDWALK NOW LETS VISITORS EXPERIENCE WETLANDS IN COMFORT AND STYLE.

PHOTOS COURTESY OF EMERALD COAST UTILITY AUTHORITY

By Mike Grennier

People don't typically think of wastewater treatment plants as local attractions, but they do in Escambia County, Fla. There, a 1.5-mile boardwalk at the Bayou Marcus Water Reclamation Facility lets visitors tour a natural wetland in style and comfort.

The boardwalk at the extended aeration, activated sludge treatment facility owned by the Emerald Coast Utility Authority (ECUA) near Pensacola, Fla., attracts walkers, joggers, bicyclists, bird enthusiasts, dog walkers, tourists, and others who want to be one with nature — to a degree.

As plant manager Steve Woods says, the boardwalk allows people to “take a walk through a real northwest Florida wetland without getting their feet muddy.”

“We have dozens of people using the boardwalk every day. We have locals visit, people visit with their kids, and we even have birdwatchers coming in from all parts of the world to use it.”

STEVE WOODS

OPPORTUNITY KNOCKS

The history of the boardwalk is rooted in a plant expansion and environmentalism effort that began in the early 1990s. At that time, the ECUA took control of 1,010 acres of freshwater, forested wet-

lands that had been decimated by questionable logging practices.

Before the plant expansion began, the developer had drained the wetlands and cleared the land to make way for a marina and golf course. However, those plans didn't work out, and ECUA acquired the land as part of its plans to expand capacity at the Bayou Marcus plant from 2.0 to 8.2 mgd. At the same time, the authority set out to restore the wetland area to its natural state.

Something had to be done, says Woods, who hunted the land as a teenager. “We knew our little plant wasn't going to be able to keep pace with the area's growth, so we saw opportunity knocking and basically said, ‘We'll fix it,’” he says.

ACCESS WITH A VIEW

With plans in place, ECUA built a 10,000-foot effluent pipeline system to discharge reclaimed water to the Bayou Marcus receiving wetland. The pipeline system includes 4,200 feet of above-ground pipe, which eliminated a host of problems that go with drainage in swampy land.

Planners built the boardwalk to provide access to the pipeline and effluent discharge areas where personnel routinely perform maintenance and monitoring. The structure also supports the above-ground pipe, which is dispersed to the wetland via seven separate zones. Yet the boardwalk also fulfills another primary mission: allowing people to experience the area's natural beauty.

The expansive boardwalk, which rests on 890 pre-stressed concrete pilings, is built with 7,748 linear feet of treated wood. It also

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includes 100,000 feet of decking made up of 12,000 individual boards, plus 47,000 feet of boards for handrails and trim.

Completed in 1998, the Bayou Marcus WRF now discharges an average of 5.2 mgd to the northern half of the wetland system, which features 650 acres of black

titi, slash pine, blackgum, gallberry, Atlantic white cedar, bald cypress, and various bays with an abundance of animals, including a diverse bird population.

LABOR OF LOVE

By discharging the high-quality effluent, the plant has helped transform the land from a virtual moonscape to a nature-lover's paradise. Woods considers the boardwalk a key part of the reclamation's success.

"We have dozens of people using the boardwalk every day," he says. "We have locals visit, people visit with their kids, and we even have birdwatchers coming in from all parts of the world to use it." Recently, the plant secured a \$15,000 grant from the Florida Fish and Wildlife Conservation Commission to enhance the boardwalk as part of the Great Florida Birding Trail.

The boardwalk, Woods says, instills goodwill among plant ratepayers. However, it comes with a price, since Woods and his staff invest a considerable amount of time and effort maintaining the boardwalk.

"Think of it this way," he says. "It's out in a swamp with 100 percent humidity and temperatures that range from 30 to 110 degrees F, combined with the sun and a wet environment. So there are boards that have to be replaced."

Additional work is also needed to keep the boardwalk free and



The plant's Eimco carousel oxidation ditch has two independent, four-stage units, each capable of treating 4.1 mgd.

clear of weeds and brush. What does the staff think of the boardwalk? "They'd probably rather not have it, because it'd be that much less work," says Woods. But he quickly adds that the same crew also appreciates what the boardwalk means for the plant and the community.

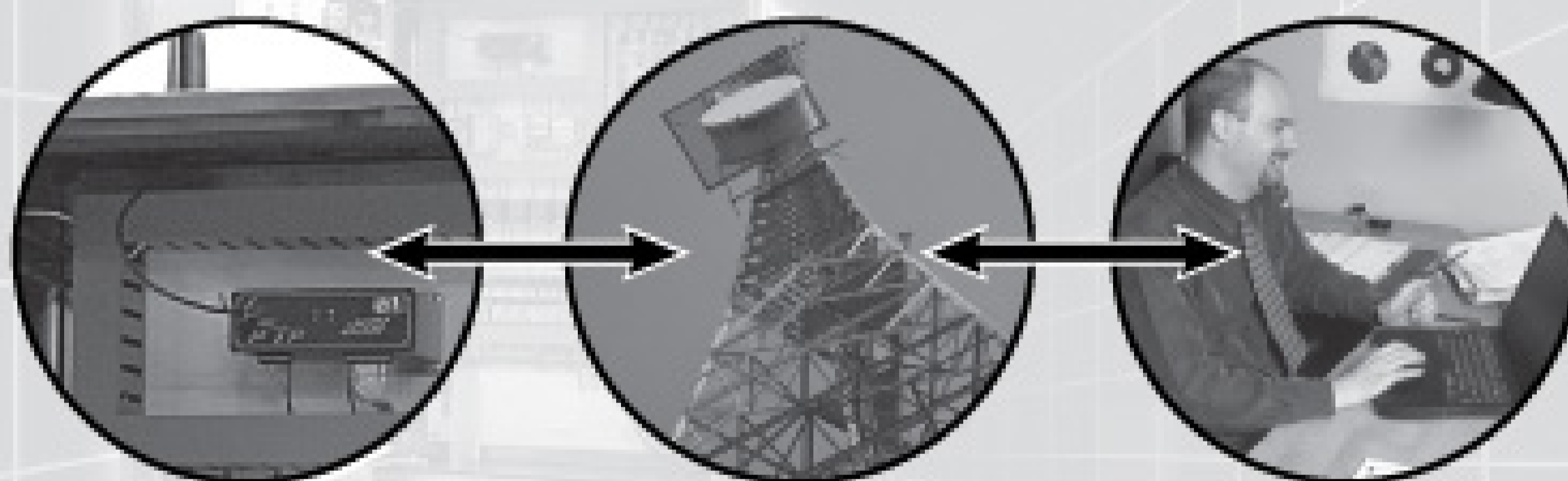
"It's part of the strategy to be a good neighbor," he says. "It's a functioning part of the plant, but it's also a gift to the public. We'd be nuts not to do it."

Visitors to the Pensacola area can find directions to the Bayou Marcus WRF boardwalk by calling the Boardwalk Information Line at 850/458-1658. **tpo**

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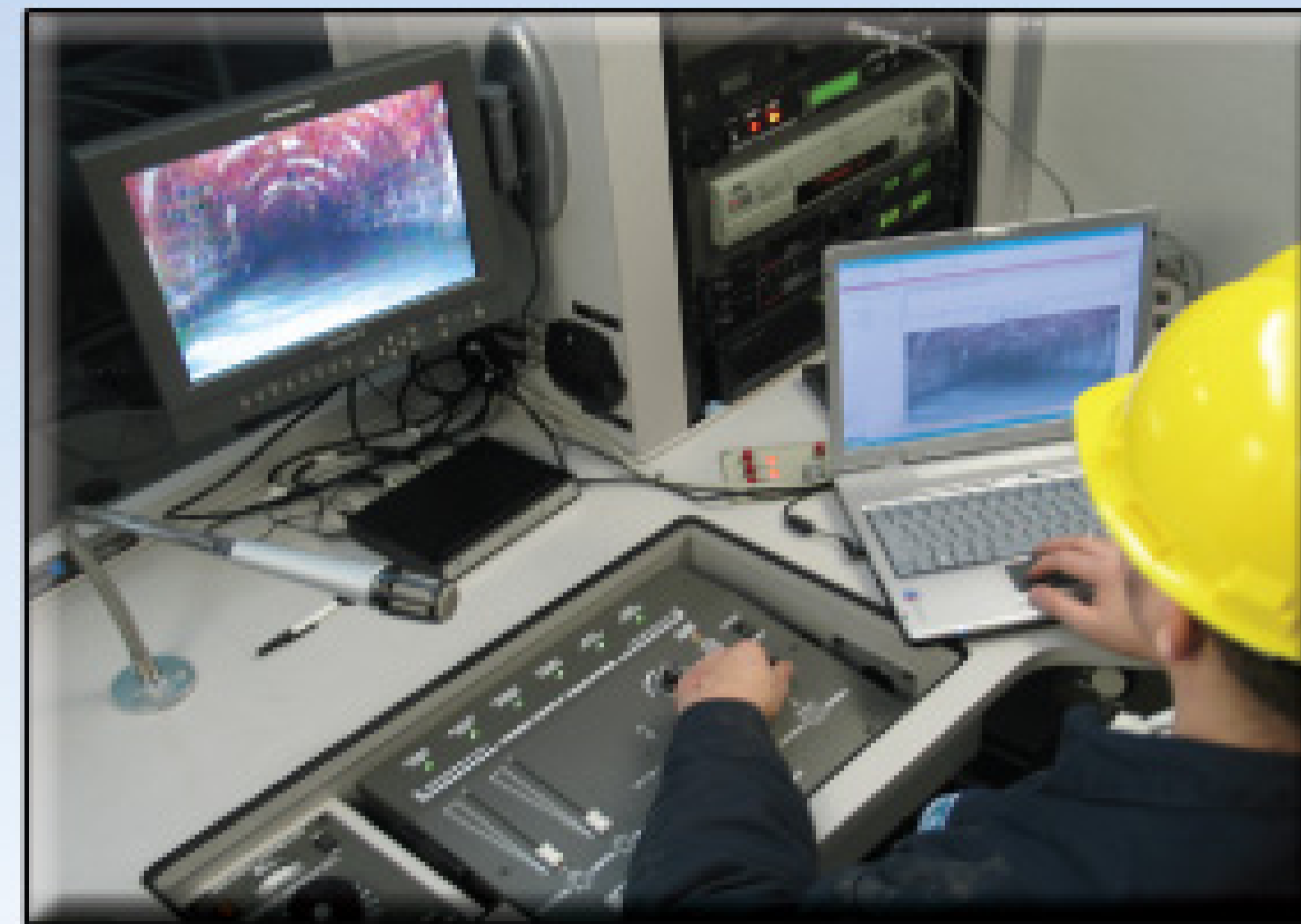
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WASTEWATER TREATMENT PLANT

By Jim Force

The Right *“Chemistry”*

A panoramic view of the City of
Kalispell Wastewater Treatment Plant.
(Photography by Carmen Daye Irish)

From left, plant team members Phil Lauman, Jesse Jones, Curt Konecky and Joni Emrick.



profile

Kalispell (Mont.) Wastewater Treatment Plant



POPULATION SERVED: 20,000

TREATMENT LEVEL: Tertiary

DESIGN CAPACITY: 3.1 mgd
(being expanded to 5.4 mgd)

AVERAGE FLOW: 3.0 mgd

PLANT PROCESS: Biological
nutrient removal

BIOSOLIDS: Dewatered,
composted offsite

STAFF: Joni Emrick, water resource manager; Curt Konecky, treatment plant manager; operators Phil Lauman, Louie Eskestrand, Jesse Jones, Jason Wisler; chemists Elizabeth Bonitz, Rebecca Bodnar

IN A PLANT THAT USES NO CHEMICALS, it's "chemistry" that matters most in award-winning performance. The Kalispell (Mont.) Wastewater Treatment Plant ranks as one of the top 10 biological nutrient removal (BNR) plants in the country and perhaps the world.

Since 1998, an impressive record, including an effluent phosphorus average of 0.12 mg/l, has netted operational honors from the U.S. EPA (2007 Clean Water Act Recognition Award) and the Montana Water Environment Association. Even further, the EPA features Kalispell as an example of exemplary performance in its reference manual on BNR plants (EPA 832-R-08-006, September 2008), leading to inquiries on the BNR operation from utilities around the globe.

And while Kalispell is a chemical-free operation, chemistry of other kinds assures success, according to water resource manager Joni Emrick, and treatment plant manager Curt Konecky. Daily operations meetings with all hands promote excellent staff chemistry. The plant's laboratory staff is an integral part of the meetings. And management watches plant process chemistry like a hawk.

READY FOR UPGRADE

The Kalispell plant is designed for 3.1 mgd from the city's 20,000 residents as well as businesses and commercial sites. An expansion, now underway, will boost capacity to 5.4 mgd.

In the headworks building, Vulcan Mensch Crawler bar screens (Vulcan Industries Inc.) and cyclone degritters remove trash and grit, which is deposited in the municipal landfill.

A lift station raises the flow to a pair of rectangular primary clarifiers. An equalization basin takes peak flows and releases volume back

into the treatment process after midnight.

At the heart of the treatment plant, Kalispell uses the modified University of Cape-town (South Africa) version of the biological nutrient removal process.

The 11-cell bioreactor provides anoxic, anaerobic and aerobic treatment, operating in series. Coarse bubble aerators supply oxygen to the aerobic basins. The process nitrifies and denitrifies the wastewater while promoting phosphorus removal and reducing BOD and suspended solids.

After clarification, the treated water passes through up-flow sand filters for advanced TSS removal. Trojan ultraviolet light units (Trojan Technologies Inc.) disinfect the effluent without chemicals. "We must be one of the earliest plants to employ full-scale UV," says Emrick. "We're proud of the fact that we are not adding chemicals to our discharge."

An aerated effluent channel oxygenates the water before it passes to a creek that feeds Flathead Lake, the largest recreational body of water in Montana. On the solids side of the plant, a two-stage fermenter produces volatile fatty acids from primary sludge, which in turn promote phosphorus uptake in the BNR process.

Primary solids then move on to an anaerobic digester. Once processed, they are blended with raw return activated sludge, thickened, and dewatered to a 16-17 percent solids cake on belt filter

A GOOD HOME FOR BIOSOLIDS

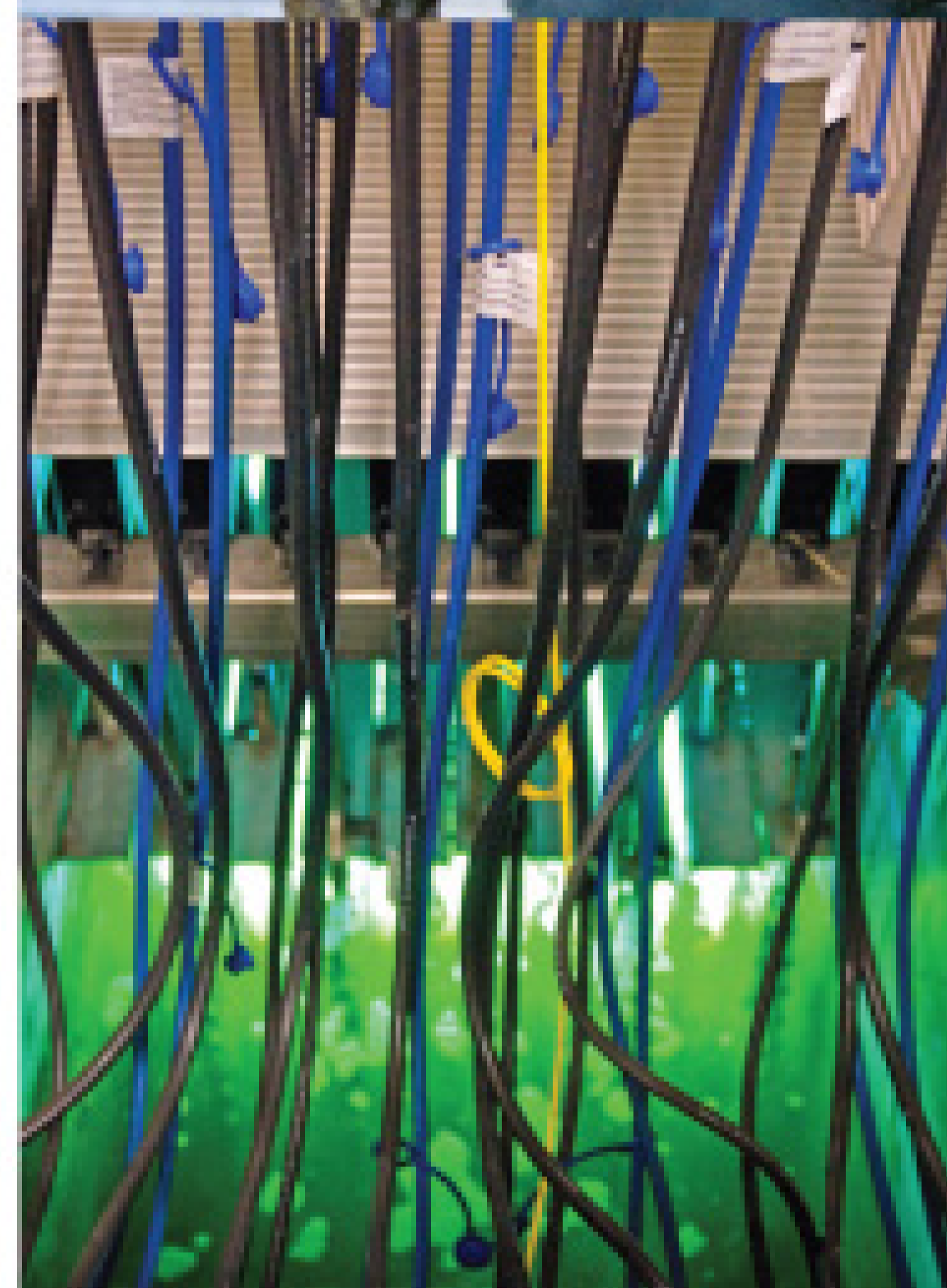
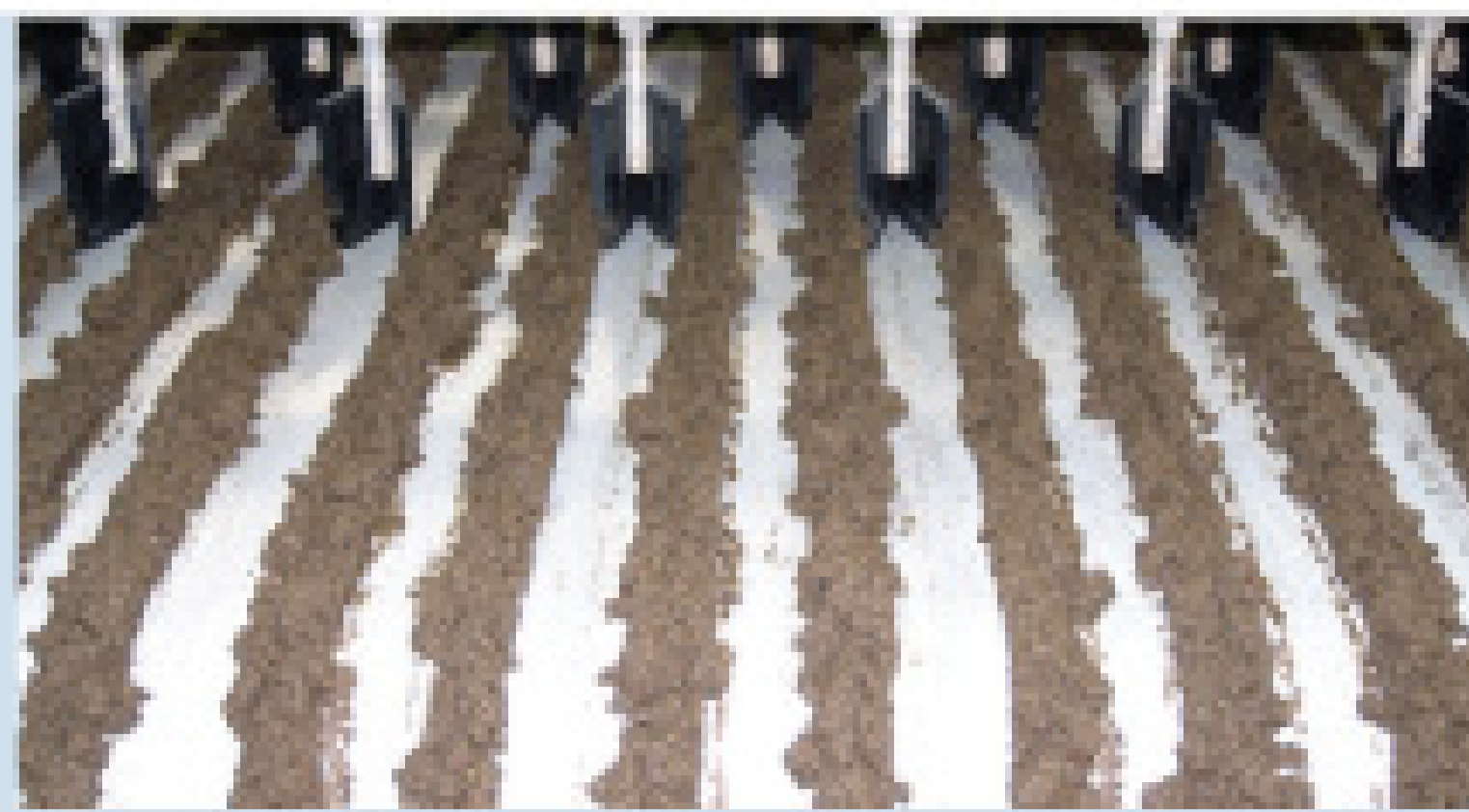
Serendipity played a role in the composting of Kalispell biosolids. “When we started up,” says Curt Konecky, treatment plant manager, “we planned to simply landfill our solids, but it turned out that the landfill really didn’t want them.”

The next step was to try to compost the biosolids at the landfill, but proximity to neighbors and potential odors nixed that plan. “Because of the newspaper publicity that accompanied these developments, a composting operations owner read about us and approached the city with the idea of composting our biosolids offsite,” Konecky says. “He worked with a local company in the lumbering business, so the wood chips were readily available.”

Kalispell and the composting firm reached an agreement, and the city purchased the equipment and vehicles to haul dewatered biosolids to the Glacier Gold LLC composting facility in Olney, about 35 miles north of the treatment plant. Current volume is about one 20-cubic-yard load per day.

“We love their biosolids, because heavy metals are essentially nonexistent,” says Joe Werner, a manager with the composting firm. “We’re very proud of our operation.” He points out that the wood chips are all virgin forest products — shavings, bark, sawdust — that used to be disposed of by burning. “We’re solving two problems at once,” he says.

After composting in static, aerated piles, the material goes on the market as Glacier Gold to landscapers and lawn and garden stores in at least seven states. It has also been used to reclaim abandoned mines, where the sterile soil needs nutrients before cover can grow.



Above and at left, operator Jason Wisner inspects operations of the UV disinfection system. Effluent from the final clarifiers goes through sand filters to remove small solids and then is disinfected. Below, lab chemist Elizabeth Bonitz takes BOD readings.



presses. Kalispell has received plaudits for its biosolids recycling program.

Using city-owned, tandem-axle 20-yard capacity trucks, plant staff transport the cake to a composting facility operated by Glacier Gold LLC, about 35 miles outside the city. There, the biosolids are blended with wood chips to make Glacier Gold compost, popular with landscapers throughout the Northwest. The material is also used in mining reclamation (see sidebar).

BATTLE PLAN

While performance has been spectacular, the plant staff didn’t just hit the “on” button when the BNR process started up in this cold weather city in the early 1990s. “We’ve had to overcome our share of issues,” says Emrick.

Maintenance is the key component in what she calls the battle plan to keep plant performance at the head of the class. A computer-based preventive maintenance program documents maintenance tasks, work orders and replacement parts. But the human element is just as important. “Maintenance is crucial here,” Emrick says. “If you don’t fix it today, you’ll have two things to fix tomorrow.”

An operator is in charge of each section of the plant and has responsibility for all maintenance in that area. “That person operates the equipment, so it makes sense that they have the responsibility for maintaining and fixing it as well,” Konecky says.

The Kalispell staff reviews maintenance needs and operational adjustments regularly at the morning meetings, so everyone knows what is going

on all around the system. The treatment team reviews lab reports regularly, too. “We watch the chemistry very closely and are on the lookout for any changes in the bio-cells,” Emrick says. “We want to maximize the biological activity — let the microbes do their thing.”

Depending on the chemistry and biology, plant personnel can determine the number of anaerobic, anoxic and aerobic cells in each of the zones to achieve optimal nutrient removal. Kalispell also monitors and carefully controls all return streams, aiming for smooth, consistent operations.



“We must be one of the earliest plants to employ full-scale UV. We’re proud of the fact that we are not adding chemicals to our discharge.”

JONI EMRICK

Operators Jesse Jones and Phil Lauman assemble the sludge recovery chain in the bottom of the primary clarifier.

KALISPELL WASTEWATER TREATMENT PLANT PERMIT REQUIREMENTS (30-day average)

| | |
|-----------|----------|
| BOD | 10 mg/l |
| TSS | 10 mg/l |
| Total P | 1.0 mg/l |
| Ammonia N | 1.4 mg/l |

“You name it, our lab is running samples on it,” says Emrick. “The more eyes and ears we have on the process, the better off we are. BNR processes do best when the flow is consistent.” Over time, this watchful approach has led to a number of key operational changes and process improvements.

For example, in the original design, dissolved oxygen was controlled only in the final aerobic BNR cell. “The trouble was, the whole system would get so low that we couldn’t bring it back by just controlling DO at the end,” explains Konecky. “We moved the control upfront, but that didn’t work either.”

The solution was to position electronic actuators in all the aerobic cells to provide optimal DO control in the BNR system. “We get finer DO control and better phosphorus removal, and we save electricity by eliminating the DO swings,” Konecky says.

In another instance, the bar screen is now controlled by the plant’s programmable logic controller, rather than by level controllers. Corrosion has been eliminated by replacing copper wiring with fiber optics, and the plant staff has made improvements to the sand filtration system.

KEEPING UP WITH GROWTH

At 3.1 mgd, the Kalispell wastewater operation strains to keep up with expansion in the Kalispell area, which is growing at about 4 percent per year. The current expansion project, designed by Morrison-Maierle Inc. with the Missoula office of the HDR consulting firm, and due to start up next June,

largely mirrors the existing plant. In a way, the \$22 million project is a reward to the staff for their hard work in previous years.

New equipment will replace most of the older units, and the capacity of some processes will be enlarged. The lift station will get a new pump, and the headworks will see new bar screens and grit-removal systems. The existing primary clarifiers and equalization tanks will continue to serve, although a new single-stage fermentation system will replace the current two-stage unit.

The plant will add two new bio-cells, both 500,000 gallons in capacity, nearly double the size of the largest of the existing bio-cell basins. The BNR process itself will be converted from the Capetown to a modified Johannesburg design, which incorporates a pre-anoxic zone. The plant will also have a third final clarifier and a larger, modern Trojan UV system. The plant expansion will also incorporate odor control.

Emrick and Konecky are eager to take command of the new systems when they come online next summer, but they know that strong performance will still depend on operators.

“Engineers design the best plant they know how to, and contractors build it as well as they can,” says Emrick. “In the end, though, it’s the operators who make it work.” **tpo**

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The Daily Grind

A SPECIALLY DESIGNED SEPTAGE RECEIVING STATION ELIMINATES MAINTENANCE AND OPERATION HEADACHES FOR COLORADO SPRINGS UTILITIES

By Scottie Dayton

Odors from the open wet well at the Las Vegas Street Wastewater Treatment Plant septage receiving station in Colorado Springs, Colo., were upsetting residents and business owners. Trash in the septage was plugging the impellers of the two old pumps and breaking their components two or three times per month.

"We were holding the pumps together with Band-Aids," says maintenance supervisor Dan Hammer. "My four mechanics were in the pit a lot and it was a hazardous environment. Besides being a confined-space entry, they had to wear respirators and constantly monitor air quality."

Replacement parts were difficult to locate and often required custom fabricating in the machine shop. Downtime lasted a few hours to a day, during which the 20 liquid waste haulers were rarely turned away. Lacking storage tanks, the utility's collection crew occasionally had to lower the level in the wet well with their vacuum trucks, then discharge into a manhole in the treatment plant.

"Pretty much anything that goes into the grinders comes out in tiny bits. The only items that ever stopped them were a screwdriver and hammer."

DAN HAMMER

Rather than replace the pumps, Colorado Springs Utilities decided to build a two-level, 500-square-foot receiving station. It uses grinders and automatic, self-cleaning fine screens to protect the pumps, provides a safe work environment, requires only preventive maintenance, and has eliminated all odor complaints.

ONLY GAME IN TOWN

The Las Vegas Street plant (50 mgd design, 32 to 33 mgd average) is fed by 1,600 miles of sewer mains and 14 pump stations, all servicing 115,000 residential and 6,400 commercial accounts. The utility adds 30 to 35 miles of sewer pipe each year.



Two Muffin Monster grinders (green) are placed in front of the transfer pumps to grind solids, rags and trash so that they flow harmlessly through pipes and pumps. (Photos courtesy of JWC Environmental)

The plant also is the only facility in its immediate area that accepts septage. Initially, haulers discharged into the open wet well, filled out their own load tickets, and deposited them in a box. The unattended area operated on the honor system.

The new receiving station, built to process 200,000 gpd of domestic waste and restaurant grease trap waste, now receives only 10,000 gpd. "The designers expected usage to expand, but it hasn't," says Hammer. "The economy didn't go where it was supposed to and only 30 haulers discharge here." Haulers are charged \$92 per 1,000 gallons plus a \$50 annual permit fee.

Trucks arriving at the station pull into a circular drive. Electronic gate cards and an electronic billing system record the trucking company, meter the flow, and read the pH level. After swiping the card, drivers connect their hoses to an exterior 2-, 4-, or 6-inch fitting that empties into a sealed PVC-lined 3,000-gallon concrete wet well. Before leaving, haulers can wash their vehicles at a special grating.

The enclosed receiving building has all electrical equipment on the second floor where digital instrumentation monitors pH, lower explosive limit, and liquid levels. Processing equipment is on the first floor.

A level meter in the wet well sends septage alternately into two Model 30000 Muffin Monster grinders (JWC Environmental). The dual-shafted grinders, which replaced bar screens with 1/2-inch openings, pulverize rags, clothing, wood, hair, plastic, and small rocks into tiny particles that flow through two alternating 5-hp chopper pumps to the headworks.

"Pretty much anything that goes into the grinders comes out in tiny bits," says Hammer. "The only items that ever stopped them were a screwdriver and hammer. The machine reversed a couple of times and, when it still

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couldn't chew up the obstruction, stopped and sent an alarm. My men removed six bolts on a little cover and pulled out the tools. The units are that simple to operate and maintain."

DEWATERING WASTE

In the treatment plant, liquid passes through another Muffin Monster unit before entering a wet well with a 5-hp recirculating chopper pump that keeps grit, scum and grease suspended. The liquid is dewatered using washer compactor augers (Vulcan Industries Inc.). As the long auger pushes the slurry through the tube, liquid drains out. The remaining solids are sprayed and washed with water, then squeezed dry and compressed. Material falls out the end of the pipe into a 3-ton dump truck that is emptied every other day at the utility's disposal facility.



Mechanic Steve Harris works on removing a screwdriver before it enters the blades and causes damage. The grinder unit sounds an alarm during the rare occasions when it cannot grind through an object.

Wastewater is screened and dewatered, too. After reaching the headworks, it flows through Model ESR automatic, self-cleaning stair screens with 6-mm bar spacings (Vulcan Industries Inc.). "We got them last year," says Hammer. "They installed easily without channel modification, and their maximum setting angle of 57 degrees makes for a compact footprint."

Residue passing through the stair screens settles out in three 750,000-gallon primary sedimentation tanks. That material is land-injected at about 6 percent solids on property owned by the utility.

The Las Vegas Street plant operation is monitored by several digital instruments that interface with a PLC-based control system (Allen-Bradley) and several Rockwell Software products, including RSView32 for full SCADA operation. The program monitors levels at the receiving station and the flow meter in the wet well, and controls the pumps. **tpo**

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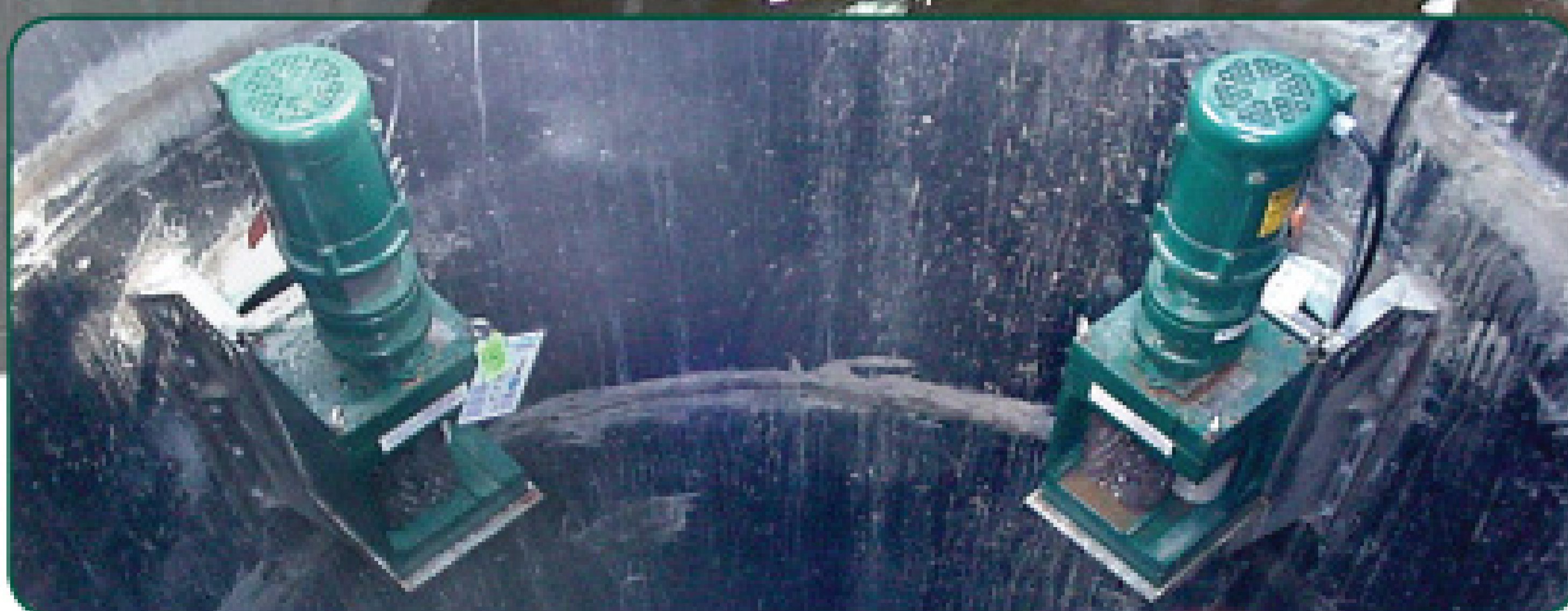
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The Lawrence Wastewater Treatment Plant has seen many expansions since it was built in 1956. The plant uses the activated sludge process and discharges to the Kansas River. (Photography by Carmen Daye Irish)



A Natural *Step*

A CERTIFIED BIOSOLIDS MANAGEMENT SYSTEM AND SUPPORT FOR LOCAL FARMERS ARE STANDARD PROCEDURES AT THE CITY OF LAWRENCE WASTEWATER TREATMENT PLANT

By Diane Gow McDilda

THE CITY OF LAWRENCE (KAN.) WASTEWATER Treatment Plant already had a good rapport with neighbors, especially the farmers who benefit from the plant's biosolids.

Along with that, employees are conscientious and management is responsible. So it was natural for Jeannette Klamm, utilities program manager for the city, to pursue an official management certification for a smooth-running biosolids operation.

Klamm knew the benefits of having effective management systems would be numerous, and she looked to the National Biosolids Partnership (NBP) and its Environmental Management System (EMS) certification as a place to start.

When the process was complete, a successful third-party audit put the city on the map as the smallest agency in the country to earn the certification.

Achieving certification wasn't so much a goal as just one more step along the way. "In the realm of things," says Klamm. "It's just the way we do things."

In fact, the facility had already earned international certifications for environmental management and occupational health and safety. The biosolids program supplies local farmers with a valuable fertilizer.

QUALITY MARKS

The Lawrence treatment plant, about 40 miles southwest of Kansas City, serves a population of about 89,000. It was built in 1956 and has gone through numerous renovations and expansions. The secondary plant uses the activated sludge process and discharges to the Kansas River after its effluent is disinfected with chlorine.



The plant's design capacity is 12.5 mgd, and it can handle wet-weather peaks of up to 25 mgd. But in a part of the country known for spring downpours, additional treatment capacity is needed. Therefore, the plant uses the ACTIFLO process from Kruger Inc., a Veolia Water Solutions & Technologies company, to handle flows up to 40 mgd (see sidebar on following page).

Awards and certifications for the Lawrence plant do not stop with the EMS. The plant has received three awards from the U.S. EPA. In 2005, the facility received Clean Water Act Recognition Awards for exemplary biosolids management, and operation and maintenance. In 2008, the plant again won the exemplary biosolids management award.

The city is also a member of the EPA's Performance Track, a program that recognizes environmental excellence and encourages facilities to operate beyond their regulatory or permit requirements.

As part of the drive in the Utilities Program to improve management, the city also received certification under two international management programs: ISO14001 for environmental management, and OHSAS 18001 for occupational health and safety. Combining these with EMS certification is a unique achievement.

"We are the only plant in the country to have all three management systems in place," says Klamm.



Judy Regnier, wastewater treatment plant manager for the City of Lawrence, Kan.

BOUNTY FOR FARMERS

The plant's anaerobically digested biosolids are provided at no charge to local farmers as fertilizer. The city has been distributing the material since 1956, but the system in place now started in the mid-1970s. From the digester, the sludge contains about 2 percent solids. It is dewatered using two 2-meter belt filter presses (Ashbrook Simon-Hartley) to cake containing 22 percent solids.

"We take it to the farmers using a contractor," explains Klamm. "EPA regulations require that we hire a contractor to do the loading rate calculations and haul it to the fields. The calculations are based on nitrogen content and the application rate. It's usually two truckloads per acre, so a farmer with a 20-acre field would get 40 truckloads."

The plant has a storage capacity for 4,000 cubic yards of biosolids (six months), enough to get through the winter when the land application program is inactive. The material is stored in two above-ground rectangular bays with concrete floors and walls and a single domed roof.

The roof sits squarely on the two outside, longer sides of the storage bays, leaving a gap between the bottom of the roof and the top of the shorter sides of the bins. This allows for ventilation, and avoids the expense of an air exchanger, while protecting the biosolids from wet weather.

The storage bays are loaded from the top via a conveyor belt that runs from the belt filter press up an incline and across a catwalk in between the bays. The end of the conveyor can be swung to fill either of the bays. Large stainless steel gates on a shorter side of each bay allow loader access.

During unloading of the bays, the gates are lifted slightly, allowing access from the bottom. As more biosolids are removed, the gates are opened higher. The gate is large enough that when completely opened, a loader can drive into the storage bay.

profile



City of Lawrence (Kan.) Wastewater Treatment Plant

| | |
|---------------------------|--|
| BUILT: | 1956 (last upgrade 2003) |
| TREATMENT LEVEL: | Secondary |
| TREATMENT PROCESS: | Activated sludge |
| FLOWS: | Design 25 mgd, average 12.5 mgd |
| RECEIVING WATER: | Kansas River |
| BIOSOLIDS PROCESS: | Anaerobic digestion |
| BIOSOLIDS VOLUME: | 4.5 dry tons/day (22 percent solids) |
| BIOSOLIDS USE: | Applied to farmland |
| WEB SITE: | http://lawrenceks.org/utilities/wwwtreatment |



Feed sludge on a belt filter press for dewatering.

PERMIT REQUIREMENTS (Main Effluent)

| | |
|---------|--|
| BOD | 45 mg/l weekly avg. 30 mg/l monthly avg. |
| TSS | 45 mg/l weekly avg. 30 mg/l monthly avg. |
| Ammonia | 16.6 mg/l daily avg. |
| E. Coli | 2358/100 ml monthly geometric avg. (November-March) 160/100 ml monthly geometric avg. (April-October) |
| pH | 6.0-9.0 |

Once the material is deposited in the fields, the farmers use manure spreaders to apply it evenly. The city requires them to disk the material into the soil to make the process more aesthetically pleasing and to deliver the maximum benefit of the nitrogen.

The biosolids are in limited supply, and it is up to the city to determine who receives it. The plant is on the east side of the city, and so farmers on that same side of town benefit. "We typically don't go west because we would have to go through town," Klamm says. "There is a lot of farm land 15 miles north and east of the plant."

Beyond that, the city can deny farmers' requests for application on their property if it could be objectionable. "If there is a development or church right next door, we say no," Klamm says. "We try to be mindful and not disturb the public. We know it's not a good idea to deliver loads near pumpkin patches in October or next to a church when there's a funeral scheduled."

It was that kind of planning that made the EMS certification a logical step.



Carolyn Woodhead, residuals coordinator, focuses on the biosolids program. The plant won certification under the National Biosolids Partnership's Environmental Management System.



Kelly French and Jay Lovett check the sodium disulfide mixing chamber before skimming algae off the surface.

TREATING THE FLOW – AND THEN SOME

The Lawrence Wastewater Treatment Plant needs a special process to handle wet-weather flows above its peak capacity of 25 mgd. The ACTIFLO process (Kruger Inc.) enables the plant to accommodate up to 40 mgd.

Influent flow above 25 mgd is diverted from the head of the plant, through a fine screen, to the ACTIFLO system, which uses ferric chloride, polymer and microsand to form floc that settles waste material out quickly. Effluent from the system is then dosed with chlorine and mixed with the plant's main effluent before discharge.

The ACTIFLO process is a compact clarification system. The microsand provides surface area that enhances flocculation and acts as ballast. The resulting sand-ballasted floc displays unique settling characteristics, allowing for clarifier designs with high overflow rates and short retention times.

In wastewater applications, the process can be applied whenever physical-chemical treatment, including coagulation, flocculation and settling, is used. It is well suited for treating CSOs, SSOs, and other wet-weather flows because of its small footprint and quick start-up time. The process efficiently removes TSS, BOD, phosphorus, COD, metals, fecal coliform and other contaminants.

Lawrence was the first municipal wastewater treatment plant in the United States to use the ACTIFLO process. "Before the ACTIFLO system, our excess flows had to bypass the plant all together,"



The excess flow storage basin is pictured with most of the plant's new buildings as of 2003. At the far end of the basin is the fine screen building. At left are the ACTIFLO process chemical storage buildings and the ACTIFLO treatment train and pump buildings.

says Jeannette Klamm, utilities program manager. "That flow went straight to the Kansas River."

The Kansas Department of Health and Environment included alternative discharge requirements in the plant's NPDES permit for the excess-flow system. One set applies to the main effluent, while the other covers the combined flows.

ROAD TO EMS

Klamm says there was no single impetus for getting EMS certification through the NBP; there were multiple reasons to take that step. "We've always had success with our program and support from the community, including the farmers," says Klamm. "We just wanted to continue to improve our program."

Klamm had learned about the program through her involvement with the Water Environment Federation (WEF). She saw the importance of EMS and the benefits it provided in improving the biosolids process and reinforcing public opinion. But when she decided to take the step, the program was still in the early stages of development.

The NBP was looking for participants, and Klamm noticed that small and medium-sized plants were under-represented. Klamm was encouraged that the NBP offered funding for communities working through the certification process.

"Being part of the development process was a good learning experience," she says. Twenty-eight agencies took part in the development process, which included workshops where organizations traded valuable information — not just what worked, but what didn't. In the end, Klamm believes teamwork was a major benefit for everyone and helped improve the quality of the program.

But it did take time. "It took us five years," says Klamm. "Now that the program is ironed out, it should take new applicants one-and-a-half to two years."

REAPING WHAT THEY SOW

The certification brought changes in operations and allowed all the employees to examine different programs at the plant. That kind of detail work can be overwhelming, but the EMS gave it structure. "Anytime you implement a new program, there's a learning curve," Klamm says. But Klamm believes the effort is an investment: the EMS program is intended to last a long time.

For Lawrence, health and safety was a critical concern. "Our staff was involved," says Klamm. "We determined what it is we do, what's our impact

on the environment, and what are our health and safety concerns, all the way from a paper cut to a confined-space hazard."

Now improvements in health and safety, and other areas, are part of the discussion in regular staff meetings. This helps the plant move from a mindset of corrective action to preventive action. "The employees say the plant is the safest it's ever been," says Klamm.

And health and safety correlates to dollars. As safety increases, injuries decrease, along with worker's compensation claims. There are other ways to

"Our staff was involved. We determined what it is we do, what's our impact on the environment, and what are our health and safety concerns, all the way from a paper cut to a confined-space hazard."

JEANETTE KLAMM

measure financial success. In the search for property on which to build a second wastewater treatment plant, the EMS helped smooth out the process.

"We wanted to purchase 530 acres," says Klamm. "We did a huge outreach to neighbors and explained where the plant would be and the date it would be built, and we had people available to talk to them."

The result was a seamless real estate transaction which Klamm believes is a direct result of the management program and credibility it conferred. The public support saved the community more than \$100,000 that had been budgeted for a community relations campaign.

From the successful pursuit of EMS certification to a community-accepted plant expansion, the City of Lawrence knows the importance of conscientious and considerate operations. It illustrates that investing in management systems, employees and the community pays for itself again and again. **tpo**

more info:

Ashbrook Simon-Hartley

800/362-9041

www.ashbrookcorp.com

Kruger Inc.

919/677-8310

www.krugerusa.com

From left, team members Ron Goolsby, Judy Regnier, Kelly French, Jay Lovett, Jeanette Klamm, Mike Hegeman, Carolyn Woodhead, Chris Eckart and Jason Riegel.





Glen Anderson examines the organisms in a return activated sludge sample. He can confirm the health and relative age of the solids in the plant using this method. (Photography by Jonas Grushkin)

It's an *Investment*

THE SOUTHERN UTE TRIBE IN COLORADO MAKES WASTEWATER TREATMENT A HIGH PRIORITY. IT PAYS OFF IN SPARKLING PLANT PERFORMANCE — AND LOTS OF RECOGNITION.

By Jim Force

THE SOUTHERN UTE INDIAN TRIBE IN SOUTHWESTERN COLORADO SEES WASTEWATER treatment as an investment rather than an expense. That approach results in a treatment facility that not only serves local people and businesses, but wins awards, as well.

Recognized for outstanding performance, automated control, and training procedures (see sidebar), the Southern Ute Wastewater Treatment Plant won first place among small advanced treatment plants (less than 1.0 mgd) for 2007 in the U.S. EPA Clean Water Act Recognition Awards.

"The Tribe doesn't want problems associated with inadequate facilities," says wastewater superintendent Fred Robyns. He credits tribal council leadership with foresight and a willingness to make improvements on a regular basis. "They're willing to deal with issues and put together a system that works," he says.

Previously, the community used lagoons to treat wastewater, but they weren't working very well. Faced with limitations on growth because of poor treatment, the Tribe took over control of

the wastewater treatment and the collection system. In 1999, the Tribe started up a new extended aeration oxidation ditch plant to serve the 1,400 tribe members and 700 citizens of the city of Ignacio.

"In the years since," says Robyns, "the Tribe has made improvements to keep the plant up to date and avoid problems before they occur." Since 2000, Southern Ute utilities (including water and wastewater) have been managed by the Southern Ute Growth Fund, the business arm of the Tribe (see sidebar). The Growth Fund has paid dividends to the tribal community, and the treatment plant is a prime example.

TREATING THE FLOW

The Southern Ute plant is rated at 0.8 mgd and runs at 50 percent of capacity. Pumps bring all sewage into the headworks, where it passes through a Rotamat fine screen (Huber Technology) and grit channels. Sewage then flows into the anoxic zone of the oxidation ditch, and then into the ditch "race track." Primary clarifiers are not used.

Southern Ute Wastewater Treatment Plant
PERMIT REQUIREMENTS

| | PERMIT | ACTUAL |
|----------------|-------------------------|-------------|
| BOD | 30 mg/l | < 2 mg/l |
| TSS | 30 mg/l | < 2 mg/l |
| Ammonia | 3 and 7 mg/l (seasonal) | < 0.05 mg/l |

"We monitor our dissolved oxygen levels in real time, and we respond immediately when septage loads cause them to drop."

FRED ROBYNS

Fred Robyns, wastewater superintendent, is shown beside a stainless steel slide gate that raises or lowers the liquid level in the oxidation ditch. A higher liquid level submerges a greater portion of the aerator, increasing the available oxygen to the mixed liquor.

profile **Southern Ute Wastewater Treatment Plant, Ignacio, Colo.**

| | |
|------------------|--|
| OWNER: | Southern Ute Growth Fund |
| SERVICE AREA: | 2 square miles, 2,000 population |
| FLOWS: | 0.8 mgd design, 0.4 mgd average |
| TREATMENT LEVEL: | Secondary |
| PROCESS: | Oxidation ditch |
| BIOSOLIDS: | Aerobically digested, dried, windrowed, spread on fields |
| STAFF: | Fred Robyns (superintendent), Glen Anderson, Greg Jones |
| OPERATING COSTS: | Approximately \$5 per/1,000 gallons treated |
| WEB SITE: | www.southern-ute.nsn.us |

“BUILD IT YOURSELF” TRAINING

As far as wastewater superintendent Fred Robyns is concerned, the old-fashioned apprentice approach is still the best way to recruit and train treatment plant operators.

“It’s hard to hire certified operators,” he says. “There is full employment in Colorado for qualified people. Many impending retirements will add to the difficulty of filling responsible positions.”

To bring fresh talent onto his staff and fill open positions, Robyns has adopted a “build our own” approach. “We look for people who might fit and start them out as truck drivers or utility workers,” he says. “Then we introduce them to collections, and eventually train them in operations.”

Staff members take recruits with them on jobs and operational rounds, using a hands-on approach. “Gradually, we give them experience and responsibility, and then we involve them in education programs leading up to certification,” Robyns says. It’s also important that new employees have time on the job to study and prepare for certification.

The approach has been successful for both tribal members and outside hires.

The program was one of the reasons the Southern Ute plant won a 2007 U.S. EPA Clean Water Act Recognition Award in the small advanced plant category. EPA cited the Tribe for competitive pay, opportunities to grow, and training and education. “This is the way I worked my way up the ladder,” says Robyns.

The oxidation ditch is a Carrousel denitr system (Eimco Water Technologies). The anoxic zone is next to and included within the greater physical structure. The anoxic zone allows for removal of ammonia through the nitrification/denitrification process.

Normal operating parameters include an MLSS of 2,000 to 3,000 mg/l, MLVSS of 70 to 85 percent, effluent temperatures of 38 to 70 degrees F, loading of 400 to 600 pounds, and SRTs of 40 to 60 days.

Mixed liquor flows from the ditch to one of two deep clarifiers rotated annually to ensure proper maintenance. An ultraviolet light system (Trojan Technologies), composed of two 10-bank four-

“The Tribe doesn’t want problems associated with inadequate facilities. They’re willing to deal with issues and put together a system that works.”

FRED ROBYNS

lamp units, disinfects the flow before discharge to Rock Creek which flows into the Pine River. One UV unit is on-line at any single time. Robyns and his operators Glen Anderson and Greg Jones change out UV bulbs about once every 30 months of continuous use.

Waste activated sludge is pumped into an open aerobic digester, where it is held long enough to meet specific oxygen uptake requirements. Digested solids are mixed with polymer and poured onto a perforated plastic bed. An underdrain takes clear liquid back to the oxidation ditch.

After a week, the solids are removed with a small Kubota tractor with squeegee bucket and spread out on a concrete pad for air-drying. A compost mixer (Brown Bear) aids in the windrow and drying process. Using manure spreaders and small dump trucks,



The 130,000 gallons of aerobic digester capacity allows 20 to 40 days of waste activated sludge detention time before dewatering and drying.

the staff applies the crumbly dried biosolids on tribal hayfields and bison pastures.

Plant performance is nearly perfect. While BOD and suspended solids permit limits are 30 mg/l, the Southern Ute plant generally puts out effluent with less than 2 mg/l BOD and TSS, for removals of 99 percent or greater. Ammonia comes in at 20 to 30 mg/l and leaves at less than 0.05 mg/l. Fecal coliforms are usually <1 geometric mean on the discharge monitoring report. Effluent turbidities are 1 to 2 NTU. In spite of snow and cold at 6,400 feet altitude, the open-air facility needs only modest adjustments to deal with seasonal conditions.

AUTOMATION AND CONTROL

The EPA credited the Southern Ute plant for an effective automation and control system. Robyns explains that the plant is staffed 40 hours per week. An Intellution iFIX SCADA system (Kepware Technologies) enables staff to monitor performance 24 hours per day and respond to alarms from their homes. It’s a secure dial-up system that enables staff to call up the plant control screen and manipulate processes on their home computers and respond to alarms via their cell phones.

The emergency power supply to the plant is automated as well. A Cummins Onan diesel generator serves as a standby and automatically kicks in to assure continuous power should the main power supply be interrupted.

The plant’s SCADA system is also instrumental in helping the plant deal with septage loads that come primarily from portable toilets and septic tanks and from large-scale public events like motorcycle rallies. The plant averages one or two septage loads of 2,000 gallons each per week.

“We monitor our dissolved oxygen levels in real time,” says



A Brown Bear composter is used to aerate and windrow biosolids before application on tribal agricultural lands.



A Rotamat fine screen from Huber Technology does duty at the plant headworks. Large solids are captured on the screen, then washed off and deposited in a trash bin.

Robyns, “and we respond immediately when septage loads cause them to drop.” He says the DO sag becomes evident within minutes of receiving a septage load. He can turn mixer rates higher depending on the amount of DO that needs to be regained. It’s a lot more accurate than manually monitoring DO levels once or twice per day.

Robyns believes all plants accepting septage need to account for its impact in their design. “It’s especially important with small plants in rural areas,” he says. “It’s a lot better to have the septage loading designed into the plant in the first place.”

That’s exactly the kind of forward-looking approach that has assured the high standard of treatment at Southern Ute, and has produced awards — not just from the EPA, but also from the Rocky Mountain Water Environment Association in 2003, 2004 and 2005.

Robyns says, “The Tribe is committed to protecting the health of the people and the environment on the reservation. The quality of its water and wastewater treatment is a direct reflection of that commitment.” **tpo**



From left, Nathan Strong Elk, utility worker; Greg Jones and Glen Anderson, plant operators; and Fred Robyns, wastewater superintendent.

SOUTHERN UTE GROWTH FUND

In a unique form of privatization, the Southern Ute Wastewater Treatment Plant is owned and managed by the business arm of the Southern Ute Indian Tribe.

Known as the Southern Ute Growth Fund, it represents a significant aggregation of businesses and investments, both on the reservation and in other states across America, and maintains direct ownership of many of the operating companies.

Major business areas include oil and gas, real estate, construction materials, and other private equity and venture capital opportunities. The fund’s multibillion dollar strategy ensures that tribal business enterprises and tribal government and services are properly funded. Established in 1999, the fund is unique among Native American tribes.

more info:

Brown Bear Corp.
641/322-4220
www.brownbearcorp.com

Cummins Power Generation
800/888-6626
www.cumminspower.com

Eimco Water Technologies
801/931-3000
www.glv.com

Huber Technology Inc.
704/949-1010
www.huber-technology.com

Kepware Technologies Inc.
888/537-9273
www.kepware.com

Trojan Technologies, Inc.
519/457-3400
www.trojanuv.com

Building for the Future

DISTRICTS IN CALIFORNIA JOIN FORCES TO TAKE ON THE CRITICAL CHALLENGE OF TRAINING AND DEVELOPING A NEW GENERATION OF OPERATORS

By Ted J. Rulseh

Wastewater operators were hired by the thousands in the early 1970s after passage of the Clean Water Act. Now, many of those operators are nearing retirement, and that's a big challenge for the wastewater treatment industry.

Almost as serious as the loss of people power is the loss of institutional memory — of operators who know their plants intimately and understand the moods, quirks and intricacies of the treatment processes and equipment.

The Water Environment Federation and state and regional associations are addressing the staffing crisis (and it is a crisis) in various ways. Meanwhile, in California, a group of 14 clean water agencies in the San Francisco Bay area has tackled the issue head-on, working with a community college to create an education program to prepare young people for wastewater careers.

Thus far, it has been so successful that the courses are routinely full, even without any advertising. As a result, the districts are starting

“Historically, we would all go out and advertise for the positions. It was a money game, where we would steal people from each other. As a group of agencies here in the Bay area, we decided that wasn't going to increase the pool of operators available.”

DOUG CRAIG

to build a pipeline of new talent, not only for themselves but for any treatment agency where the students might decide to apply what they learn.

One agency deeply involved in the program is the Central Contra Costa Sanitary District, headquartered in Martinez. The district also operates its own training program that helps newly hired operators in training earn their state certifications and move quickly up the ranks.

Doug Craig, director of plant operations, and Michael Scahill, communication services manager, talked with *Treatment Plant Operator* about the need for new operators, the district's own training initiatives, and the collaborative education program in the Bay Area.

tpo: How serious is the potential shortage of wastewater operators?

Scahill: About three years ago, we started looking at succession planning and the status of baby boomer retirements facing the water

and wastewater industry. We saw that within 10 years, some 50 percent of operators would be retiring. In California alone, between water and wastewater, that's close to 8,000 people. It's also a national problem.

tpo: In a more immediate sense, how does the wave of retirements affect your facility?

Craig: Two of our long-time shift supervisors recently gave me their resignations — they are retiring. These two gentlemen were each here for 30 years, and they watched a lot of what is here get built from the ground up — the best training there can be.

They are extraordinarily competent and capable in all aspects of operations, and they are both excellent supervisors. To replace people like that is not easy. So we can't afford to focus on the low end of the operator spectrum.

We have to focus on moving our operators to the highest levels possible and preparing the more seasoned ones to fill the supervisory positions when experienced people leave. We need to make sure they are confident and capable and that we have, as far as possible, a seamless transition to new people sitting at the helm and running the main controls. It's a whole program that has to be addressed continuously.

tpo: How have treatment agencies typically dealt with operator recruitment and staffing?

Craig: Historically, we would all go out and advertise for the positions. It was a money game, where we would steal people from each other. As a group of agencies here in the Bay area, we decided that wasn't going to increase the pool of operators available.

tpo: What led to the creation of the cooperative education program for new operators?

Scahill: When we started looking for new sources of operators, the major frustration was that there were no training programs in our



From left, Michael Scahill, communication services manager, and Doug Craig, director of plant operations.



The first class to graduate from the Mathematics of Water and Wastewater Treatment course, part of an operator training program.

county or anywhere near us. The closest training program was at Solano Community College, 40 miles north of here, in Fairfield. They had an eight-course program in Water and Wastewater Technology.

We knew it wouldn't be practical to send people there because of the travel time and the cost. So, in essence, we contracted with Solano College to bring the courses here to Contra Costa County. Once we succeeded with our first semester, we moved it to three other sites in the county and to one site to the south in Alameda County.

tpo: How difficult was it to get the program established and fill the courses?

Scahill: For our first semester, which started August 2007, we offered three courses. Just from word of mouth, and from the group of 10 agencies that initially put up money for the program, the courses filled up in less than two weeks, with 30 people per class. We did no advertising and issued no press releases.

tpo: What kinds of people are coming into the program?

Scahill: We get a combination of people coming straight out of high school, and people working in other industries. At least a third, and sometimes approaching half, are people who are working in water and wastewater or know someone in the industry. The first semester, we had three students attend who were children of employees at our district. We see people coming from a broad geographic area.

tpo: How exactly is the program structured?

Craig: We contract with Solano Community College. They approve the instructors. All of the instructors work for one of the agencies that sponsor the program. Their compensation is on a scale based on experience and education. The quality of the instructors is very high, and that is reflected in good student reviews. We have Ph.D.-level people teaching the math course, and people with master's degrees teaching some others.

These are all 16-week college-credit courses, taught in the evenings, each course once a week, for three or four hours. The courses are free to anyone who signs up. The partner agencies pay Solano College. The students don't pay for tuition or books.

Scahill: My executive assistant, Deborah Hill, serves as registrar. She's been magnificent working with students to make sure they understand the registration process and make sure they receive the appropriate credits. Although Central Contra Costa handles a large share of the administration, the program is a true partnership among the 14 agencies that now support it. Each semester, it's a group decision what will be taught, where it will be taught, and who the instructors are going to be.

HIGH-PERFORMANCE LEADER

The Central Contra Costa Sanitary District Wastewater Treatment Plant in Martinez, Calif., earned a 2008 Clean Water Act Recognition Award from the U.S. EPA — second place among large secondary plants.

The facility, opened in 1948 and upgraded several times, treats an average of 45 mgd, serving a 146-square-mile area that is home to 450,000 residents and more than 3,000 businesses. The plant can handle wet-weather flows up to 240 mgd and has an average dry-weather design flow of 54 mgd.

All the wastewater is secondary treated, UV disinfected, then discharged to Suisun Bay. About 600 million gallons per year is tertiary treated by additional filtration and disinfection before being distributed as Title 22 recycled water for landscape irrigation, industrial processes and plant operations.

The EPA award summary cited the district for its proactive training program, pollution prevention initiatives, and aggressive collection system maintenance management. In 2007, the district received the Collection System of the Year award from the California WEA for its reduction of annual sanitary sewer overflows (SSOs) from 290 in 1990 to 81 in 2007.

In 2008, the plant received the National Association of Clean Water Agencies (NACWA) Platinum Award for its 11th year of complete compliance with all federal and state permit requirements.

The plant employs a total of 90 operators, maintenance technicians, laboratory staff and administration. Overall district employment is 270.

tpo: Why do you feel the program has been so popular?

Scahill: It can lead to careers with good salaries and benefits. There's also very good job security — people are going to continue flushing no matter what happens to the economy.

Craig: Right now everybody's worried about losing a job. I sit in on some interviews with job candidates, and many people say one reason they're interested in the position is job security. Once they get that job, they feel they're going to have a career they can count on — they're not going to be laid off every three years.

In our area, the median starting salary for a Grade 1 operator is about \$4,800 a month. If they can work their way up to the journeyman level in three or four years, the pay is about \$5,800 per month at low end and \$7,000 at high end.

So if you are strongly interested in this industry and you come into the program and do everything we want you to do and move up, then in three or four years you can make more than \$75,000 a year. That gets you into a good career at a pretty good salary in a reasonable time. Of course, California as a whole is on the high end of the pay scale. If you're looking countrywide, at some of the smaller states and smaller cities, where the industry isn't recognized as well, compensation will not be as good.

tpo: Does the education program lead directly to employment with the sponsoring agencies?

Scahill: It is not a job-placement program. The courses prepare the students to take their state certification exams in either water or

“Although Central Contra Costa handles a large share of the administration, the program is a true partnership among the 14 agencies that now support it. Each semester, it’s a group decision what will be taught, where it will be taught, and who the instructors are going to be.”

MICHAEL SCAHILL

wastewater operations. There is no guarantee of a job upon completion, and we make that clear on the front end.

But the students do get exposure to teachers from the sponsoring agencies, and we have certainly notified students when there are job openings. Just about all of the agencies have said they plan on hiring people in a year or two directly out of the program.

And the skills students gain through the courses easily transfer to anywhere else in the country where openings exist.

Craig: After completing courses, the students need to complete 2,080 hours of work in a treatment plant to be eligible for certification as Grade 1 operators. Agencies can hire students directly out of the program as operators in training. That enables them to get their hours and move up. In effect, we’ve opened the orifice to allow many more opportunities for people to get into wastewater treatment.

tpo: After two full years, how would you assess the effectiveness of the education program?

Scahill: To date, we’ve typically seen 30 students — the maximum — starting out in every class we’ve offered. Very consistently, about 20 of those pass. We are closing in on 200 students who have completed multiple courses. We still haven’t had to advertise at all. First consideration for enrollment goes to students who have taken classes already.

The students have liked the instructors, and instructors have enjoyed

what they’re doing. So far, all of them have returned to teach the classes a second and third time. At least a half-dozen of the students have already been hired by sponsoring agencies.

Craig: The beauty of the program is that we can rotate the classes we offer into different locations to make it convenient for people in different service areas to enter the program and get through it without having to drive long distances. A lot of agencies are interested in hiring to reflect the diversity of the local population. By offering the courses locally, they can draw students from within their service areas.

Scahill: It’s also the kind of program that agencies in other parts of the state can easily replicate by contracting with a community college that has a water and wastewater program in place.

tpo: How does this program fit with your own staffing needs and internal training programs at Central Contra Costa?

Craig: We will see at least three retirements in 2009 and perhaps as many as five, and we have to replace those experienced people. We used to have the luxury of hiring operators and letting them increase their knowledge and move up over time, according to their individual wishes.

Now, when we hire people, I find out upfront if they are willing to commit to a program to advance from operator in training to a journey-level operator in three to four years. It’s an aggressive training program.

Because we saw this issue coming some years ago, we created an electronic information system in which we converted all our operating manuals, training manuals, and training videos to a digital format. We have more than 300 gigabytes of information and growing. It’s all being built into a plant information system where operators sit in our training room and go online and learn.

When we hire new operators in training, they start out spending half their time viewing videos and doing other office-based study, and the other half with a shift supervisor or other high-level staff member who walks them through the processes and explains them. Then we put them on shift to work with journey-level staff to mentor on various processes. They work different shifts and in different areas of the plant.

They do that until they progress through the operator-in-training phase and become Grade 1 operators. As they become internally certified and pass all the requirements to operate equipment that’s within their state certification, we start putting them into operating stations on their own. **tpo**

SPONSORING AGENCIES

Fourteen agencies support the education program in wastewater treatment sponsored by the Bay Area Clean Water Agencies through Solano Community College:

- Central Contra Costa Sanitary District
- Contra Costa Water District
- City of Livermore
- Delta Diablo Sanitation District
- Diablo Water District
- Dublin San Ramon Services District
- East Bay Municipal Utility District
- Ironhouse Sanitary District
- Mt. View Sanitary District
- Oro Loma Sanitary District
- Rodeo Sanitary District
- Union Sanitary District
- West County Wastewater District
- Zone 7 Water Agency

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Better Processes

MANUFACTURERS OFFER A WIDE RANGE OF MONITORING AND CONTROL DEVICES TO HELP KEEP TREATMENT PROCESSES WORKING SMOOTHLY

By Scottie Dayton

Process automation helps wastewater treatment operators keep treatment systems functioning and in compliance with permit requirements. Here are some of the latest innovations in tools for process monitoring, automated control, sampling, trend analysis, flow measurement and more.

DECENTRALIZED AUTOMATION

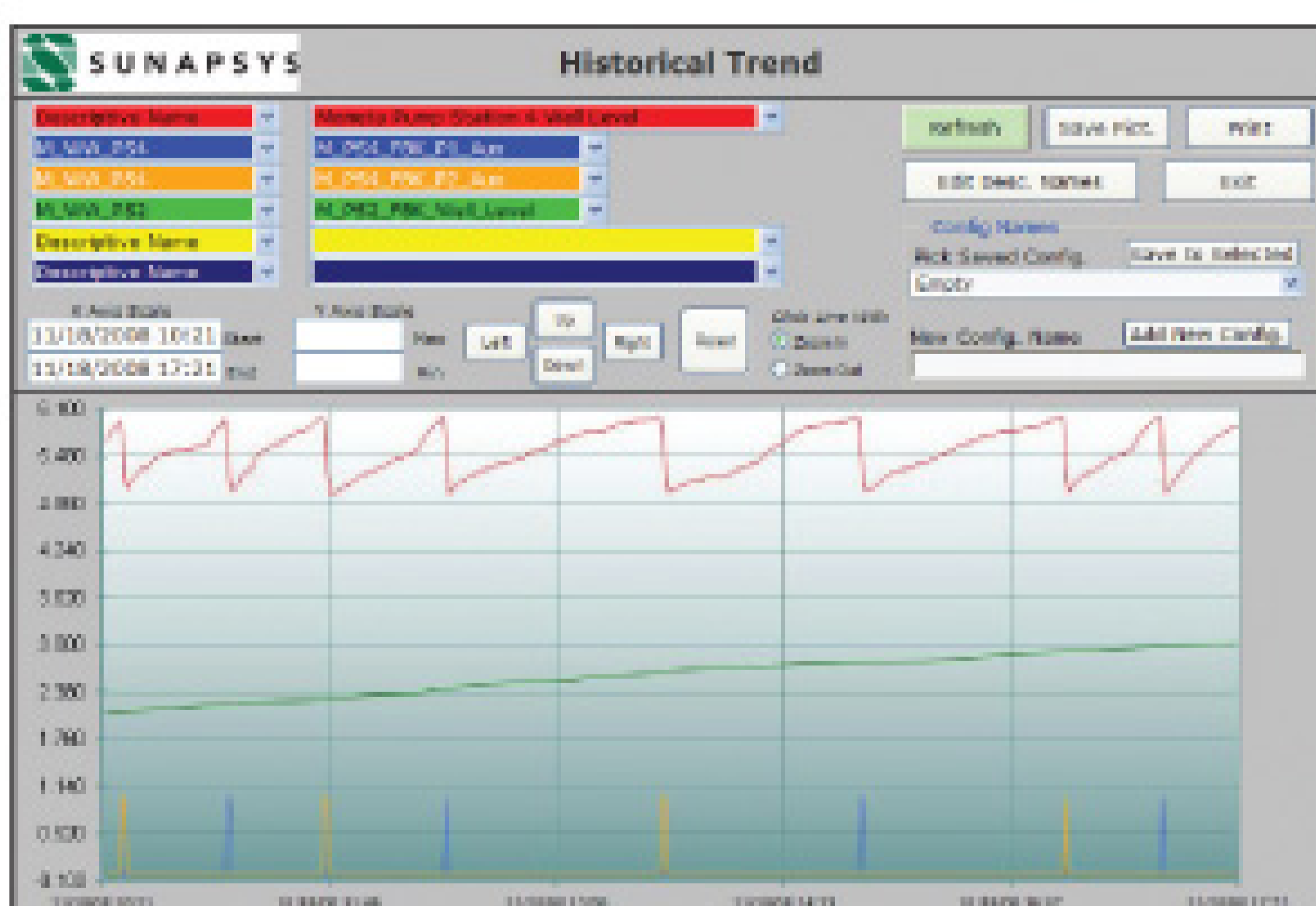
Meeting telecontrol application requirements, the **750-872 PFC controller from WAGO Corp.** simplifies network access and remote data monitoring and collection. The IEC 61131-3 compliant modular system makes all fieldbus and input/output data available to wastewater treatment control systems, and provides access to more than 300 analog, digital and specialty modules.

Data acquisition or control protocols include Modbus TCP/RTU, IEC 60870-5-101/-104, 3964R, RK512, and Ethernet/IP). System management and diagnostics protocols include HTTP, BootP, DHCP, DNS, SNMP, FTP, SNMP and SMTP. Users can place HTML pages on an internal server for Web-based monitoring or access programs via XML and ASP. The system also has library functions for e-mail, SOAP, ASP, IP configuration, and Ethernet sockets and file system.

Equipped with a 32-bit CPU, the multitasking system has a battery-backed, real-time clock for data logging. Access to IEC 60870-5-101 and -104 telecontrol protocol is through function blocks using CoDeSys. Users not wishing to write a PLC program can parameterize the telecontrol protocols within CoDeSys. **800/346-7245; www.wago.us.**

TRENDING TOOL

Wastewater operators can spot operational issues before they become serious with the **Trending Tool from**



Trending Tool from Sunapsys Inc.



750-872 PFC from WAGO Corp.

Sunapsys Inc. Users need only a Web browser to view predefined trends or time-based data from any database. They can map database field names to user-friendly names and export trends for sharing with others. The tool enables operators to plot levels, flows, pump status and more. Holding the mouse pointer over a trend reveals its actual point values. Features include scroll and zoom, drop-down lists, and pop-up calendars. **540/904-6862; www.sunapsys.com.**

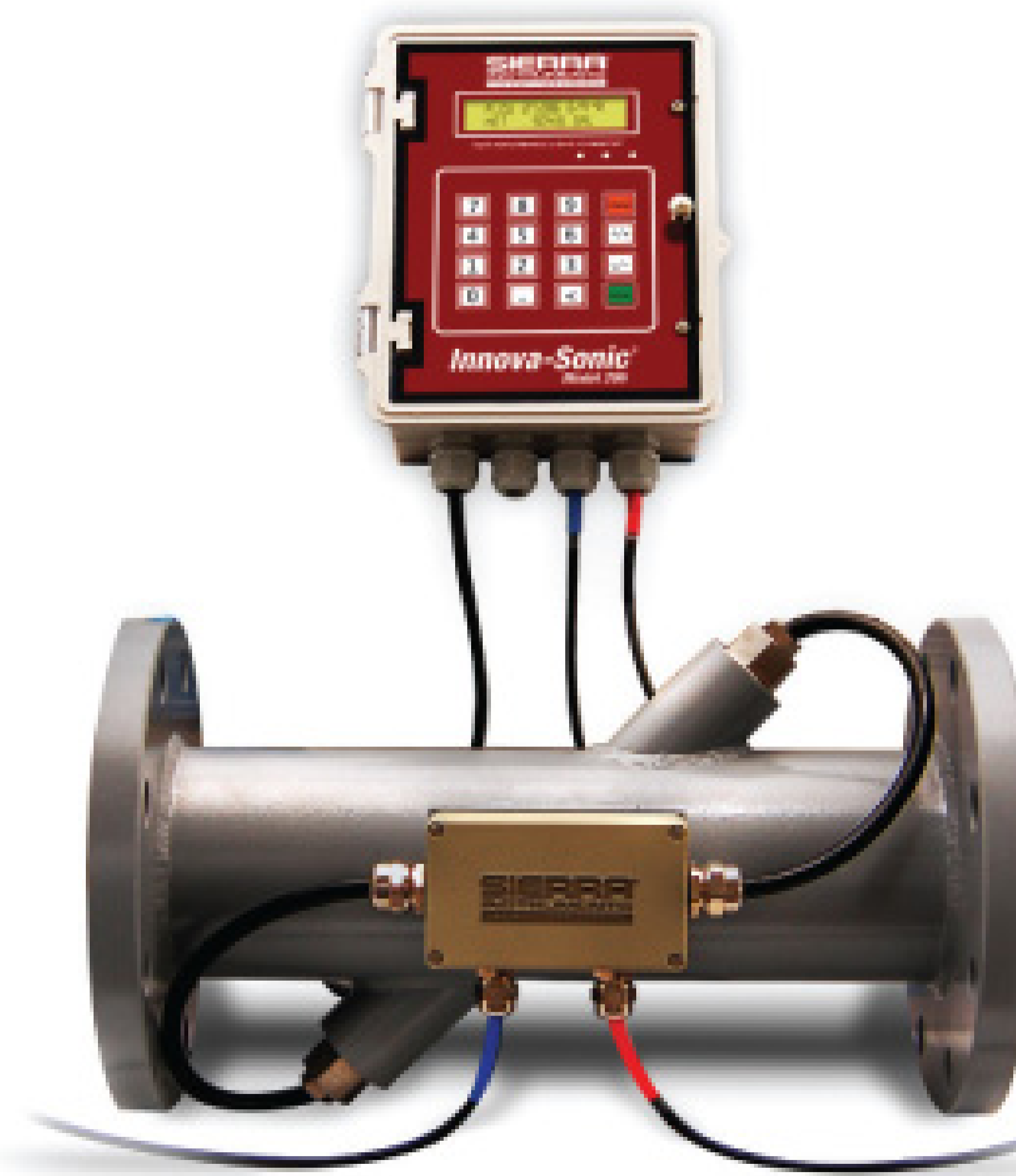
CONSTANT PRESSURE CONTROL

The **H2O variable frequency drive (VFD) from SJE-Rhombus** has integrated advanced pumping software that reads the discharge pressure and adjusts the pump speed to maintain a constant output pressure without a programmable logic controller or separate controller.

Automatically adjusting pump speed to correspond with lower demand reduces electric motor energy consumption by 20 to 50 percent. Available from 5 to 150 hp at 200 to 230 volts and 5 to 500 hp at 380 to 480 volts, the speed pumping application handles single- or multiple-pump operations. The standard VFD has a NEMA 1 enclosure with a pressure transducer, and



H2O VFD from SJE-Rhombus



Innova-Sonic Model 206 from Sierra Instruments Inc.



Model ST51 from Fluid Components International



GC52 from Ashcroft Inc.

can be customized for specific requirements including outdoor-rated enclosures, terminal blocks, door-mounted keypad, hands-off-auto switch, line and load reactors, dv/dt filters, IEEE-519 compliance, remote monitoring, and control (SCADA). **888/342-5753; www.sjrhombus.com.**

MASS FLOW METER

The **Model ST51 mass flow meter from Fluid Components International** measures digester gas, biogas and other methane composition biofuel gases, including natural gas. Units are precision calibrated to match the gas composition and specific flow conditions of each digester system. Meters have a thermal mass flow element with flow accuracy to ± 1 percent of reading from 0.3 to 400 SFPS (0.08 to 122 MPS), and repeatability of ± 0.5 percent. The flow element works in 2- to 24-inch lines. Electronics are housed in a compact, explosion-proof transmitter that installs easily and requires little maintenance. **800/854-1993; www.fluidcomponents.com.**

ULTRASONIC FLOW METER

The **Innova-Sonic Model 206 from Sierra Instruments Inc.** includes a digital correlation transit-time device that has fewer upstream/downstream piping requirements and no moving parts. The meter has zero tracking with no damping, measures down to zero flow, and outputs in 4-20mA DC analog and RS 232.

PicoFly measurement technology processes the ultrasonic transit time in picoseconds (one trillionth of a second), enhancing resolution and low-flow detection. Reading accuracy is ± 0.5 percent, and the unit can measure any clean liquid regardless of conductivity down to zero flow. The unit offers low power consumption, digital signal processing with advanced noise filtering, accuracy and repeatability of ± 0.1 fps, -40 to 176 degrees F temperature range, and zero to 23 fps liquids bidirectional flow range.

Large-scale integration technology allows 10 times the component population compared to typical integrated circuits. The in-line spool design has a carbon steel flow body available with ANSI or DN 16 flanges. Easy to program, the meter has a readable 16-character-by-two-line backlit display. **800/866-0200; www.sierra-instruments.com.**

COMPACT PRESSURE TRANSMITTERS

The **GC51 and GC52 gauge and differential pressure transmitters from Ashcroft Inc.** offer an economical alternative to network process transmitters when a digital protocol is not required. The design has a 2.65-inch diameter NEMA 4X/IP65 enclosure and stainless steel wetted parts to accommodate wet or dry media. The GC51 has ranges from 0 to 7,500 psig and the GC52 has D/P ranges up to 400 inches of water.

A built-in LCD backlit display and 4-20mA output provide local indication and remote signaling. GC series transmitters measure fluid levels in tanks and differential pressures across membranes in water purification systems. Media isolators are available for sludge or caustic media installations. **800/328-8258; www.ashcroft.com.**

WEB-ENABLED CONTROLLER

The **Model 5300 automation controller from Control Technology Corp.** accesses remote sites via Ethernet or wireless communications. It supports CTC Web server technology, enabling users to securely monitor and control process variables, especially SCADA applications requiring 24-hour remote access.

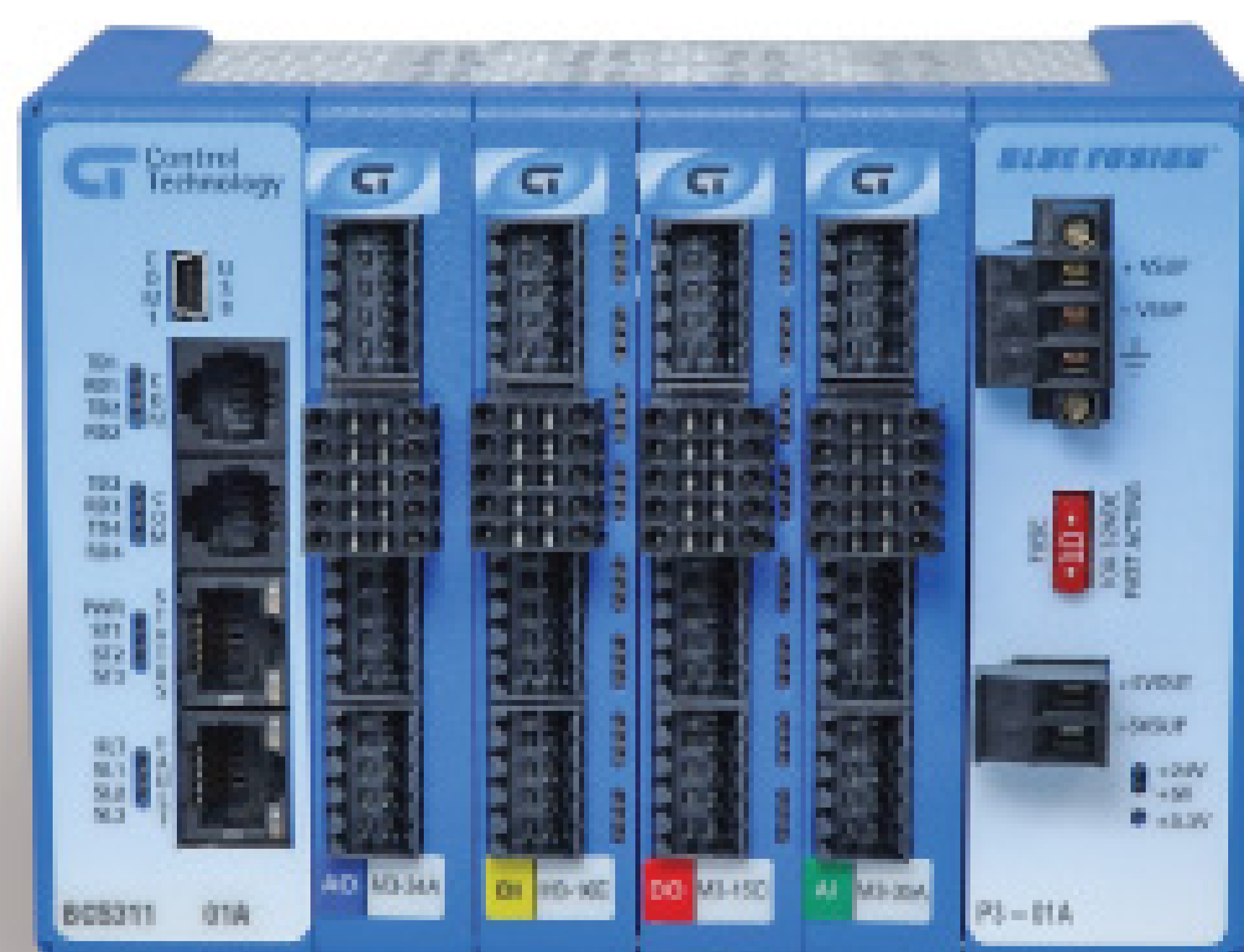
Using webHMI software, operators can create graphical HMI projects and host them on the controller's Web server, giving any browser-based device interactive HMI functionality. High-speed data logging stores time- and date-stamped measurements to internal or external files. Remote terminal units also support wireless communications.

Operators can choose from multiple CPUs and various input/output and motion modules. Up to 16 I/O or motion modules can connect to one CPU for a maximum of 512 I/O or 32 axes of motion in a single controller. Input/output modules come in 4-, 8-, 16- and 32-channel versions and plug into terminal blocks. The unit connects to color displays that are readable in full sunlight to total darkness.

The controller supports Modbus serial and Ethernet connections, and Modbus/RTU and Modbus/TCP in master or slave configurations. Operators can run multiple Modbus networks of different types simultaneously. **888/818-2600; www.ctc-control.com.**

SELF-LEARNING SAMPLER

The refrigerated **Quick Lift Sampler (QLS) from Quality Control Equipment Co.** delivers an accurate, repeatable sample. A vacuum pressure pump lifts samples up to 28



Model 5300 from Control Technology Corp.



Quick Lift Sampler from Quality Control Equipment Co.



Digital Indicating Controller from Analytical Measurements



725B from RTK Instruments Ltd.

feet without damaging or distorting them, and they are unaffected by horizontal runs of 125 feet or more. Strong purge capabilities eliminate cross contaminants in the intake line. The maintenance-free unit checks itself after each sample to verify the amount. If incorrect, it self-calibrates automatically. A programmable sample size of 20 to 500 ml in 1 ml increments allows the sampler to self-learn. **800/959-7232; www.qcec.com.**

DIGITAL CONTROLLER

The **Digital Indicating Controller from Analytical Measurements** configures to monitor and control pH or ORP (Redox). If recording is needed, operators can add a strip chart or circular chart. Manual temperature compensation is from 0 to 100 degrees C.

The instrument has a large digital display readable from more than 50 feet away and a two-point controller to activate pumps and alarms based on pH or millivolt setpoints. Options include a 4-20 mA output for remote monitoring and recording, and an ATC probe for automatic temperature compensation. The unit, protected in a NEMA 4X enclosure with clear plastic front-hinged panel, comes with a probe and buffer solutions for calibration. **800/635-5580; www.analyticalmeasurements.com.**

ALARM ANNUNCIATOR

The **725B stand-alone annunciator from RTK Instruments Ltd.** uses Canbus communication technology and a multi-redundant design. Interchangeable ultra-bright white LEDs illuminate alarm windows. An optional integral 1ms event recorder and universal power supply that connect to 85-264V AC or 88-360V DC are available.



Jerome 651 from Arizona Instrument LLC

Modular construction allows units to be assembled in almost any size and shape from one to 256 channels in a single housing with choice of window sizes and colors. Up to 32 output relays can be configured as group, audible or diagnostic relays. Six pushbuttons and dual audibles cover almost all alarm applications. Each alarm channel is fully programmable using the supplied configuration utility and a standard USB port connected to a PC or laptop. **908/688-6709; www.rtkinstruments.com.**

MONITORS H₂S EMISSIONS

The **Jerome 651 fixed monitoring system from Arizona Instrument LLC** provides long-term, unattended monitoring of hydrogen sulfide levels from 0.003 to 50 ppm. A weatherproof, temperature-controlled box houses the Jerome X631 gold film sensor.

The box also has a control panel for on-site programming and a 2.4-GHz radio for remote programming and data downloading. Built-in software includes statistical analysis and graphing capabilities, extensive data storage, customizable reports, and high H₂S-level

e-mail alerts. For large sites, multiple units can be linked to form a comprehensive perimeter or facility monitoring system. **800/528-7411; www.azic.com.**

DO SENSOR

The **Triton D08 dissolved oxygen sensor from Electro-Chemical Devices (ECD)** delivers accurate measurement with low maintenance and low cost of ownership in municipal wastewater applications.

The unit uses intelligent microprocessor-based electronics and stores calibration data within the sensor. The maximum error rate is less than 2 percent, repeatability ±0.5 percent, and resolution 0.01 ppm or 0.01 percent saturation. It withstands pressures up to 145 psi.

A replaceable cap contains a circular layer of optically active, oxygen-sensitive molecules that is highly permeable to oxygen and rapidly equilibrates. Via digital communication, the unit sends DO data to ECD's C-22 Controller, which provides a 4-20mA output signal to the treatment plant control room. The unit has no membranes, no electrolytes, and no anode/cathode assemblies. **800/729-1333; www.ecdi.com.**

PROCESS CONTROL SOFTWARE

Advantage from Total Systems Resources is a fully functional HMI/SCADA software program for Windows. It is a maintenance scheduler, remote alarm notifier, process or strategy simulator/tester, PID (process identifier) controller, report generator, and multiple poller. Online configuration, multiple security levels, math function library, and a pending optical particle counter (OPC) are included, all without third-party application appendages. **888/583-3001; www.TSR-Advantage.com. tpo**

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GRACE

UNDER PRESSURE

THE SUPERINTENDENT OF A NEW YORK TREATMENT PLANT EARNS ACCOLADES FOR FAST AND EFFECTIVE RESPONSE IN THE FACE OF A NEARLY CATASTROPHIC FLOOD

By D. Douglas Graham

THE SUSQUEHANNA RIVER IS THE MISSISSIPPI OF THE NORTHEAST. Stretching nearly 450 miles, it's the region's longest waterway and among its most significant historically.

Much of the Susquehanna's recent history is tumultuous. In 1972, the tail end of Hurricane Agnes dumped nearly 2 feet of rainwater on the New York-Pennsylvania border area, swelling the river and its tributaries to flood levels.

More recently, in June 2006, a storm system whipped up by a stalled jet stream flooded the Mid-Atlantic region once again, most destructively in the Susquehanna River basin near Binghamton, N.Y. Enter Catherine Aingworth, superintendent of the Binghamton-Johnson City Wastewater Treatment Facility in Vestal, N.Y. She led her team in a valiant effort to save the plant — at the time under extensive renovation — from destruction. For that and other exemplary service, she received the 2007 Public Works Leader of the Year Award from the American Public Works Association.

NOT-SO-WARM WELCOME

Aingworth had signed aboard at Johnson City after more than 17 years of wastewater industry experience in nearby Endicott. She served as assistant superintendent at Binghamton-Johnson City for two years, and was then promoted to the top job.

A week later, she was struggling against flood waters to save not only her plant but a large equipment inventory at risk of being ruined. "The plant was undergoing a refit, and the process left a lot of gear lying around near the riverbank," she recalls. "I was unaware of a catastrophic flood in the making until I received a warning from the local water department the night before it happened.



Catherine Aingworth, superintendent of the Binghamton-Johnson City Wastewater Treatment Facility in Vestal, N.Y., at the chlorine and dechlorination building, checking out an effluent sample. (Photography by Chuck Haupt)

"The day of the flood turned out not only rainless but bright and sunny, which seemed at odds with the idea that we might possibly be washed away," Aingworth says. "The plant employees thought I was nuts when I had them move the exposed equipment out of range of the river, as it hadn't even crested yet.

"They didn't know that upriver the stage was set for calamity. The ground was saturated, and all the streams feeding into the Susquehanna were already flooding."

TREADING WATER

Built before 1960, the Binghamton-Johnson City plant was designed to process an average flow of 26 mgd. It had experienced several major facelifts before the \$68 million expansion in summer of 2006. The real estate around the facility was as dense as a shopping center parking lot with propane tanks, cranes, trucks, backhoes and other construction equipment and vehicles.

The lower levels were also full of pricey electrical equipment, such as variable-frequency drives, new pumps, grinders and controls, all of it mortally exposed as water began to lap over the riverbank.

"The aim of the expansion was to convert the plant's activated sludge treatment process to a technology called biological aerated filtration (BAF)," Aingworth explains. "In the original process, influent passed through tanks containing high concentrations of bacteria and microbes,

which chew up solids. High flows neutralize the process because water passes through the system too quickly for it to be effective.

"The solution was BAF, where you have bacteria growing on clay that does not wash out with heavier flow. BAF is SCADA-controlled, so when part

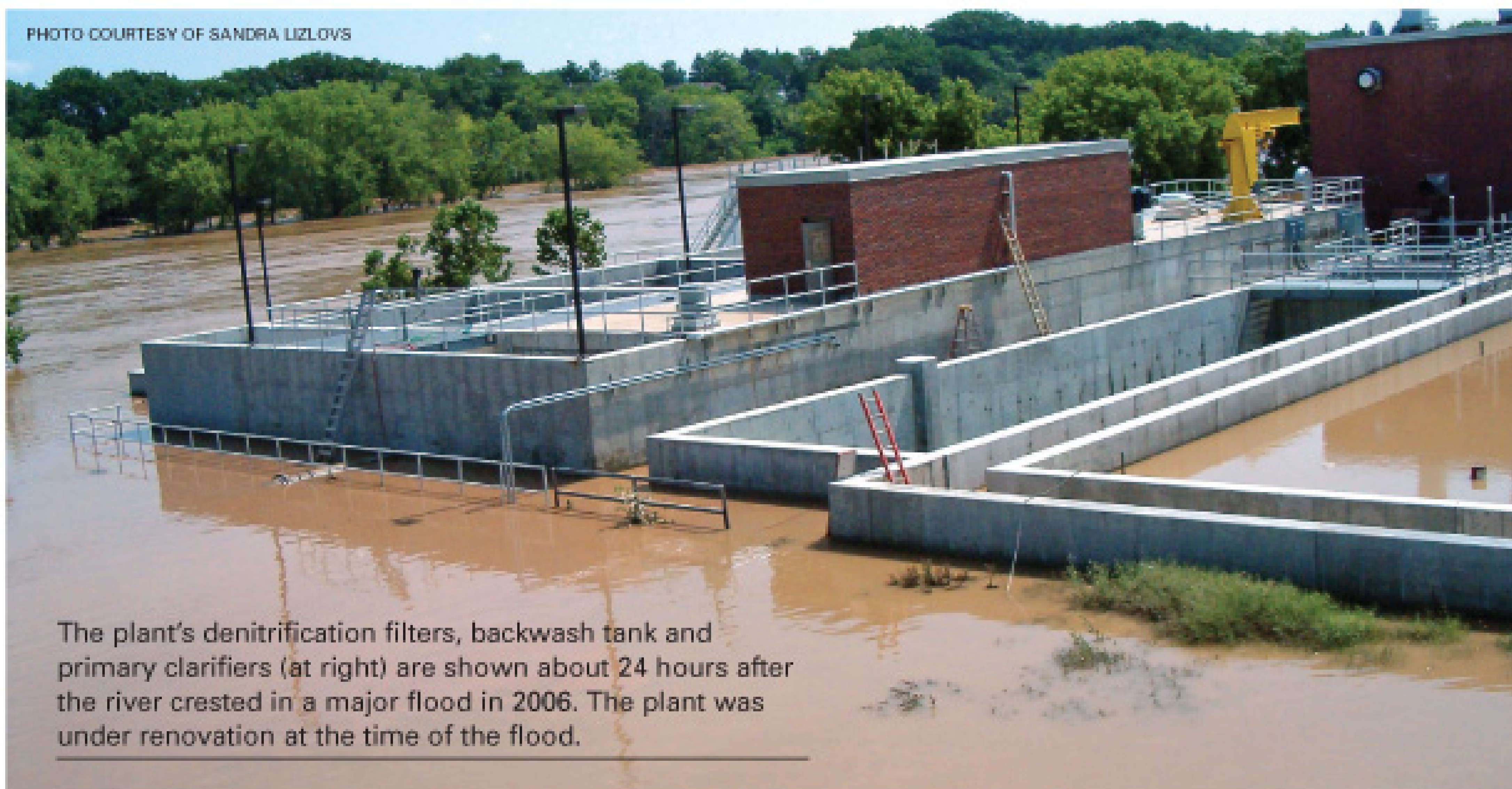


Aingworth consults with Joe Weiskopff with IDI of Richmond, Va., about the treatment plant's nitrification tanks.

"The day of the flood turned out not only rainless but bright and sunny, which seemed at odds with the idea that we might possibly be washed away. The plant employees thought I was nuts when I had them move the exposed equipment out of range of the river, as it hadn't even crested yet."

CATHERINE AINGWORTH

PHOTO COURTESY OF SANDRA LIZLOVS



The plant's denitrification filters, backwash tank and primary clarifiers (at right) are shown about 24 hours after the river crested in a major flood in 2006. The plant was under renovation at the time of the flood.

Aingworth is shown with operator Rick Furiosi at the nitrification complex.

of the plant went underwater, the sensors, clay media, wiring and all accessories that accompany it were either submerged, destroyed or both.

TWO-YEAR DELAY

“The expansion was just two days away from going on-line, but the flood prolonged the project by two more years,” Aingworth says. “We finally went on-line in May 2008. This thing really challenged us.”

Aingworth and her crew rescued as much of the smaller material as they could lift, leaving behind the BAF system to the installation contractors. Many of the weightiest items were abandoned, as the logistics involved in their relocation were impossible under the circumstances.

Aingworth personally helped in the removal effort, working with her crew in hip-deep water that kept getting deeper. Work continued until it could advance no further. By noon, the river had claimed almost the entire plant, except the administration area.

“Thankfully, no one was injured,” Aingworth says. “We did, however, put in a great deal of overtime, during which a heck of a lot of doughnuts and pizza were consumed. It took six weeks for the water to subside, and then our work really began.

“The flood left an accumulation of mud and silt on everything, and it had to be pumped out along with the water. Motors not rescued had to be refurbished, and there was substantial mud buildup in the acetylene tanks as well. The disaster has left us still struggling some, but all in all things are under control. Suffice it to say, it’s been quite an ordeal,” she says.

A NATURAL

A native of Cleveland, Ohio, Aingworth has worked in the wastewater business for most of her professional life. Her interest in the field began in 1969,

“I wanted to get into a career field where I could make a difference. As a kid, I hadn’t yet decided on the job path I would take, but I knew it would be environmentally involved one way or another.”

CATHERINE AINGWORTH

when the northern Ohio branch of the Cuyahoga River literally caught fire. It blazed for only 30 minutes, but the cost of the disaster was extremely heavy.

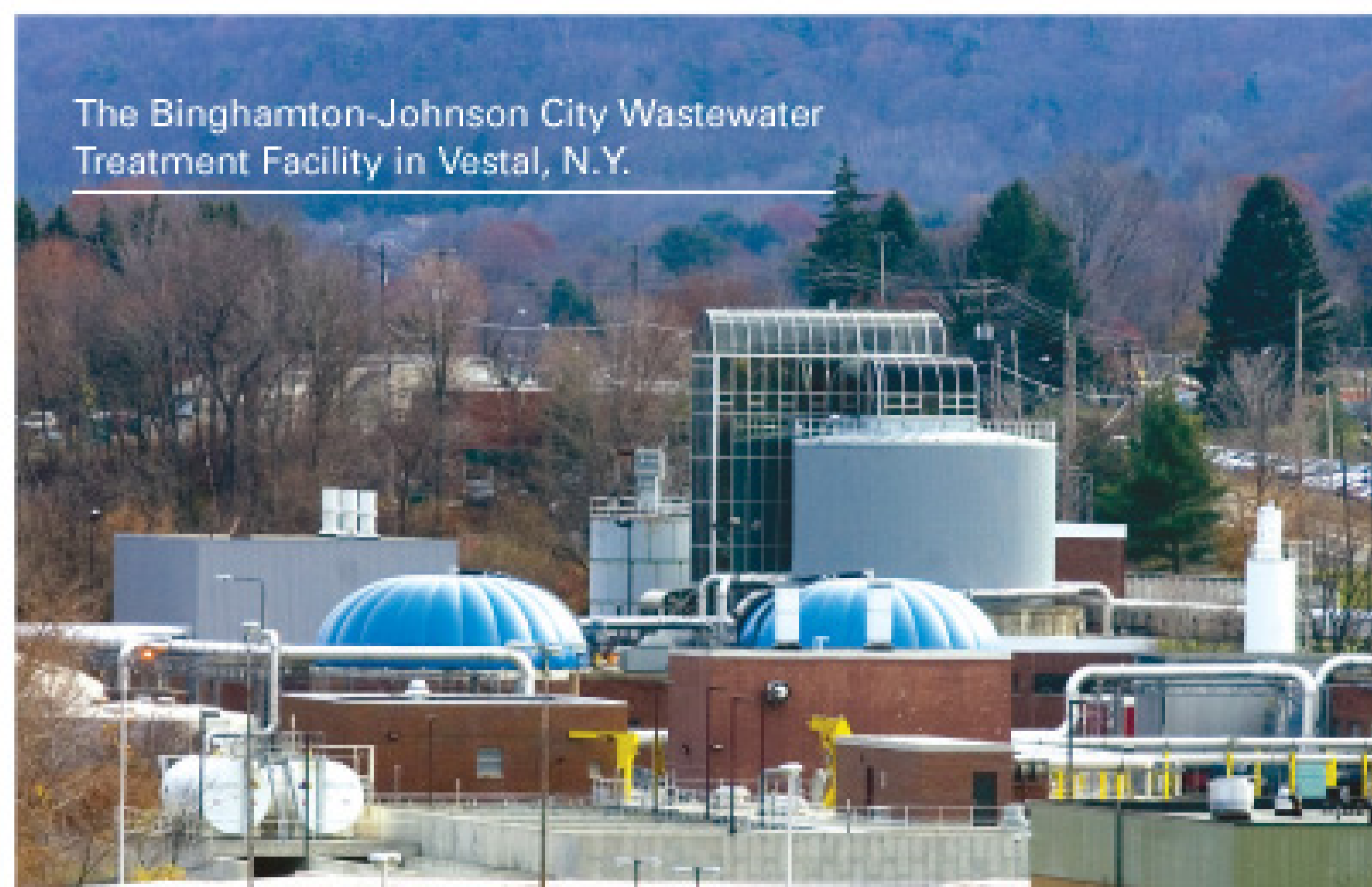
A child at the time, Aingworth was appalled and became an environmental advocate from that point forward. “I wanted to get into a career field where I could make a difference,” she remembers. “As a kid, I hadn’t yet decided on the job path I would take, but I knew it would be environmentally involved one way or another.

“I was a member of the Cleveland Environmental Club and The Nature Conservatory while still attending community college. I eventually earned a bachelor’s degree from University of Wisconsin in natural science with a focus on bacteriology, a natural segue to the wastewater business.

“My first exposure to the industry was a summer partnership in an Ohio water and wastewater plant,” she says. “My second was with an engineering company that had a wastewater contract operation. I stayed in the business when my husband and I relocated to New York state, and I remain a wastewater industry lifer to this day.”



The Binghamton-Johnson City Wastewater Treatment Facility in Vestal, N.Y.



CHANGE OF STYLE

The 2006 Susquehanna flood had an impact on Aingworth’s management style, which in her early career, she says, was mostly oriented top-down.

Today, Aingworth oversees her crew of 38 more collaboratively, thanks in part to positive results earned by that approach at the height of the crisis. “I’ve become a very big advocate of teamwork,” she says.

“During the flood, I worked closely with my management teams to come up with a game plan that identified and prioritized all the steps that had to be taken to save the plant and equipment. Every day, the teams would provide me and one another with progress reports about jobs already accomplished, and recommendations about what should be tackled next.

“This approach fit in very well with my management philosophy. The crisis really tested us, but we dealt with it in a way anyone would have a right to be proud of. Teamwork works.” **tpo**



Every day is Earth Day.™

"You need to have personal drive; 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 in it, and I want to continue to have a healthy river for myself."

Andrew Knight **An Original Environmentalist**

LEAD OPERATOR
Columbia Boulevard
Wastewater Treatment Plant
Portland, Ore.

Read about original environmentalists like Andrew each month in *Treatment Plant Operator*.

tpo

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people

Elliott Garay is the newest certified wastewater treatment plant operator in Lake Placid, Fla. Employed as the town's meter reader since October 2000, Garay worked extra hours in the wastewater treatment plant and took the required courses to qualify for the certification exam. He recently passed the drinking water treatment plant courses and is preparing for that state examination.

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

associations

Texas Water Conference

Texas Water Conference is April 14-17 at the Moody Gardens Hotel and Convention Center in Galveston. More than 365 exhibits will introduce attendees to the latest in equipment, technology and services for the wastewater and water industry.

Two days of technical sessions will focus on odor control, biosolids, wastewater collection and infrastructure, robotics in large-diameter pipelines, and sludge reduction technologies. This is a joint conference of the Texas Section of the AWWA and Water Environment Association of Texas. Call 512/251-8101 or visit www.texas-water.com.

First Operator Certification Board Meeting

About 50 delegates attended the first annual Operator Certification Board stakeholders meeting of the Saskatchewan Water and Wastewater Association. Member Rod Broadfoot from the provincial Ministry of Environment announced that all new ABC operator certification exams will be in metric units, a situation unique to Canada.

AWWA Adopts e-Learning Platform

The American Water Works Association updated its Online Institute to a new e-Learning platform that provides more content, functionality, and efficient buy-online capabilities. Visit www.awwa.org for a list of more than 35 self-paced courses in water operations, occupational safety, and human resources. Enrollees can start any time and have 90 days to study the modules and take the exams.

awards

Ontario Association of Sewage Industry Services

- Robert Noble Award – Jamie Delaney, District of Muskoka

Saskatchewan Water and Wastewater Association

- Dave Clark Operator of the Year Award – Roy Hammond, Elrose
- Dale Heshka Operator of the Year Award – Brian Giroux, Fort Qu'Appelle
- Supplier of the Year Award – ATAP Infrastructure Management Ltd., Saskatoon
- Centennial Merit \$1,500 Scholarship – Lane Neilson, Water Resources Engineering Technology Division of the Saskatchewan Institute of Applied Science and Technology
- Gus Feitzelmayer \$1,000 Scholarship – Joshua Yohnke, Water Resources Engineering Technology Division of the Saskatchewan Institute of Applied Science and Technology

education

Water and Waste Operators Annual Short Course

The Water and Waste Operators Association of Maryland, Delaware and District of Columbia Short Course is May 30 to June 1 at Washington College in Chestertown, Md. Courses offered include Distribution and Collections, Industrial Waste, Introduction to Wastewater, Intermediate Wastewater, Advanced Waste Liquids, Advanced Waste Solids, and Superintendent Training. Call Marshall Phillips at 410/493-7152 or visit www.wwoa-cwea.org/wwoa.html.

Sustainability in Wastewater/Water Systems

The Virginia WEA Education Committee and Virginia AWWA Water Resources and Environment Committee are holding their first joint education seminar on April 16 at the Holiday Inn Select Koger South Conference Center in Richmond. The seminar focuses on sustainability in wastewater and water systems. Call 540/678-1557 or visit www.vwea.org.

British Columbia

The British Columbia Water and Wastewater Association is offering these CEUs in Vancouver:

- May 25 – Confined Spaces
- May 25 – Unidirectional Flushing
- May 25-29 – Water Distribution I, II, and III
Water Treatment I and II
Wastewater Collection I, II, and III
Wastewater Treatment I, II, III, and IV
Chlorine Handling
Managing Small Water Systems
- May 26 – Shoring and Utility Location Awareness
- May 27 – Leak Detection
- May 27-28 – Managing Small Wastewater Systems
Call 604/433-4389 or visit www.bcwwa.org.

California

The California WEA has these workshops:

- 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 the State University, McKimmon Center in Raleigh:

- May 4-8 – Eastern Biological Wastewater Operators School
- May 5-8 – Physical/Chemical Wastewater Operators School
Call 919/784-9030 or visit www.ncsafewater.org.

Rocky Mountain States

The Rocky Mountain Section of the AWWA is offering a reuse workshop on Aug. 13 at Colorado School of Mines, Golden, Colo. Visit www.rmsawwa.net.

Saskatchewan

The Saskatchewan Water and Wastewater Association has these CEU workshops:

- May 6 – Math for Operators, Whitewood
- May 12 – Math for Operators, Weyburn
Call 306/761-1278 or visit www.swwa.sk.ca. **tpo**



CALENDAR OF EVENTS

April 1-2

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

April 1-3

Water Environment Association of Utah Conference and Exhibition, Dixie Center, St. George. Call Paul Heck at 801/316-9800 or visit www.weau.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 8-10

Water Security Congress Conference, Omni Shoreham Hotel, Washington, D.C. Call 800/926-7337

or visit www.awwa.org/conferences/security.

April 14-17

Texas Water Conference, Moody Gardens Hotel and Convention Center, Galveston. Call 512/251-8101 or visit www.texas-water.com.

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 and 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.

May 3-6

WEF Residuals and Biosolids Specialty Conference, Doubletree Hotel-Lloyd Center, Portland, Ore. Call 800/666-0206 or visit www.wef.org.

May 5-7

Alaska Water Wastewater Management Association Training Conference, Dena'ina Civic and Convention Center, Anchorage. Call 907/561-9777 or visit www.awwma.org.

May 6-8

Arizona Water & Pollution Control Association Conference & Exhibition, Renaissance Hotel & Spa, Glendale. E-mail [Debbie Muse at musegroup@aol.com](mailto:musegroup@aol.com) or visit www.awpca.org.

May 6-8

Arizona Water Association Conference and Exhibits, Renaissance Hotel and Spa, Glendale. Call Mark Gross at 602/263-9500 or visit www.azwater.org.

May 10-13

Nutrient Recovery from Wastewater Streams International Conference, Westin Bayshore, Vancouver, British Columbia. E-mail mmori@venuewest.com or visit www.nutrientrecovery2009.com.

May 10-15

New Jersey Water Environment Association Conference, Bally's, Atlantic City. Call Jack Lagrosa at 201/296-0021 or visit www.njwea.org.

May 12-14

North Carolina Rural Water Association Conference, Sheraton Four Seasons, Greensboro, N.C. Call 336/731-6963 or visit www.ncrwa.com.

May 12-15

AWWA Hawaii Conference and Exposition, Sheraton Waikiki, Hawaii. E-mail hiawwa@gmail.com or visit <http://awwa-hi.org>.

May 18-22

Central States Water Environment Association Annual Meeting, Marriott Resort, Lincolnshire, Ill. Call 815/954-2714 or visit www.cswea.org.

May 19-21

Indiana Water Environment Association Wastewater Challenge, Mishawaka Utilities, Mishawaka. Call 317/328-2151 or visit www.indianawea.org.

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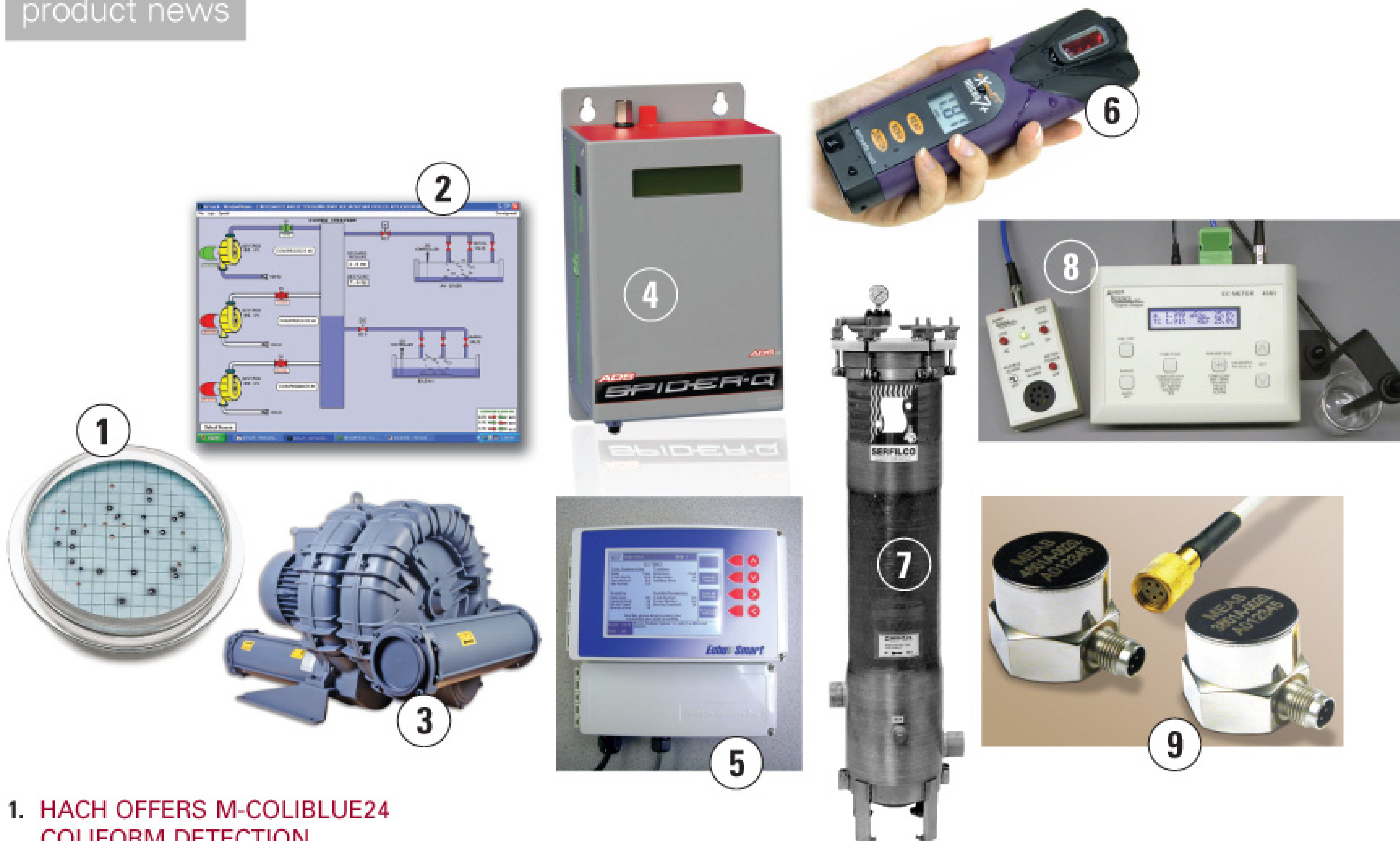
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1. HACH OFFERS M-COLIBLUE24 COLIFORM DETECTION

Hach Co.'s m-ColiBlue24 Broth water analysis simultaneously detects and identifies both total coliforms and E. coli with complete enumeration in 24 hours and no confirmation step. Testing requires no fluorescent lamps or color comparators. Interpretation of the results is done visually. Approved by the EPA for monitoring drinking water and wastewater, it can be used to detect coliforms in surface, ground, well and recreational water. **800/227-4224; www.hach.com.**

2. DRESSER ROOTS INTRODUCES AERATION CONTROLS

Dresser Roots has introduced the IntelliView line of aeration controls and control systems, designed to maximize the efficiency of blowers and compressors in wastewater operations. The system can be purchased as part of a Roots aeration blower system or integrated into new aeration systems using any manufacturers' blowers. In addition, owners of existing or older systems can retrofit the control to optimize performance. Models are available for positive displacement or multistage centrifugal blowers. Single-stage centrifugal control options include variable speed, inlet guide vanes, and variable discharge diffuser vanes. All controllers include equipment health monitoring and safety shutdown as well as process control options. **832/590-2408; www.dresser.com.**

3. FPZ INTRODUCES K SERIES BLOWERS

K Series regenerative blowers from FPZ Inc. offer a quieter alternative to PD/rotary-lube blowers, with most models meeting OSHA sound requirements. The direct-blowers require no maintenance and are oil-free, with airflows over 1,500 cfm and pressures exceeding 10 psi. **262/268-0180; www.fpz.com.**

4. ADS INTRODUCES SPIDER-Q PUMP STATION MONITOR

The Spider-Q pump station monitor and alarm from ADS LLC is a volumetric quantification system, featuring wireless data access, automatic data delivery, influent and effluent flow calculation, alarming and reporting. The stand-alone, compact, single-box system requires no user software and operates using a Web server built into the monitor, allowing direct communication with most computers, regardless of brand or operating system. **800/633-7246; www.adsenv.com.**

5. ENTECH RELEASES ECHOSMART LEVEL ANALYZER

The EchoSmart interface level analyzer from Entech Design Inc. can be configured as a stand-alone instrument or as a network of interconnected smart sensors. An optional ZigBee Compliant radio frequency communications system eliminates the need to install cable and piping, with no special programming or additional hardware required. The graphical LCD monitor incorporates an intuitive, full-screen programming format. In addition to the standard signal-profile display, users can select one of five tank configurations. The controller can provide continuous, real-time level measurement data for up to 16 smart sensors in a network. **940/898-1173; www.entechdesign.com.**

6. INDUSTRIAL TEST SYSTEMS INTRODUCES EXACT PHOTOMETER

The eXact Micro 7+ handheld colorimeter from Industrial Test Systems Inc. directly reads nine parameters: alkalinity, bromine, calcium hardness,

free chlorine, total chlorine, copper, ozone, permanganate, pH and transmission. In transmission, the meter tests for ammonia, chloride, chloride dioxide, chromium hexavalent, cyanuric acid, iodine, iron, low range total hardness, manganese, nitrate, nitrite, acid pH, alkali pH, potassium, sulfate, sulfide and turbidity. The meter is EPA-compliant for free and total chlorine regulatory testing. **800/861-9712; www.sensafe.com.**

7. SERFILCO OFFERS FRP CHAMBER WITH FILTER CARTRIDGES

The Series FRP chamber with Maxi-Depth filter cartridges from Serfilco Ltd. pre-filter water entering the reverse osmosis stage of water purification units, providing particulate removal and extending the life of solutions through clarification. The filament-wound fiberglass-reinforced plastic chambers offer non-metallic solution contact with flows up to 320 gpm and easy cartridge change. Rated to 125 psi from 32 to 200 degrees F, the chambers also purify deionized, sea, and brackish water, and many industrial liquids and chemicals. **800/323-5431; www.serfilco.com.**

8. AMBER SCIENCE OFFERS MODEL 4083 METER

The Model 4083 EC meter from Amber Science Inc. is a multiparameter device designed for measuring conductivity, resistivity, high purity water, total dissolved solids, salinity and temperature of aqueous solutions. It features a user-friendly interface with auto range, a two line, backlit display, RS-232 output with PC software for data logging, and operates on a 9-volt battery or 115-volt AC adaptor. **541/345-6877; www.amberscience.com.**

9. MEASUREMENT SPECIALTIES INTRODUCES DC ACCELEROMETERS

Compact, hermetically sealed models 3801A and 4801A DC accelerometers from Measurement Specialties Inc. are designed for transient measurement in harsh environments. The units feature gas-damped MEMS sensing elements with wide frequency response. Offered in ranges from plus or minus 2g to 2,000g, the meters are suited to both low-level and high-end transient shock measurements. Integral over-range stops provide shock protection in excess of 10,000g without affecting calibration. Model 3801A has an mV output signal for shock pulse measurements, while model 4801A has a signal-conditioned, amplified output for low level measurements. **949/716-7516; www.meas-spec.com/vibration.**

GE DESIGNS ADVANCED COOLING SOLUTION

Designed for simple operation and rapid deployment, the Advanced Cooling Solution from General Electric Co. combines TruSense direct polymer monitoring, GenGard chemistry and wireless communications to ensure cooling systems are consistently operating within the optimum level of treatment chemicals and using water in the most efficient manner. The system automatically responds to swings in pH, high iron levels, clarifier carryover and increased suspended solids loading, tightening control without operator intervention. Containing no heavy metal tracer and incorporating a halogen-resistant azole, GenGard limits corrosion and the accumulation of metal ions in discharged cooling water. **866/439-2837; www.gewater.com/index.jsp.** *(continued)*

product spotlight

Non-Contacting Flow Meter Mounts Outside the Pipe

By Ed Wodalski

The DFM 5.0 flow meter from Greyline Instruments Inc. is designed to read difficult liquids, such as wastewater, sludge, slurries, abrasives or any liquid with bubbles or suspended solids from outside the pipe. "You don't have to cut pipe. You don't have to shut down flow," says advertising manager Ernest Higginson. The meter's no-contact design also means no maintenance, no sensor fouling, no obstructions and no drop in pressure.

Another key feature is the meter's one-size-fits-all sensor. "Any pipe over 1/2 inch can be measured with this meter," Higginson says. "Unlike other meters that are matched to the bore size of the pipe, with this one, you just tell it that it's a 6-inch, 12-inch or whatever the pipe diameter is, and it does the calibration." That also can be a cost-saver compared to meters that increase in price as the pipe gets larger.

"For Greyline, this is a new platform, basically," says Higginson. "It's a completely redesigned product in every respect — hardware, software, transducer. The signal processing is probably the most advanced feature, certainly the most advanced in an ultrasonic flow meter that we've ever made." The design goal is for the meter to either read flow accurately, or to read zero if it's unable to pick up a clear signal.

Data can be output to memory sticks, so there's no need to take a laptop to the instrument to retrieve files. Options enable control relays to be added by plugging in a circuit board. "The instrument detects that the board has been plugged in and it loads the software for the circuit board and adds that to the menu structure, so it's self-configuring if you change a component," he says.

Calibration and startup are completed using a built-in, five-button



DFM 5.0 flow meter from Greyline Instruments Inc.

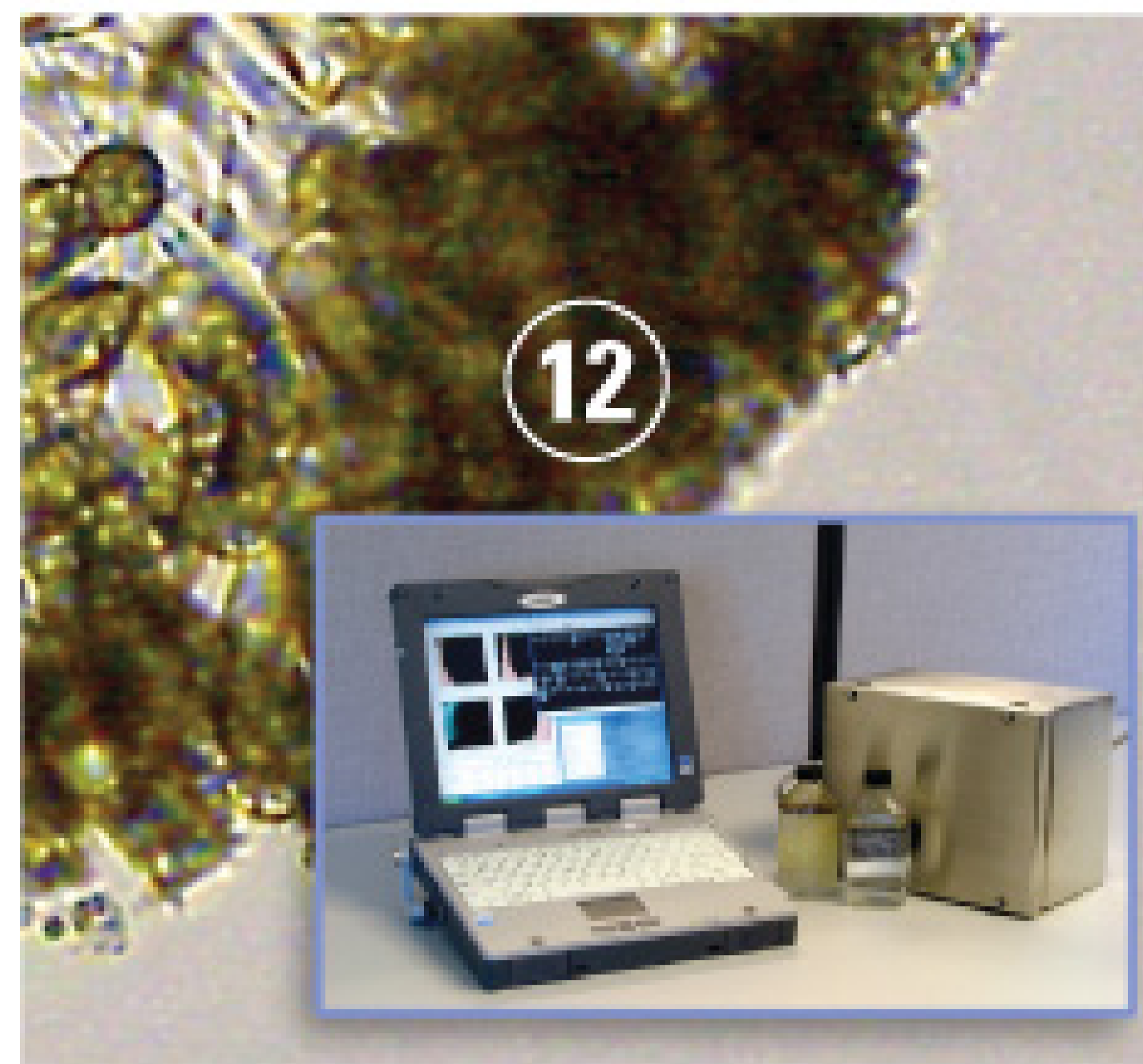
keypad, once the flow unit and pipe diameter are input. Settings are password protected to prevent tampering.

Upon activation, the sensor continuously transmits an acoustic signal that is reflected back from moving particles or gas bubbles suspended in the fluid. If the fluid is in motion, the echoes return

at an altered frequency proportionate to flow velocity. The meter measures the frequency shift to calculate flow. Noise-suppression circuitry filters "dirty" power and electric interference. This is all done with one sensor, Higginson says. "Most manufacturers of Doppler sensor flow meters use two sensors. They separate the transmit and receive function," he says. This makes for more difficult installation since the sensors have to be mounted in the correct position for optimum signals. "In our case, because it's all self-contained, the installation is fairly simple."

Calibration data and totalizer values also are automatically stored during power interruptions. Other standard features include isolated 4-20mA output and two control relays. Options include a built-in data logger and reporting system with USB output and Windows software.

For more information: 888/473-9546; www.greyline.com. tpo



10. OMEGA ENGINEERING OFFERS TEMPERATURE CONTROLLER

The CN730 series 1/4 DIN temperature controller from Omega Engineering features a dual display and programming menu. Functions include on/off, PID, auto or manual tuning. The controller accepts a variety of thermocouple and RTD inputs. The process value and set-point value are simultaneously displayed with the process value in red and the set point in green. **888/556-6342; www.omega.com.**

11. ADVANCE PRODUCTS OFFERS RADOLID PROTECTION CAPS

Radolid protection caps with volatile corrosion inhibitors from Advance Products & Systems are designed to protect nuts and bolts from destructive corrosion. The caps can be pressed onto nuts and bolts by hand, and snap into place. Loading the caps with APS's high-melt

corrosion inhibitor grease gives added protection. **800/315-6009; www.apsonline.com.**

12. FLUID IMAGING INTRODUCES FLOWCAM ANALYSIS SYSTEM

The FlowCam WW particle imaging and analysis system from Fluid Imaging Technologies is designed to monitor the biological makeup within the secondary system of a wastewater treatment facility. The system enables wastewater operators and laboratory technicians to verify secondary treatment basins are operating within the optimum microbe level and makeup. High-speed instrumentation takes hi-resolution, full-color digital images of individual bacterial cells and other microorganisms as well as inorganic solids. The system relays size, length, width, shape, count and other parameters in real time, while saving the images and corresponding data in a digital library. **207/846-6100; www.fluidimaging.com.**

13. MEGATOR INTRODUCES ALPHA SKIMMER

The stainless steel Alpha skimmer from Megator Corp. is designed to remove wastewater sewage scum from aeration tanks. The lightweight skimmer can be operated by one individual, while its shallow draft allows for usage in 12 inches of water. The skimmer is available in four sizes: 1 1/2, 2, 3 and 4 inches. The folding option enables the skimmer to be lowered through manholes and boreholes, self-deploying upon contact with water. **800/245-6211; www.megator.com.**

14. McCROMETER OFFERS V-CONE FLOW METER

The V-Cone flow meter from McCrometer is designed to measure liquid flow in close proximity to an elbow, reducing the straight pipe requirement between the two by up to 70 percent. The meter operates over a flow range of 10:1 with low head loss and supports line sizes from 0.5 inches to greater than 120 inches. It also offers accuracy of plus 0.5 percent and repeatability of 0.1 percent. **951/652-6811; www.mccrometer.com.**

TOPP INDUSTRIES OFFERS FIBERGLASS COMPOSITE HUBS

Fiberglass composite hubs are available in 2-, 3-, 4-, 6- and 8-inch sizes from Topp Industries. Corrosion-resistant, the hubs include hardware and basin seal, with accessory seals available. The hubs fit all basins/pump stations (18-30 inches, 36-48 inches, and 60 inches and up) and feature a butt pipe or pass-through design. **800/354-4534; www.toppindustries.com. tpo**

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 A screenshot of the TPO online magazine website. The header includes the TPO logo and navigation links for SUBSCRIBE, EDITORIAL, PRODUCT GUIDE, and ADVERTISING. The main content area features several articles with images, including one titled 'VIEW THE CURRENT ISSUE ONLINE!' which is circled in yellow.

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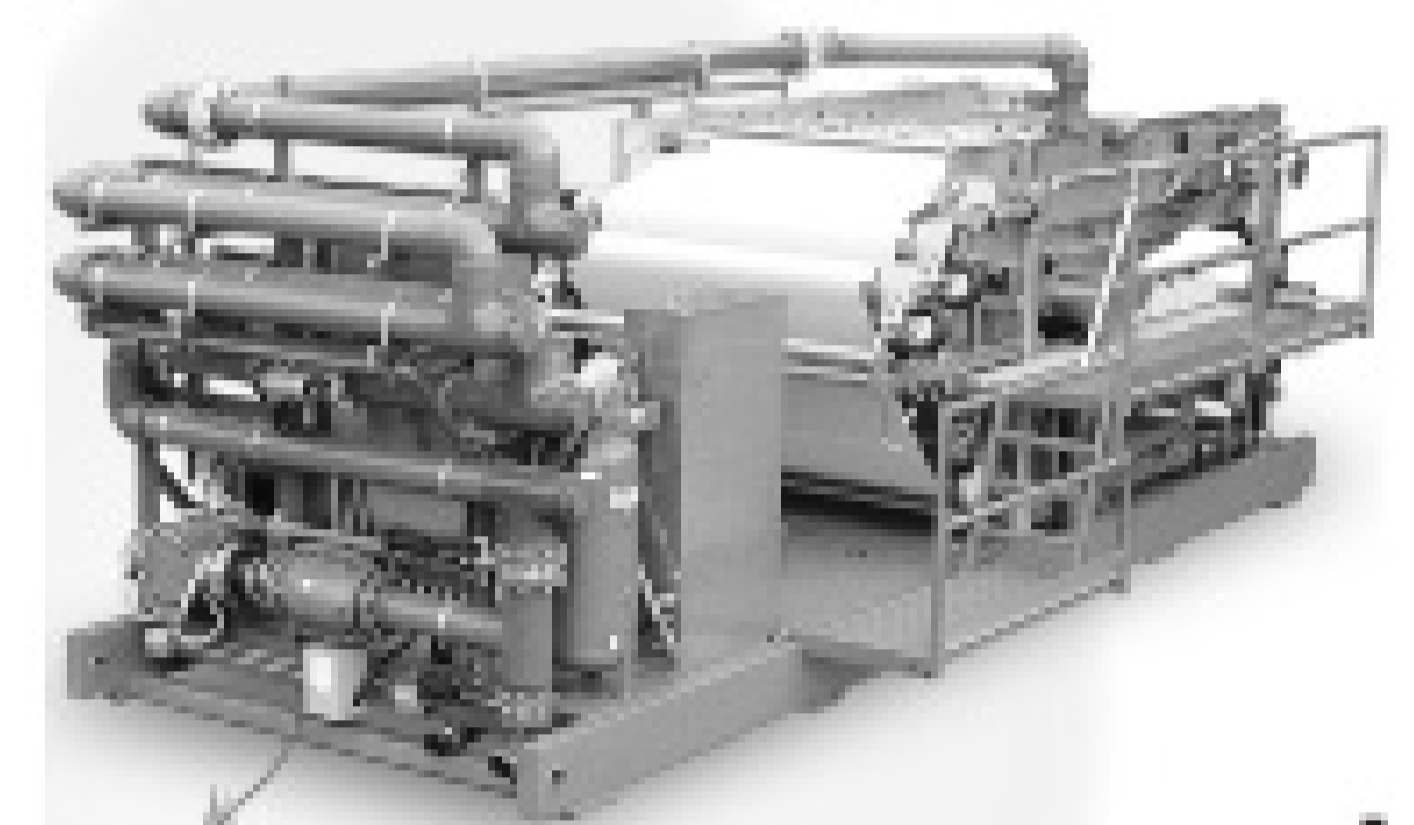


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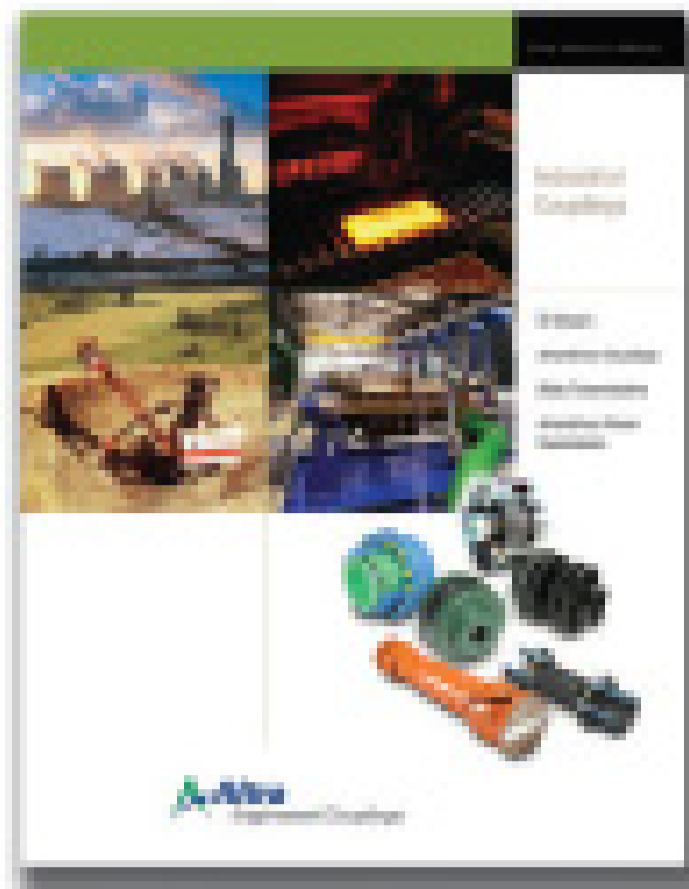
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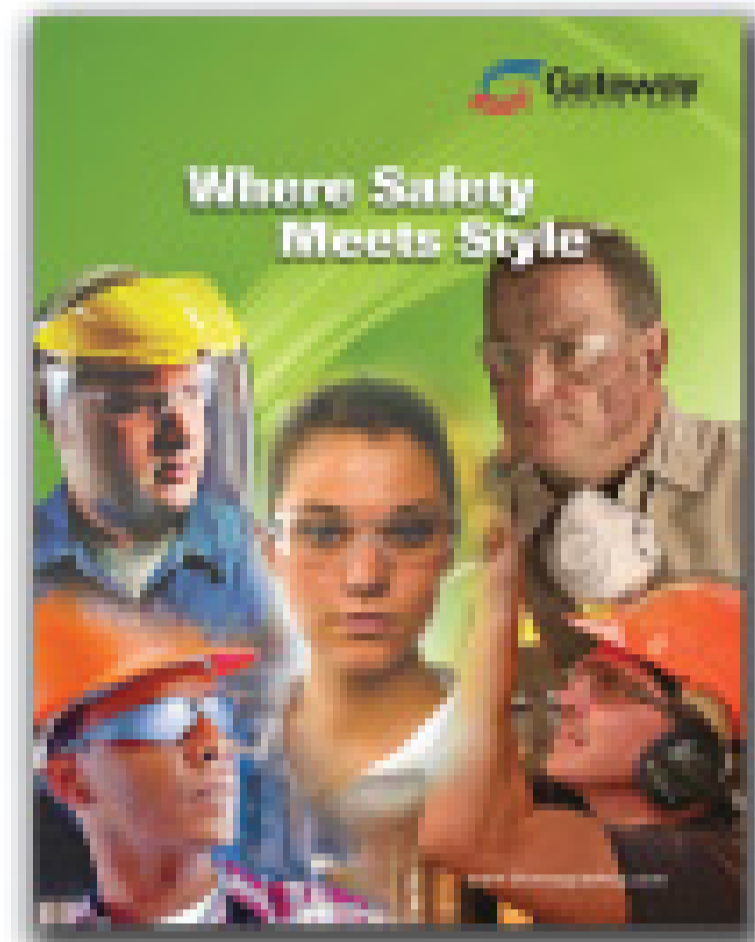
Altra Industrial Offers Couplings Brochure

The eight-page couplings brochure from Altra Industrial Motion offers engineers a reference guide to the company's lineup of industrial products. The guide can be downloaded from Altra's Web site, www.altramotion.com, or obtained by calling 815/389-6336.



GLV Forms Joint Venture with Global Water Engineering

GLV Inc. of Montreal, Canada, has teamed with Global Water Engineering Ltd. of Hong Kong to form Global Water & Energy LLC. The joint venture will market GLV's anaerobic digestion processes for the treatment of industrial wastewater and its energy production technology using the biogas generated by the digestion of industrial organic waste.



Gateway Releases 2009 Product Catalog

The 2009 Gateway Safety Inc. product catalog features more than 60 styles of safety eyewear, hearing, respiratory, head and face protection, as well as at-a-glance safety certification icons, including ANSI, CSA, UV-A and UV-B.

Bio Clean Environmental Adds Sales Manager

Jerry Warner has joined Bio Clean Environmental Inc. as sales manager. Based in Salt Lake City, Utah, Warner will represent the stormwater filtration company throughout the western United States. He attended the University of Utah and received a degree in marketing from LDS Business College in Salt Lake City. He brings more than 10 years experience to his position.

Canadian Environmental Conference Set for April 20-21

The 17th annual Canadian Environmental Conference and Tradeshow (CANECT) will be held April 20-21 at the Metro Toronto Convention Centre. Session topics include water and wastewater compliance, environmental regulation and compliance, and managing approvals and permits. For more information, call 888/254-8769, ext. 21, or visit www.canect.net.

Val-Matic Receives ISO Certification

Val-Matic has received ISO 9001:2008 certification after an audit from Lloyd's Register Quality Assurance. The certification body recognizes adherence to International Organization for Standardization in the development, manufacture and supply of products.

Smith & Loveless Releases Sonic Start Bulletin

Smith & Loveless Inc. has released its Sonic Start Streamline bulletin No. 621. The publication showcases the prime sensing system and features design benefits. To obtain a copy, e-mail answers@smithandloveless.com.



GE Hitachi Nuclear Cuts Treatment Plant Water Usage

GE Hitachi Nuclear Energy has reduced annual water usage by 25 million gallons at its Wilmington, N.C., treatment site by reusing wastewater effluent through the use of ecomagination ZeeWeed membrane bioreactor technology. Instead of using groundwater to cool its towers, the site relies on MBR ultrafiltration and biological treatment to produce high-quality wastewater effluent. The operation also requires less chemical use, produces less residual waste and has a smaller physical footprint than conventional reuse systems.

Osprey President Gives Presentation on Pollution Prevention

Vincent Sculla, president and chief executive officer of Osprey Biotechnics Inc., gave a presentation on pollution prevention and environmental restoration using locally produced bio products at a European sales and strategy meeting in Beli Manastir, Croatia.



Vincent Favre

HWM Names Favre Canadian Sales Manager

Vincent Favre has been named Canadian sales manager for Halma Water Management. Favre will provide customers with better access to the company's line of water monitoring technologies and support sales growth. Favre has a master's of science and bachelor's of science degrees in math and physics from the University of Lyon, Lyon, France.

Staco Paper Discusses Economics of Improving Power Factor

Staco Energy Products has released a white paper on the efficiency of power use titled *The Economics of Improving Power Factor*. The 16-page paper, written by Staco president Ed Kwiatkowski, E.E., includes formulas, charts and graphs to help understand the power factor and how utilities charge for inefficient use of power, as well as the economic relevance of improving it. Copies are available online at www.stacoenergy.com/energypaper. **tpo**

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