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AUGUST 2014

David Breitenstein
Facilities Manager
Lane County, Ore.

# Green Insurance

## POPLAR TREES DIVERSIFY AN OREGON BIOSOLIDS PROGRAM

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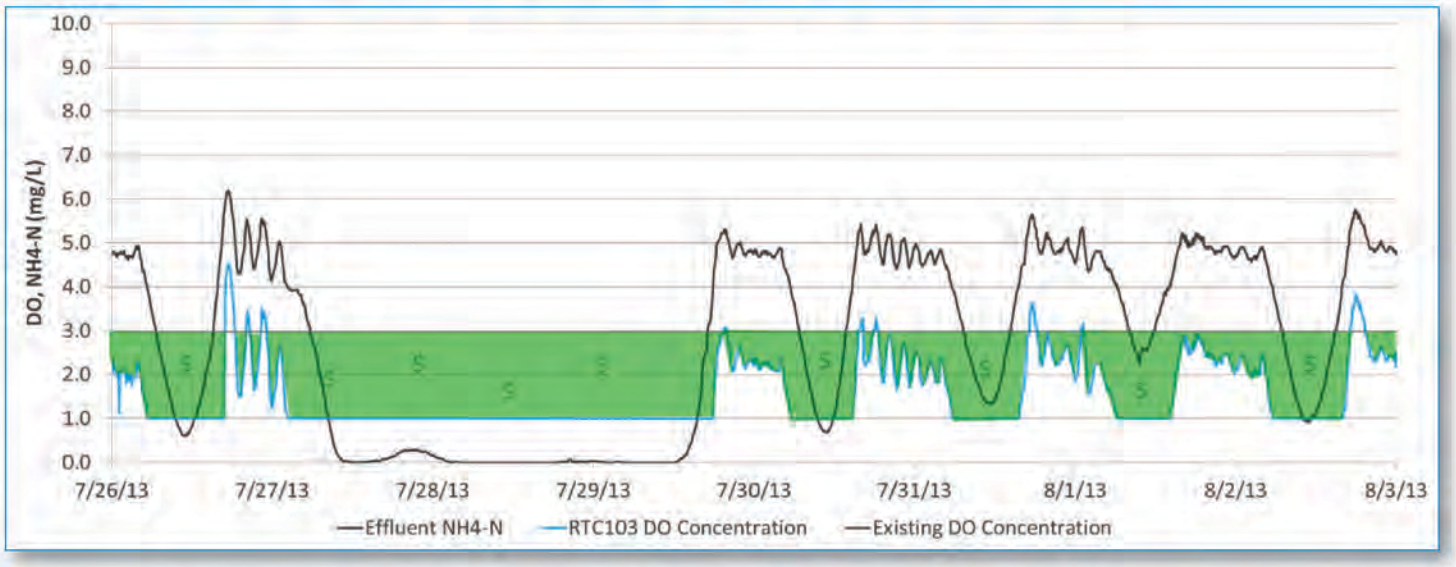


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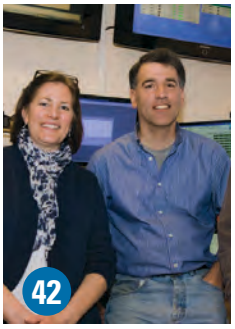



## on the cover

A tree plantation called Biocycle Farm gives the Metropolitan Wastewater Management Commission in Oregon a new use for biosolids and insurance against the possibility of decline in farm application sites. David Breitenstein, facilities manager, is shown at the commission's regional wastewater treatment plant. (Photography by Eric Bishoff)

## top performers:

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Award-winners Jennifer Baca and Chris Lopez meet every challenge, from the lab to the compost facility, at the Los Alamos County treatment plants.

**By Trude Witham**

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A poplar tree farm allows an Oregon utility to diversify its beneficial use options for Class B biosolids and significantly extends the land application season.

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Two advanced treatment plants in Florida make process and facility changes that save hundreds of thousands on electricity and chemicals.

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The water utility in Wisconsin's capital city combs older neighborhoods to find old private wells as part of efforts to protect its groundwater supply.

**By Ted J. Rulseh**



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# The Reclamation Imperative

THE "ONCE THROUGH" APPROACH TO USING NATURAL RESOURCES FELL OUT OF FAVOR LONG AGO. IS IT TIME TO RETHINK THAT APPROACH AS IT APPLIES TO WASTEWATER TREATMENT?

**By Ted J. Rulseh, Editor**

Think back to how our society functioned 50 or 60 years ago. We drank beer or soda pop from cans that we simply tossed in the trash. Industries took in raw materials, made products, and sent the wastes into the air and water, or to the dump.

Around the first Earth Day back in 1970, we decided that was no way to live. In the 1990s we got serious about recycling, and curbside programs sprang up everywhere. Now recycling is the default position where any resource is concerned.

To a large degree that's true in wastewater treatment, as well — though not everywhere. In water-scarce areas, of course, water reclamation is more rule than exception. As water-supply issues become more acute, one can't help but wonder if that should be the case in most regions, water scarce or not. Should the default position be to, in essence, put the cleaned-up water back where it came from?

## A RADICAL IDEA?

I know, this sounds a bit edgy. Reclaiming wastewater costs money — more than basic secondary treatment. Communities aren't swimming in cash, and homeowners and businesses aren't exactly clamoring for higher user fees. But before dismissing the idea, let's look at a few of arguments in its favor.

First, as NPDES permits get stricter, the gap between secondary-treated and reclaimed water is shrinking. Permits continue to ratchet down limits, most notably on nitrogen and phosphorus. Removal of those nutrients often takes out more of the traditional constituents — BOD and TSS — in the bargain. For example, one way to reduce phosphorus discharges is to filter phosphorus-containing solids (TSS) out of secondary effluent.

So if you're running a filtration (tertiary) step, and you're disinfecting, how far are you from actual reclaimed water? Is it then simply a matter of finding users for the water and laying pipe to get it to them? (I know, all that costs money, too.)

## COMPLETING THE CYCLE

Second, why make city water and then ship it down a stream? It's one thing if you're a city like my hometown, right on Lake Michigan. There you pull in water, treat it, send it to the homes and businesses, get it back, treat it again and put it back in the lake. The cycle is complete. It makes perfect sense.

But consider another community where I lived, my college town in southeastern Wisconsin. The source was groundwater. The wastewater treatment plant discharged to a river. In time, the aquifer came under stress; the long-term supply became a concern. Suppose that city, and other communities relying on the same aquifer, were to reclaim their wastewater and use it for groundwater recharge? Keep it local.

If more communities reclaimed water, would their residents respect that water more? And respect the people who treat it more? If water sourced in (or near) the community stayed in the community, would people be more inclined to treasure it and less likely to abuse it?

Third, why make city water and use it to irrigate lawns and parks? Grass and trees grow fine on lower-quality water. Might it be cheaper, all things considered, to use reclaimed water for the landscapes, as long as the distribution system isn't a major public works project?

## SHOWING RESPECT

And finally, here's a softer argument. Doesn't reclamation show the ultimate respect for the resource? And might it finally lead people to respect and value that resource the way they should? Yes, final effluent from treatment plants generally is cleaner than the receiving stream. But when we ship it downriver, there's still a perception that it's something to get rid of.

If more communities reclaimed water — whether supply issues really demanded it or not — would their residents respect that water more? And respect the people who treat it more? If water sourced in (or near) the community stayed in the community, would people be more inclined to treasure it and less likely to abuse it? I suppose that's a good question.

## PLEASE SHARE

I can imagine lots of counterarguments to what I've presented. So, rather than debate myself, I'll leave the counterpoints to you.

What's your opinion? Should water reclamation become the default standard or at least become much more prevalent? What would it take for your facility to reclaim wastewater, if you're not doing that already? Am I stark raving crazy? Send your comments by way of an email to editor@tpomag.com. I promise to respond, and we will publish comments in a future issue. tpo

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# A Little More Oomph

### VERMONT SHOWS THE POWER OF ORGANIZING OUTREACH AND EDUCATION FROM THE STATE ASSOCIATION LEVEL


**By Ted J. Rulseh**

Many clean-water plants do their own outreach. The City of Montpelier (Vt.) Wastewater Treatment Plant is among them.

"But when you do tours for school groups, it doesn't get you much overall coverage," says Bob Fischer, lead operator. "It just gets you that class and teacher."

Doing things at the state association level "gives a little more oomph," says Fischer, also president of the 600-member Green Mountain Water Environment Association (GMWEA). In that spirit, the GMWEA teamed with the North East Biosolids and Residuals Association (NEBRA) to promote the first Vermont Water Quality Day on May 25.

The day's events included tours and other events at eight of the state's 90 clean-water plants. Also on tap was a demonstration of biosolids land application near Essex Junction — broadening the day's focus to include the industry's resource recovery function.

## RAISING THE PROFILE

The GMWEA has made a point in recent years of raising its profile. "Three years ago, nobody besides the operators even knew who we were," says Fischer. "Everybody knows who we are now. We've become a real player."

Among its activities, the association has reached out to environmental groups, notably Lake Champlain International and the Conservation Law Foundation. An annual Legislative Breakfast gives members exposure to state lawmakers. Partly as a result, Fischer has testified twice on industry issues before state legislative committees.

Fisher also serves on a citizens' advisory committee on Lake Champlain water-quality issues, and the association has commented to the U.S. EPA on proposed total maximum daily load for phosphorus.

## WHAT COMES NEXT?

Looking to raise the organization's profile further, the GMWEA board conceived Water Quality Day. "We ran it by Ned Beecher, executive director of NEBRA, and he was excited about it," says Fischer. "Some of our board members and operators were hesitant, but I said, 'Well, it's like the Legislative Breakfast. We've had our third one, and a ton of legislators were there; the first time we had hardly any.'

"We thought it would be better to go forward with Water Quality Day and let it grow, rather than sit on our hands. We moved forward, and it has taken right off."

Beecher proposed asking Gov. Peter Shumlin for an official proclamation. Since Beecher lives in New Hampshire, Fischer made the request, which the governor granted, declaring May 25 as Water Quality Day in the state. With support from Mary Ellen Parkman, GMWEA executive director, Fischer and colleagues sent notices to the news media, gaining advance coverage in newspapers, on Vermont Public Radio and elsewhere. At the association's request, Lake Champlain International notified its 4,000 members.

## GETTING BIGGER?

On the day, treatment plants opened for visitors from 9 a.m. to 2 p.m. David Mears, commissioner of the state Department of Environmental Conservation, opened the festivities at the Montpelier wastewater treatment facility with a brief talk to high school students, and facility tours followed.

Pleased with the event's success, Fischer is looking to expand it next year. "We're going to try and draw stormwater in," he says. "And since we're a combined water and wastewater association, we may try to work drinking water into it, too. We're always looking to get the word out any way we can." tpo

## letters

### More on plant names

I've been involved for years in the discussions about what to call wastewater treatment plants. In 1995, I took over what was then the New York City Department of Environmental Protection Bureau of Clean Water.

It was renamed from the Bureau of Water Pollution Control (which had water pollution control plants) to reflect the Clean Water Act. Unfortunately, no one told the public, and we constantly got calls about dirty water in people's taps. We changed the name to the Bureau of Wastewater Treatment.

In later discussion at the Water Environment Federation and with members, I suggested that Shadow Traffic in New York City had the answer: Water Plant — which is what they call the North River Water Pollution Control Plant. I still think as wastewater treatment, water reclamation and water treatment get closer together, water plant is the best for all.

**Robert E. Adamski, P.E.**

### Enjoys the 'Visitors'

I enjoy the "Visitors" feature in *TPO* magazine. Over the years, we've had some "close encounters" with wildlife at the Urbana-Champaign Sanitary District. Like many wastewater plants we have white-tailed deer, geese, groundhogs, and an occasional red fox. Most of our encounters have involved some type of rescue operation.

Years ago a deer was stuck in the sludge on the drying pad. After we helped it out, it was too weak to run away, and it died some time during the night. Once we had a large snapping turtle in an aeration tank that was offline. The tank was filled with plant water, and he even had a large pipe he could sun himself on. We tried catching him in a net and a trap with beef liver, but we failed. Most likely, he died during the winter.

We had a muskrat in the same tank, so we placed a board at an angle to act as a ramp. We didn't see him after we put up the ramp, so we assume he was able to climb out. One year we had raccoons in the attic of the administration building. I felt a simple solution would be to go up into the attic, grab them by the tail, and let them loose. Good plan, but for some reason we had no volunteers — no one ever listens to the lab guy!

Happily, we've had success in many other animal rescues. Once, a beaver was swimming in one of the clarifiers. We used a landing net duct-taped to a long pole and were able to catch him in the weir. We turned him loose in the creek. One time six baby ducks were caught in a channel. Only two were still alive, but we caught them in a bucket and turned them loose in the creek.

A few years ago, we had a red-tailed hawk with a broken wing walking around the plant. The question was: How do you pick up an injured hawk who likes to hiss at you when you get close to him? And what do you do with him after you catch him?

We made a call to the University of Illinois veterinary hospital, and they said they would accept the hawk — if we could bring him in. My supervisor, Jim Royer, took an old lab coat, walked over to the hawk, put it over the bird, and picked him up! He handed the hawk to me. My co-worker, Wade Lagle, drove to the animal hospital. We called a few days later, and they said they were able to put a pin in his wing, and he was doing fine. He couldn't be released in the wild, but they had contact with raptor shelters.

Our last adventure was a snake swimming in a secondary clarifier. We were able to catch him in a net as he swam in the weir. It was a fox snake about 3 feet long. We turned him loose in some tall grass by the creek. Who said wastewater treatment is boring?

Thanks,

**Rod Meikamp**
**Laboratory Technician**
**Urbana-Champaign (Ill.) Sanitary District**

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# A STELLAR TEAM

## AWARD-WINNERS JENNIFER BACA AND CHRIS LOPEZ MEET EVERY CHALLENGE, FROM THE LAB TO THE COMPOST FACILITY, AT THE LOS ALAMOS COUNTY TREATMENT PLANT

STORY: **Trude Witham**
PHOTOGRAPHY: **Eric Draper**

JENNIFER BACA AND CHRIS LOPEZ LOVE A challenge, and it has taken them far. From temporary laborer, to senior operator in charge of laboratory operations, Baca has excelled at every turn. Lopez, also a senior operator, began in collections, then moved to wastewater operations.

While Baca's challenges have included learning about wastewater laboratory operation and compliance testing and reporting, Lopez had to learn to operate a trickling filter and an activated sludge plant. Both are also helping start up a composting operation.

They work for the Los Alamos County (N.M.) Department of Public Utilities, which operates a trickling filter treatment plant (built in 1965) in the town of White Rock, and an activated sludge plant (built in 2007) in the City of Los Alamos.

Senior operators Chris Lopez and Jennifer Baca at the Los Alamos Wastewater Treatment Plant.

Their success comes from determination, a strong work ethic and the support of their mentors. Both received 2012 Outstanding Operator of the Year awards from the New Mexico Water and Wastewater Association for their roles.

### RAPID ADVANCEMENT

Baca started in 2005 at a now-decommissioned trickling filter plant in Los Alamos, doing grounds work and cleaning. She moved to full-time work eight months later. "I started learning about maintenance and how the operations process worked, and I found it more interesting," she says. Moving up through the ranks, she earned more advanced wastewater certifications.

In mid-2007, she took over the lab. "The lab technician left, but not before he taught me the basics of lab work," Baca says. "My supervisor continued the instruction, and I read up on the more difficult lab procedures on my own." When a new activated sludge plant replaced the trickling filter plant later that year, Baca moved the lab operation there.

She learned to operate the activated sludge plant and was promoted to senior operator after earning her Level 4 wastewater certification in 2011. She cites Lopez as her primary mentor: "Chris taught me a lot over the years, and is always willing to share his knowledge."

Lopez started his career in 1992 at the wastewater treatment plant in Santa Fe, working in collection system maintenance. He transferred to the Los Alamos trickling filter plant in 2002 and there learned about treatment processes and equipment maintenance. A Level 2 wastewater operator at the time, he earned Level 3 and 4 wastewater, Level 3 wastewater laboratory technician, Level 2 water operator, and compost facility operator certifications.

When the activated sludge plant came online, co-workers trained him on that process and on pumps, motors and electrical equipment mainte-

A key challenge for Chris Lopez was mastering adjustments to the biological nitrification/ denitrification process to account for the effects of seasonal temperature changes.

## Jennifer Baca and Chris Lopez, Los Alamos County (N.M.) Department of Public Utilities

POSITION: **Senior Operators**

EXPERIENCE: **Baca, 9 years; Lopez, 22 years**

CERTIFICATION: **Both Level 4 wastewater operator, Level 2 water operator, Level 3 wastewater laboratory technician, compost facility operator**

MEMBERSHIP: **New Mexico Water and Wastewater Association**

GOALS: **Baca: See her career through to retirement; Lopez: retire, do woodworking**

GPS COORDINATES: **(White Rock plant) Latitude: 35°49'36.12" N; Longitude: 106°11'06.46" W (Los Alamos plant) Latitude: 35°52'53.35" N; Longitude: 106°14'54.34" W**

Jennifer Baca enjoys lab work and leading lab tours, showing kids the process microorganisms and the difference between influent and effluent.

Jennifer Baca and Chris Lopez appreciate the team atmosphere at their facility that helps them perform effectively.

## WEEKEND FUN

When he's not working at the White Rock and Los Alamos wastewater treatment plants, Chris Lopez likes to create things out of wood. "I have a woodworking shop at home, and I make cabinets or furniture in the evenings and on weekends. I use mostly pine and oak," he says.

He worked as a carpenter for 10 years before entering the wastewater field. While he mostly makes things for himself, he also sells items. He credits his uncle for teaching him woodworking.

While he plans to do woodworking full time when he retires, he wants to keep his hand in the water treatment field: "I might help a local small system operate its package wastewater treatment plant — something to keep my skills up and help out in the community."

Jennifer Baca enjoys weekend trips to the mountains on her three-wheeled motorcycle. "I ride my trike just on weekends during the warmer months, and I enjoy going through the New Mexico and Colorado mountains," she says.

She has been riding for about 10 years with family and friends. "I took the motorcycle safety class on a regular bike and passed it, but out on the street I felt more comfortable on a trike." She also enjoys spending time with her family and taking her niece to ballet, flamenco and gymnastics classes.

nance. "My mentors are Santiago Martinez, my supervisor, and Jeff Ayers, plant superintendent," says Lopez. "There was a lot of hands-on training."

### RUNNING TWO PLANTS

Today, Baca and Lopez work closely together at the White Rock trickling filter and Los Alamos activated sludge plants. "I work Monday through Friday in the lab and help out with operations when needed," says Baca. "I also rotate on weekends with the other two senior operators." Besides Baca and Lopez, the department team includes:

- Roland Dixon, senior operator, 16 years
- Ellis Nevarez Jr., operator, five years
- Marcos Ocanas, operator, one month
- Jeremy Martinez, apprentice I, two years
- Larry Naranjo, apprentice II, two years

All operators divide their time between the two plants, which are 6 miles apart.

The trickling filter plant (0.8 mgd design, 0.3 mgd average) serves 6,000 residents of White Rock. Two parallel treatment trains each include a grit settling channel, a primary clarifier, a cobble rock media trickling filter and a secondary clarifier. Flow is combined at a serpentine chlorine contact chamber, and the effluent is discharged to the Rio Grande or sent to reuse.

Reuse water flows to a lined holding pond for use on ball fields and in town parks. Effluent for discharge is dechlorinated and the flow is measured with a Parshall flume staff gauge and ultrasonic totalizing meter (Evoqua Water Technologies). The primary sludge is hauled to the Los Alamos plant's headworks and added to that plant's biosolids for composting.

"We operate a biological nitrification/denitrification process, so the bugs react differently to temperature changes. What works well in the warm summer months may not work at all in the coldest months. We have to be constantly monitoring and adjusting our process."
**CHRIS LOPEZ**

The activated sludge plant (1.4 mgd design, 0.9 mgd average) serves 12,000 residents of Los Alamos. After screening and grit removal, influent is sent to an anoxic selector basin, then to two extended aeration basins equipped with fine-bubble disc diffusers (Sanitaire). The flow passes through two secondary clarifiers and a UV disinfection system (TrojanUV). From there, it is either treated with a chlorine disinfection system (MIOX) and sent to a holding tank for reuse, or discharged to a neighboring wetland. Biosolids are treated in an aerobic digester (Ovivo) and dewatered on a belt filter press (Ovivo).

Up to 600,000 gpd of reclaim water can be sent to a holding tank for reuse in parks, sports fields and the municipal golf course. "All the water reuse occurs between March and September. The rest of the year we discharge to wetland," says Lopez.

Both plants can pose challenges. "The trickling filter is an older plant, and although it is easier to operate, there are maintenance issues," says Lopez. At the activated sludge plant, the belt press dewatering process with polymer addition can be challenging at times: "We have been trying different vendors for our polymer to see which ones work best."

**Los Alamos Wastewater Treatment Plant PERMIT AND PERFORMANCE**

| | PERMIT (monthly average) | EFFLUENT (average) |
|---|---|---|
| **BOD** | 30 mg/L | 3.46 mg/L |
| **TSS** | 30 mg/L | 4.62 mg/L |
| ***E. coli*** | 126/100 ml | 11.61/100 ml |
| **Total nitrogen** | 10 mg/L | 4.72 mg/L |
| **Copper** | 28.5 mg/L | 9.10 mg/L |

**White Rock Wastewater Treatment Plant PERMIT AND PERFORMANCE**

| | PERMIT (monthly average) | EFFLUENT (average) |
|---|---|---|
| **BOD** | 30 mg/L | 19.35 mg/L |
| **TSS** | 30 mg/L | 17.78 mg/L |
| ***E. coli*** | 126/100 ml | 17.64/100 ml |
| **Total nitrogen** | 30 mg/L | 20.45 mg/L |

## ALWAYS LEARNING

Baca and Lopez spent a lot of time learning their areas of expertise. In the lab, Baca was challenged to perform all operational and regulatory sample testing, staying on top of reporting paperwork for state and federal permits, and equipment calibration. "Some lab machines are touchy, and one little thing can throw them off," she says.

For Lopez, the main hurdle was learning the activated sludge process. He and the other operators received classroom and hands-on training from equipment vendors. Lopez also received hands-on training from superintendent Ayers, whose 25 years' experience with activated sludge plants helped all the operators understand the new plant's performance and limitations.

A typical day for Lopez includes inspecting belts and pumps, wasting sludge, monitoring and adjusting the process as necessary, working with composting, doing routine rounds, checking SCADA data and performing preventive maintenance.

*(continued)*

Operational challenges include the wide daily and seasonal temperature variations of the high desert environment, which can dramatically affect treatment. "We operate a biological nitrification/denitrification process, so the bugs react differently to temperature changes," Lopez says. "What works well in the warm summer months may not work at all in the coldest months. We have to be constantly monitoring and adjusting our process."

Says Baca, "We have a total nitrogen limit of 10 mg/L. Every morning I run the ammonia nitrate test, and if it's close to the limit, I tell the operators to adjust the airflow into the aeration basins."

> "We have a total nitrogen limit of 10 mg/L. Every morning I run the ammonia nitrate test, and if it's close to the limit, I tell the operators to adjust the airflow into the aeration basins."
> **JENNIFER BACA**

## BETTER BIOSOLIDS

Lopez and Baca have been learning a lot about solids processing and composting at the activated sludge plant. "We also composted the solids at the old trickling filter plant, but the whole process is different at the new plant, where we compost the solids with manure and wood chips to produce Class A biosolids," says Lopez. "We produce more biosolids, and it contains much more water than at the old trickling filter plant."

The first batch of Class A biosolids was distributed to county residents last May. Although Baca and Lopez are both certified in composting operations, Lopez does the bulk of the work for now. Once he has mastered the process, he will train the other operators. Baca mostly performs lab tests to document the process for state regulators.

Both operators found their awards gratifying. Nominated by Santiago Martinez, they didn't know about the awards until they were asked to attend the ceremony. "We were both surprised and honored," says Lopez. "They gave us each a plaque, and there was a banquet after the ceremony."

Says Martinez, "Both Jennifer and Chris have shown strong initiative and dedication. When they see things that need to be done, they take it on without being told. If work is delaying their departure at the end of the day, they don't complain but continue until the job is done."

Baca and Lopez appreciate the plant operators' team mentality. Says Baca, "We all have different years and levels of experience, and we all help each other out. Santiago is out there helping us, and so is Jeff [Ayers] when we need him."

They also enjoy dealing with the public. Lopez observes, "We give a lot of plant tours to school groups, and it's fun." Baca leads tours of the lab, showing the kids the microorganisms and the difference between influent and effluent.

Lopez offers advice to would-be operators: "If you are interested in the environment, you can do a lot of good working in this field. Many people out there don't care about the environment or don't think about it, but it's an important part of the job and another reason I like what I do." **tpo**

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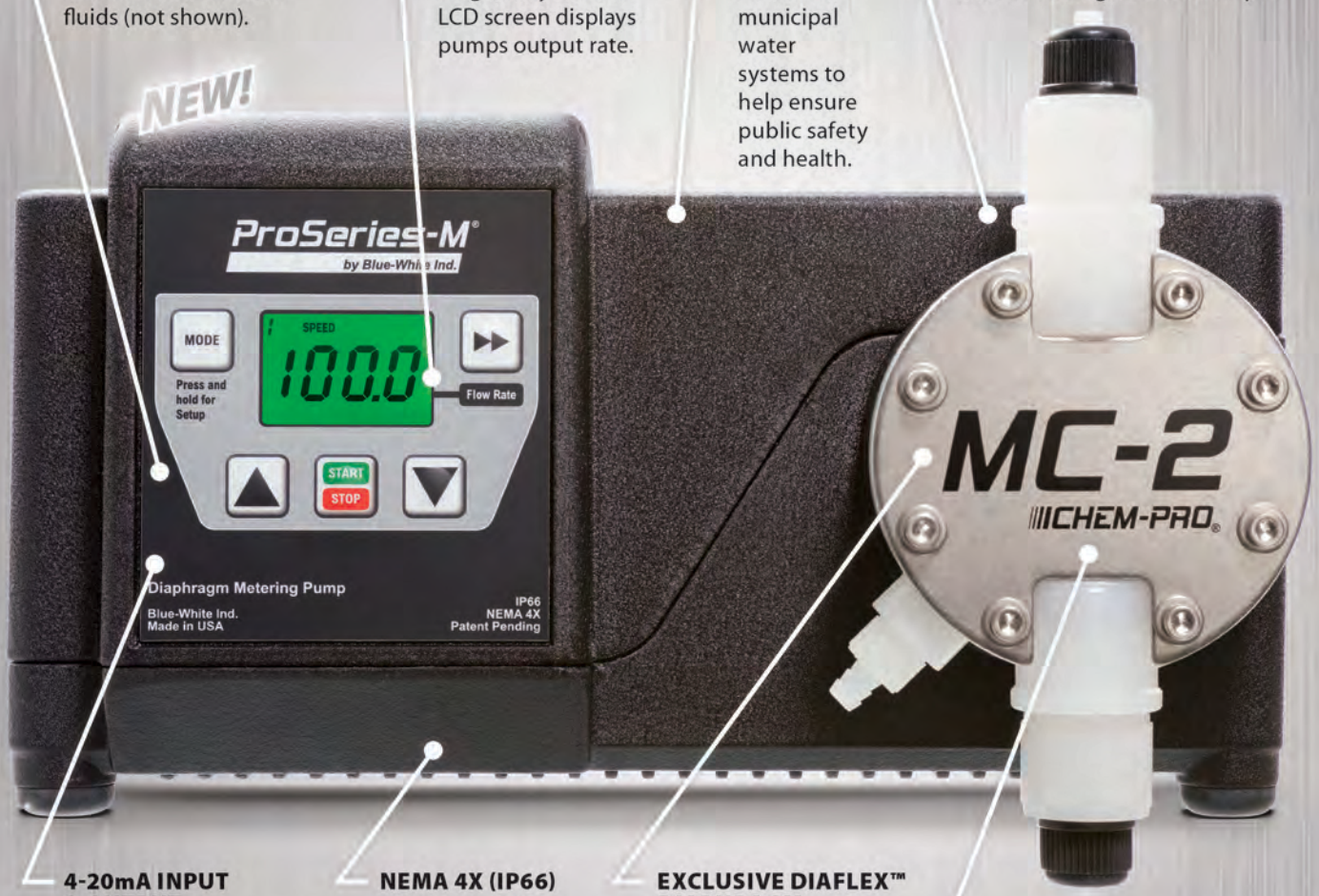


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LEFT: Signs on city buses deliver water conservation alerts and event announcements. BELOW: Dowser Dan, played by Evan Kelley, conveys water conservation and protection messages to grade school students.

# Pulling Out All the Stops

THE CITY OF AUSTIN USES ALL AVAILABLE CHANNELS TO PROMOTE WATER CONSERVATION IN A DROUGHT-PRONE AREA WHERE EVERY DROP COUNTS

**By Linda Edmondson**

Droughts are a serious matter for Austin, Texas. The city watershed system includes the Colorado River and the Highland Lake chains with storage lakes Travis and Buchanan, where the water capacity today is at a dangerously low 37 percent.

The drought began nearly five years ago. To its credit, however, this city of 840,000 has been highly proactive in water conservation and protection since the early 1990s with public education and outreach. This, combined with interdepartmental participation, has given the community some of the best educated "water consumers" in a region where every drop matters.

The city's water utility conducts more than 100 outreach events every year, according to Jill Mayfield of the public information office. From a speaker's bureau and special events, to collaborative city/state presentations and in-school programming, the outreach team optimizes every means and opportunity to educate and motivate the community to conserve water.

## A LITTLE SONG AND DANCE

In 1991, the Water Conservation Division created Dowser Dan, a captivating character who performs for K-4 students in 160 public and private schools in six area school districts. Evan Kelley, a public information specialist with the utility, has performed this role for 18 years.

"Besides Dowser Dan, I play two other characters each time," says Kelley. "Sonny Brightwater talks about the importance of saving water and how to protect it from contamination. Dwain Piper uses a clean blue plunger as a pointer, as well as an inflatable globe and other water-related graphics, to talk about water use and conservation."

Kelley's goal is to engage his young audience for a full 45 minutes: "I step out of sight for a few seconds to introduce the next character, changing costumes at the same time. Each character sings a special song related to his topic. With the help of props, music and audience participation, the kids learn a lot while being entertained."

Teachers can schedule performance dates online. Since 1991, more than half a million kids have learned lessons about water from Dowser Dan.

## DRAWING BIG CROWDS

Austin's biggest outreach program is the Water Science Expo. Held for the past 20-plus years, this event draws nearly 2,500 kids in grades three through five. Much of the content aligns with teaching curriculums. "The Expo is a huge collaborative effort involving city and state resources," Mayfield says. "Our support is very broad-based, from department executives to a large group of staff and community volunteers.

> "We are finding that videos are often more readily embraced than some informational articles."
> **JILL MAYFIELD**

"We have presentations on water and wastewater treatment, the lab, fire hydrants, conservation and special services. Several city departments participate, including Watershed Protection, the Office of Sustainability, Austin Resource Recovery, and Health and Human Services. Some state and federal groups participate, including the USDA Natural Resources Conservation Service, the State Board of Plumbing Examiners, Texas A&M Forest Service, and the Texas Parks and Wildlife Department."

Mayfield describes Austin as a progressive community with early adopters who, along with city officials, were already embracing the conservation movement in the 1970s and 1980s. "Our outreach group has always sup-

ported rebates and consumer programs," Mayfield says. "We're presently promoting a rebate program for water retention practices, including garden mulching and lawn aeration."

## SKILLED TEAM AT WORK

The public information group appears to be a well-oiled media team. On staff are two graphic artists. Television, radio, print ads, and bus and taxi billboards are all in the media mix. Social media are being used more, including Facebook and Twitter to promote rebates and programs.

These media channels also help promote "Water Stages" that residents must follow. The four stages relate to the severity of drought conditions, and each includes water-use restrictions, such as limiting the frequency and time of day for lawn watering and car washing. "With graphics already in place, we can change the stage alerts quickly for any drought change," Mayfield says.

Educational videos on YouTube and the city's website have become much more important. For example, residents can find a short video on how to change a faucet aerator or change a showerhead. "We are finding that videos are often more readily embraced than some informational articles," Mayfield observes.

The outreach team is exploring the use of a mobile classroom, possibly a large van equipped with displays and electronic media to teach water conservation in a new and dynamic way. "We don't always need to do new things," Mayfield says. "It's OK to repeat our messages as new people are always joining our communities. But we continue to explore and adapt new ideas as our situation and the media change, so we can make every man-hour and every dollar count." tpo

### What's Your Story?

***TPO* welcomes news about your public education and community outreach efforts for future articles in the Hearts and Minds column. Send your ideas to editor@tpomag.com or call 715/277-4094.**

Kids see water contamination up close using microscopes at Austin's Water Science Expo.

PHOTO COURTESY OF LOWER COLORADO RIVER AUTHORITY

Storage lakes in the Austin watershed system, like Lake Travis, shown here, were recently at 37 percent capacity.

# Failure to Break Down

A SIXTH-GRADER'S SCIENCE PROJECT CLEARLY SHOWS WHY CONSUMERS SHOULD TAKE "FLUSHABLE" WITH A GRAIN OF SALT WHEN BUYING DISPOSABLE WIPES

**By Ted J. Rulseh**

Do you need hard evidence that some "flushable" wipes products really don't break down as advertised? Sixth-grader Savanna Ballard has it.

She called her project in the Harmony Grove Elementary School science fair, "Don't Flush That Flushable!" The project won first place in the fair's Earth and Environmental Division, then took second place in a regional science fair at Southern Arkansas University. It also did a service to her community of Camden, Ark., and its water utility, because the story of her findings made the local newspaper.

No one was prouder than Savanna's father, Keith Ballard, wastewater plant supervisor for Camden Water Utilities, who gave her the idea for the project and offered guidance and clerical help along the way.

## PROOF POSITIVE

In Savanna's experiments, none of five brands of wipes broke down anywhere near as completely as toilet paper, which served as a control. The test procedure was simple. Savanna bought five brands of wipes labeled as flushable. She put a sheet of each product in a separate jar of water and a sheet of toilet tissue in another jar. She then stirred each jar vigorously every two hours for eight hours — her father felt that would reasonably simulate the agitation a wipe would receive going through a sewer system.

**BREAKDOWN OF WIPES LABELED AS FLUSHABLE**

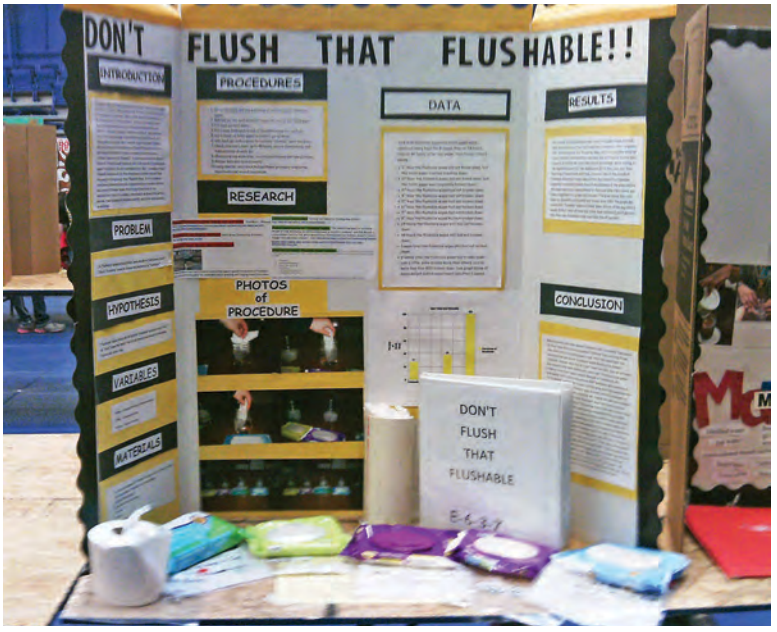
| Flushable Wipes Brand | Percent Breakdown |
|---|---|
| Pull-Ups Big Kid | 38% |
| Cottonelle | 27% |
| Equate | 5% |
| Equate Fresh Scent | 3% |
| Parent's Choice Kids | 2% |

For the Harmony Grove fair, Savanna simply displayed the jars, showing that the wipes had not broken down the way toilet paper did. She wrote up the results, typed them with help from her father, and pasted the information on a large display board in classic science fair format: problem, hypothesis, variables, procedure, research, data, results, conclusion.

"The judges said it was pretty interesting, and they had never seen anything like that before," Savanna recalls. In fact, they later told her science teacher, Michele Lawson, that they liked the project because it dealt with a current problem. They also said Savanna would have won the fair's overall top prize if she had included some mathematical data.


PHOTOS COURTESY OF MICHELE LAWSON

Savanna Ballard completed her award-winning science project with guidance from her father, Keith Ballard, a wastewater treatment plant supervisor.




Savanna's project included data on the breakdown characteristics of several disposable wipes products.

## TO THE NEXT LEVEL

Savanna took care of that for the regional science fair, by which time the various wipes had been immersed in water for six weeks. With help from her father, she used a lab oven at the Camden Wastewater Treatment Plant to dry a fresh sample of each wipe and the wipes from the jars. Then she weighed each piece on a balance in the lab and calculated the percent of each tested wipe that had broken down. The accompanying table shows the results (see sidebar).

Savanna's work with her project didn't end with the science fairs — she displayed her project in late April at the Arkansas Water Works & Water Environment Association Annual Conference and Exposition.

## NATURAL SCIENTIST

Lawson notes that Harmony Grove teaches students to understand the scientific method: "There's a reason scientists investigate things. Savanna knew there was a real problem that people needed to be aware of. She flourishes in science. She has a natural aptitude for it. This wasn't the first time she has gone to regionals for a science project.

## A PROBLEM IN CAMDEN?

Despite what his daughter Savanna's science project showed, Keith Ballard says wipes have not caused major problems in the Camden sewer system.

"We see some come through," says Ballard, wastewater plant supervisor. "In some areas more than others, such as near day care centers. But we don't really have the problems that some of the big cities do."

Nonetheless, he did a little research and found that wipes that don't break down in sewer pipes can cause expensive problems. "I figured out that if you have a septic tank and it filled up with these 'flushable' wipes, it would cost you $350 to $400 to have the tank dug up and pumped out. If you stopped up a sewer line and a contractor had to come out and dig it up, that would cost anywhere from $800 to $1,200."

> "The judges said it was pretty interesting, and they had never seen anything like that before."
>
> **SAVANNA BALLARD**

"She was really invested in the project. Working with the scientific method just propelled her to the top. She was competing against hundreds of kids at the regional fair, so to get second place was awesome. Her confidence level went up, her writing skills went up."

And best of all, thanks to Savanna, more people in Camden know how to be vigilant about disposing of wipes properly — in the trash and not the toilet.

**tpo**

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# Up With *Efficiency*

TWO ADVANCED TREATMENT PLANTS IN FLORIDA MAKE PROCESS AND FACILITY CHANGES THAT SAVE HUNDREDS OF THOUSANDS ON ELECTRICITY AND CHEMICALS

STORY: **Trude Witham**
PHOTOGRAPHY: **Rob Herrera**


WHEN THE CITY OF WINTER HAVEN UTILITY SERVICE Department began an aggressive cost savings program in 2012, leaders made sure the operations staff was involved. The ongoing program at the city's two wastewater treatment plants has saved nearly $110,000 on electricity and $450,000 on chemicals.

It didn't come easy for the operations team in this central Florida city of 34,000. "A lot of adjustments had to be made and a lot more sampling conducted," recalls Kim Hansell, department director. "We prepared them by saying, 'This is the vision, and this is what we want to accomplish. If you do the sampling and make the adjustments, you will see the benefits.' Once they started seeing results, they got really excited."

Equipment modifications and upgrades helped save chemicals and electricity, while operational changes increased efficiency. Now the utility's 12 operators and four maintenance technicians are challenged to keep the plants running smoothly and stay on top of preventive maintenance, while monitoring and understanding how their decisions affect energy use. "It's a question of optimizing and finding the right balance of efficiency and sustainability — for example, understanding the electrical rate and how running equipment at peak usage times affects cost," says Hansell.

So far, the team has met the challenge. For instance, over the past year, operators at the 7.5 mgd Plant 3 enacted a process sampling program that optimized chemical dosage. The 1.7 mgd Plant 2 freed up more than a million gallons a day of drinking water by producing reclaim water for irrigation and in-plant uses.

The City of Winter Haven Wastewater Treatment Plant staff includes, from left, Carlos Brito, Plant 3 chief operator; Kim Hansell, utilities director; Terry Carver, Plant 2 chief operator; Frank O'Neal, Class B wastewater operator; Josh Best, operator trainee; Mike Graham, Class B operator; Jimmy Reddick, Class A operator; and Chris Shelton, Class C operator.

## Winter Haven (Fla.) Wastewater Treatment Plants 2 and 3

| | |
|---|---|
| BUILT: \| | **Plant 2: 1971; Plant 3: 1977** |
| POPULATION SERVED: \| | **75,000 customers** |
| EMPLOYEES: \| | **12 operators, 4 maintenance crew** |
| FLOWS: \| | **Plant 2: 1.7 mgd; Plant 3: 7.5 mgd** |
| TREATMENT LEVEL: \| | **Tertiary by 2015** |
| TREATMENT PROCESS: \| | **Activated sludge** |
| RECEIVING WATER: \| | **Plant 2: reclaimed; Plant 3: Peace River tributary** |
| BIOSOLIDS: \| | **Landfilled** |
| ANNUAL BUDGET: \| | **$8.8 million (operations and maintenance)** |
| WEBSITE: \| | **www.mywinterhaven.com** |
| GPS COORDINATES: \| | **Plant 2: Latitude: 28°03′13.49″ N; Longitude: 81°43′43.75″ W Plant 3: Latitude: 27°57′08.12″ N; Longitude: 81°42′32.80″ W** |

Marcus Hamilton, Class C wastewater operator, cleans a bar screen (Huber Technology) in the plant headworks.

## OPERATING INGENIOUSLY

Operators at Winter Haven's two wastewater treatment plants have gone through two upgrades and an ongoing cost reduction program. They have also dealt with extreme weather. Their success through it all stems from experience and dedication.

For example, operator Jim Lang, who works at the city's wastewater treatment Plant 2, found a way to make it easier to reach the return activated sludge pumps with a motor hoist. "He created a slide plate with pry holes," says Kim Hansell, Utility Services Department director. "We slide the motor onto the plate with a pry bar so we can lift it with an engine hoist."

Operators at Plant 3 came up with a process sampling program that reduces cost by allowing chemical dosage optimization. "By looking at the permit requirements and lab samples, they determined that changes had to be made at the plant to promote better spending habits and save money," says Carlos Brito, chief operator.

Operators have also seen their share of rain events. Brito observes, "We've had heavy rainstorms that affected our inflow and infiltration, and although we have a program to address this and a generator to deal with power outages, it's still a challenge."

Three hurricanes proved especially challenging. "Everyone learned a lot from hurricanes Charley, Frances and Jeanne in 2004," Hansell says. "We experienced extended power outages, and with 192 lift stations, it was a challenge to maintain sewage flow. But we did very well." The utility has since installed permanent generators at 32 regional pump stations and maintains a fleet of eight trailer-mounted generators. "This will greatly improve our response to future storm events," says Hansell.

The Plant 2 team includes Terry Carver, chief operator and industrial pretreatment coordinator (Class A wastewater certification, 29 years at the plant); and operators Jonathan Adamson (Class A, 14 years), Jim Lang (Class B, 25 years), Steve Nicholson (Class C, 10 years) and Miguel Thilus (Class C, one year).

Plant 3 team members are Brito (Class A, two years at the plant; 14 years in the industry); operators Jimmy Reddick (Class A, 29 years), Frank O'Neal (Class B, 24 years), Mike Graham (Class B, 26 years), Chris Shelton (Class C, 15 years) and Marcus Hamilton (Class C, eight months); and operator trainee Josh Best. Terry Holley, Class A operator (four years) supervises the four-member maintenance staff.

*(continued)*


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## MAJOR UPGRADES

Plant 2 was built in 1971 and Plant 3 in 1977. Plant 1 was decommissioned and converted to a lift station in 1979. A major upgrade to Plant 2 in 1991 added sand filters (INFILCO DEGREMONT) and a chlorine contact chamber to produce reclaimed water for irrigation. Two in-ground storage tanks help meet reclaimed water peak demands. Other major equipment in use at Plant 2 includes:

- Bar screens (Huber Technology) and grit removal system (Fluidyne Corp.)
- Clarifiers (drives by WesTech Engineering)
- Anoxic basin with EMU (WILO USA)
- Aeration blowers (Hoffman & Lamson)
- Return activated sludge and scum pumps (WEMCO)
- Sludge transfer pumps (Moyno)
- Biosolids belt press (PHOENIX Process Equipment Co.) with conveyor system (Keystone Conveyor Corp.)
- Deming effluent pumps (Crane Pumps & Systems)

> "We can monitor phosphorus, nitrate and nitrite levels from 10 sample spots. We have about a year and a half of data."
> **CARLOS BRITO**

In 1998, the clarifier gearboxes and sweep arms were replaced to improve efficiency. Ongoing clarifier rehabilitation includes structural improvements to the walkways and added safety features. The plant operates at 62 percent of its 1.7 mgd design capacity.

Plant 3 was upgraded from an activated sludge plant to an advanced treatment plant in 2008. The process includes a post-anoxic zone with MicroC 2000 (Environmental Operating Solutions) as an alternative carbon source for denitrification, internal mixed liquor recycle, alum addition for phosphorus removal, filtration, chlorine contact, dechlorination and re-aeration.

The plant operates at 57 percent of its 7.5 mgd design capacity. Major equipment includes screening and degritting, blowers, aeration tanks, aerobic digester, biosolids thickener and belt press, clarifiers and chlorine contact chamber. Effluent is discharged to a Peace River tributary; biosolids are digested, thickened, dewatered and landfilled.

## ATTACKING COSTS

The utility's cost reduction program has yielded impressive results. Plant 3 used to operate two chlorine contact chambers with a total 380,000-gallon capacity and average contact time of 4.05 hours for 4.5 mgd. Closing one contact chamber reduced detention time to two hours, allowing less chlorine to dissipate.

The plant team also installed new sodium bisulfate injectors in the re-aeration basin to allow more complete mixing. "This has lowered our sodium bisulfate use and allowed us to turn off the re-aeration blower when the dissolved oxygen is above 6.0 mg/L," says Carlos Brito, the plant's chief operator. "Our limit is 5.0 mg/L." Plant 3 also reduced chemical costs by:

- Manually adjusting alum and acetic acid based on in-house process control grab sample results.
- Adding nitrate and phosphate analyzers for automatic chemical adjustment.
- Updating the SCADA PLC with a trim factor that automatically adjusts the chlorine and sodium bisulfate dosage by up to 50 percent based on the chlorine residual.
- Switching from acetic acid to MicroC 2000, saving 65 percent annually.
- Tying the sand filter chlorine pumps to the SCADA so they are controlled by effluent flow. This has reduced liquid chlorine use by about 100 gallons.


Carlos Brito,
Plant 3 chief operator

The utility has reduced electrical costs by:

- Turning off three air conditioning units in the electrical building on cooler days.
- Updating the PLCs for effluent pump variable-frequency drives so they come on one at a time rather than two at a time.
- Shutting off the digester blowers during the day.
- Using only one aeration blower from winter to late spring.

"Last winter we found that we only needed one aeration blower, because the colder temperature lowers the wastewater a few degrees and allows the water to hold more oxygen," says Hansell. "That helps with energy efficiency in the winter."

## PRIMING THE PROCESS

The utility has also saved money with other process enhancements, including:

- Sending scum from the scum pits to the thickener instead of the digester.
- Turning off the return activated sludge pumps for an hour before wasting when the sludge blanket is less than 2 feet. This allows a thicker blanket to build so that less water is pumped and more solids are wasted into the thickener.

*(continued)*

- Decanting the biosolids thickener so that less phosphorus in the supernatant is recycled back to the plant, saving on chemicals.
- Decanting the digester to use space more efficiently for biosolids treatment.
- Running the belt press on second and third shifts to use cheaper off-peak power.

Chris Shelton, Class C wastewater operator, performs BNR sampling in the lab facility.

Operators use a customized program to track nutrient values and optimize chemical dosage. "It gives us the daily, monthly and yearly highs and lows of nutrient readings in each BNR section," says Brito. "That allows us to monitor seasonal changes in the wastewater." That in turn allows operators to respond before problems occur.

"We can monitor phosphorus, nitrate and nitrite levels from 10 sample spots," Brito adds. "We have about a year and a half of data."

## RECLAIMING THE WATER

Beyond cost savings, a major process improvement involves wastewater reclamation. In 2013, Plant 2 used some 3.3 million gallons per month of reclaim water for washdown, clarifier and belt press sprays, and plant site irrigation. More was distributed as irrigation water for homeowners, golf courses, crops and public access areas. Plant 3 plans to start producing reclaim water for irrigation in 2015. "We have made the necessary equipment upgrades, and our pumping and storage facility is under construction now," says Brito.

An industrial pretreatment program involving three major customers is working well under the watchful eye of Terry Carver, chief operator at Plant 2. A fats, oil and grease program helps prevent sanitary sewer overflows and plant process upsets. "We instruct restaurants on best management practices to help reduce grease trap pumping frequency," Hansell says. "That saves them money in hauling costs while preventing grease from entering the sewer system.

"The city is aggressively tackling this issue by maintaining communication between the city, businesses and haulers so everyone can stay in compliance. This allows all involved to focus on their business rather than on clogged pipes and overflows." Inspections, enforcement and a preferred hauler program contribute to success.

## EXPERIENCED TEAM

Most of the plant operators have been with the utility for at least 10 years and were there during the Plant 3 upgrade. "Carlos came to us with experience at a similar plant, so he has been able to help train the operators on the process," says Hansell. "The most difficult piece for them to learn was the new PLC and how it can be used to optimize the process." They learned as they went with training support from the device vendor.

The utility plans to continue the cost reduction program. "The more we can reduce our costs, the better," says Hansell. "Meanwhile, our goal is to beneficially reuse treated effluent in innovative and environmentally sensitive ways. In all that we do, our focus is on environmental stewardship and being the leaders in our community. Solar energy is an option we plan to consider and evaluate in the very near future."

She would also like to look at producing Class AA biosolids: "It is expensive to haul biosolids away to the landfill. We own 400 acres, so we just need to figure out how to make biosolids management cost-effective and what the payoff is." tpo

**Winter Haven Wastewater Treatment Plant 2**
**PERMIT AND PERFORMANCE**

| | PERMIT (Monthly Avg.) | EFFLUENT (2013 Avg.) |
|---|---|---|
| **BOD** | 30 mg/L | 3.14 mg/L |
| **TSS** | 5.0 mg/L any sample | 1.81 mg/L |
| **Residual chlorine** | 1.0 mg/L, minimum | 2.0 mg/L |
| **Fecal coliform** | 25/100 ml | <1/100 ml |

**Winter Haven Wastewater Treatment Plant 3**
**PERMIT AND PERFORMANCE**

| | PERMIT (Monthly Avg.) | EFFLUENT (2013 Avg.) |
|---|---|---|
| **BOD** | 10 mg/L (Jan-Feb, June-Sept, Nov-Dec)<br>5.0 mg/L (March and May)<br>3.0 mg/L (April and October) | 2.05 mg/L |
| **TSS** | 20 mg/L | 1.1 mg/L |
| **Total phosphorus** | 1.0 mg/L | 0.62 mg/L |
| **Residual chlorine** | 0.5 mg/L | 1.85 mg/L |
| **Fecal coliform** | 200/100 ml | <1/100 ml |



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# Savings Everywhere

THE BIRCH BAY WATER AND SEWER DISTRICT TEAM FINDS WAYS TO SAVE OR EXTRACT ENERGY FROM ALMOST EVERY ASPECT OF FACILITIES AND OPERATIONS

**By Doug Day**

The Birch Bay Water and Sewer District wastewater treatment plant is small, and so are its staff and community.

In six years as operations manager for the district, based in Blaine, Wash., Mike Sowers has been given a green light to seek out improvements, even if it means spending some of his limited operations and maintenance budget.

"My philosophy is that it's better to improve than it is to just fix things," says Sowers. "I get a lot of support from our commissioners, our management, our engineer and the crew. The savings have built our credibility and enabled us to keep doing the things we want to do, like installing more variable-frequency drives [VFDs]."

Since 2007, the plant has reduced its energy consumption by 28,000 kWh per month. "Our bill has dropped from around $9,000 a month to $7,500 despite an increase in electrical rates and wastewater flows, and that includes adding a new lift station and installing heating and air conditioning in two buildings," Sowers says.

## TRACKING IMPROVEMENTS

Sowers says it's hard to tell how much of the savings come from which specific projects. Newly installed power monitors will help him with that, while also helping the plant limit demand charges from the local utility. The $1,500 in monthly savings comes in handy at the district's activated sludge plant (1.3 mgd design, 0.84 mgd average).

This process water pump system enables use of reclaimed effluent for in-plant purposes, saving 4 million gallons of potable water per year.

The plant serves the resort area of Whatcom County on the Puget Sound, where the population ranges from 4,000 in winter to 12,000 in the summer tourist season. "We're a small community so we don't have a lot of play in our budget," says Sowers. "So it has a big impact. My budget is 8 percent less than it was in 2009.

"Coming from a maintenance background, I've seen places that don't replace equipment unless it can come out of the capital budget. I'll go ahead and replace it using O&M money if I have to, if it will pay for itself quickly."

## EFFLUENT HEAT

Sowers had been interested in effluent heat recovery for some time and had a chance to use it in 2009. "We were looking at replacing some old heating and air conditioning units," he says. "We use propane, so that was costing us several thousand dollars a year. I brought up the topic to our system engineer, and he completely ran with it."

Four heat pumps have reduced propane costs by $4,000 a year. The project is shown at the waterline installation stage.

The heat recovery system (Carrier) uses four heat pumps that recover heat from effluent at 50 to 70 degrees F. The total cost of the system was $85,000. "That's comparable to what we would have paid for new heating and air conditioning units," notes Sowers. "And we added air conditioning to two buildings. It's a 1/3 horsepower pump, and only uses 5 to 10 gallons of effluent flow per minute." The effluent is returned to the plant headworks after going through the system.

The crew at Birch Bay includes, back to front: Mike Trueblood, operator; Fred Reid, foreman; Mike Sowers, operations manager; and Lawrence Gonzales, operator.

While he can't isolate the electrical savings from other projects done about the same time, effluent heat recovery is saving about $4,000 a year in propane costs alone. "We now use so little propane that our tank was filled only once last year compared to almost monthly before," Sowers says.

## BETTER PROCESSES

On the process side, Sowers and his team have added nine VFDs (Allen-Bradley by Rockwell Automation and ABB) to improve efficiency across the plant. VFDs are also being added to lift stations and new drum screens to

optimize control and minimize energy consumption while maximizing capacity. Other improvements include:

- Automating the return activated sludge process to improve treatment and energy demand while minimizing operator attention.
- Adding SCADA dissolved oxygen control to the aeration process to enhance efficiency and save energy.
- Installing mixers at several lift stations to eliminate weekly pumping, saving labor and waste hauling costs.
- Switching from potable to reclaimed water for in-plant uses, saving 4 million gallons of potable water per year.

> "Our bill has dropped from around $9,000 a month to $7,500 despite an increase in electrical rates and wastewater flows, and that includes adding a new lift station and installing heating and air conditioning in two buildings."
>
> **MIKE SOWERS**

## SIMPLE STEPS

Other simple energy-saving measures have also made a difference. Turning down thermostats may not save a lot of energy, but it helps. So will new on-demand water heaters. "We went from a 50-gallon propane water heater in our shop to a 3-gallon tankless electric unit that was half the cost," Sowers says. "We now have hot water within a few seconds, which also saves water.

"It's good to start with green products such as LED lighting. But there are many ways to conserve and 'create' energy if one looks at every facet of the operation." On his wish list is replacement of 1970s backup generators with high-efficiency, clean-burning engines. There are plans to switch to fine-bubble diffusers for aeration, potentially cutting energy use by 40 percent. A few small solar panels are in the works, as well.

All those changes have certainly not hurt performance. The plant has received the state Department of Ecology's Outstanding Treatment Plant Award 12 times in the past 15 years, including the last five years in a row. tpo

## Paying less for better light

Mike Sowers is a big fan of LED lights since he used them to replace 10 fluorescent and metal halide fixtures in a shop building and three dozen exterior metal halide fixtures.

"We would replace bulbs every fall and spring, and it seemed about a quarter of them would need new ballasts," says Sowers. "That was $100 per fixture every time. LEDs are about $150 per fixture." The 96-watt fluorescents were replaced with 44-watt LEDs. Some 90-watt metal halide wall lamps were replaced with 20-watt LEDs.

The LEDs cut energy use by more than 50 percent and give better light. There is no flicker, and the outdoor LEDs cast light where it is needed without adding to light pollution. No LEDs have needed replacement, and that gives the staff more time to concentrate on treating wastewater. Lights have also been placed on timers, motion detectors or PLCs to shut them off when not needed.

To reduce lighting needs, Sowers has made skylights almost mandatory: "Our new headworks building has skylights. The shop roof needed to be replaced; the lights in that building were on all day because it was dark inside. It only cost us an extra $4,000 to install skylights, and the building lights are off almost year-round now."

# Green Insurance

A POPLAR TREE FARM ALLOWS AN OREGON UTILITY TO DIVERSIFY ITS BENEFICIAL USE OPTIONS FOR CLASS B BIOSOLIDS AND SIGNIFICANTLY EXTENDS THE LAND APPLICATION SEASON

STORY: **Erik Gunn**
PHOTOGRAPHY: **Eric Bishoff**

IN THE WESTERN OREGON CITIES OF SPRINGFIELD and Eugene, a successful program provides land-applied biosolids to local farmers, mainly for growing grasses. But 10 years ago, the Metropolitan Wastewater Management Commission (MWMC), which serves the two cities and parts of Lane County, began diversifying.

Facing concerns that farmer customers might be less available someday, the commission took the creative step of planting its own tree farm called the Biocycle Farm. The project offered a new use for biosolids and now takes about 20 percent of the wastewater treatment plant's output. "One of the values of the tree farm is that it is a fallback for us if for any reason our private land application sites went away," says David Breitenstein, who as manager of the treatment plant also oversees the biosolids program and the tree farm.

## COMMUNITY COLLABORATION

The MWMC is an intergovernmental agency that represents Lane County as well as Eugene and Springfield, the county's two main cities. Representatives from the two city councils and the Lane County Board of Commissioners make up the governing body, along with members of the general public appointed by each of the three constituent governments.

The arrangement dates back to the late 1970s, when the cities and the county teamed up to seek federal grants to build a regional wastewater treatment facility. Each city still operates its own local wastewater collection system.

The commission has no employees. Instead, it contracts with Eugene for day-to-day operation of the treatment plant and related services and with Springfield for administrative services.

## HISTORY OF BENEFICIAL USE

"For the last 30 years or more we've had a strong program going with the application of biosolids to farmland," says Breitenstein, a Eugene city employee. The treatment plant has had little trouble finding an outlet for its product, a class B material, and has maintained strong relationships with area farmers.

Poplar trees at Biocycle Farm now receive about 20 percent of the biosolids from the treatment plant serving Eugene and Springfield and surrounding areas.

The team at the Metropolitan Wastewater Management Commission's regional treatment plant is shown outside the operations building.

## Metropolitan Wastewater Management Commission
**(Eugene, Springfield, and parts of Lane County, Ore.)**

| | |
|---|---|
| FOUNDED: \| | **Late 1970s** |
| POPULATION SERVED: \| | **243,000** |
| PLANT FLOWS: \| | **49 mgd design, 27 mgd average** |
| PLANT PROCESS: \| | **Activated sludge with biological nutrient removal** |
| BIOSOLIDS PROCESS: \| | **Mesophilic anaerobic digestion** |
| BIOSOLIDS VOLUME: \| | **4,620 dry tons per year** |
| BIOSOLIDS USE: \| | **Class B material for farmland, tree farming** |
| WEBSITE: \| | **www.mwmcpartners.org** |
| GPS COORDINATES: \| | **(Eugene) Latitude: 44°05'40.46" N; Longitude: 123°07'11.07" W (Springfield) Latitude: 44°02'48.99" N; Longitude: 123°01'06.81" W** |

At one time the commission had more than 10,000 acres approved through the Oregon Department of Environmental Quality for land application. At any one time, about a half-dozen farmers are partners with the program. "They're very satisfied and repeat customers," Breitenstein says. "We never have any difficulty in terms of needing to recruit more. They're lined up waiting for the product."

The primary use is for annual rye grass, some of it for animal feed and some as a seed crop. Much of it is exported. In the late 1990s, concerns surfaced that farmland application might fall out of favor with the public or with public officials. A citizen committee was appointed to examine the program's future prospects. Some worried the MWMC was too dependent on area farmers.

"Biosolids practices do get challenged around the country from time to time," Breitenstein acknowledges. "We wanted to diversify our program to improve reliability and the assurance that we could continue biosolids recycling in a sound ecological manner. Otherwise, if there was any problem with going to grass fields, and that use went away, our only other option would be to landfill and not use the material in a beneficial manner."

### CHANGE OF FOCUS

Based on the panel's recommendations, the commission established an application site to grow poplar trees. The site includes 394 acres of growing space; with buffer zones, the total size of the site is 595 acres. Project staff visited other communities in the region that were already using biosolids to feed smaller plots of poplars. Breitenstein says those sites more typically used poplar farms for applying treatment plant effluent.

Poplars have a hearty appetite for biosolids, and their growth cycle offered great flexibility for application. "The application rates are greater for the nitrogen uptake compared to the grass," says Breitenstein. "Also, the application season is much longer." In 2013, the farm yielded its first harvest: 52 acres of timber used to make pulp and hog fuel (wood chips used for mulch or boiler fuel).

The biosolids from the treatment process are batch-pumped daily to the biosolids management facility, about 5.5 miles from the plant, where they are held in 25 acres of facultative sludge lagoons. Originally built with clay liners, the four lagoons, each covering 6.25 acres, have been relined with impermeable HDPE liners to bring them up to current design standards.

"Each year in March or April we'll start harvesting biosolids from the lagoons," Breitenstein says. After dewatering with a belt filter press to 15 percent solids, the material is laid out in windrows on 25 acres of asphalt-lined air-drying beds. The final air dried product is 50 to 70 percent solids.

Young poplar trees planted from the first phase of what will be a 394-acre plantation will have potential for sale as saw logs or peelers.

Commission staff members in charge of operating and maintaining the GE/Jenbacher cogeneration system are, clockwise from the front, Todd Anderson, supervisor; and Andy Boering, Mark Mortensen and Monty O'Connor, mechanics.

"We continue to harvest throughout the summer, and we have our first application ready in July," Breitenstein says. "We use our own trucks and end-dump trailers that we load and haul to the farm fields." Most of the farms are within about 5 miles of the lagoons.

After farmers harvest their crop and remove the straw, "We surface-apply the biosolids using tractors and manure spreaders," Breitenstein says. "After we are done with our application, the farmers work it into the field and then replant."

> "One of the values of the tree farm is that it is a fallback for us if for any reason our private land application sites went away."
> **DAVID BREITENSTEIN**

## LIQUID APPLICATION

The tree farm lies next door to the biosolids management facility. Biosolids for use there bypass the drying beds and are applied as liquid. The material is dredged from the lagoons and placed in holding tanks, then pumped through an underground irrigation system to the farm.

The first of three phases of trees, 156 acres' worth, was planted in 2004. "We planted hybrid poplars which are more suitable for milling as either saw logs or peelers," says Breitenstein. For the first two years, the poplars' growth was a bit stunted for lack of moisture. Irrigation lines have since been installed, and effluent is sent to the site through the same pipeline used to transport biosolids.

The water is the same quality as that discharged to the Willamette River, except that the irrigation water is not dechlorinated. The farm uses about 70 million gallons of effluent per year.

## POWER PLAY

Reuse at the Metropolitan Wastewater Management Commission wastewater treatment plant doesn't stop with biosolids and effluent for irrigation. The plant uses biogas from the digestion process to power an 800 kW cogeneration system (GE/Jenbacher). The electricity is sold to the Eugene Water and Electric Board, a city-owned utility. The plant receives nearly $300,000 a year in revenue from the transaction and an additional $80,000 from the sale of renewable energy credits.

Cogeneration at the facility has been in place since 1984, when the treatment plant was built.

The system provides hot water to heat the anaerobic digesters and for building space and domestic water heating. The system provides about 55 percent of the plant's electric power.

## THE PROCESS

The Metropolitan Wastewater Management Commission treatment plant in Eugene handles effluent from member communities along with septage delivered by waste haulers.

Screw-lift pumps (Lakeside Equipment) and submersible pumps (Flygt – a Xylem Brand) are installed at the headworks along with bar screens (FMC). Debris and rags are sluiced to a Channel Monster grinder (JWC Environmental). The flow then passes through a Hycor Helisieve Plus fine screen (Parkson Corp.). A Eutek HeadCell stacked tray system (Hydro International) and aerated grit channels provide grit removal, followed by centrifugal grit pumps and Hydrogritter cyclones and classifiers (WEMCO).

The stream then goes through circular primary clarifiers (WesTech Engineering). The aeration process treatment uses a 700 hp dual-core turbo blower (APG-Neuros), a 1,000 hp blower (Hoffman & Lamson), and fine-bubble diffusers (Sanitaire – a Xylem Brand), followed by secondary clarifiers (WesTech). A Fuzzy Filter tertiary filtration process (Schreiber) with 11.7 mgd capacity provides enhanced TSS removal during high-flow periods.

Three mesophilic anaerobic digesters provide a combined 3-million-gallon capacity. The digesters are equipped with covers and mixers, as well as Muffin Monster grinders (JWC). Digester feed solids pass through a gravity thickener (WesTech) and gravity belt thickeners (Alfa Laval Ashbrook Simon-Hartley). Odor control at the headworks, primary clarifier and gravity thickener stages is provided by filtration media biolfilters (Biorem).

Because the system uses mesophilic rather than thermophilic digestion, the biosolids are Class B, although David Breitenstein, plant manager, says the majority of material tested in the past has met Class A requirements.

> "The application rates on trees could be greater for the nitrogen uptake compared to the grass. Also, the application season is much longer."
>
> **DAVID BREITENSTEIN**

Since that first year, other varieties of poplar have been planted, and they have benefited from the irrigation. "Even though they were planted later, they appear to be of much better quality," Breitenstein says. "So we hope that with future harvests there can be some alternative wood product options."

On the 595-acre farm site, 394 acres are planted with 88,000 hybrid poplar trees in seven varieties. The first harvest in 2013 took 9-year-old trees. The farm's agricultural zoning requires that trees be harvested within 12 years, Breitenstein says.

Application to the poplars is limited only by the winter conditions. "As soon as the ground is dry enough, usually around April or May, we can start applying biosolids clear through to October," says Breitenstein.

For now, he doesn't expect the tree farm to change the overall biosolids program: "I foresee that we would continue with a diversified program, with probably about the same proportion of the biosolids going to the farm as we've been doing." If the primary application sites ever fall out of favor, other farmland is available. But knowing the tree farm is in place offers security for the program's future: "It's a very good insurance policy." tpo

David Breitenstein, facilities manager at the MWMC regional treatment plant, oversees a successful biosolids program that now fertilizes poplar trees in addition to cropland.

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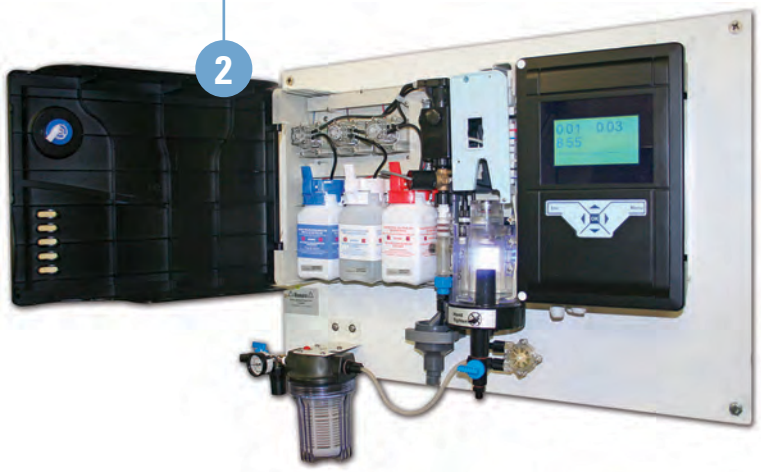



1) The analyzer is suitable for water and wastewater and a variety of industrial applications. 2) The unit can be configured to measure up to four parameters — free chlorine, total chlorine, pH and temperature.

# High Accuracy, Less Chemistry

A MULTIPARAMETER ONLINE CHLORINE ANALYZER FROM THERMO FISHER SCIENTIFIC HELPS WATER AND WASTEWATER FACILITIES GET RELIABLE READINGS WHILE USING SIGNIFICANTLY LESS REAGENT

**By Ted J. Rulseh**

Accuracy matters greatly in online chlorine measurement, but so does the cost of the measurement device and the reagents it consumes.

The Thermo Scientific Orion Chlorine XP analyzer from Thermo Fisher Scientific is designed to combine high performance with low lifetime cost of ownership. Its applications include drinking water and wastewater treatment plants and a variety of industrial processes.

Depending on the user's chosen configuration, the device can measure free chlorine, total chlorine, or both. Its colorimetric functionality minimizes periodic recalibrations and is compatible with all disinfectant systems. Manav Randhawa, the company's product manager for process water analysis instruments, talked about the technology in an interview with *Treatment Plant Operator.*

**tpo: What was the main market need this analyzer was designed to address?**

**Randhawa:** A key comment we heard from users of analyzers was the consumption of reagent. We set out to create an analyzer that would target that customer pain point. This analyzer allows users to customize the reagent mixing, so that based on a five-minute test cycle time, the reagent can last up to two months, versus the 30-day duration that is more typical today. So the cost of ownership from a reagent point of view is essentially cut in half.

**tpo: In dollars and cents, how significant is this potential cost savings?**

**Randhawa:** Let's assume that each reagent replacement costs $50. If the reagent is replaced monthly and the analyzer lasts six years, then the lifetime cost of that reagent is $50 times 72 months, or $3,600. If we can extend that replacement interval to two months, we can reduce that by half. That's the cost of ownership savings the customers were looking for.

> "The maintenance on this analyzer is low. We recommend a yearly maintenance kit. All that needs to be replaced is the filter and the pump."
>
> **MANAV RANDHAWA**

**tpo: How exactly does this analyzer draw and test samples?**

**Randhawa:** The analyzer uses colorimetric DPD chemistry. The sample is first filtered and then admitted to a sample chamber by way of an automatic solenoid valve. A peristaltic pump then delivers reagents to the sample chamber. A piston inside the chamber moves vertically to mix the reagents and the sample.

Once a homogenous mixture has been created, a light beam passes through the chamber, and the color is measured to determine how much chlorine is present in the sample. After the reading is taken, the sample is ejected, and the piston completes a couple more vertical cycles with a fresh sample to make sure the chamber is clean, so that accuracy is sustained from one sample to the next. A unique feature of this unit is that if there is no sample flow, the analyzer will alarm and shut down.

**tpo: How would you describe the accuracy of this unit?**

**Randhawa:** One attribute of this analyzer is that the intensity of light changes or self-calibrates with the new sample intake. For example, if there is a more impure or turbid sample, the light beam intensity automatically increases. That increases the accuracy of the analyzer. We can achieve resolution down to 10 parts per billion, within a measurement range of zero to 10 parts per million.

**tpo: How many parameters can this device measure?**

**Randhawa:** It can be configured to measure up to four parameters — free chlorine, total chlorine, pH and temperature. This reduces the need for customers to purchase multiple analyzers.

> "A key comment we heard from users of analyzers was the consumption of reagent. We set out to create an analyzer that would target that customer pain point."
>
> **MANAV RANDHAWA**

**tpo: What maintenance does this device require?**

**Randhawa:** The maintenance on this analyzer is low. We recommend a yearly maintenance kit. All that needs to be replaced is the filter and the pumps. The automated cleaning of the sample chamber, besides enhancing accuracy, reduces the time required by the customer to make sure the chamber is clean. The chamber does not need to be replaced as part of annual maintenance.

In our field tests, this unit has performed very well even in wastewater applications where the samples are quite dirty.

**tpo: Does this unit have applications beyond the water and wastewater sectors?**

**Randhawa:** It is suitable for a variety of industrial applications, including for bottling plants, cooling towers, and for life extension in reverse osmosis skids, to make sure the feedwater is free of chlorine that would damage the membranes. **tpo**

# Good Well *Hunting*

## THE WATER UTILITY IN WISCONSIN'S CAPITAL CITY COMBS OLDER NEIGHBORHOODS TO FIND OLD PRIVATE WELLS AS PART OF EFFORTS TO PROTECT ITS GROUNDWATER SUPPLY

STORY: **Ted J. Rulseh**
PHOTOGRAPHY: **Mary Langenfeld**

Most old wells Madison Water searches for are not this obvious or as picturesque. From left, Joseph Grande, water-quality manager; Marie Van Aartsen, water-quality program specialist; and Kevin Miller, water-quality aide, sit on a 1934 well built as a Depression-era project near the Lake Mendota shoreline. The city does not use it but honored a request from residents not to dismantle it.

SOME PEOPLE WHO LIVE IN OLDER NEIGHBORHOODS in Madison, Wis., are surprised to find Kevin Miller at their door, asking to look for a private well on their property.

Often their response is, "We don't have a well. We've had city water for 30 years," says Miller, a water-quality aide (and designated "well hunter") with the Madison Water Utility. Sometimes those residents are wrong — they do have a well, an artifact of earlier times that while no longer in use creates a conduit to one of the aquifers that supply the city's drinking water.

Finding and abandoning those wells is a part of Madison Water's source water protection program. As long as old wells exist, they pose a threat of water supply contamination.

Miller finds them in the middle of backyards, next to garages and in basements. When he does, the homeowners receive orders to abandon them, with financial help from the city and sometimes the state Department of Natural Resources (DNR).

> "Many wells were at summer cottages that when built did not need connections to the municipal water system. We wanted to be sure those wells were properly abandoned if they weren't being used."
> **JOSEPH GRANDE**

The well survey program began in 2010, the same year in which Madison Water tightened its well abandonment ordinance. Last December, the utility abandoned its 200th private well since the survey's inception. Joseph Grande, water-quality manager, hesitates to estimate how many more wells might exist — it could be several hundred.

### HIGH-PURITY SOURCE

Madison is rich in water resources — the center of this city of 235,000 is built on an isthmus between lakes Mendota and Monona — but it has relied on groundwater for well over a century. That's because in the "bad old days," the lakes were repositories for sewage and all manner of pollutants.

Source protection matters greatly because Madison residents drink groundwater after only minimal treatment. The utility has 22 deep wells scattered around the city, each with a capacity of about 3 mgd. The wells typically pump a total of 28-30 mgd, although summer usage can drive demand up to 40 mgd, and even 50 mgd in extreme drought.

"Each well has its own treatment," says Grande. "We pump the water out, add chlorine and fluoride, and deliver it to distribution. We treat one


well for iron and manganese removal. At another we recently added an air stripper to remove VOCs, in particular tetrachloroethylene [a dry-cleaning chemical]. The concentration is below the regulatory standard, but we saw it increasing and wanted to add treatment before getting anywhere close to the limit."

## THE EXTRA MILE

Madison Water, a department of the city overseen by an appointed board, goes far beyond what's legally required to safeguard its supply. An example is the utility's all-inclusive approach to wellhead protection planning.

"We're required by the DNR to have wellhead protection plans for wells drilled after 1992," says Grande. "That means we need such plans for only three of our wells, but we decided some years ago to develop plans for all of our 22 wells." To date, 19 of the plans have DNR approval and the remaining three are being prepared for submittal.

### Madison (Wis.) Water Utility

| | |
|---|---|
| FOUNDED: | **1882** |
| CAPACITY: | **67 mgd** |
| EMPLOYEES: | **129** |
| SERVICE AREA: | **City of Madison and surrounding communities** |
| POPULATION SERVED: | **235,000** |
| SOURCE WATER: | **Groundwater** |
| INFRASTRUCTURE: | **22 wells, 30 reservoirs, 828 miles of mains, 8,231 hydrants, 18,792 valves** |
| SYSTEM STORAGE: | **39 million gallons** |
| ANNUAL BUDGET: | **$35 million (operations)** |
| WEBSITE: | **www.madisonwater.org** |
| GPS COORDINATES: | **Latitude: 43°04'52.06" N; longitude: 89°22'19.06" W** |

Kevin Miller and Marie Van Aartsen examine a well that is no longer in use. Proper abandonment of such wells involves contracting with a licensed well driller or pump installer to fill and seal the well with an impermeable material like bentonite clay.

"Wellhead protection plans describe the local hydrogeology, the aquifers and their capacity, and they include data from modeling performed by the Wisconsin Geological Survey that identifies the well's capture zone — the land area from which precipitation ultimately will make it down into the well within five years," Grande says.

In addition, a zoning layer prohibits businesses that use hazardous chemicals (as defined by the U.S. EPA) from locating within wellhead protection areas. Such operations include dry cleaners, gas stations and car repair shops. The minimum protection zone is a 1,200-foot radius around the wellhead; it can extend farther based on the size of the five-year time-of-travel capture zone.

Homeowner Elizabeth Duke shows Kevin Miller where he might locate an old well in her basement's alcove.

## ON THE LOOKOUT

The well hunting program so far has given priority to the wellhead protection areas, starting in older parts of the city where records indicate that some homes are older than the water mains that now serve them.

A good example is the area around Well 14, an older section between University Avenue (which runs through the University of Wisconsin campus) and the shore of Lake Mendota. "In that case we looked beyond the wellhead protection zone because we knew we would find a high concentration of wells in that area," says Grande. "Many were at summer cottages that when built did not need connections to the municipal water system. We wanted to be sure those wells were properly abandoned if they weren't being used."

Another case involves Well 7 on the city's north side. There, a number of houses started construction in the late 1930s but were derailed by the onset of World War II, as building materials were redirected to the war effort. Many people lived in the unfinished homes and had private wells until municipal mains were installed in the 1940s. Other cases simply involve farmhouses in areas that developed into subdivisions as the city grew.

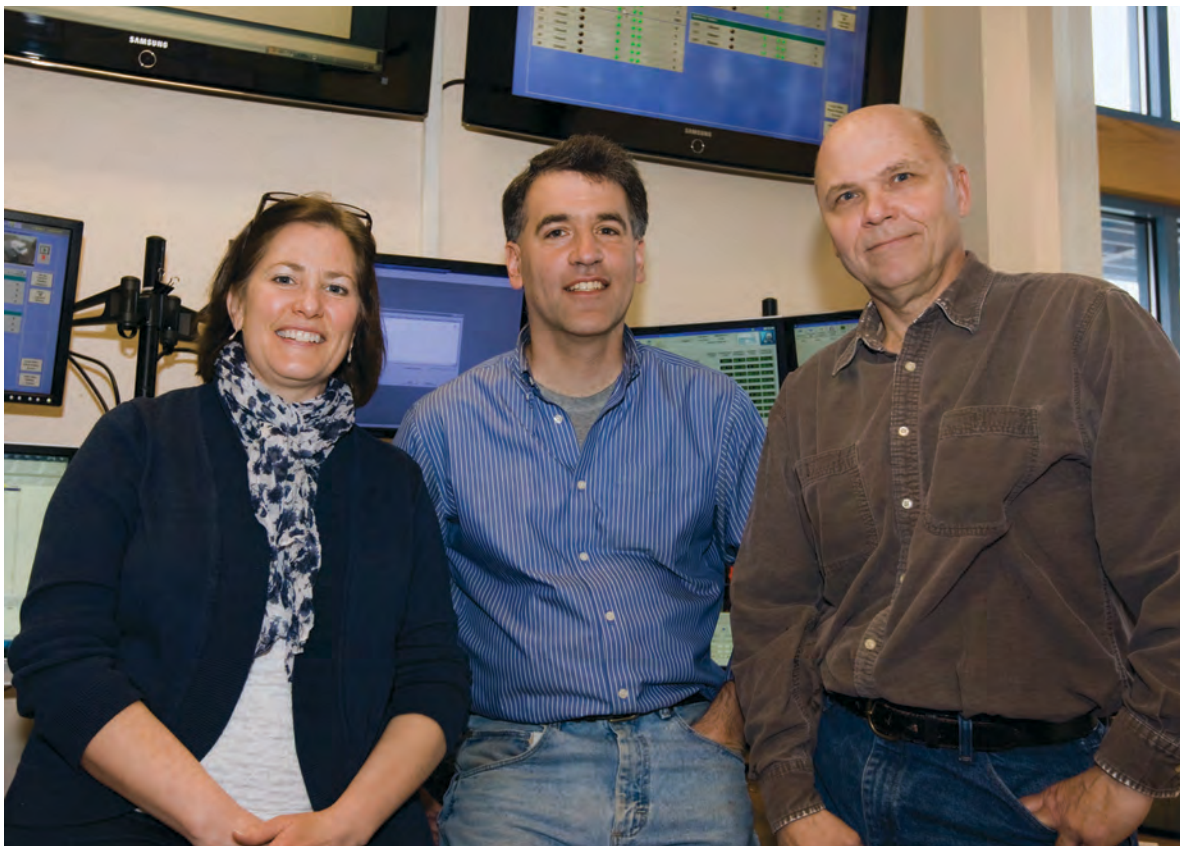
> "Sometimes I have to move a box or two. We typically don't ask them to clean the basement so we can see every nook and cranny."
> **KEVIN MILLER**

## WHY IT MATTERS

Old wells in these and other areas are potential avenues for groundwater pollution. While actual incidents may be rare, they can be severe. During one inspection, Miller found a washing machine discharge hose routed into what the owners thought was a floor drain but was actually a well casing. In another instance, an old well alcove in a basement had a vent pipe to the outside that a fuel oil delivery driver mistook for a fill pipe. Some residents have been known to dump used motor oil into old well casings.

Incidents like that help motivate Miller as he makes his rounds, generally from April through November when there is no snow to obscure evidence of wells. Letters are sent to notify residents of well inspections in their neighborhood. Miller sets out daily with a list of addresses and a map, in most cases looking in backyards for features such as a protruding casing, a concrete slab with a manhole cover in it, or a depression that might indicate the presence of a well pit.

At some homes, based on criteria that include the relative age of the house and the water main, Miller has instructions to check inside the house,



Three of the seven members of the Water Quality Program: Marie Van Aartsen, Joseph Grande and Kevin Miller. The staff also includes Ken Tarver, water-quality aide. Glenn Puntney, Theresa Peters and Harley Lemkuil are classified as cross-connection control inspectors but also serve as private well inspectors.

as well. If no one is home, he leaves a door hanger. If someone answers the door, he explains what he's up to.

Most homeowners he meets feel certain they have no well. "I persist and ask them to allow me to look anyway, and they do," he says. "Many times I do find wells in those situations." Sometimes it's a casing that a previous owner cut down level with the concrete basement floor. Other times it's an alcove — a room about 4 feet square — that once housed a well pump but is now used for storage.

Miller doesn't disturb the home during inspections: "Sometimes I have to move a box or two. We typically don't ask them to clean the basement so we can see every nook and cranny." Finished basements hinder inspection, but Miller doesn't pull up carpeting or ask people to open up drywall. Wells hidden behind improvements are unlikely to present contamination problems.

"I do indicate to people that if they do some remodeling in the future and find a pipe that's not connected to something, they should call and have us look at it," Miller says.

## TAKING ACTION

If Miller finds a well, he gives the homeowner a variety of information, including a description of the reimbursement program and a list of well drillers and pump installers who are licensed for well abandonment. He also refers owners to the Madison Water website, where more information and answers to frequently asked questions are available.

"I recommend they contact a couple of the contractors and get bids on the job," Miller says. "Once they decide on a contractor, that contractor calls us a couple of days before doing the work so we can be there to observe."

Owners receive an official notice and order for the well abandonment. Typically the work must be done in 90 days, although the utility freely grants extensions for financial hardship, weather difficulties and other reasons. "We don't want to make it more costly for them just so we can meet a deadline," Grande says. "Giving them another two months will not increase the contamination risk dramatically. We tend to be pretty flexible as long as we know they're working on it."

The Madison Water program reimburses owners for half the well abandonment cost up to $1,000. Owners can also access the DNR's income-dependent Well Abandonment Grant Program, which covers up to 75 percent of the cost.

"We didn't want an approach where we said, 'You welcomed us into your house to look for this well, and as a thank you we're going to force you to abandon it at your own cost, which may be up to $1,200,'" Grande says. "We're not trying to be punitive. We're trying to protect the groundwater. A number of people have had their well abandonments paid for entirely by city and state funds."

Well abandonment typically means filling the hole with bentonite clay pellets. The cost then depends on the well's depth, which may range from 25 to more than 250 feet. "We sometimes find wells that are fully intact and could almost be plugged in and operated — the pump and wiring are still there," Miller says. Naturally, those abandonments cost more. Sometimes concrete well pits must be collapsed and filled with pea gravel.

## MORE SAFEGUARDS

Madison Water's source water protection goes beyond wellhead protection areas and private well surveys. It includes measures designed to keep diffuse sources of pollution in check and ensure that economic development in wellhead protection zones is appropriate to the setting.

"We rely on existing programs and help spread the word on things homeowners can do," says Joeseph Grande, water-quality manager. "Dane County operates a Clean Sweep program as a way for residents to dispose of household hazardous waste properly. They're able to take hazardous waste to the landfill for a modest fee. We promote that program as a way to reduce the likelihood of those chemicals contaminating the groundwater supply. We also promote less hazardous and more environmentally friendly cleaning products that people can use in their homes."

The utility also works with the city Planning Department to enforce the special zoning layer within wellhead protection areas. "All redevelopment proposals within wellhead protection areas, in addition to review by the Planning Department, have to be approved by the water utility, as well," Grande says. "We work with Planning to promote activities that will be good for the local economy but also consistent with groundwater protection."


A sign in front of Joseph Grande's office shows his belief in his product. "A number of years ago we had bumper stickers made with the slogan, 'I drink only tap water,'" he says. "It was a promotion against the waste associated with bottled water and the virtues of tap water."

> "There are still probably several hundred and maybe up to 1,000 more that we haven't discovered yet. On the other hand, we may only find 200 more."
> **JOSEPH GRANDE**

Grande says, "We are actually enforcing a state code, so if there is any doubt about whether we should allow a pit to remain or have it abandoned, we go to the DNR and ask for guidance. If a homeowner doubts our authority or questions our decisions, we go directly to the DNR and ask what they would tell the well owner to do."

## THE ROAD AHEAD

Madison Water has completed well surveys around seven of its 22 deep wells, starting around those where old private wells were most likely to exist. "We are unlikely to find many wells in the remaining wellhead protection areas, just based on the ages of the neighborhoods," Grande says. "But when we expand beyond the wellhead protection areas, there likely will be significant areas that have unabandoned wells."

Meanwhile, the utility has informed local real estate associations about its well abandonment program, and some calls for inspections come from agents or from owners of homes in the process of being sold.

The sheer number of property inspections around a municipal well can be substantial. The Well 14 area, which served as the pilot for the well hunting program, saw 802 homes inspected externally, and 304 of those inside, as well. The Well 7 survey included 543 external inspections, 170 of those also inspected inside.

In all, including wells abandoned in the years before 2010, Madison Water has closed off some 500 private wells. "There are still probably several hundred and maybe up to 1,000 more that we haven't discovered yet," Grande says. "On the other hand, we may only find 200 more."

Whatever the case, Madison residents can feel confident their groundwater is being protected as old wells are sealed off, year by year, step by methodical step. **tpo**



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# Trouble on the Horizon?

DIOXANE HAS BEEN APPEARING IN COMMUNITY WATER SUPPLIES. HERE'S A LOOK AT THIS EMERGING CONTAMINANT AND THE AVAILABLE TREATMENTS.

**By John Rowe, Ph.D.**

A small community contacted Florida Gateway College with a concern about 1, 4-dioxane, a new pollutant that has been found in water supplies in California, New Hampshire, Colorado and North Carolina. Community leaders explained that their treatment plant tests for only a fraction of the chemicals in use today.

If a water treatment facility's team members know what is in the raw water, they can test for and remove it. However, many chemicals can contaminate water supplies, and it is not feasible to test for all of them. Wellhead protection plans and sanitary surveys are conducted to identify sources and types of pollutants and to prevent pollution from occurring.

The pollutant of interest to this community, 1, 4-dioxane (often called simply dioxane) is a heterocyclic organic compound — a colorless liquid with a faint sweet odor. Classified as an ether, it has been used mainly as a stabilizer for the solvent trichloroethane and occasionally as a solvent for various applications. Legislation in the 1990s aimed to phase out trichloroethane through the Clean Air Act and the Montreal Protocol. Since then, production of dioxane as a stabilizer has decreased. Today, it is primarily used as a solvent for cellulose, organic products, lacquers, paints, cosmetics, deodorants, emulsions and adhesives.

## IMPACTS ON GROUNDWATER

Dioxane is irritating to the eyes and respiratory tract. Heavy exposure (significantly higher than in commercial products) can cause damage to the central nervous system, liver and kidneys. Accidental worker exposure to dioxane has caused several health problems. Dioxane is classified as a possible human carcinogen and is a known carcinogen in animals. The greatest health risk from dioxane is associated with inhalation of vapors.

Dioxane is highly soluble in water, does not readily bind to soils and readily leaches to groundwater. It is also resistant to natural biodegradation. Because of this, a dioxane plume is often much larger and farther down gradient than the associated solvent plume.

We explained to the community leaders that dioxane has affected groundwater supplies — it has been detected at or above 1 part per billion in many locations in the U.S. In New Hampshire, it was found at 67 sites in 2010 in concentrations from 2 ppb to more than 11,000 ppb. Thirty of these sites were solid waste landfills, most of which had been closed.

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In 2008, testing found dioxane in almost half of tested organic personal-care products. Since 1979, the Food and Drug Administration (FDA) has tested cosmetic raw materials and products for dioxane. It was present in certain ingredients at up to 1,410 ppm and in finished products at up to 279 ppm. Levels exceeding 85 ppm in children's shampoos indicate that close monitoring of raw materials and finished products is warranted. The FDA encourages manufacturers to remove dioxane, but they are not required to by federal law.

In 1992, 1.13 million pounds of dioxane was released into the U.S. environment, about 60 percent to the air, about 40 percent to surface waters and less than 1 percent onto land. It has been detected in surface water, groundwater and wastewater treatment plant effluents.

## EMERGING CONTAMINANT

Inhalation is the most common route of exposure to dioxane, but exposure may occur through contaminated food and water or through contact with skin. Exposure in tap water through inhalation during showering can result in higher exposures than ingestion through drinking water. Acute side effects include irritation of the eyes, nose, throat and lungs; drowsiness; vertigo; headache; and anorexia. Human and animal studies identify the liver and kidneys as the target organs for dioxane toxicity. Chronic exposure may result in dermatitis or liver and kidney damage. The reproductive effects are unknown.

The EPA classifies dioxane as an emerging contaminant and includes it in the third Drinking Water Contaminant Candidate List. It is also a proposed contaminant for the third Unregulated Contaminant Monitoring Rule program. In 2004, Colorado became the first state to establish an enforceable cleanup standard for dioxane in groundwater and surface water. The standard, being phased in, required facilities to meet a 3.2 ppb limit by 2012.

Pump and treat remediation is the primary method used at sites contaminated with dioxane. Advanced oxidation processes involving hydrogen peroxide with UV light or ozone are used to break down the chemical. Breakdown products include aldehydes and organic acids. Other remediation treatments include photocatalysis and soil vapor extraction. Dioxane is not well controlled by adsorption onto activated carbon and is not readily removed by air stripping. It is not well degraded by typical soil microorganisms.

## EFFECTIVE TREATMENTS

Several treatments are effective for dioxane removal; some remove more than 99 percent under specific conditions. Advanced oxidation processes such as ozone combined with hydrogen peroxide, UV light combined with titanium dioxide, UV light combined with peroxide, and hydrogen peroxide combined with ferrous iron are the most effective treatments. Atypical treatments that show promise include biological treatment and biofiltration with added microbes, corona discharge, gamma irradiation and sonication.

Aeration, chlorine disinfection, permanganate addition, conventional treatment, hydrogen peroxide addition, ozonation, powdered activated carbon and UV irradiation alone have been ineffective at removing dioxane. Adsorptive media is also ineffective; aeration and air stripping can remove 3 percent of the contaminant. Biological filtration using an aerobic bacterial strain, like P. dioxanivorans, can remove 93 percent, granular activated carbon 20 percent, reverse osmosis can remove 96 percent and nanofiltration 48 percent.

College representatives encouraged the community leaders to test for dioxane to determine whether it is a contaminant that merits local attention. The most probable source in their area would be wastewater effluents.

ABOUT THE AUTHOR

*John Rowe, Ph.D., is a professor of Water Resources at Florida Gateway College in Lake City, Fla. He can be reached at john.rowe@fgc.edu.* tpo

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# What's All the Fuss?

BY NOW BIOSOLIDS SHOULD HAVE COME OF AGE AS A WELL-ACCEPTED RECYCLED PRODUCT, YET PUBLIC SUSPICION STILL EXISTS. HERE'S A PERSPECTIVE ON THE ISSUE FROM THE NORTHWEST US

**By Ted J. Rulseh**

Maile Lono-Batura

Biosolids have been put to beneficial use for decades, in fact for centuries. Across North America, excellent recycling programs have thrived for 20, 30, 40 years and more.

High-quality products fertilize farms and forests; help lawns, gardens and landscapes thrive; and restore lands laid bare by mining. Yet still, on almost a weekly basis, in some state or province, a controversy erupts over biosolids.

The best publicized example is the decision earlier this year by natural foods retailer Whole Foods to refuse to sell produce grown in soil fertilized with biosolids. On top of that, we often see news reports of this or that rural township or county being petitioned to ban or severely restrict land application of biosolids.

To put it mildly, the science behind these initiatives is highly suspect. Yet people are concerned, and their concerns must be taken seriously and addressed sensitively. Maile Lono-Batura, executive director of the Northwest Biosolids Management Association, has seen these issues often and up close. She talked about the state of public acceptance of biosolids, and other topics, in an interview with *Treatment Plant Operator*.

**tpo: What do you observe, regionally and nationally, about the state of public understanding of biosolids and beneficial use?**

**Lono-Batura:** It largely depends on how people are first exposed to the subject. If they have never heard of it and their very first exposure is something they see in the media, there are different directions they can go in assimilating that.

Today, with the ability to write blogs and create communities online, we find people banding together who are either for or against something. So we have groups across the country who try to distribute and spin information about biosolids. It's an easy subject to misconstrue and to find a following within Internet pockets across the U.S. and in Canada. I have file folders on different controversies that have happened over the years, local and national.

> "Today, with the ability to write blogs and create communities online, we find people banding together who are either for or against something. So we have groups across the country who try to distribute and spin information about biosolids."
> **MAILE LONO-BATURA**

**tpo: Given that beneficial use programs are widespread, why do you suppose that the concept isn't more widely accepted?**

**Lono-Batura:** It depends on the community people are in, what they have heard about it and, most important, who they have heard it from. If they hear it from a friend who uses it in a garden and really believes in how it works, that's different from if they hear about it through a Google Alert or from a public meeting. It's very much a function of the messenger and the format of the message.

**tpo: In the past, certain opponents of biosolids have gained national attention. Sources at Cornell University come to mind. Do you still see such sources having influence?**

**Lono-Batura:** Murray McBride and Ellen Harrison were the movers and shakers at Cornell. They did a paper called "The Case for Caution," and more recently a second rendition of it. The flip side of all this controversy, and the research reports battling over who's right and who's wrong, is that it keeps us on our toes. We do need to pay attention to how we use biosolids. We need to use it right, and use it respectfully. A reason associations like ours have lasted is that we truly believe we need to be good neighbors. When you see bad apples, you have to say, "Hey, please be a better environmental steward. Observe how other people are doing this so that we can have good relationships with our communities."

**tpo: In this day and age, when best practices are well known and widespread, do you still see agencies handling biosolids in less than ideal ways?**

**Lono-Batura:** Ideally, everyone wants to do it the right way. But if there are budget pressures, maybe an agency goes with the lowest-bid contractor, who might not operate as responsibly as the one who costs more. You also can have pressures from upper management and what they believe is right. In the end, the takeaway is that we all need to do a good job and make sure we provide good examples of how to use this product responsibly.

**tpo: Does it seem to you as if the closer people actually get to the product, the more accepting they become?**

**Lono-Batura:** Yes. You'd think it would be the opposite for some people, but it's not. When they see the product, it looks like soil. It doesn't look the way the blogs picture it. They see that it's a product. It does work, and it's safe. For example, people go to TAGRO [in Tacoma, Wash.]. They see the headquarters offices, the production facility, and a garden lush with flowers, fruits and vegetables. The proof is right there that it does work.

**tpo: Where people are concerned about biosolids, what is it fundamentally that they don't understand?**

**Lono-Batura:** A few things play into it, and one of them, even though many people deny it, is the 'ick factor.' Biosolids came from humans, and it's strange to some people that we would even consider using it. Manure from

a grass-fed animal, they have no problem with that. In addition, with more advanced research capabilities, we're detecting substances in biosolids at lower concentrations, and we're seeing things we hadn't seen before. And so people think, 'What is this doing here and how long is it going to last in the environment? Is it safe?' A large reason our organization was created is to collaborate on research to help answer those questions. In reality, many of these are compounds where the highest exposure people will get is from direct contact — like through brushing your teeth or taking a pill.

**tpo: From the point of view of a clean-water agency or an operator, how can your association help them?**

**Lono-Batura:** Our membership base is clean-water agencies, along with subscriber companies who provide services to that group. Since our origin in 1987, part of our charter has been to fulfill needs for biosolids managers. This region needed a network to disseminate best practices and help guide regulations. In Washington, our organization played a major role in creating a unified biosolids rule for the state, in place of a patchwork quilt of county regulations.

Another big part of our mission is to answer questions that people have, and that we have. We pool our research funds. Every year nearly half our budget goes to research at local universities. We ask: What do we want to know? What's most important? What are our priorities?

**tpo: What are your association's research priorities now?**

**Lono-Batura:** They change from year to year. Since the early 1990s, we have worked with the University of Washington, Washington State University and Oregon State University. At present we're also working with the University of Arizona. Members have the ability to direct funds toward a specific project if it can't be funded within the general research budget.

One area we've looked at in the past year is carbon accounting and how biosolids contribute to carbon sequestration in the soil. We're also looking at compound breakdown. People want to know what's happening to the compounds that enter wastewater. Some of them go right to the biosolids; others are more of a concern for the effluent side. So we look at the fate of contaminants in biosolids and how that may affect application rates.

There's also research on using biosolids in urban areas, such as in stormwater bioretention systems. The University of Arizona has done extensive research on bioaerosols, because that was a big concern. Some groups opposed to biosolids said people were getting sick from aerosols from application sites nearby.

**tpo: What would you say to those who claim biosolids have not been studied adequately?**

**Lono-Batura:** The development of the federal 503 biosolids regulation took an extensive amount of work. It was a rigorous risk assessment that serves as the foundation on which other research is built. It gives biosolids a strong position and a clear sense of direction. In our area, Washington State University has studied tall fescue crops over a 20-year period, looking at growth, harvest and at what's happening in the soil. So while it's often alleged that there haven't been any long-term studies, actually there have been.

**tpo: How does your association help members on the communications front, when they do run into biosolids controversies?**

**Lono-Batura:** We put out information that is easily digestible for the public. Like our one-page fact sheets that tell in very plain language what biosolids in forestry is about, and what biosolids in agriculture is about. We make these fact sheets available to our members or anyone interested in learning more about biosolids.

In addition, under our university research agreements, our researchers are available to go to members' facilities and end-use sites and help them troubleshoot their operations. That has become an essential part of what we do. We also have an extensive research library. Every month our University of Washington researcher distills down all the recent articles, whether favorable or unfavorable to biosolids, and gives a summary so that members have a pulse on what is happening. The summary is available online, and our members have access to the full articles. More than 2,600 sources are currently listed there. Other regional biosolids associations have contributed to this library, so their members can have access, as well.

**tpo: Briefly, how would you characterize the state of biosolids in your region?**

**Lono-Batura:** We have a great beneficial use rate in the Northwest — 88 percent. And we have a lot of fantastic long-term programs, from agriculture, to renewable fuel crops, to mine reclamation. There's all this groundbreaking research and a network that is really strong. On the other hand, there continue to be challenges, especially in the form of proposed bans. We've seen that in California and Virginia, and they're coming to this neck of the woods, as well. It serves to bring our network closer together to work more strategically on how to make sure beneficial reuse can continue.

> "We put out information that is easily digestible for the public. Like our one-page fact sheets that tell in very plain language what biosolids in forestry is about, and what biosolids in agriculture is about. We make these fact sheets available to our members or anyone interested in learning more about biosolids."
>
> **MAILE LONO-BATURA**

We've formed a group called the Association of Biosolids & Byproducts Associations (ABBA), and we meet quarterly to talk about what's going on in each of our regions. It's a great way to gauge what's happening. Why are people upset about this program? Why is some other program working well? And how do we duplicate that in our neck of the woods?

**tpo: How would you assess the impact of the decision by health food retailer Whole Foods not to buy produce grown with biosolids as fertilizer?**

**Lono-Batura:** The ABBA group has reached out to them saying we understand their decision, based on their business interests, but that we would like them to learn a little more about biosolids. They don't have to sell produce that comes from those farms, but just give us a chance to show what we really do and that it's not what their sources are telling them. tpo

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DIRECTORY:

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DIRECTORY:

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| **Ovivo USA, LLC**<br>2404 Rutland Dr., Austin, TX 78758<br>512-834-6000 Fax: 512-834-6039<br>info.us@ovivowater.com www.ovivowater.com | | ✔ | | | | | | ✔ |
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| **UGSI Chemical Feed**<br>1901 W Garden Rd., Vineland, NJ 08360<br>855-669-3845 856-896-2160 Fax: 858-218-3792<br>info@wtchemfeed.com www.ugsichemicalfeed.com<br>See ad page 11 | | | | ✔ | | | | ✔ |
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| **WesTech Engineering, Inc.**<br>3665 S West Temple, Salt Lake City, UT 84115<br>801-265-1000 Fax: 801-265-1080<br>info@westech-inc.com www.westech-inc.com | | | | | | | ✔ | ✔ |

"The team members are the greatest resource at this plant. They know it. They've been here forever. They do the work. I'm support staff. I coordinate what they do, and the best way for me to do that is to listen to what they have to say."

**Nate Tillis, Operations and Maintenance Supervisor**
**Beloit (Wis.) Water Pollution Control Treatment Facility**

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# People.

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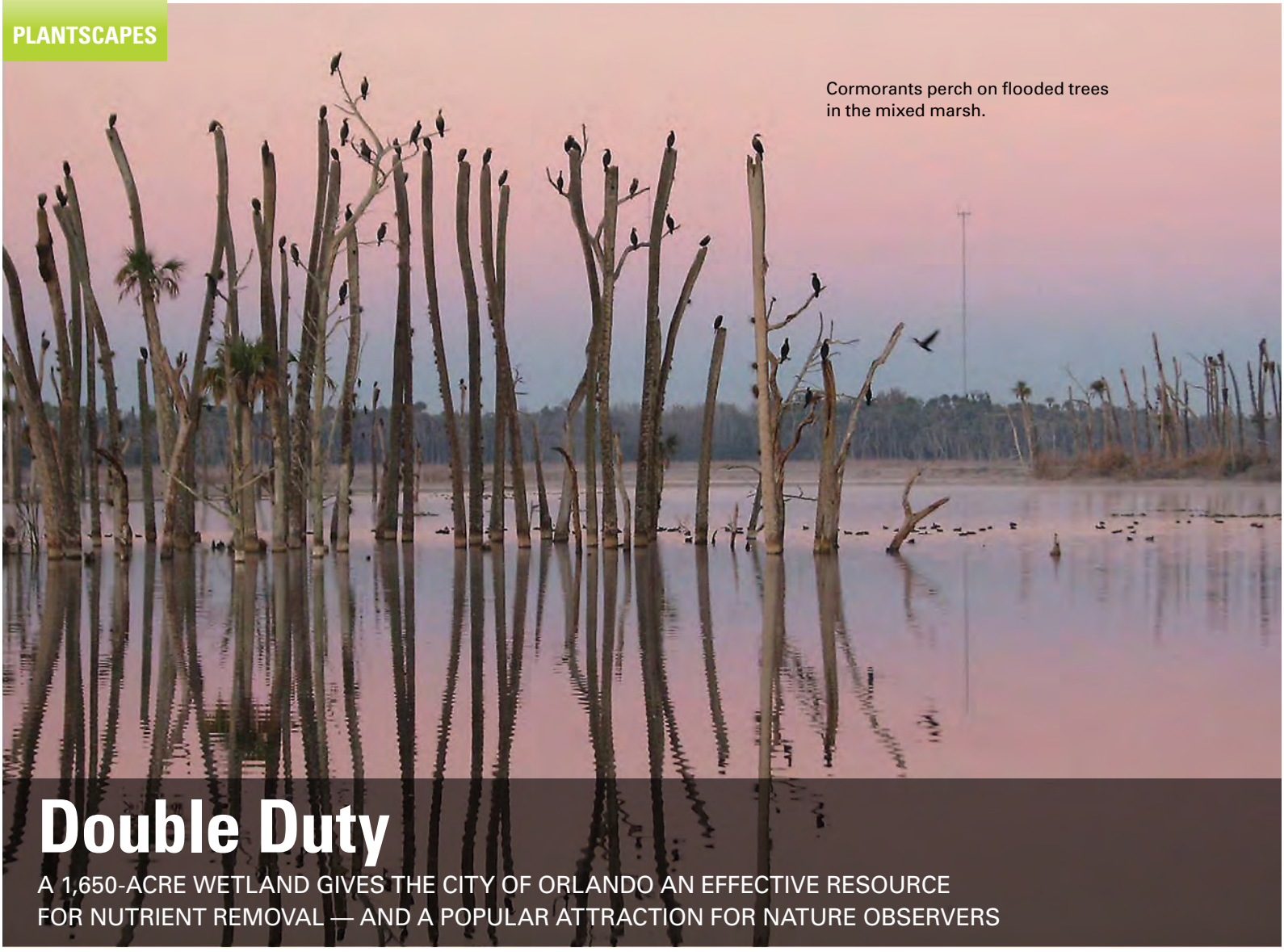


Cormorants perch on flooded trees in the mixed marsh.

PHOTOS COURTESY OF IRON BRIDGE WASTEWATER RECLAMATION FACILITY

# Double Duty

## A 1,650-ACRE WETLAND GIVES THE CITY OF ORLANDO AN EFFECTIVE RESOURCE FOR NUTRIENT REMOVAL — AND A POPULAR ATTRACTION FOR NATURE OBSERVERS

**By Jeff Smith**

The Iron Bridge Wastewater Reclamation Facility can claim several firsts. It was one of the world's largest treatment plants to use rotating biological contactors (RBCs) for BOD removal and first in the United States to use RBCs for denitrification. But its best-known feature is the world's first large-scale tertiary treatment constructed wetland — which doubles as a hugely popular recreation stop.

Built in 1987 on the site of a former dairy farm, the 1,650-acre wetland helped the City of Orlando, Fla., meet a mandate to lower nutrient discharges at a time when population was increasing and the 24 mgd capacity of the Iron Bridge plant was maxed out. Reclaimed water from the plant travels 17 miles in a 4-foot-diameter buried pipe to a structure that distributes it among three separate but integrated wetland cells, each with its own ecological character.

### PART OF THE PROCESS

"The wetlands are part of our permitted treatment process," says Bob Rang, plant manager at Iron Bridge (which no longer uses RBCs). "They have expanded its role into some public uses, but water that's out there is nonpublic access reuse water."

The public-use portion is the wildly successful Orlando Wetlands Park, which the city created a couple of years after the wetlands proved successful in nutrient removal. As recalled by Mark Sees, a colleague of Rang, the mayor at the time commented during a visit: "Wow! This place is gorgeous — let's make it into a park."

Since then the Wetlands Park, which Sees manages, has developed into a nature complex with 18 miles of earthen-berm roads that compartmentalize the wetlands into 17 treatment cells. Six more miles of hiking, biking and horseback-riding trails meander through various habitats past rest areas with benches, observation decks and four picnic pavilions.

Trailside information kiosks with brochures and maps complement an education center that explains the treatment functions of the plant and wetlands. A 50-car parking lot serves the park's more than 15,000 annual visitors — locals as well as tourists. The park is open to the public from February through mid-November.

### FESTIVE TIME

Environmental organizations sponsor events at the park, such as the North American Butterfly Association's annual butterfly count, which has recorded more than 60 species. Native-plant hikes and bird-watching tours are common. Boy Scouts have placed birdhouses and bat boxes throughout the park, and they hand-planted 2,000 seedling trees.

But the biggest event is the annual Wetlands Festival in mid-February. "This year's festival was awesome," says Sees. "More than 4,000 people attended, and we unveiled our incredible wastewater display." The 22-foot-

Custodians of the wetlands include, from left, Gary Foreman, equipment operator; Kathryn Rothfeld, environmental specialist III; and Mark Sees, wetlands manager.

LEFT: Wetlands cell showing flooded trees and a roadway winding along a berm. RIGHT: About 750 alligators live in the wetlands.



> "The combination of wetlands treatment and advanced wastewater treatment has proven that strict water-quality goals can be achieved while providing an amenity for wildlife and the public."
> **MARK SEES**

long display includes an operating scale model version of a lift station, bar screens, aerator, clarifier and disinfection, along with miniature wetlands and rapid infiltration basins. The display was created by Athena Parslow, the city's wastewater compliance program manager, and her team. The festival included many other attractions:

- An American Indian youth organization performed a tribal dance demonstration.
- The Florida Trail Association led wilderness hikes.
- The Florida Native Plant Society conducted native plant identification tours.
- A local radio station personality hosted a lawn and garden show.

Other activities included photo hikes led by professional wildlife and nature photographers, bird-banding and butterfly netting demonstrations, hay rides and guided bus tours. Music from a live band added to the festivities.

## A LONG JOURNEY

Park visitors can view the 17 cells that make up three wetlands systems, separated by earthen berms and designed to process a total of 35 mgd of reclaimed water. Flow begins at the distribution structure with a deep marsh habitat of cattails and giant bulrush. Next come mixed marsh and wet prairie cells of pickerelweed, duck potato and aquatic shrubs. The water's final holdover before discharge to the St. Johns River is a hardwood swamp populated with cypress, ash, hickory and tupelo trees.

Altogether, more than 2 million aquatic plants provide habitat for wildlife like foxes, squirrels, raccoons, bears, alligators and turtles. Wading and migratory birds, such as brown pelicans, sandhill cranes, great blue herons, least terns, bald eagles, hawks and vultures, also find refuge in the wetlands.

Sees and his wetlands staff routinely sample the water at designated points. Flow takes a 15-foot drop in elevation from the inlet to the outfall during its 30- to 40-day trip through the wetlands. "Operators from the Iron Bridge Facility sample at the outfall each day," Sees notes. "They also help us out with mechanical and electrical maintenance when we need it."

To maintain the wetlands' nutrient collection capacity, the cells — from 15 to 150 acres each — are periodically drained and about 18 inches of sediment mucked out. Heavy equipment is used to dig wind-ditches around the cell, and hydraulic pumps dewater the muck before bulldozers and excavators move it to windrows for drying. After a few months, the dried muck is trucked to on-site storage piles. Restoration and replanting completes the 15- to 30-year cycle.

After about a year in storage, the dried material becomes a nutrient-rich topsoil the city ultimately intends to sell. A nearly completed agreement with a fertilizer contractor will ensure future reuse, according to Sees.

He concludes, "The combination of wetlands treatment and advanced wastewater treatment has proven that strict water-quality goals can be achieved while providing an amenity for wildlife and the public." tpo

### Share Your Ideas

***TPO* welcomes news** about interesting features of your facility's grounds, signage or buildings for future articles in the PlantScapes column. **Send your ideas to editor @tpomag.com or call 715/277-4094.**

# Better Than Rehab

## A NEW PLANT WITH A SPECIAL LAGOON TREATMENT SYSTEM HELPS A SMALL MISSOURI CITY IMPROVE EFFLUENT QUALITY AND COMPLY WITH STATE PERMIT LIMITS

**By Tim Canter**

The 20-year-old Miner (Mo.) Wastewater Treatment Plant faced a number of technical issues in 2012. The town's old three-cell 0.302 mgd aerated lagoon had high levels of suspended solids. Its ammonia and nitrogen concentrations were above their targets.

"There was quite a bit wrong with the plant," says Marvin Hatton, chief operator. The city needed to clean up its discharge to comply with Missouri Department of Natural Resources (DNR) and U.S. EPA regulations.

The plant's staff and Norman Lambert, city engineer, decided it was time for a full-service upgrade. They called in Environmental Dynamics International (EDI) to assess the issues and develop a rehabilitation plan, ultimately choosing to replace the plant with a brand new facility.

Essential to the new process is an Intermittently Decanted Extended Aeration Lagoon (IDEAL) system. The solution has successfully reduced effluent ammonia, BOD and TSS and enabled the plant to meet DNR requirements.

### DOWNSIZING TO UPGRADE

Miner (population 980) is a rural community halfway between St. Louis and Memphis, Tenn. Its old plant would have needed significant work to be able to comply with tightening effluent standards. "It would have been just as cheap to have a new plant put in as to have the old one cleaned out and put back in service," Hatton says. "To be honest, it was just time to update."

> "It's a pretty good little plant. Our numbers have been really good. I mean, really good."
> **MARVIN HATTON**

Partial mix zone (left) for sludge management and quiescent zone (right) for solids separation.

PHOTOS COURTESY OF TIM CANTER

The rural community of Miner found a brand new lagoon treatment system to be a better option than a rehabilitation project on an existing lagoon.

Lambert selected EDI to design and implement the new lagoon treatment plant with the IDEAL solution, which focuses on eliminating solids, oxygen demand and ammonia in the effluent. The process can provide full nitrification while removing a majority of total nitrogen through denitrification.

The overall process uses two ponds: the IDEAL system for advanced treatment followed by a partial mix basin with a settling zone for sludge storage and solids separation. This shrinks the footprint of the plant while improving its efficiency and effectiveness.

The IDEAL process aerates influent for two hours for BOD removal and nitrification. The wastewater then enters an anoxic settling and decant phase (one hour each), providing denitrification, retaining biomass and discharging clear water.

Supernatant and stabilized waste sludge are partially mixed in the second pond to maintain a positive level of dissolved oxygen to digest solids and prevent ammonia rebound. A small portion of the secondary pond is a dedicated quiescent zone where solids not trapped in the partial mix zone settle. This allows clear water to flow out of the pond and to UV disinfection. Finally, the effluent discharges to the North Cut Ditch.

"It's a pretty good little plant," Hatton says. "Our numbers have been really good. I mean, really good."

### MAJOR IMPROVEMENTS

When construction for the lagoon process was complete in November 2012, EDI representatives spent a week training the staff on the new equipment and processes. Later, a joint effort between the city and EDI tracked the plant's effectiveness during the record-cold winter of 2013-2014.

Hatton and his staff gathered composite influent and effluent samples twice a week while monitoring temperature in the IDEAL pond. Those

The new lagoon system has functioned well in warm and cold conditions and has reduced ammonia, BOD and TSS to below permit limits.

samples were sent to Environmental Analysis South in Jackson, Mo., and tested for TSS, ammonia, BOD, nitrate, nitrite and total nitrogen.

Consistently, analysis of incoming and outgoing nutrient levels has been strongly positive. Ammonia levels, for example, have averaged 27 mg/L entering the plant and drop to less than 0.05 mg/L by discharge. Not one sample has come in above the method detection limit of the analysis, even when the temperature dropped below 3 degrees C.

Similarly, BOD dropped from 230 mg/L to 4.5 mg/L and TSS from 104 mg/L to 5.3 mg/L. Total nitrogen dropped 66 percent, from 32 mg/L to 11 mg/L. A site visit from DNR officials in which samples were taken and tested also yielded enthusiastic feedback.

## CONTINUING PARTNERSHIP

Hatton notes that the process was easy to install and requires little maintenance. To obtain maintenance support for the new system, the city explored a maintenance agreement with EDI. "If I have any problem I can call and they'll do a little troubleshooting on the phone, and if that doesn't take care of it, they'll come down," says Hatton. "They've been really good with us."

### ABOUT THE AUTHOR


*Tim Canter of Environmental Dynamics International works on development of advanced wastewater treatment systems for earthen basins. He can be reached at Tim.Canter@wastewater.com.* **tpo**

# Positive Feedback

## CLOUD-BASED SOFTWARE HELPS HOMEOWNERS MONITOR AND COMPARE THEIR WATER USAGE AND TAKE ACTION, ENABLING THEIR UTILITY TO CUT CONSUMPTION SUBSTANTIALLY

**By Scottie Dayton**

PRODUCT: | **Home Water Reports service**
MANUFACTURER: | **WaterSmart Software**
USER: | **East Bay Municipal Utility District, Oakland, Calif.**
APPLICATION: | **Water conservation programming**
BENEFITS: | **Saved 3,300 to 6,200 gallons per household in fiscal 2013**

Customers adopting water efficiency practices and conservation programs from the East Bay Municipal Utility District enabled water usage to remain flat for 40 years despite a population increase of 300,000 (30 percent).

Nevertheless, Richard Harris, P.E., manager of water conservation for the district, based in Oakland, Calif., sought ways to save even more water. "People can't manage what they can't measure," he says. "How to create that awareness is a challenge common to most utilities."

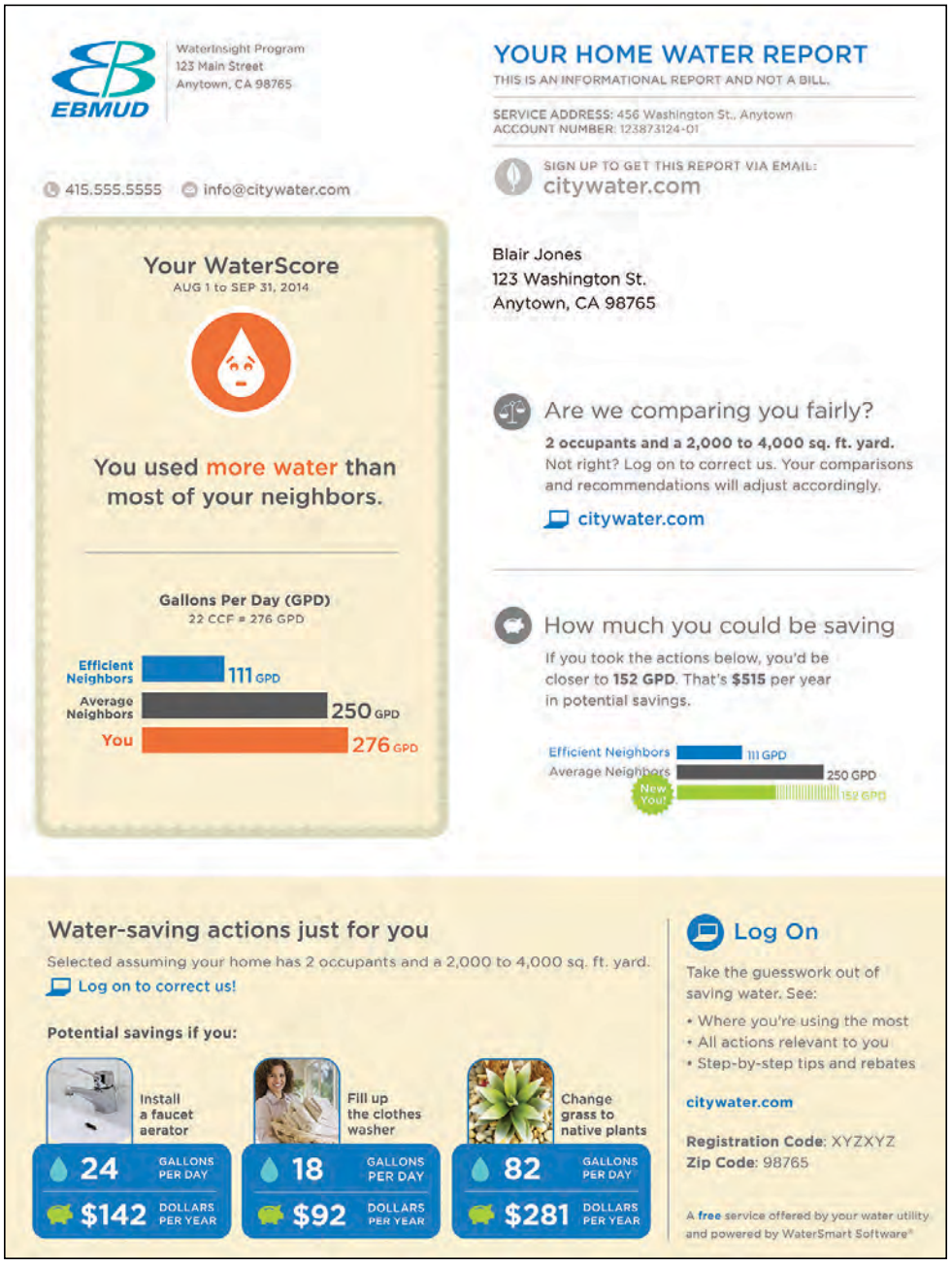
In June 2012, the district agreed to a year-long pilot project to test the Home Water Reports service from WaterSmart Software. The Web-based data management tool gives homeowners periodic information on their water use, then compares it to how much they used in the past, the average use of similar households, and how much the most efficient similar households use.

In this first independent study of the software, sponsored by the California Water Foundation, a test group using the service reduced water use by 5 percent above a control group. "During the test period, the service saved 3,300 to 6,200 gallons per household," says Harris.

The study also showed that those receiving Home Water Reports were twice as likely to take part in the district's water conservation programs, which included rebates for high-efficiency toilets and clothes washers and incentives for water-saving landscape retrofits. They were more than six times as likely to request a home water conservation audit. Households that received their reports on paper performed slightly better than those who received them by email.

### ASSEMBLING THE PLAYERS

The district's two-county, 332-square-mile service area has 22 communities totaling 1.34 million customers. The area has three major regions. The flat western portion is influenced by San Francisco Bay and its fog belt. The hilly central region requires extensive pumping. The eastern portion has higher temperatures and a less dense population on larger lots. "Within a 30-mile radius, summer temperatures can differ by 30 degrees F," says Harris.




VISUALS COURTESY OF WATERSMART SOFTWARE

An example of a print-format home report generated by the WaterSmart software.

The district's conservation initiatives included a home survey kit to acquaint customers with their water use, standard residential water audits, giveaways of low-flow showerheads, faucet aerators and hose nozzles, and free dye tablets to help detect leaking toilets.

"We saw WaterSmart's turnkey solution as a cost-effective way to engage all our customers, build their trust, and give them access to information they need to manage their water," says Harris. The software uses the district's billing and meter reading data to create personalized household water reports and dashboards that give customers feedback on their usage.

Communities in Castro Valley were selected as the test group. "We sent letters to 8,000 single-family households explaining the pilot program, then included their first Home Water Report in a separate mailing or email seven to 10 days after their most recent utility bill," says Harris.

The district also identified 1,500 other participants from throughout its service area to bring the total test group to 9,500 households. The report gave owners the choice to opt out, but fewer than 0.1 percent did so. Another 5,000 single-family households were chosen from the Oakland area at random for the control group. They did not receive the reports.

## A FRESH VIEW

Customers were encouraged to select electronic reports, which generally cost one-third as much to distribute as printed ones. Many did, and they also began using the program's WaterInsight website. The home page summarizes water use relative to a peer group and recommends tips and tools to achieve the next level of water conservation. Other pages allow users to verify or update household information, track their usage in greater detail, and track the actions taken to reduce it.

> "We received numerous letters thanking us and detailing what participants had learned from the program. We also had quite a few customers dramatically reduce their water use."
> **RICHARD HARRIS, P.E.**


An example of a Web report generated by the software. Links at the bottom of the page allow users to "drill down" for more detailed information.

"The portal allows customers to link to our conservation services, facilitate rebate applications, and save a survey report to use as a personal work plan for water-saving activities over the next three to six months," says Harris. "Every 60 days, we forward our meter-reading data to WaterSmart, and they generate new target benchmarks for participants."

During the pilot, the district distributed surveys via email and postal mail for participants' reaction to statements about water use. "We received 2,600 replies, or a 21 percent response," says Harris. "The survey helped us identify areas of customer interest, established baseline household demographics, and told us where to apply more resources and energy."

Every two months, the district uses the portal to send messages about what it is doing, listing community events and offering additional conservation tips.

The technology often opened the eyes of those who believed they were doing a good job of conserving water. "We received numerous letters thanking us and detailing what participants had learned from the program," says Harris. "We also had quite a few customers dramatically reduce their water use."

## ON THE HORIZON

Harris says he needs another year or two of data before he'll know the true cost-benefit of the program. "On average, the annual cost of the Home Water Report service is about the same as the cost of a showerhead distribution program," he says. "The cost is certainly lower than many other conservation measures, and the amounts conserved can defer the purchase of supplemental water or the capital expenditures to expand the supply."

Harris estimates it costs $5 to $10 per account per year to deliver reports. The district has signed a three-year contract with WaterSmart to expand the program. The expansion projects 50,000 additional participants in fiscal 2015, 75,000 in 2016 and 100,000 in 2017. "Our goal is to expand the program throughout our service area," says Harris. "We want to cover every geographic subregion and multiple income levels and household sizes."

Participation should not be a problem: Many in the community lived through the severe 1976-1977 drought and others. They are engaged, curious and willing to look for savings. The study has shown Home Water Reports to be an effective, homeowner-friendly tool to help achieve water use efficiency goals. **tpo**

# Headworks and Biosolids Management

By Craig Mandli

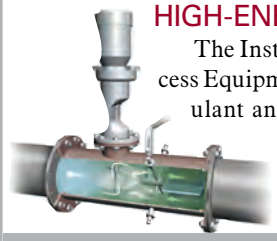
## Chemical/Polymer Feeding Equipment

### DRY CHEMICAL/POLYMER FEEDER

VF-100 dry chemical/polymer feeder from Eagle Microsystems

The direct-drive VF-100 dry chemical/polymer feeder from Eagle Microsystems offers feed rates from 0.05 to 50 cubic feet per hour. Rates are controlled by an electronic SCR speed control. The unit is constructed from 304 stainless steel for corrosion resistance and long life in harsh chemical feed environments. The maintenance-free feeder requires no lubrication. **610/323-2250; www.eaglemicrosystems.com.**

### HIGH-ENERGY FLASH MIXER



InstoMix mixer from Walker Process Equipment, a Division of McNish Corp.

The InstoMix high-energy flash mixer from Walker Process Equipment, a Division of McNish Corp., disperses coagulant and other flocculent solutions into raw water and wastewater. The flash blending (within milliseconds) of coagulant results in optimum floc formation and maximizes chemical economy. The compact in-line units are constructed for flange mounting directly in the pipeline and are equipped with an internal-feed manifold designed to distribute solutions uniformly throughout the sectionalized mixer body. The inline design allows a low-energy input, low headloss and high G-Value result. The agitator can be custom-sized to produce a desired G-Value. Units are available for 8- to 72-inch pipelines. **630/892-7921; www.walker-process.com.**

## Composting Equipment

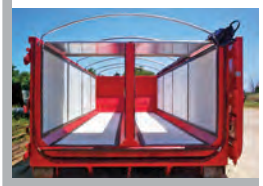
### COMPOST MIXER

Industrial Compost Mixers from ROTO-MIX

Industrial Compost Mixers from ROTO-MIX are available in four capacities from 16 to 34 cubic yards. The rotary design uses a large-diameter rotor and two side-mounted augers to accomplish a rapid, thorough mix with no tunneling. The rotor lifts material up to the side augers that move material end-to-end. The total movement of material in the mixing chamber eliminates dead spots, helping consistently balance nutrients and microorganisms. It is available in truck, trailer and stationary models. Folding and hydraulic-drive conveyors are available for windrowing or stacking. Also available are stainless steel shells and liners, electronic scales, and enclosed oil-bath drives. **620/225-1142; www.rotomix.com.**

## Dewatering Equipment

### OPEN-TOP ROLL-OFF DEWATERING UNIT



ADS dewatering unit from AQUA-Zyme Disposal Systems

The ADS 30-cubic-yard open-top roll-off dewatering unit from AQUA-Zyme Disposal Systems can be filled with 22,000 to 25,000 gallons of liquid waste at 1 to 2 percent solids in about two hours. After draining 24 hours, the unit can be hauled to a landfill or other permitted facility. Volume can be reduced by 80 percent, with reductions to 98 percent in BOD, COD, FOG and TSS. Effluent is clear and sewerable. The unit has few moving parts and includes a roll-over tarp system, side, floor and center screens, 1/4-inch floor plate, seven-gauge side plates, four door binder ratchets, eight drain ports, two inlet ports and a long-handle scraper. Units also available in 15-cubic-yard capacity. **979/245-5656; www.aqua-zyme.com.**

### DEWATERING CONTAINER FILTER

Sludge Mate container filters from Flo Trend Systems

Sludge Mate container filters from Flo Trend Systems can dewater a variety of materials such as alum, ferric, lagoon and digested sludge; septic tank, grease trap and slaughterhouse waste; wastewater residuals; and sump bottoms. The closed-system design provides total odor control, weather protection and no spillage. Units have 10-gauge reinforced walls and a seven-gauge carbon steel floor. Options include peaked roofs with gasketed bolted-down access hatches, drainage ports, inlet manifolds, floor filters and side-to-side rolling tarps. Units are available as roll-offs or trailer and tipping-stand mounted. Capacities range from 5 to 40 cubic yards. **713/699-0152; www.flotrend.com.**

### HORIZONTAL SLUDGE-DEWATERING SYSTEM

Sludge-dewatering system from In The Round Dewatering

The horizontal sludge-dewatering system from In The Round Dewatering has a stainless steel drum with perforated plastic tile lining. The drum is mounted on a roll-off frame for easy transportation and unloading. Water trays allow for containment of discharge water. An 18,000- to 25,000-gallon batch is mixed with polymer before being filtered in the rotating drum, driven by a 1/2 hp variable-speed electric motor with a heavy-duty chain and sprocket. The turning eliminates crusting and wet pockets, producing uniform, consistent results. The dewatered material dumps easily, and the drum is self-cleaning. Dewatering is complete after one night. **317/539-7304; www.itrdewatering.com.**

### SLUDGE BLANKET LEVEL DETECTOR

Automatic Sludge Blanket Level Detector from Markland Specialty Engineering

The Automatic Sludge Blanket Level Detector from Markland Specialty Engineering helps monitor and control interface levels in sedimentation basins and clarifiers, including DAF units, decanting tanks, hoppers and upflow filter reactors. It automates solids removal when treating raw water, wastewater and backwash from sand/membrane filters. Users can program solids removal pumps to operate only when necessary, preventing carryover, optimizing feed density for improved filter press/cen-

trifuge/digester performance, and improving outflow for reuse. It uses high-intensity infrared light to measure the settled sludge bed and overlying cloud layer. A slim profile makes it suited for constricted spaces. **855/873-7791; www.sludgecontrols.com.**

Dewatering containers from Wastequip

### DEWATERING CONTAINER

Dewatering containers from Wastequip are suited for wastewater treatment facilities, manufacturing plants, spill sites, construction sites, refineries and mines. They have gasketed doors and are hydro-tested for leakage. Disposable liners and an easy-to-remove shell enable quick cleanup. The removable shell allows the unit to be used as a sludge container. Containers can be custom-configured and are available in 20- and 25-cubic-yard capacities. **877/468-9278; www.wastequip.com.**

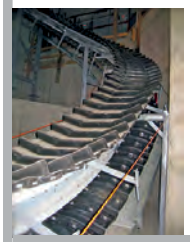
## Screw Conveyors

### SHAFTLESS SCREW

Shaftless screws from S2S Industries

Shaftless screws from S2S Industries use a thick inside profile for stress resistance. The maximum stress imposed on the screw is by the gear drive along the inside center axis of the screw. Screws are available in a thicker center axis cross section and a thinner outer cross section, or as a one-piece section. They can be manufactured in a variety of standard and exotic materials. **514/228-1660; www.s2sindustries.com.**

### MATERIAL CONVEYOR



Pathwinder conveyor from Serpentix Conveyor Corp.

The Pathwinder conveyor from Serpentix Conveyor Corp. has a three-dimensional design and belting system, allowing one continuous-path conveyor to perform the work of multiple conventional conveyors. Its helical, horizontal and vertical curve track capabilities reduce intermediate transfer points and multiple power transmission components, making paths adaptable to new or existing plant layouts. With modular conveyor track construction, it can facilitate future changes to the conveyor path. The closed-link chain design ensures positive belt guidance and eliminates belt drift and slipping. The chain assembly includes lightweight, abrasion-resistant enhanced plastics that reduce friction between the guide blocks and guide channel. Each belt section is convoluted, permitting paths to convey materials at inclines up to 45 degrees. **800/466-7979; www.serpentixconveyor.com.**

### SLUDGE CONVEYOR

Shaftless screw conveyors from Sodimate

Shaftless screw conveyors from Sodimate transport sludge or grit between two points without altering feed accuracy or damaging product particles. Designed to be paired with a sludge mixer, units can also collect grit from shakers, classifiers and screens. The conveyors can be custom-fabricated with various liner materials. They can be interconnected in various configurations, can be inclined or horizontal, and can extend up to 100 feet. **773/665-8800; www.sodimate-inc.com.**

### FLEXIBLE SCREW CONVEYOR

Flexible Screw Conveyors from Spiroflow Systems

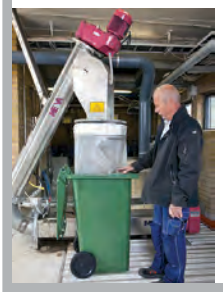
Flexible Screw Conveyors from Spiroflow Systems can accurately meter chemicals used for control of pH, bacteria, taste and odor. Chemicals such as hydrated lime, activated carbon and soda ash can be accurately dosed using loss-in-weight or volumetric metering, while eliminating dust and environmental contamination. The devices convey dosing chemicals from silos, bulk bags or bin hoppers to achieve accurate dosing rates as low as 2 pounds per hour. They convey in any direction from horizontal to vertical. They can be routed around fixed obstacles and equipment and from one room to another through small wall openings. They require minimal maintenance, are easy to clean and dust-free, and can operate at rates from 2 to 88,000 pounds per hour. **704/246-0900; www.spiroflowsystems.com.**

## Solids Hauling/Application

### COMMERCIAL MANURE SPREADER

SLC 100 Series ProTwin Slinger manure spreader from Kuhn North America

The SLC 100 Series ProTwin Slinger commercial manure spreader from Kuhn North America is available in large-capacity truck-mount or trailer models. Even, controlled spread patterns and optional scale systems on some models provide precise application of biosolids, compost, food waste and many other solid materials. The deflector provides an adjustable spread pattern. The discharge can be closed for travel, preventing spillage on roadways. The discharge guides material outside the tire tracks while spreading. **608/897-2131; www.kuhnnorthamerica.com.**



Longofill continuous bag system from Paxxo

### BAGGING SYSTEM

The Longofill continuous bag system from Paxxo can connect to the discharge point of machines used to move, dewater or compact screenings, grit and biosolids. Material is then deposited in a 90-meter-long continuous bag for odor containment and spillage control. The cassette bag is easy to seal, and the material and odors are trapped inside, cutting down development of bacteria and fungus spores. **770/502-0055; www.paxxo.us.**

## Belt Filter/Rotary Presses

### HIGH SOLIDS-CAPTURE SCREW PRESS

DSP Screw Press from BDP Industries

The DSP Screw Press from BDP Industries has a pre-thickening rotary concentrator that increases influent solids content from 0.5 to 2 percent to over 5 percent, reducing volume by at least 60 percent. Filtrate is recycled to the rotary drum concentrator feed, making 95 percent solids capture possible. A tapered shaft screw reduces path length for the liquid to be expressed from the

cake and causes a pressure force at a right angle to the auger shaft and against the perforated drum, reducing plug formation. The screw auger's screen enclosure has slotted perforations that maximize screen porosity and increase capacity. **518/527-5417; www.bdpindustries.com.**

Belt filter presses from Bright Technologies

## BELT FILTER PRESS

Belt filter presses from Bright Technologies are constructed of 304 stainless steel. A radius wedge and high-performance drainage roll allow for high throughput and increased solids output. A pneumatic steering and tensioning system provides safety and ease of operation and control. The system is easy to install and includes operator-friendly controls. The PLC and touch-screen controls easily integrate into new and existing wastewater treatment facility SCADA systems. **800/253-0532; www.brightbeltpress.com.**

## ROTARY DEWATERING PRESS

The rotary press from Fournier Industries uses two slowly rotating screens to create a 2-inch channel that sludge passes through as it dewaters. A pressure restrictor on the outlet allows the operator to vary final cake dryness. The unit has few components and is designed for ease of maintenance. The totally enclosed design mitigates odors and keeps the operator out of direct contact with the sludge. The system can be equipped with a single dewatering channel or expanded with up to six channels. **418/423-4241; www.rotary-press.com.**

Rotary press from Fournier Industries

Spiral Press from JDV Equipment Corporation

## COMBINATION PRESS

The Spiral Press from JDV Equipment Corporation combines dewatering, compacting and conveying in a single compact unit for wastewater screenings and miscellaneous debris. A drainage zone at the feed end drains free water as solids are conveyed through the system. The compaction zone forms the material into a plug that is squeezed against an adjustable-pressure, spring-loaded door, which further dewaters and compresses the material against a wedge wire cage. The resulting liquids are drained off to return into plant flow. The end product of plugged solids is periodically expelled into a bagging system or container. **973/366-6556; www.jdvequipment.com.**

## SLOW-ROTATING SCREW PRESS

The ACAT screw press from Kusters Water, division of Kusters Zima Corp., dewaters sludge efficiently. It offers slow rotational speed, low maintenance, low noise and low energy consumption. **864/576-0660; www.kusterswater.com.**

ACAT screw press from Kusters Water, division of Kusters Zima Corp.

## RECESSED-PLATE FILTER PRESS

The recessed-plate filter press from McLanahan treats thickener or clarifier underflow or other waste materials, dewatering very fine solids from wash water or industrial processes. Slurry is pressure-pumped into recessed chambers wrapped in filter cloth. The resulting solids form dry, easy-to-handle cakes that discharge from the press bottom. Water is recycled back to the process for reuse. Units typically require no added polymers or chemicals after the thickener. No full-time operator is required, as units can be monitored remotely. **814/695-9807; www.mclanahan.com.**

Filter press from McLanahan

Rotary Fan Press 2.0 from Prime Solution

## HIGH-CAPACITY ROTARY FAN PRESS

The high-capacity, compact Rotary Fan Press 2.0 from Prime Solution provides dry cake and is maintenance friendly. It adds internal mixing to the company's rotary fan press technology to enable dewatering of difficult sludges. **269/694-6666; www.psirotary.com.**

# Centrifuges/Separators

## DECANTER CENTRIFUGE

The ALDEC G3 decanter centrifuge from Alfa Laval is equipped with a 2Touch control package, making it easy to monitor and adjust. The smaller conveyor diameter makes room for more liquid in the pond and allows higher bowl wall pressures, boosting processing capacity or yielding drier cake. Power plates reduce power consumption by up to 40 percent. **866/253-2528; www.alfalaval.us/wastewater.**

ALDEC G3 decanter centrifuge from Alfa Laval

THK thickening centrifuge from Centrisys

## THICKENING CENTRIFUGE

The THK thickening centrifuge from Centrisys thickens waste activated sludge without polymer. The system produces up to 8 percent cake solids running at flow rates up to 1,000 gpm. **877/339-5496; www.centrisys.us.**

## HORIZONTAL SOLID-BOWL CENTRIFUGE

The horizontal, solid-bowl (decanter) centrifuge from NOXON North America has a variable-frequency drive to supply fully electric drive packages that have the same torque-generating characteristics as units that use hydraulic backdrives. It combines the advances of VFDs with control alternatives and scroll designs to dewater a wide variety of sludges and slurries to higher cake solids concentrations with ideal capture efficiency. Materials of construction are chosen to suit the application, and include high carbon (50W), stainless 304 and 316, all protected with tungsten carbide coatings. **416/843-6500; www.noxon.com.**

Centrifuge from NOXON North America

## RENTAL DEWATERING CENTRIFUGE

Rental centrifuge-based dewatering systems from Pace Dewatering Systems come with 25- to 29-inch-diameter bowls. Units come with con-

trol buildings that provide a comfortable, weatherproof operating environment. Renters can perform a pilot test before committing to purchase. Units can provide short-term dewatering during construction or emergencies. **800/465-2115; www.paceds.com.**

**Dewatering systems from Pace Dewatering Systems**

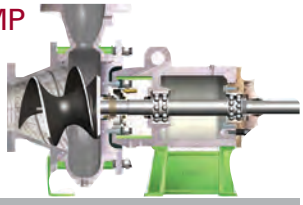
## Grinders/Shredders

### SINGLE-SHAFT MACERATOR

**Rotorrake macerator from Boerger**

The Rotorrake compact, non-clogging, single-shaft macerator from Boerger grinds coarse solids and stringy material to protect downstream equipment. It incorporates reversible flow direction and extraction of hard substances with throughput of up to 4,000 gpm. Solids-laden liquids are fed through rotating angled counter blades, where they are captured and chopped. Macerated solids flow with the liquid, and foreign materials accumulate in the debris collector. The unit can be used as a stand-alone machine, as a pump, or with other peripheral machines. **844/263-7437; www.boerger.com.**

### SCREW CENTRIFUGAL PUMP



**Triton screw centrifugal pumps from Vaughan Company**

Triton screw centrifugal pumps from Vaughan Company handle thick biosolids, large or stringy solids, shear-sensitive fluids, and delicate or highly abrasive materials. They offer steep performance curves, non-overloading power characteristics, heavy-duty power frames and a flushless mechanical seal. A water-flushed mechanical seal or packing is available. **888/249-2467; www.chopperpumps.com.**

## Grit Handling/Removal/Hauling

### SHAKER SYSTEM

**Total Clean System from DEL Tank & Filtration Systems**

The Total Clean System from DEL Tank & Filtration Systems takes the initial flow directly from trucks, tanks or pits, and pumps it over a scalping shaker, where all oversized debris, usually 8- to 10-mesh material, is removed. The remaining slurry is pumped to primary hydrocyclone/shaker units, where the sand fraction (74 microns) is removed. Any solids remaining in the primary hydrocyclone overflow and screen underflow pass through the tilted plate baffle section of the V-Tank. The remaining solids settle and are conveyed to the pump suction of the recycle pumps by the shaftless auger, then through sets of recycle hydrocyclone/shaker units for additional removal of solids, down to 37 microns. The effluent overflow can then be treated with polymer and pumped to a clarifier/thickener tank, where remaining solids settle. The thickened underflow can then be pumped to centrifuges for final solids removal. **800/468-2657; www.deltank.com.** *(continued)*

Grit Czar grit removal system from Envirodyne Systems

### VORTEX-TYPE GRIT REMOVAL SYSTEM

The Grit Czar self-cleaning, hydrodynamic vortex-type grit removal system from Envirodyne Systems has no moving parts. It accommodates varying flows, has low headloss, and can be used for coarse to fine grit removal. It has no submerged parts to maintain and has a small footprint. It produces grit with low organic content. Water and air scour lines or mechanical means can be supplied to fluidize the grit and further scrub organics. Grit pumping options include air-lift, vacuum-primed and self-priming. **717/763-0500; www.envirodynesystems.com.**

### EFFICIENT FINE GRIT REMOVAL SYSTEM

The Hydro-Grit grit vortex system from Fluidyne Corp. removes sand and inorganic material before the wastewater treatment process. The system removes 95 percent of grit particles 74 microns and larger. It has low energy consumption and has no submerged moving parts. Pre-aeration is available if required. The unit provides grit washing, variable circulation rate control and all-hydraulic non-clogging operation. It is available in freestanding FRP or stainless steel and can be installed above or below ground in a sealed or open environment. Its AirCirc system maintains vortex regardless of the influent flow rate. **319/266-9967; www.fluidynecorp.com.**

Hydro-Grit grit vortex system from Fluidyne Corp.

## Screening Systems

### TANK-MOUNTED SCREEN

The TLT Series stand-alone primary tank-mounted screen from IPEC Consultants can be used for truck receiving and pumped sanitary wastewater applications. Components include a tank, shaftless screw, screen basket, transport tube, press zone and discharge section. There are two automatic showers, one inside the tank and one in the press zone and upper transport zone. Influent enters the upstream end of the tank where coarse solids are retained on the surface of the screen basket. The shaftless screw brushes captured solids from the screen surface up the transport section to a press zone, where a plug is formed. Solids are dewatered by compaction against the plug, and liquid is discharged through a short screen section. The press zone shower washes fine, loose solids back into the channel. Compacted solids with dryness of 40 percent or more are scraped from the plug and discharged. **800/663-8409; www.ipec.ca.**

TLT Series screen from IPEC Consultants

### SELF-CLEANING FINE SCREEN

The CleanFlo Monoscreen self-cleaning fine screen from WesTech Engineering uses a blade and drive system to create a progressive step motion that allows screenings to be evenly distributed while minimizing water level surges. The result is screenings capture of 82.5 percent. When matched with a CleanWash SWP/CPS dewatering unit, the combination maximizes solids capture for almost any headworks operation while minimizing the amount of solids for disposal. **801/265-1000; www.westech-inc.com.**

CleanFlo Monoscreen screen from WesTech Engineering

## Heaters/Dryers/Thickeners

### DIRECT SLUDGE-TO-SLUDGE HEAT EXCHANGER/ RECOVERY SYSTEM

Large-gap heat exchangers from DDI Heat Exchangers provide non-plug operation for more than eight years. They allow for a wide gap — larger than the pipe or the pump opening — reducing the risk of plugging or blockage in the channels. Correct channel width enables fast flow to reduce the risk of baking to the surface. Outside bends increase mixing, which increases the turbulence and heat transfer without obstructing the flow. **514/696-7961; www.ddi-heatexchangers.com.**

Heat exchangers from DDI Heat Exchangers

### BIOSOLIDS DRYING SYSTEM

Biosolids drying systems from Komline-Sanderson can handle more than 1,000 tons of wet cake per day. They use steam or thermal fluid; heat is supplied by natural gas, digester gas, landfill gas or fuel oil. Excess heat from combustion engines or turbines can also be used to heat thermal fluid or produce steam. The dryer's shaft, hollow paddles and trough are all heated. Indirect drying using the airtight dryer minimizes off-gases, simplifying odor control and enhancing safety. The system produces Class A exceptional quality granular product for agricultural uses. It can operate as a scalper to generate an autogenuous product for use as green fuel. **800/225-5457; www.komline.com.**

Biosolids drying systems from Komline-Sanderson

### THERMAL DRYER

The BioCon dual-belt thermal dryer from Kruger USA processes biosolids into a marketable Class A end product, dried to at least 90 percent solids. The product can be enhanced by including particle-sizing equipment. The product offers storage efficiency and ease of spreading with agricultural equipment. The unit can be paired with a bagging or silo storage system. **919/677-8310; www.krugerusa.com.** tpo

BioCon dryer from Kruger USA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**ASCO Series 212 composite valves for water purification and conditioning.** For reverse osmosis applications from drinking water to restaurant equipment to grocery store produce misting, here's the valve you've been waiting for! Available in 3/8" to 1" pipe sizes, it's the first to combine reliable, lead-free construction — proven up to 1 million cycles — with the highest available temperature and pressure ratings, plus testing and certification by NSF International. It also provides the industry's fastest, most cost-effective assembly via our unique new FasN™ universal valve connection system. Get tomorrow's perfected composite technology by calling ASCO today!

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800-972-ASCO (2726) | www.ascovalve.com/composite | e-mail: info-valve@asco.com

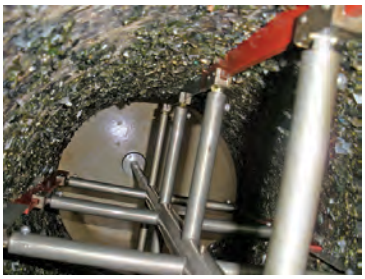
By Craig Mandli

## Scrapers clean solids from intake system

### Problem

Backwash strainers at a wastewater treatment plant in Toronto, were consistently clogging with oversized solids that made it past the intake bar screens. Downstream pumping equipment experienced high failure rates, and subsequent treatment stages were overwhelmed by the solids.

### Solution



The plant installed two 16-inch **Automatic Scraper Strainers** from **Acme Engineering Products** rated for 6,000 gpm each. The scraper keeps the screen clean using aggressive brushes that clean out the slots of the wedgewire screen. It operates automatically, using line pressure to intermittently purge accumulated solids. Maintenance is infrequent and requires simple replacement of the scraper blade and brush.

**RESULT**

The plant has more uptime as the strainer effectively removes large solids, and downstream treatment equipment operates within normal parameters. Maintenance is reduced on related equipment in the pumping system. **518/236-5659; www.acmeprod.com.**

## Shaftless screw conveyors transport wet sand vertically 65 feet

### Problem

The City of Alma, Quebec, spent $40 million over 16 years attempting to transport 360 cubic feet of wet sand per hour, vertically 65 feet, to discharge into trucks or onto the floor. Despite trying several methods, the city never achieved the desired results.

### Solution

The city replaced its existing installation with a complete system from **Atara Equipment** comprised of six shaftless **screw conveyors** — four horizontals and two verticals. A grit chamber conveyor discharges into a settling hopper, where a spiral feeds the first vertical conveyor. That then feeds a crossing conveyor to a second vertical conveyor, which in turn feeds the out-loading conveyor. In summer, that conveyor level-loads a truck waiting below. In winter, when the truck is used for sanding the roads, the conveyor discharges onto the floor.

**RESULT**

The city tested the system for six months using a same-capacity vertical demonstration unit before purchasing. The unit easily brings the sand up and discharges it into a designated area. The final installation has operated since 2001 without repairs or major overhaul. The vertical screw conveyors also proved effective in dewatering the sand. By the time it is discharged, the sand is dry enough to leave no standing water in the truck or on the floor bin, and needs no further treatment. **866/931-5445; www.ataraequipment.com.**

## Presses provide temporary dewatering after hurricane damage

### Problem

Hurricane Sandy wreaked havoc on the Bay Park Long Island wastewater treatment plant in New York. More than 4 feet of water in the solids-handling building wiped out the feed pumps, polymer systems and electrical equipment. Mobile Dredging of Chester, Pa., won a contract for temporary dewatering until the solids building could be rebuilt.

### Solution

Mobile Dredging installed four **Charter Machine Co. Sentry Tower Presses** within eight weeks. The presses are skid-mounted and complete with feed pumps, polymer makeup systems, wash water booster pumps, conveyors and controls. The flexibility of the presses' three-belt design allows operators to vary the gravity belt speed to optimize solids thickening and maximize solids loading to the pressure section. The units can be equipped with 15 pressure rollers to gain extra time under pressure, leading to drier cake solids and lower hauling costs.

**RESULT**

The presses have performed dewatering as required since installation. **732/494-5350; www.chartermachine.com.**

## Mixer helps plant produce marketable compost

### Problem

In the mid-1990s, the Lynden (Wash.) Wastewater Treatment Plant was land-applying biosolids at 1 to 3 percent solids, and costs were adding up. Lynden chose composting as a less expensive alternative. However, initial operations lacked a suitable mixer. The old mixer could not handle the large, heavy loads of biosolids and wood waste. The unit broke down frequently.

### Solution

The city replaced the original mixer with an **ECS Luck/Now Compost Mixer** from **Engineered Compost Systems (ECS),** designed for mixing biosolids. The heavy-duty 805-cubic-foot-capacity electric mixer is stainless steel lined and has four hardened horizontal augers. It includes readable scales that allow operators to follow weight-based recipes (biosolids and bulking agents) to create a proper compost mix.

**RESULT**

The mixer has given operators better control of the compost process, enabling them to produce a better-quality product more efficiently. The city is making and selling 3,000 cubic yards per year of U.S. EPA Grade A compost. **206/634-2625; www.compostsystems.com.**

## Heat exchangers eliminate fouling, snagging issues

### Problem

United Kingdom waste management company Cory Environmental uses a thermal transfer solution to assist in waste treatment and energy production at its anaerobic digestion plant in Weston-super-Mare, England. Waste feedstock is anaerobically digested to produce methane gas. Once captured, the gas is used to generate green electricity for the national grid. Fouling or snagging of waste particles while heating materials for the digesters created problems, including system downtime and potential loss of valuable digestate.

### Solution

Cory Environmental selected four **DTI corrugated tube heat exchangers** from **HRS Heat Exchangers,** used for digester and process tank heating and digestate heating to achieve pasteurization. The corrugated tube profile provides an internal tube that inhibits fouling and increases the heat transfer rate.

**RESULT**

Fouling and snagging were eliminated, as there was no change in the cross-sectional area along the length of the heat exchanger. The increased turbulence from the corrugation improved heat transfer efficiency. The remaining digestate can now also be used as a fertilizer, reducing material sent to landfill. **623/915-4328; www.hrs-heat exchangers.com.**

## Wastewater basin cover and liner protect groundwater and environment

### Problem

To manage high growth in Riverside County, the Lee Lake Water District in Corona, Calif., was required by the California Regional Water Quality Control Board to add to its storage and treatment capacity by building a containment structure equipped with a geomembrane base liner to protect the groundwater. Also required was a floating cover to control odor, eliminate evaporation, exclude waterfowl and animals, and provide vector control.

### Solution

**Layfield Group** installed the **Enviro Liner 6060HD,** a fortified polyolefin geomembrane manufactured from prime-grade resins, and an advanced UV antioxidant package. Three layers of geosynthetics were installed. A 10-ounce nonwoven geotextile fabric was installed directly above the subgrade surface as a cushion fabric. Next, a 6040HD 40 mil fabric was prefabricated (factory seamed into large panels) and installed for the baseliner geomembrane, followed by a 6060HD 60 mil floating cover geomembrane.

**RESULT**

The client is satisfied with the basin cover system and reported no groundwater contamination issues. **800/796-6868; www.layfield environmental.com.**

*(continued)*

## Headworks package protects MBR system

### Problem

Shepherdstown, W.Va., needed a major upgrade to replace its conventional activated sludge treatment plant with a membrane bioreactor (MBR) to comply with the Chesapeake Watershed Nutrient Removal Permit. Space was at a premium, as the headworks building measured just 23 by 35 feet. The challenge was to deliver a traditional screen, a complete grit system including pump and classifier, two center-flow fine band screens and conveyance to a screening, washing and compaction system.

### Solution

**Hydro-Dyne Engineering** custom designed and manufactured a complete integrated **headworks package** to protect the MBR. The system includes a Triden screen with a 3 mm laced link bar grid designed to remove bulk rags and plastics, a 7-foot vortex grit trap sized to catch 95 percent of grit particles greater than 200 microns at peak flow, and two 42-inch fine screen channels, each containing a Hydro-Flo screen with 2 mm UHMWPE perforated panels.

**RESULT**

The upstream security allowed Shepherdstown to capture the fibrous, stringy material and remove it from the flow stream. To date, all is working well. **813/818-0777; www.hydro-dyne.com.**

## Rotary fine screen used to protect large MBR

### Problem

Operators of the City of North Las Vegas field facility membrane bioreactor plant worried that hair strings reaching the bioreactor membranes could wrap around and cause buildup on membrane strands, obstructing flow around the membrane or breaking the strands. Continuous buildup would damage many strands, jeopardizing water quality and requiring expensive repairs.

### Solution

**Rotamat RPPS center-feed drum screens** from **Huber Technology** were installed as part of a new water treatment and reclamation process. It enables 24/7 processing, unmanned for 14 hours per day.

**RESULT**

Operators report trouble-free operation and no buildup on the bioreactor membrane. **704/949-1010; http://huberforum.net.**



## Pumps with urethane stators improve downtime at plant

### Problem

The wastewater treatment plants in Hamilton, Ontario, collect sewage and stormwater. The city continuously battled with the abrasive quality of processed water. The abrasive material shortened life for the nitrile stators and imposed high costs for stator maintenance and replacement.

### Solution

**Moyno** provided **Moyno 2000 pumps** equipped with new urethane stators and tested them. The pump has a crowned gear universal joint drive train configuration to provide torque and thrust control. Joint seals protect the gear joints from pumpage contamination. The pump line offers flow rates to 2,500 gpm and pressure capabilities to 1,000 psi.

**RESULT**

The pumps exceeded expectations. The city ordered five more urethane replacement stators for the pumps after the first urethane stator outlasted the nitrile stator by more than 10 times and continued to run without failure. As the city expands, the stator will lower maintenance costs and significantly reduce downtime. **877/486-6966; www.moyno.com.**

## City upgrades headworks to protect equipment and end odor problems

### Problem

The 25-year-old original headworks at the Missoula (Mont.) Wastewater Treatment Plant required high maintenance and did not efficiently remove grit. "It was really tired," says Gene Connell, treatment supervisor for the Wastewater Division. "It just wasn't built to today's standards, and there wasn't any practical opportunity for expansion or upgrade." The poor performance was exposing downstream equipment to damage and contributing to odors that lingered well beyond the treatment plant.

### Solution

After consultation with a representative from **Smith & Loveless,** the city launched a new headworks facility in 2012 that included two **PISTA Grit removal systems** and two **PISTA TURBO grit washers.** The system was designed for an average daily flow of 7 mgd and a peak flow of 13 mgd.

**RESULT**

The facility achieves 95 percent grit removal down to 140 mesh, better protecting downstream equipment. "As operators, you can look and see the performance," Connell says. "It's clearly better. We're getting much better grit removal." Odors have been eliminated, thanks in part to the grit washers, which Connell says are highly durable and require very little maintenance. **800/898-9122; www.smithandloveless.com.**

## Screw press saves on landfill disposal costs

### Problem

The Immokalee Water and Sewer District (IWSD) in southern Florida pays $470,000 annually for biosolids dewatering and hauling to a landfill. However, landfilling is not a long-term solution.

### Solution

As part of a biosolids management strategy, IWSD directed the engineering firm Greeley and Hansen to issue a request for proposals in summer 2012, asking teams to provide a plan to design, build and finance a Class AA biosolids production facility. **Schwing Bioset** was selected to provide its high-performance **screw press,** offering an efficient dewatering solution. The dewatered solids will be fed through the Class AA Bioset process, producing a fertilizer-grade product.

**RESULT**

IWSD will use the Class AA biosolids on its 300-acre sprayfield site leased to a cattle farmer. Since IWSD is required to fertilize the property annually, the biosolids will eliminate commercial fertilizer and the costs of landfilling. Annual savings are expected to approach $400,000. **715/247-3433; www.schwingbioset.com. tpo**

# tpo CLASSIFIED ADVERTISING

AUGUST

### DEWATERING

Flo Trend Systems Model SM-15-0-WS: 15-cubic-yard roll-off dewatering box. Can be used with a hook lift. Box only used 1.5 years. Comes with rolling tarp. Does not include polymer injection system. Asking $14,500 OBO. 801-430-7287, UT (P08)

FKC Screw Press, Class 'A'; JWC septage receiving station; Fulton boiler; Spiroflow bulk dispenser; Xerxes tanks and Gorman-Rupp pumps. For additional information contact John W. Campbell 231-547-4429 or jwc@bigfishenvironmental.com (P08)

### EDUCATION

RoyCEU.com: We provide continuing education courses for water, wastewater and water distribution system operators. Log onto www.royceu.com and see our approved states and courses. Call 386-574-4307 for details. (oBM)

### POSITIONS AVAILABLE

LOOKING FOR CHANGE? 35-year Montana business has immediate openings for experienced drain technicians. Cleaning, jetting, video, pumping, lining, plumbing. Wages DOE. Relocation benefit negotiable. Call 406-788-3204 for information. (C08)

NYC-metro area pipe rehabilitation company looking to fill immediate openings for experienced TV operators, cutters and CIPP-lining laborers. Must have CDL. Send resumes to Danielle at dtrainor@en-techcorp.com or by fax to 201-784-0855. (C08)

### PUMPS

**Buy & Sell** all makes and models, **new & used** vacuum pumps & high pressure water pumps, and good used replacement parts. Call for an inventory sheet and save. **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (CBM)









## 1. CONVEYOR COMPONENTS BIN LEVEL CONTROL

The CR Roto-Level Control from Conveyor Components Co. protects against material overflow, empty bins, abnormal levels and plugged chutes. The low-torque motor drives a paddle sensor that continuously rotates inside the bin until it detects material. When material surrounds the paddle, microswitches are activated to signal audible or visual warnings to stop operation. The paddle resumes turning once bin material is cleared and the microswitches are deactivated. **800/233-3233; www.conveyorcomponents.com.**

## 2. BLUE-WHITE DIAPHRAGM METERING PUMP

The Chempro-M diaphragm metering pump from Blue-White Industries is designed for the injection of aggressive and/or viscous chemicals. The non-loss motion pump is powered by a variable-speed DC motor. Features include a Dia-Flex single layer PVDF diaphragm for chemical compatibility and PVDF pump head. The LCD with UV protective cover indicates output in several optional measurements, including mL/mm or gpm. Intelligent electronics permit connection to SCADA systems and other remote controllers. **714/893-8529; www.blue-white.com.**

## 3. KROHNE ULTRASONIC GAS FLOWMETER

The Optisonic 7300 universal ultrasonic gas flowmeter from KROHNE is designed for process and auxiliary measurements. Applications include compressed air, mixed gases, steam or flue gas. **800/356-9464; http://us.krohne.com.**

## 4. QCEC WASTEWATER SAMPLER

The Optima wastewater sampler from QCEC meets or exceeds EPA guidelines. Features include vacuum technology, lifts to 28 feet and horizontal runs to 150 feet. Options include programmable sample size. **800/959-0232; www.qcec.com.**

## 5. WESTECH CERAMIC DISC FILTER

The Ceramic Disc Filter from WesTech Engineering features one-piece, pressure-formed disc technology for greater cake drying, less energy use, higher backwash pressure and longer-lasting filter media. **801/265-1000; www.westech-inc.com.**

## 6. ABB HEAVY-DUTY SAFETY SWITCHES

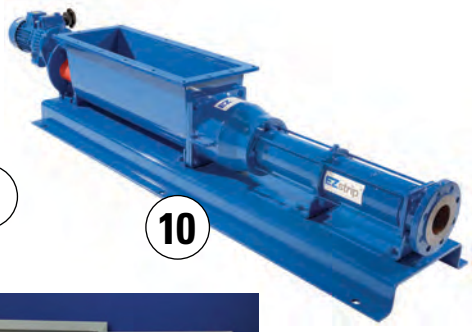
Heavy-duty safety switches from ABB Low Voltage Products are designed to meet UL98, CSA and NEMA KS-1 standards. The 600-volt and 200kA rated switches are available fused and non-fused. **800/435-7365; www.abb.us/lowvoltage.**

## 7. GATEWAY SAFETY BIFOCAL SAFETY GLASSES

Conqueror MAG bifocal safety glasses by Gateway Safety provide eye protection as well as the ability to view objects up close, including blueprints, schematics, small parts, equipment settings and tools. Available in five diopter strengths from 1.0 to 3.0, the one-piece polycarbonate wraparound lens exceeds ANSI Z87.1+ and CSA Z94.3 standards. Glasses are available in clear and gray (1.5, 2.0 and 2.5 only) lenses. **800/822-5347; www.gatewaysafety.com.**

## 8. PRECISION DIGITAL METERVIEW EX PROGRAMMING SOFTWARE

MeterView EX programming software for Vantageview PD6730 and ProtEX PD6830 pulse input flow rate/totalizers from Precision Digital Corp. provide plant operators with full control of the meter configuration process using an intuitive layout and easy-to-understand interface. Tabs include K-factor, display, pulse output, 4-20 mA output and data logging. Features are organized by related item. An onboard meter data log holds up to 1,024 records and can be downloaded to a PC. Logged records contain date, time, rate, total, grand total and log number. **800/343-1001; www.predig.com/meterviewex.**



## 9. PROSOFT INDUSTRIAL CELLULAR GATEWAY

The ICX30-HWC industrial cellular gateway from ProSoft Technology provides wireless Ethernet and serial connectivity to remote devices and equipment over 3G cellular service, including PLCs, RTUs, DCS systems, electronic billboards and communication towers. Remote devices are accessed using secure VPN tunnels over Internet connections. **661/716-5100; www.prosoft-technology.com.**

## 10. MOYNO EZSTRIP CAKE PUMP

The EZstrip cake pump from Moyno features a feed chamber that can be disconnected for access to the rotating assembly. The rotor can be separated from the conveyor for removal of the rotor and stator. Options include ribbon screw conveyor to assist blending or conveying products and separate bridge breaker for smooth feeding. **877/486-6966; www.moyno.com.**

## 11. HEMCO ACID STORAGE CABINET

The acid storage cabinet from HEMCO is available in 12-, 18-, 24-, 30-, 36-, 42- and 48-inch widths. Standard size is 35 inches tall and 22 inches deep. The molded, one-piece fiberglass liner inserts directly in the cabinet and is sealed on all edges for easy cleaning. Features include a containment lip on the front bottom edge and air inlet vents on the front access doors. **800/779-4362; www.hemcocorp.com.**

*(continued)*

wastewater:
# product spotlight

## Energy-saving, closed vessel UV system treats wastewater for reuse

**By Ed Wodalski**

The **ultraviolet low-pressure (UVLW), closed-vessel treatment system** from **Engineered Treatment Systems (ETS)** is designed for high-quality wastewater, filtered effluent or membrane-treated wastewater destined for reuse, especially in water-stressed regions.

The system's plug-and-play, low-energy 800-watt amalgam lamps have a 12,000-hour life span (approximately one year) and five-year sleeve life. They can be configured horizontally, vertically or parallel for treating flows from 300 gpm to more than 15 mgd.

"Most reuse is indirect potable reuse, IPR. But in many parts, water-stressed states are turning to direct potable reuse," says Jon McClean, president of ETS.

IPR blends treated water with a natural water source, such as an aquifer or reservoir, while direct potable reuse treats wastewater to drinkable standards and returns it upstream of a water treatment plant or directly into a potable water distribution system.

Since most water-stressed areas are located in hot climates, they also face high energy demands from the use of air conditioners and other cooling units.

"So we find that water stress and power stress go hand-in-hand," McClean says. "The UVLW uses an amalgam lamp, which is almost 40 percent efficient. Most other lamps are between 10 and 15 percent efficient."

To further optimize energy efficiency and water quality, ETS uses CFD (computational fluid dynamics) modeling to better understand fluid movement inside the reactors and across the UV lamps, turning portions of the system on and off as needed.

Ultraviolet low-pressure (UVLW), closed-vessel treatment system from Engineered Treatment Systems

"We realize that fluid flow isn't symmetric, therefore the lamp arrangements are not symmetric," he says. "We pack the lamps closer in higher-velocity zones, and where we have low velocity we pack fewer lamps. In one reactor we might have a 16-lamp design with 15 on top and only one on the bottom."

McClean compares wastewater movement inside the reactor to that of a river. "Think of how a river flows around the bend. There are areas where the river is bursting around, and there are areas where there is backwater flowing the other way."

In the treatment process, water flowing at a rapid velocity is exposed to the UV lamps for a short period of time.

The modular system, with six to 45 lamps, treats between 2 mgd and 4 mgd of effluent in temperatures from 32 to 113 degrees F.

"To get to 12 mgd, we have two or three of them in parallel. Most plants run at about 40 percent capacity with an evening peak," he says. As flow builds, a second or third system comes online.

"The real step forward is we now treat wastewater like we do drinking water," he says. "It's all being measured; it's all being treated. We can't afford to waste energy." **877/885-4628; www.ets-uv.com.**


## 12. WEDECO OZONE OXIDATION SYSTEMS

SMOevo and PDOevo ozone oxidation systems from Wedeco – a Xylem Brand, use Effizon evo 2G electrodes to produce ozone from oxygen or air using double-discharge gap technology in the treatment of municipal water and wastewater. The electrodes are manufactured from corrosion-resistant inert materials and require little maintenance or cleaning. **855/995-4261; www.wedeco.com/us.**

## 13. SPIRE METERING ULTRASONIC FLOWMETER

The RH40 hand-held ultrasonic flowmeter from Spire Metering Technology, formerly Shenitech, is designed to deliver fast, nonintrusive flow and energy measurement across an array of pipe sizes (0.5 to 120 inches in diameter) and applications. Weighing 1 pound, the meter features Bluetooth interface and smartphone or PC connectivity for data downloading, visualization and analysis. **888/738-0188; www.spiremt.com.**

## 14. CAIG ELECTRONIC CONTACT SPRAY

DeoxIT Gold G5S-6 electrical and electronic spray from CAIG Laboratories is made to clean and improve connectivity, as well as protect all metal connections, even under severe environmental conditions. **858/486-8388; www.caig.com.**

## 15. VAL-MATIC QUADROSPHERE BALL VALVE

The QuadroSphere ball valve from Val-Matic Valve & Manufacturing Corp. has a contoured ball with four recessed surfaces that allow solids to be flushed from the body/ball cavity, preventing them from being trapped around the back of the seat rings and bearings. Recessed surfaces on the ball provide lipped edges for scraping the seats clean to avoid buildup of solids and scale. **630/941-7600; www.valmatic.com.**

## 16. BROOKSIDE-AGRA MICROBIAL BLEND

Advanced Bio Pro Concentrate microbial blend from Brookside-Agra is designed to biologically degrade odors associated with agricultural and environmental conditions. The all-natural, liquid blend of stable microbial cultures, enhancers and nutrients also eradicate fats, oils, grease and other organic materials. **618/628-8300; www.brookside-agra.com.** tpo

water:
# product spotlight

FlexiFloat from Aqua-Aerobic Systems

## Aeration float folds for deployment through reservoir manway

**By Ed Wodalski**

The **FlexiFloat** self-deploying segmented float from **Aqua-Aerobic Systems** is designed to replace the conventional float on an Aqua-Jet surface aerator or AquaDDM mixer for deployment through limited-access openings, primarily in covered water reservoirs. The float folds into a cylindrical shape approximately 24, 27 and 33 inches in diameter (small, medium and large models).

NSF-approved, the float unfolds as it meets the surface water, ready for the power unit to be installed. Models can be fitted with 2, 7.5 and 15 hp motors and weigh approximately 325, 580 and 1,000 pounds (motor and float). The small model float is approximately 4 feet long when folded and unfolds into an X-figure, approximately 9 feet across.

"Many water treatment plants are covered reservoirs that have manways to get in and out of the tank," says Jim Knight, inventor of the FlexiFloat technology. "One of the challenging things that has come up, with drinking water reservoirs in particular, is the disinfection byproduct trihalomethane [THM]." THMs are formed when natural organic material in drinking water is treated with chlorine. High levels of THMs represent a potential health risk and are limited by the U.S. Environmental Protection Agency at 80 parts per billion. One way to remove them from water is through aeration.

"Reservoirs were built long before THMs became an issue," Knight says. "They never thought they needed to lower something from an equipment standpoint through the hatch. This is a way to retrofit those drinking water reservoirs to bring them up to today's standards for removing disinfection byproducts."

The float and power unit can be used to aerate tanks from 100,000 to approximately 8 million gallons in size. **800/940-5008; www.aqua-aerobic.com.**

# people/awards

The **Big Coppitt Regional Water Reclamation Facility** received the 2013 Domestic Wastewater Plant Operations Excellence Award from the Florida Department of Environmental Protection for its operations and maintenance practices.

The **New Richland Wastewater Treatment Plant, operated by People Service,** was recognized by the Minnesota Pollution Control Agency for perfect permit compliance in 2013.

**Medford Public Works** was recognized by the Minnesota Pollution Control Agency for a perfect wastewater treatment plant permit compliance record in 2013.

The **Maine Wastewater Control Association** received U.S. EPA New England's Environmental Merit Award for the "Save Your Pipes: Don't Flush Baby Wipes" public education campaign.

The National Association of Clean Water Agencies presented **Congressman Bob Latta** (R-Bowling Green, Ky.) with its National Environmental Achievement Award for Federal Public Service. The award recognizes Latta's contributions in promoting affordability of wastewater infrastructure projects for communities, and his sponsorship of H.R. 3862, the Clean Water Affordability Act. The legislation aims to provide relief and flexibility for communities with mandated, extensive water infrastructure projects.

**Bob Shull,** public works director in Ottawa, Ill., won the Kenneth C. Merideth Award from the Illinois Water Environment Association for his contributions to wastewater treatment plant operator professionalism.

**Ridgewood Green RME** received the Biogas Project of the Year Award from the American Biogas Council for a renewable energy project at the wastewater treatment plant owned by the Village of Ridgewood, N.J.

**Rosaleen G. Hall** was named the 2014 Professional Woman of the Year by the National Association of Professional Women. Hall is the president, treasurer and secretary at AZ Wastewater Industries in Phoenix.

**Dana Green,** facility operator at Renewable Water Resources' Georges Creek/Marietta facilities, received the 2014 Operator of the Year Award from the Water Environment Association of South Carolina.

**Joshua Webb,** instrumentation and electronics technician for Renewable Water Resources, received the 2014 Maintenance Person of the Year Award from the Water Environment Association of South Carolina.

The **City of Tomah Wastewater Treatment Plant** was named the top plant in Wisconsin by the Wisconsin Rural Water Association.

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

# education

## Florida

TREEO Center at the University of Florida in Gainesville offers these courses:

- Aug. 4 – Basic Water and Wastewater Pump Maintenance, Gainesville
- Aug. 5-8 – FL Water Distribution Systems Operator Level 2 and 3 Training, Gainesville
- Aug. 18-22 –FL Water Class A Certification Review, Gainesville
- Aug. 19-22 – FL Water Class B Certification Review, Gainesville
- Aug. 26-29 – FL Water Class C Certification Review, Gainesville
- Sept. 23-25 – Introduction to Electrical Maintenance, Boca Raton
- Oct. 8-9 – Sequencing Batch Reactor Operation, Make it Work for You, Gainesville

Visit http://www.treeo.ufl.edu/wastewater-courses.aspx.

## Indiana

The Alliance of Indiana Rural Water is offering these courses:

- Aug. 28 – Financial Impact of Phosphorus Removal, Roachdale
- Oct. 21 – GIS Mapping, Scottsburg
- Oct. 29 – Lift Station Troubleshooting and Pump Service, Indianapolis
- Nov. 6 – GIS Mapping, Cloverdale
- Dec. 2 – Meeting Ammonia Limits in Lagoon Systems, Shipshewana

Visit www.inh2o.org.

## Michigan

The Michigan Water Environment Association is offering these courses:

- Sept. 11 – Collections, East Lansing
- Oct. 29 – Health and Safety, East Lansing
- Nov. 5 – Process Seminar, East Lansing

Visit www.mi-wea.org.

## Nebraska

The Nebraska Water Environment Association is offering a Wastewater Training course on Oct. 6-8 in Lincoln. Visit www.ne-wea.org.

## New York

The New York Water Environment Association is offering these courses:

- Oct. 23 – Solids Handling and Dewatering, Babylon

*(Continued on page 78)*

# events

**August 21**
Fox Valley (Ill.) Operators Association 8th Annual Mini-Conference, Carpentersville. Email foxvalleyoa@gmail.com or visit http://fvoa-illinois.org.

**Aug. 25-28**
Kansas Water Environment Association-Kansas Section of American Water Works Association Joint Annual Conference, Capitol Plaza Hotel and Convention Center, Topeka. Visit www.kwea.net.

**Aug. 26-29**
One Water - Ohio Water Environment Association and American Water Works Association Joint Conference, Hilton Columbus Downtown. Visit www.ohiowea.org.

**Aug. 27-28**
Water Environment Association of Texas Laboratory Topics Biennial Conference and Expo, Dallas/Allen. Visit www.weat.org.

**Sept. 8-11**
WaterJAM, joint conference with the Virginia Water Environment Association and the Virginia Section of American Water Works Association, Hampton. Call 804/332-5286 or visit www.vwea.org.

**Sept. 27-Oct. 1**
Water Environment Federation WEFTEC Conference, Morial Convention Center, New Orleans. Visit www.weftec.org.

## Electro Static releases AEGIS repair handbook

The *AEGIS Shaft Grounding Ring Motor Repair Handbook* from Electro Static Technology describes best practices for protecting motor bearings from electrical damage. The book explains how to diagnose electrical bearing damage caused by variable-frequency drives (inverters). It also explains best practices for preventing such damage to motors of various sizes and horsepower. The book can be downloaded at www.est-aegis.com/bearing.

## AWWA names Membrane Young Professional of the Year

The American Water Works Association named Michael Hwang the Membrane Young Professional of the Year. A member of the Arizona section, Hwang is an engineer at CH2M HILL in Phoenix, where he serves as the west regional membrane technology leader for the firm's water business group.

## Sprayroq names certified partners

Sprayroq named SubSurface of Moorhead, Minn., Certified Foundations of Lakeland, Fla., and Empipe Solutions of Hannon, Ontario, Canada, as members of its Sprayroq Certified Partner network. Certified partners complete two weeks of training in the application of Sprayroq structural and protective coatings and undergo annual performance reviews.

## SEPCO launches website

SEPCO launched a new corporate website, www.sepco.com, featuring product descriptions, downloadable data sheets and customer feedback.

## Aqua-Aerobic launches Request a Design

Aqua-Aerobic Systems launched Request a Design on its website, www.aqua-aerobic.com. The feature enables users to request a technical application for any of the company's adaptive water treatment solutions, including aeration/mixing, biological processes, cloth media filtration and membranes.

## HOBAS recertified to ISO 9001, 14001

HOBAS Pipe USA was recertified in accordance with ISO 9001 and 14001. The certificates verify the establishment and application of quality (9001) and environmental (14001) management systems for development, production, sales and customer service of centrifugally cast fiberglass-reinforced polymer mortar pipes. **tpo**



*(Continued from page 77)*

- Oct. 29 – Solids Handling and Dewatering, Bath
- Nov. 5 – Solids Handling and Dewatering, Syracuse
- Nov. 13 – Disinfection Optimization, Chautauqua

Visit www.nywea.org.

### Ohio

The Ohio Water Environment Association is offering the following courses:

- Oct. 30 – Watershed Workshop, Columbus
- Dec. 11 – Biosolids Workshop, Lewis Center

Visit www.ohiowea.org.

### Wisconsin

The University of Wisconsin Department of Engineering-Professional Development is offering the following courses in Madison:

- Oct. 28-30 – Wastewater Treatment Processes and Technologies, Madison
- Dec. 3-5 – Sanitary Sewer and Collection System Engineering, Madison

Visit http://epdweb.engr.wisc.edu.

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

- September 9-11 – Fundamentals of Modern Wastewater Treatment Process, Milwaukee
- Sept. 16 – Confined-Space Entry, Wauwatosa

Visit http://dnr.wi.gov. **tpo**

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

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Operators Everywhere Trust USABlueBook®

Struthers Wastewater Treatment Plant in Ohio is making tremendous strides toward going green. Through their installation of a methane-powered generator system that uses methane collected from their anaerobic digesters, they've increased the efficiency of their plant, while committing to saving hundreds of thousands of dollars on utility costs in future years.

Since the completion of the generator system, funded by $5.4 million stimulus ddlars from the Ohio EPA through the federal American Recovery and Reinvestment Act, Struthers has seen big savings on energy costs. Superintendent Bob Gentile shared, "Our electrical costs are down from about $25,000 monthly to only $13,000 or $14,000. Plus... our gas bills have dropped from about $1,700 per month to around $500."

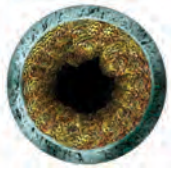
## "We rely on USABlueBook for all of our MRO supplies."

In order to ensure their system's continued success, proper maintenance will be crucial. "While the installation of the generator system was handled by contractors, we rely on USABlueBook for all of our MRO supplies. We just recently had to change out a motor on one of our recirculation pumps, and you guys were able to help us out. USABlueBook is great. Your book has everything we need, and our orders are always shipped very nicely. We buy everything we can from you guys," said Bob.

# Featured Products From USABlueBook®

## *Stop grease problems before they start!*

Jetfoam, EHC-33 and Big Blue Bio-Blocks remove grease build-up to keep your lines clean and running at full capacity. These environmentally-friendly products eliminate stoppages, unpleasant odors and untimely service interruptions. Use separately, or together for a powerful 3-step solution.


Grease build-up before


Clean pipe after!

### 1 Jetfoam Emulsifier

Use with a sewer jetter to liquefy grease and keep it in suspension. Non-corrosive surfactant blend lets you clean twice as much sewer in the same amount of time.

| DESCRIPTION | STOCK # | EACH |
|---|---|---|
| 5-Gallon Pail | 48163 | $ 134.95 |

### 2 EHC-33 Bioenzyme

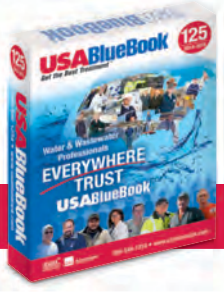
Breaks down proteins, fats and carbohydrates. Industrial-strength bacteria live and reproduce in an environment without free or dissolved oxygen.

| DESCRIPTION | STOCK # | EACH |
|---|---|---|
| 25-lb Pail of 8-oz Quick-Dissolve Bags | 48165 | $ 399.95 |

### 3 Big Blue Bio-Blocks

Dissolve over 30 to 90 days to continuously add grease-fighting bacteria. Perfect for lift stations or wet wells.

| DESCRIPTION | STOCK # | EACH |
|---|---|---|
| 5-lb Block | 49828 | $ 99.95 |
| 10-lb Block | 49829 | 199.95 |
| 30-lb Block | 49831 | 399.95 |

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**For more information on these products, see pages 194-195 in USABlueBook Catalog 125.**

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