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JUNE 2012

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Case of the
vanishing solids

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compliance
coordinator
Jason Manning

Industrial pretreatment
specialist Jeff Camp

Natural gas
supply officer
Freddie Martin

Balancing Act

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on the cover

A policy of treating industries as customers defines the pretreatment program at the Greenville (N.C.) Utilities Wastewater Treatment Plant. Shown from left are environmental compliance coordinator Jason Manning, industrial pretreatment specialist Jeff Camp, and natural gas supply officer Freddie Martin (formerly industrial services coordinator). They are pictured above the outfall and in front of the plant's Tetra Tech filter. (Photography by John Bullard)

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let's be clear

Whatever It Takes

OPERATORS FEATURED IN THIS ISSUE SHOW WILLINGNESS TO TAKE ALMOST ANYTHING THAT NEEDS DOING AND ADD IT TO THEIR JOB DESCRIPTION

By Ted J. Rulseh, Editor

Perhaps nothing irks an employer more than a team member saying, when assigned an out-of-the-ordinary task, "That's not in my job description."



After college, before landing a job in my field (journalism), I worked on the banquet setup crew at a high-end hotel. One day the maitre'd asked my colleagues and me to polish some silver sugar-packet holders for the banquet tables.

I was indignant; I was hired to muscle tables, chairs and room partitions around, not to do sissy work like shining up table doo-dads, and in not quite in so many words, I said so. After a closed-door "discussion" with the boss, I had to decide if I wanted to do whatever I was asked from then on or find my college-educated self on the street looking for another stopgap, near-minimum-wage job.

I decided my pride could stand polishing some silver, and in the few months I was there my pride stood doing various other non-macho things that just needed to get done. I taught myself to take pride in being part of the team and doing what it took to give customers a great banquet experience. Although I never polished silver again after I left there, the lesson stood me in good stead.

PITCHING IN

In *TPO* articles we meet a lot of people who apparently learned a similar lesson somewhere along the line. That's true in Tacoma, Wash., where operators have helped in various ways to launch and sustain the TAGRO biosolids program.

Their contributions included brainstorming about and tinkering with the production process and the recipe, more or less within their realm, as well as lending a hand in less technical areas like marketing and public communication — likely not disciplines they learned in their job-related training and schooling.

No one had to twist their arms. They believed in the product, and they believed in beneficial use of biosolids, and so they did whatever it took to make the program successful — and it is.

EMBRACING CHANGE

Then there's the crew at the treatment plant in Willmar, Minn. They spend countless hours, on top of their regular duties,

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helping to plan and design a new plant with a process they hadn't run before.

It started with a leadership team taking part in planning and design workshops long before construction started. It extended to many hours of classroom and hands-on training on new equipment and procedures. It extended to making the switch from the old plant to the new, running both during the transition period. Then there was the matter of fine-tuning the new process until everything was running smoothly.

One can only imagine the extra hours the Tacoma and Willmar team members put in and the stress they added to their lives. But I am willing to bet that if you asked them, all would say they loved the challenge and, if asked, would do it again.

One can only imagine the extra hours the Tacoma and Willmar team members put in and the stress they added to their lives. But I am willing to bet that if you asked them, all would say they loved the challenge and, if asked, would do it again.

THIS IS THE NORM

Stories like these shatter the stereotype of the public employee who just arrives at 7:30, does the bare minimum, and goes home at 4. We have many reasons to recognize and respect wastewater operators. This sort of diligence, which seems much more like the rule than the exception, is just one more. **tpo**

River Culture

LOXAHATCHEE RIVER DISTRICT STAFF EDUCATES THE PUBLIC ON PROTECTING AND PRESERVING A WILD AND SCENIC RIVER IN FLORIDA

By Briana Jones

Visitors to the Loxahatchee River Center don't just learn about the river — they can see, touch and feel it. A Touch Tank lets kids and other visitors pick up and hold aquatic creatures.

"Each group that comes through gets a Touch Tank demonstration," says Jocelyn O'Neill, environmental education coordinator at the Loxahatchee River Center. "We've got sea urchins, sea cucumbers, snails, sea stars, and hermit crabs that they can touch and hold."

The Touch Tank is just one of the attractions at the River Center, opened in 2008 and operated by the Loxahatchee River Environmental Control District (LRECD) in Jupiter, Fla. It's a place where the public can learn about the importance of the Loxahatchee River and preserving its waters. The LRECD Wastewater Facility treats up to 11 mgd (design) and serves about 80,000 people. The reclaimed wastewater is used for irrigation.

This fiber optic interactive exhibit teaches visitors about where their water comes from, how they use it, and how it is then treated and recycled as irrigation water.

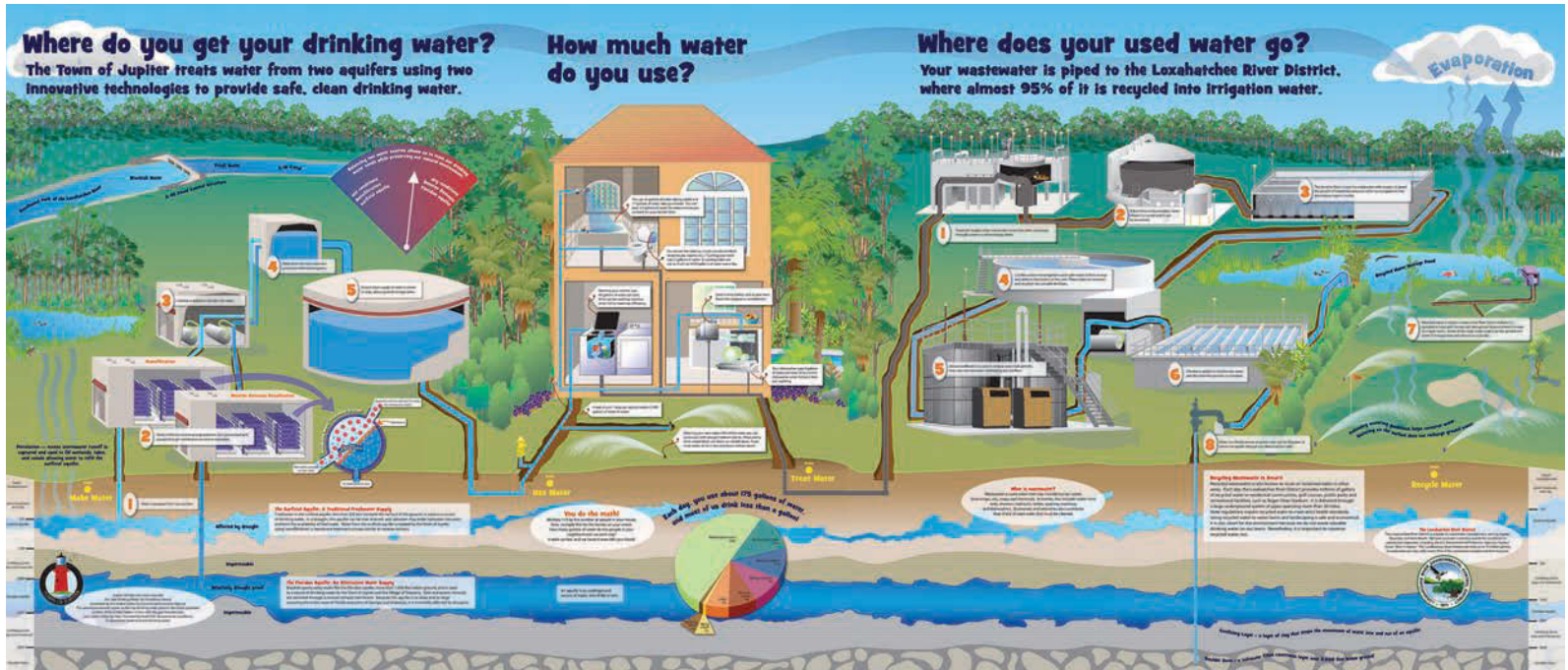


PHOTOS COURTESY OF LRECD

Callie Sharkey, River Center staff member, quizzes Girl Scouts about how they use water daily and what happens to it after they use it.

PROTECT AND PRESERVE

"The LRECD was put in place to protect and preserve the river, which is one of only two designated Wild and Scenic Rivers in Florida," says O'Neill. "That was the whole mission of the district when it was formed 40 years ago."



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The staff of three educators at the 5,000-square-foot River Center teach students and adults how water in the river is used and reused within the community and why it needs to be protected.

“The River Center has evolved within the LRECD to become an environmental education program,” says O’Neill. “None of us are operators, but we’re all educators.

“We bring people in to learn about the river and what we can do to protect it. That means treating wastewater to prevent pollutants from entering the river. It also means reusing that water in our community as an alternative source of water — again protecting the river and reducing the amount of water taken out of the watershed.”

HANDS-ON LEARNING

The River Center gets about 20,000 visitors each year. Different exhibits show and tell the public how wastewater treatment works and how it relates to them. Says O’Neill: “We have a nice, big exhibit that shows how the people in the community get their water, how they use it, and then what happens to it after they use it, which gets into wastewater and reuse.

“The water balance display discusses water resources and how they’re used, and the balance between the two. That includes using reuse water as an alternative resource.”

Both displays are interactive, creating a hands-on learning experience. “We also have several aquariums and each one of them represents a different habitat on the Loxahatchee River,” says O’Neill.

Operations staff members were involved in planning and designing the displays. “When they were first designing it, we gave all the artists a tour of the plant and told them about the processes, and helped them with the photos and the captions,” says plant superintendent Sheldon Primus. “I designed a schematic they could use for the displays.”

INDIVIDUAL LEARNING

The staff at the River Center provides group-specific education based on the students’ ages and their reason for visiting.

“For the Girl Scouts, we have a great program called the Eco-Action Interest Patch,” says O’Neill. “One of the components is always science and technology. That’s when we get into the specifics about wastewater treatment, what’s involved with certain steps, why it has evolved into the technology we’re using today, and the advancements we’re still making.”

Groups use a range of skills to understand how wastewater treatment works. “For each student field trip group that comes through here, we provide a component that specifically takes them through each one of the exhibits and gets them to interact in a direct way using math skills and word skills,” says O’Neill.

OPERATORS JOIN IN

The three River Center staff members can’t do it all by themselves, so the operators at the LRECD play a big role in helping the citizens of Jupiter understand why their water is important.

O’Neill notes: “Whenever we’re doing an outreach in the community, Sheldon and all of his operators are always available for us.

“Our objective is for people to understand why wastewater treatment is necessary and how it functions in their community.”

JOCELYN O’NEILL

“At the Jupiter Jubilee annual community event, we set up our table with a big display, and the operators are there so people have a way to be involved with the Loxahatchee River on a more personal level.”

Primus adds: “At the Jubilee, we have a display that shows the reuse portion of the system and we give out materials so people understand the difference between their drinking water supply and the reuse supply. We educate the public that the more they use the reuse water, the less they’re taking away from the drinking water supply.

“We gear a lot of the handouts toward the kids, like coloring books. We want to catch them early so they start thinking environmentally.”



Dr. Albre Arrington, executive director for the Loxahatchee River District (LRD), describes wastewater treatment processes and how water is recycled back into the community.

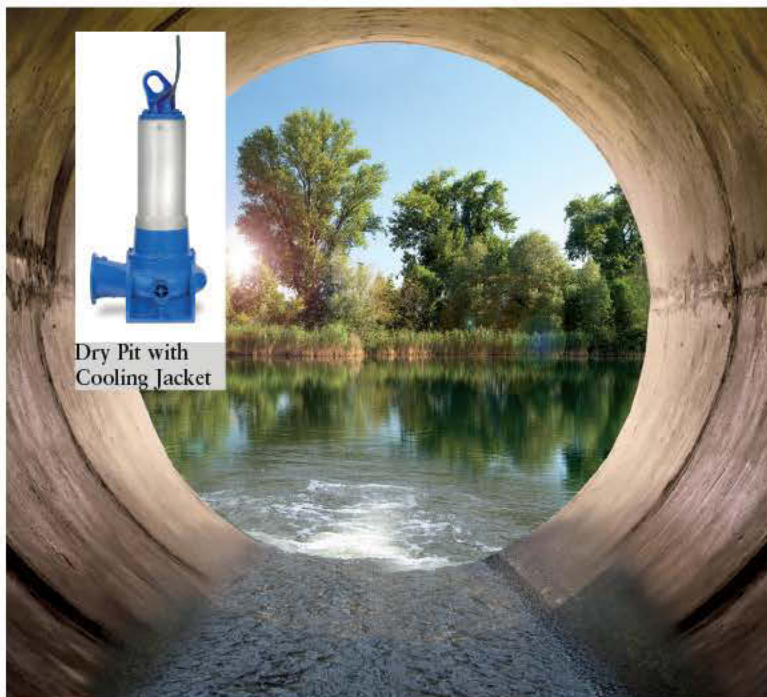
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Dry Pit with Cooling Jacket

Primus also participates in local events distinct from the River Center. “Envirothon, a two-day event held locally in Jupiter, is a science competition between high school environmental students,” he says. “The district was one of the key sponsors last year. I talked to the youth about the process of wastewater and what the field is like for those who are interested in staying in environmentalism as they go through college and graduate. Our Jupiter High School won the Envirothon in 2011.”

Seeing and hearing from the plant staff gives the public a chance to see what the operators are all about. “We’re not like the Ed Norton types from ‘The Honeyymooners,’” Primus jokes.

GETTING THE WORD OUT

O’Neill and her staff do not just wait for visitors at the River Center. They are proactive in getting information out.

“Going to events is a big pull for us to get the word out about the River Center,” O’Neill says. “We get a lot of people that way who haven’t been exposed to us before. We also use Facebook and we have a website (www.loxahatcheeriver.org).

“Through our school program, every student goes home with a personal invitation to return to the River Center with their family. We tell them, ‘You’ll be the tour guide.’”

The Loxahatchee River Center is a central location for people to come and learn, but the staff reaches out beyond those four walls. Says O’Neill: “Our objective is for people to understand why wastewater treatment is necessary and how it functions in their community.” **tpo**

What’s Your Story?

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Wastewater Division manager Dan Thompson, left, and daily shift operator Bill Shaw control the oxygen flow in the anaerobic stage. (Photography by Jim Bryant)

Keeps Getting *Better*

THE OPERATIONS TEAM IN TACOMA, WASH., HAS PLAYED A CRITICAL ROLE IN PRODUCING AND MARKETING HIGH-QUALITY AND POPULAR BIOSOLIDS PRODUCTS

By Jim Force

LIKE ANY SUCCESSFUL PRIVATE BUSINESS, THE Tacoma Central Wastewater Treatment Plant practices good customer service and product diversity as it markets its biosolids products to area customers. It offers top dressing for lawns, potting soil to retail outlets, and liquid fertilizer for farms and a unique elk habitat area.

And the plant's operators have had a lot to do with the program's development, working out kinks in the biosolids processing train, developing new products, and delivering the material to thousands of customers throughout the area.

The program, known as TAGRO, has won numerous accolades. Most recently, the program won the 2011 Excellence in Biosolids Award from the Northwest Biosolids Management Association.

Division manager for wastewater operations Dan Thompson gives much of the credit to the ingenuity of his team. "We've relied on the creativity of our operators," he says. "They've really got us ahead of the game." And now,

as the Tacoma plant works to turn its biosolids operation from a cost center to a profit center, operators will no doubt play a role again.

THREE BASIC PRODUCTS

The Tacoma Central Treatment Plant is an advanced secondary facility. The original operation dates to 1953, and the plant has seen three major expansions since: primary treatment in 1967, secondary treatment and the TAGRO biosolids operation in 1989, and increased hydraulic capacity in 2009.

Today, the plant serves 250,000 people in the Tacoma area. After screening (Mahr bar screens from Headworks), grit removal and primary treatment, wastewater is treated in a four-deck oxygen activated sludge system (supplied by the Union Carbide Environmental Systems department, later acquired by Lotepro, now part of Mixing and Mass Transfer Technologies).

Clarified effluent, meeting a 30/30 permit, is disinfected with sodium hypochlorite in a ProMinent system and discharged to Commencement Bay



A TAGRO truck empties product at the plant's processing area. The biosolids cake is later mixed with sand and sawdust and sold as a top dressing product for gardens and lawns.

BIOSOLIDS BUZZ

Division manager for wastewater operations Dan Thompson attributes the success of the Tacoma biosolids program to building excitement for the product and "making it cool."

"We don't do much print advertising," he says. "We have a pretty good website, but our strategy is to get our end-users to talk about how they use the products." Demonstration projects and partnerships with key organizations have also helped.

The treatment plant maintains its own garden, supplemented with the TAGRO product. The program donates to local charities, and in the past entered TAGRO-grown vegetables in competitions at the county fair. It's most helpful when the winner of the pumpkin-size contest has used TAGRO biosolids to supplement the soil, Thompson says.

The treatment plant also supports local community gardens. In fact, funds from product sales have supported the Tacoma community garden, and Thompson is on its board of directors. Tacoma works closely with the University of Washington, Washington State University, and garden clubs. It's also an active member of the Northwest Biosolids Management Association.

"In the beginning, recycling biosolids was pretty controversial," Thompson recalls. "Our approach was to work on the grassroots side of things. Wastewater treatment people are not always the best spokespeople, so we encourage our users to speak out. We want people saying, 'This is great stuff. If you don't use it up, I will.'"



Wastewater
Division manager
Dan Thompson

profile

City of Tacoma (Wash.) Central Wastewater Treatment Plant



BUILT: 1953; expanded 1967, 1989, 2009

POPULATION SERVED: 215,000

FLOW: 60 mgd design, 20 mgd average

TREATMENT LEVEL: Advanced secondary

TREATMENT PROCESS: High-purity oxygen

RECEIVING WATER: Commencement Bay (Puget Sound)

STAFF: 35 liquid-side operators, 12 biosolids operators, 20 maintenance staff

MANAGEMENT: Dan Thompson, operations division manager; Amy Middleton, assistant operations division manager; Gordon Behnke, biosolids supervisor

BIOSOLIDS PROCESS: Thickening, dual digestion, belt press dewatering

BIOSOLIDS VOLUME: 4,000 dry tons per year

BIOSOLIDS USE: Land application and agricultural/horticultural products

WEBSITE: www.tagro.com

GPS COORDINATES: Latitude: 47°14'40.26"N; Longitude: 122°24'35.95"W

Daily shift operator Bill Shaw at the treatment plant's Mahr bar screens (Headworks).



Day shift operator Virginia Shaver monitors flow controls for the belt filter press (Envirex/Siemens Water Technologies).

"We've relied on the creativity of our operators. They've really got us ahead of the game."

DAN THOMPSON

of Puget Sound. Flow averages 20 mgd — 88 percent domestic and 12 percent commercial-industrial.

Biosolids removed from the process follow several paths to final disposition. Dissolved air flotation units thicken the material ahead of a Dual Digestion process of aerobic and anaerobic digestion (aerobic digestion equipment from the Lotepro Environmental Systems Group of Mixing and Mass Transfer Technologies). Thompson says the system reduces odors but does not hinder gas production or volatile solids reduction. The gas is captured and used for building heat (boilers from Cleaver-Brooks).

About 12 percent of the biosolids are removed from the plant as a liquid (5 to 7 percent solids) and trucked to nearby farm fields or to an elk habitat reclamation area near Mount Rainier, about 40 miles away. The plant manages a fleet of 3,000-gallon tank trucks equipped with spray guns to "paint the pastures," as Thompson puts it. "If we have more than 7 percent solids, the material can get pretty stinky," he says. In some applications, the liquid is

mixed with grass or wheat seed to promote ground cover.

The remainder of the digested biosolids moves on to an Envirex (Siemens) belt filter press. Polymer is added, and cake solids average 22 to 24 percent. About 85 percent of the cake is mixed with sawdust and sand to make TAGRO top dressing for lawns. The sand comes from a local quarry, and the sawdust from a nearby woodworking company.

The mix ratio is four parts biosolids cake, two parts sand, and two parts sawdust. Customers pick up some of the top dressing at the plant. The TAGRO team delivers the rest via city-owned trucks in 1- to 5-cubic-yard shipments. Users pay \$10 a cubic yard.

The remaining cake forms the basis for potting soil. The plant mixes Douglas fir tree bark from a local mill with the cake, bags the material, and sells it to retail establishments like greenhouses and nurseries. Altogether, the TAGRO program has about 4,000 customers, and it seeks new ones through marketing efforts that include demonstrations, partnerships with other organizations, and word of mouth.

"Biosolids reuse is cheap, safe, and it really works. We've seen the benefits, and when we communicate those to people, with a little coaching, we can really turn a lot of gardeners on."

DAN THOMPSON

FINE-TUNED PROCESS

On the surface it would appear that the TAGRO program has had smooth sailing over its 20-plus-year history. Not necessarily. Thompson says the dual digestion process posed challenges early on.

"We weren't getting up to the required temperatures in the aerobic phase," he says. "It's designed to be autothermal, but it wasn't. We were unable to reach the reaction temperature. Plus, we had odor issues in the anaerobic stage. So we involved our operations team and worked out solutions."

So, the team sat down together and brainstormed ideas? "Exactly," says Thompson. "A lot of these dual digestion systems are no longer in operation, but we agreed that adding a pre-heating step ahead of digestion might be the answer. We discussed it during our operational staff meetings. It seemed if we could get our material up to temperature, that would be the answer."

Based on that idea, the team installed a spiral heat exchanger ahead of the aerobic digestion basin, increasing the temperature of the input and getting the aerobic digestion process up to the required temperature of about 170 degrees F.

To reduce odors in the anaerobic (thermophilic) system, the team devised a step-down process that lowers digestion temperatures from 130 degrees to 90 degrees F in three stages using spiral heat exchangers. "At higher temperatures, the digested solids were the source of odors," says Thompson.

Cake solids are critical to a good biosolids product, Thompson maintains. For that reason, an operator tends the belt filter press operation around the clock, making sure the feed solids are adjusted so

that the final cake ranges between 22 and 24 percent solids.

Russ Muncey is the senior operator overseeing the biosolids dewatering process. Thompson notes that cake solids in many similar operations might be in the 16 to 18 percent range. "We need to have our feed solids at 1.8 percent, but it can vary as low as 1.46 percent," he says. "That's why we need to watch the press operation very closely. That's the big thing."

Once the cake comes off the belt press, dump trucks haul it to the biosolids preparation area, a covered building, open on the sides. Framed beds are already filled with the correct ratio of sand and sawdust for the TAGRO lawn-topping product and with bark for the potting soil product. The biosolids cake is dumped onto the beds, mixed, then loaded onto a belt that takes it through a shredder (Royer) to break up clods.

HELP WITH MARKETING

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The Tacoma TAGRO team includes, from left, biosolids distribution equipment operators Donald Boe and Chris Trumbull, senior operator Russ Muncey, biosolids distribution equipment operator Aarron Robertson (in back), Wastewater Division manager Dan Thompson, and biosolids coordinators Tom Amundson and John Wells. They are shown with a biosolids bagging machine (Rotochopper).

tion side of the TAGRO program. “They’re the secret to our success,” says Tom Amundson, biosolids coordinator. “They all buy into the program. It’s not just to make a living. They understand and accept that this is a pretty good thing to be doing.”

Amundson says his team’s enthusiasm and support for the Tacoma biosolids program translates into customer support, as well. “A lot of wastewater

“We’re one of the lowest-cost biosolids operations in the area.

But we want to be a profit center, not a cost center.”

DAN THOMPSON

plant operators are afraid of biosolids reuse,” he says. “But our staff understands it, and understands people’s reservations surrounding the concept. Biosolids reuse is cheap, safe, and it really works. We’ve seen the benefits, and when we communicate those to people, with a little coaching, we can really turn a lot of gardeners on.”

Amundson adds that a wide customer base also helps. “It’s better to have 4,000 customers using a ton of biosolids each than one user taking 4,000 tons,” he says. “With 800,000 people in our metropolitan area, there are enough people here to use it all up.”

Thompson adds that the successful product mix itself is the result of

operator ideas. “In the early days,” he says, “we were spreading liquid biosolids on farm fields, but as time went on these fields became full of houses.

“We wondered what we could put there, and Gordon Behnke, our biosolids supervisor, started experimenting, adding sawdust and making a product that would be appropriate for homeowners and their lawns.” The result was the TAGRO mixture the plant now widely markets to the community. The operators also came up with the potting soil idea.

FUTURE IMPROVEMENTS

As successful as the TAGRO biosolids program has been, Thompson and his staff continue to look for improvements. “We’re operating cost effectively right now,” he says. “We’re one of the lowest-cost biosolids operations in the area. But we want to be a profit center, not a cost center.”

To do that, the Tacoma team believes it needs to produce and sell more of the potting soil, which sells for \$30 a cubic yard, or three times the price of the lawn dressing. “Making a profit is not just minimizing costs,” says Thompson. “We need to get more retail outlets.”

The plant has purchased a mechanical Rotochopper bagging machine, which will help the team bag and produce as much as 60 times more potting soil than before. “We were bagging the material by hand, and were capable of putting out about 50 bags an hour,” Thompson says.

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In addition to producing more bags, Thompson says Tacoma wants to at least triple the number of retail outlets for the potting soil. "It's a big mountain to climb for us," he says. But given the history of the TAGRO program, you get the feeling they'll meet that goal as well. **tpo**

Senior operator Russ Muncey checks up on the biosolids dewatering process in preparation for adjusting the polymer addition rate.

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PARTIALLY SUBMERGED DISC FILTERS ENABLE A PLANT IN NORTHEAST ILLINOIS TO RESOLVE SAND MIGRATION AND GAIN 600 SQUARE FEET OF STORAGE AREA

By Scottie Dayton



Operator Kevin Kurtz greases one of three drum bearings on a SuperDisc filter.



Workers from Manusos General Contracting in Fox Lake, Ill., install a SuperDisc filter assembly in Bay 2.

Hydrogen sulfide and chlorine had eroded the rails on traveling bridge filters over three sand filter bays at the Glendale Heights (Ill.) Wastewater Treatment Plant.

While frequent bridge derailments annoyed the operators, a bigger problem was the sand sucked up by the backwash pump. The return process deposited it at the headworks, where the material ruined the impellers on influent pumps. It also accumulated on the bottom of the digester, affecting the diffusers' ability to aerate and circulate the material.

To resolve these and other related issues, the plant team selected partially submerged disc filters supplied by WesTech Engineering.

CLOGGING ISSUES

"We have a lot of inflow and infiltration problems," says plant manager Chuck Fonte. "At 8 or 9 mgd, sand clogged our grit system and blinded the bridge filters, causing the excess flow tanks to fill sooner than necessary."

Sludge commingling with the sand in the bays also blinded the filters. "No matter how much we chlorinated, we couldn't get them clean," says Fonte. "We'd have to drain the 5 mgd bays and scoop out the small cells by hand every five or six years."

The sand also had to be replenished annually. Operators risked back injuries when leaning through the handrails to pass 50-pound bags of sand to their co-workers down in the bays. Maintaining the bridge filters took 15 labor hours per week.

In 2011, officials hired Chicago engineering firm Baxter & Woodman to upgrade the tertiary treatment. They suggested the disc filters because they would fit in the 74- by 125- by 6.81-foot bays and came closest to matching the plant's hydraulic profile.

"After evaluating the bids, we selected WesTech Engineering," says Fonte. "Besides offering a substantial savings, the filters would provide additional filtration area to handle 21 mgd, which was 3 mgd more than requested in the bid."

Manusos General Contracting installed three units in two months. "Since March 2011, the plant hasn't gone to high flow," says Fonte. "But the best thing is that we no longer have sand issues, nor do we have to replace the material." The filters lowered TSS from



Lead operator Al Fajardo inspects the filter cartridges on a SuperDisc filter.

PHOTOS COURTESY OF JUDY KUPKA

4 mg/L to 2 mg/L and use 2 kWh per day less electricity than their predecessors.

LOOK AT THE SPACE

The 10.52 mgd (design) activated sludge plant operating in extended aeration averages 3.5 mgd with 21 mgd maximum flow. The sand filters have a solids loading rate of 30 mg/L. Effluent discharges to the DuPage River and biosolids are land-applied.

Construction began on Bay 3 in November once rain was no longer a concern. Using a Bobcat excavator, Manusos workers removed the sand filter and charcoal filter beneath. Scooping out the material left the floor uneven, so they applied a layer of thin-set concrete to level it. The process was repeated in each bay.

"Doubling up units in the first bay enabled Manusos to convert the third bay into a storage/meeting room," says Fonte. "We gained 600 square feet."

Meanwhile, workers built a knee wall in Bay 1 to divert all the flow to it, then removed the sand filter in Bay 2. Other workers cut a hole in the wall of the building large enough to slide in a 7 mgd filter assembly. It included a support frame with trough, motor, backwash pump and piping, rotor drum with discs, and a fiberglass cover with hatches. "They look like large beer cans on their sides," says Fonte.

Inside the units is a row of 20 eight-foot rotating discs. Each one holds 10 removable filter cartridges

"Previously, it took three bays to treat 15 mgd. Now we can handle 21 mgd in one-and-a-half bays."

CHUCK FONTE

with 10-micron polyester woven media. During operation, liquid feeds into the center of the drum, passes through the media, and is discharged.

As captured solids collect on the discs, the influent level increases and signals a backwash cycle. A high-pressure spray then cleans the filter and discharges solids into the reject flume.

50 PERCENT REDUCTION

After workers lowered the filter assembly into Bay 2, they anchored it to the floor and connected the piping and electrical. Once it was online, they opened the bypass gate and directed flow from Bay 1 into it.

Workers prepared the first bay like the others and cut a hole in the wall opposite it to slide in two 7 mgd units. "Previously, it took three bays to treat 15 mgd," says Fonte. "Now we can handle 21 mgd in one-and-a-half bays." Before leaving, Manusos also installed an actuated bypass gate and SCADA system.

That summer, algae growth in the uncovered clarifiers caused its usual problems, only this time large clumps of it threatened to clog the filter media. Operators tried chlorinating the clarifier, but it didn't work. "We have two trough weirs and had to chlorinate both sides," says Fonte.

Lead operator Al Fajardo had a simpler solution. He built screens ahead of the units to catch the

scum. Every morning, an operator pulls the screens and sprays them to remove the algae. "That's the only maintenance other than greasing the drum bearings once a week," says Fonte. The units are chemically cleaned annually. All work is done at floor level.

POPULAR ATTRACTION

Many Great Lakes municipalities have visited Fonte to look at the filters. Last September, the facility was host to a monthly gathering of the Fox Valley Operators Association in the new storage/meeting room. "Everybody toured the units and were amazed at how they work," says Fonte. "We are very pleased with them and will show them to anyone who is interested." **tpo**

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Balancing Act

PRETREATMENT TEAM MEMBERS AT A NORTH CAROLINA TREATMENT PLANT WORK AS PARTNERS WITH BUSINESSES TO PROTECT THE ENVIRONMENT AND SUPPORT ECONOMIC GROWTH

By Doug Day

Wastewater treatment plant operator III Quentin Corey checks the controls for the plant's power generation system (Cummins); control panel from Schneider Electric. (Photography by John Bullard)



profile Greenville (N.C.) Utilities Wastewater Treatment Plant

FLOWS:	17.5 mgd design, 10 mgd average
TREATMENT LEVEL:	Tertiary
TREATMENT PROCESS:	Biological nutrient removal
RECEIVING WATER:	Tar River
BIOSOLIDS:	Composted by private firm
STAFF:	27
ANNUAL BUDGET:	\$2,800,000
WEBSITE:	www.guc.com
GPS COORDINATES:	Latitude: 35°21'32.79"N; Longitude: 77°24'59.99"W



Consistent attention to detail is one reason Freddie Martin's name is included in the North Carolina Division of Water Quality's Pretreatment Professionals Honor Roll. He earned the distinction as industrial services coordinator for Greenville Utilities Wastewater Treatment Plant in 2006 for leadership of the city's program.

"We're here because the state requires us to be here," says Martin. "The industries are our customers and are the reason we exist as a utility. So we try to maintain a real positive working relationship with them as well as with the regulators."

When Martin left, the pretreatment duties fell to Jeff Camp, industrial pretreatment specialist, and Jason Manning, environmental compliance coordinator. Camp handles the day-to-day operations while Manning handles administrative duties.

SIGNIFICANT CHALLENGE

The 175 mgd (design) biological nutrient removal wastewater treatment plant has six major Significant Industrial Users, accounting for about 10 percent of the 10 mgd average daily flow. At one time, a single pharmaceutical plant contributed that much flow. While smaller now, that company is still an important focus of the pretreatment program because of its potential impact on the treatment process.

The knowledge gained from dealing with that plant's organic chemical loading had a lasting impact. "We did a lot of organic analysis and traced some chemicals that were causing treatment problems back to them," Martin says. Much of that data was later used by the U.S. EPA in the development of pharmaceutical regulations.

One of the most damaging chemicals was dimethyl sulfoxide (DMSO). "It caused a drop in our dissolved oxygen and an awful smell," says Martin. "It inhibited our process in more than one way, and it came in often enough so that operators knew when they detected even a hint of the odor, we could expect treatability problems."

Manning says operators would immediately contact his lab so that samples could be drawn. They would take steps to increase oxygen, ramp up the blowers, and ensure that there was enough biomass to provide a buffer.

CONSISTENT ATTENTION TO DETAIL IS ONE REASON

Freddie Martin's name is on the North Carolina Division of Water Quality's Pretreatment Professionals Honor Roll. He earned the distinction as industrial services coordinator for Greenville Utilities Wastewater Treatment Plant in 2006 for leadership of the organization's pretreatment program.

Martin says the award was based on Greenville's history of compliance, inspection results, and the involvement of the utility with the North Carolina Pretreatment Consortium, a group formed about 15 years ago. "They were generally impressed with our program," says Martin. "Our compliance inspections were always favorable, and they felt we were doing things the way they wanted, which made the inspections much easier."

A policy of treating industries as customers continues to define the pretreatment program, which Martin led from 1990 (about two years after it began) until 2007. He then became the natural gas supply officer for the community-owned Greenville Utilities, which provides electric, water, sewer and natural gas service to Greenville and most of Pitt County. The utility has 135,800 customer connections, including more than 28,000 sewer connections.



ABOVE: Laboratory technician II Kevin Hardee tests samples (Hach DR 5000 spectrophotometer). BELOW: Wastewater treatment plant operator III Warren Harris checks a control panel (Tetra Tech).



“What I’m trying to get them to understand is that we’re here for permits and enforcement, but we’re also here to help the industry work, live, and do everything they need to do in this community to provide jobs, protect the environment and promote our economy.”

JASON MANNING

The manufacturer had a pretreatment facility and was not having the same problems as the treatment plant, so it took some convincing to make them believe they were the source. That included immediate testing whenever operators detected the odor.

“We have automated samplers at major lift stations in the system, and we used portable samplers at individual manholes identified in our monitoring plan,” says Martin. “We would contact the customer to sample their effluent.”

A RARE CUSTOMER

One of the more unique wastewater customers to come along in Greenville, N.C., is no longer in operation, but former industrial services coordinator Freddie Martin remembers it well. The company recycled rare earth metals – 17 elements like yttrium, praseodymium, and ytterbium.

“They had things in their effluent that nobody else would have anywhere,” says Martin. “It was kind of hard to decide whether or not it was treatable.”

Thought to be very rare at one time, rare earth metals are actually common and are now among the hottest commodities in the world. They are used in electronics, catalytic converters, hybrid car batteries, mercury vapor lamps, high-strength metal, lasers, TV picture tubes, camera lenses, and many other products. Some have highly specific uses with no known substitute.

The Greenville company recycled the elements from those products to help fill the need; rare earth elements are difficult to mine because they are not usually found in concentrated amounts in nature.

Rare earth recycling is a growing industry as China, the source of 95 percent of the metals, has cut back on exports to meet its own needs. The market is trying to fill the gap, and that includes opening mines in the U.S.

As it ended up, the rare earth metals never caused treatment problems at Greenville because the whole idea was to recycle them and not let them go down the drain. But the work did result in a highly acidic discharge.

Environmental compliance coordinator Jason Manning says the situation was well documented, and that has paid off as another similar industry has moved to town. “Because we went through it, there were some measures, standards and procedures put in place in our pretreatment program that we are using now,” said Manning. That has helped Greenville welcome a new business while also effectively treating its waste.

Once convinced, the company was able to make changes to its processes that ended the problem. It was a good outcome for Martin – protecting the environment and the treatment plant while helping a local company.

AN ECONOMIC TOOL

He feels helping business is an important role for pretreatment programs. “We work with our Economic Development Commission when an industry is interested in coming to town,” says Martin. “It’s helpful when water, wastewater, and pretreatment people are involved early on.”

One such case was a manufacturer of silica gel, the material in desiccant packets found in product packaging. “They produce a lot of saltwater (high in TDS) in the form of sodium sulfate, and we discharge into freshwater,” says Martin. A pretreatment study found the treatment plant could process the company’s effluent without added expense.

“If there is an issue with regulations, we’ll try to work with companies instead of against them,” Martin stresses. “We’re not looking to carry a big hammer and bang them over the head. We want to find a solution that works for them and works for us.”



The Greenville Utilities team includes, from left, operator III Quentin Corey, environmental compliance coordinator Jason Manning, natural gas supply officer Freddie Martin, laboratory technician II Crystal Respass, laboratory technician II Kevin Hardee, and industrial pretreatment specialist Jeff Camp.

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In one recent case, a company accidentally discharged caustics in violation of its permit and didn't notify the treatment plant right away. Operators detected the problem on the SCADA system when a pumping station sensor showed high pH.

"We tried to handle it with grace and good customer service," says Manning. "We're working with them on implementing corrective actions and improving their processes, especially around communications. What I'm trying to get them to understand is that we're here for permits and enforcement, but we're also here to help the industry work, live, and do everything they need to do to provide jobs, protect the environment and promote our economy."

RECESSION TROUBLES

Camp says the balance between regulations and customer service became more difficult when the recession hit. "Several businesses left, and a lot of them had to downsize," he says. "That makes the pretreatment job challenging, because you have to protect your plant and your receiving waters and follow state and federal regulations, while also trying to be as customer-friendly as you can."

One thing Camp has done is to try to help out with sampling. "I've gone out to do the sampling, and we run the analyses for companies,"



Freddie Martin, now natural gas supply officer, led the Greenville Utilities pretreatment effort for 17 years (Sigma portable sampler from Hach Flow Meter Products & Services, TrojanUV disinfection unit).

"If there is an issue with regulations, we'll try to work with companies instead of against them. We're not looking to carry a big hammer and bang them over the head. We want to find a solution that works for them and works for us."

FREDDIE MARTIN

he says. "We're just trying to help with the cost as a customer service."

He has also seen a change in the regulatory environment. The state pretreatment program just lost a full-time position, and the same has happened at the federal level, so the staffs are overworked and trying to be more efficient.

NEW ECONOMICS

Municipalities have the same challenges. That is one reason Martin's duties were split between two existing positions when he left the pretreatment program. Greenville's wastewater department cares for 479 miles of pipe, 38 pump stations and



Greenville Utilities uses a "Cease the Grease" program to teach residents about the effects of FOG.

28,000 connections. "Pretreatment seems to be a catchall, and we wind up being involved in a lot of different things," says Martin.

One such project is for the drinking water treatment plant. The Tar River runs through Greenville and empties into the Pamlico River and Pamlico Sound, a saltwater

estuary. "At times, especially during drought conditions, the saltwater can come back up the river," says Martin. "We help identify how far the salt comes upstream." It hasn't been a problem, but monitoring continues as far as 10 miles downstream.

The pretreatment staff also assisted in lead sampling for the water utility. Samples were taken across the community to help identify homes that still have lead solder in their plumbing connections.

Martin was also involved in several groundwater remediation projects. One is remediating the spill of about 10,000 gallons of gasoline from an underground line at a gas station that was cut during installation of an underground utility line. Martin was the project manager for that work, which pumped the remediated groundwater into the wastewater system. Monitoring and reporting continues to this day.

Camp is also involved in the wastewater utility's FOG program. "I used to go out and sample food service establishments," he says. "That has been turned over to the Engineering Department, but pretreatment staff still gets involved

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Operator III Warren Harris at the belt filter press (Andritz) in the dewatering facility.

if we have a problem in the collection system and enforcement is needed.”

Manning also heads up the wastewater department’s environmental laboratory, which does some reporting, monitoring, and analysis for the drinking water plant. “They bring in dozens if not hundreds of samples every month,” says Manning. “It works well because it gives them verifiable data with a quick turnaround.”

The key for the current success of the pretreatment program, adds Man-

ning, was that Martin laid a solid foundation. “In this economy, we are always looking to find cost savings,” he says. “Because the program was running so smoothly, we were able to keep things operating at a very high level with current staffing.” **tpo**

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THE WILLMAR TREATMENT PLANT TEAM GOT INVOLVED EARLY AND STAYED INVOLVED LATE TO ENSURE A SMOOTH TRANSITION TO A BRAND-NEW FACILITY

By Trude Witham

FACING PAGE: The Willmar team includes, from left, front row, superintendent Colleen Thompson, operator Allen Schueler, operator Terry Thole; middle row, biosolids coordinator Jason Lindahl, working foreman/lab technical manager Jim Gauer, lab technician Jim Werder; back row, lift station mechanic Tom Templer, operator Chris King, operator Doug Ruter, maintenance mechanic Paul Marcus, and assistant lab technician/safety coordinator Les Lange. (Photography by Mark Peterson)

WHEN THE WILLMAR (MINN.) WASTEWATER TREATMENT Plant needed more capacity, better odor control and the ability to meet stricter effluent limits, the city built a new activated sludge plant five miles west of town.

The six-year project, completed in 2010, tested the four operators' mettle as they ran two plants simultaneously until the new one was online. They also spent three months in classroom training. Along the way they met the challenges of taking part in the planning and design phases, starting up a new laboratory, incrementally taking flow from the old plant to the new over five weeks, and adding seed sludge from the old site. They also decommissioned the old plant.

Throughout the process, the team stepped up to the plate, and their work paid off. The plant has successfully met effluent limits, including those for phosphorus and ammonia. At 5.24 mgd, it will allow residential and industrial growth and accommodate a projected population of more than 27,000 by 2030.

Close involvement in all phases of the project — planning, design, construction and startup — gave the staff an extra measure of pride in the new plant and a deeper understanding of how it works.

profile

Willmar (Minn.) Wastewater Treatment Plant



BUILT:
2010

POPULATION SERVED:
19,941

EMPLOYEES:
11

FLOWS:
5.24 mgd design, 7.51 mgd
average, 27.36 mgd peak

TREATMENT LEVEL:
Advanced secondary

TREATMENT PROCESS:
Activated sludge

RECEIVING WATER:
Hawk Creek

BIOSOLIDS:
Land-applied

WEBSITE:
www.willmar.mn.us

GPS COORDINATES:
Latitude: 45°6'26.45"N;
Longitude: 95°2'8.44"W

HISTORY OF UPGRADES

Willmar, the fastest-growing non-metropolitan city in Minnesota, lies 100 miles west of the Twin Cities. It is surrounded by lakes, rolling hills and farmland. Its first wastewater treatment plant was built in 1930 and used fixed-film treatment technology. As the city grew, a 1960 upgrade increased the capacity to 2.5 mgd.

Another upgrade to 5.04 mgd in the early to mid-1980s added rotating biological contactors (RBCs). Then the plant began seeing increased industrial loadings, including grease and feathers from meat and poultry processing plants, that affected RBC performance, created odors, and caused cleaning and maintenance problems.

In 1988, the plant added a new trickling filter ahead of the RBCs, and odor control for the screenings building, primary clarifiers, trickling filter, RBCs, and gravity sludge thickener. Rotary drum fine screens were added to supplement the influent mechanical screen. These



Maintenance mechanic Paul Marcus checks the fine step screens (Vulcan).

“The operations staff does all the process testing and shares many ideas and solutions to make the plant run smoothly. I am very proud of them for their dedication and common effort to preserve and protect the environment.”

JIM GAUER

removed feathers and other material that had been lodging in the RBCs and reducing effectiveness. In 1996, the plant upgraded the biosolids storage.


THE BIG DECISION

Still there were issues. The plant's location near a mall and residential area meant that odor remained a problem. “This was partially caused by a persistent filamentous bacterium, called *Beggiatoa*, from the large amount of sulfur entering the plant,” says plant superintendent Colleen Thompson.

The plant was also operating at or near capacity for BOD, TSS, total nitrogen and total phosphorus, and the city was expecting new effluent limits for phosphorus and ammonia to take effect in 2010.

In 2004, the city council passed a resolution to relocate the treatment plant. With community support, grants and low-interest loans from the state and federal governments, the city built the new plant on 37 acres purchased in the early 1990s. The site is surrounded by farmland.

“We chose an activated sludge plant based on cost, ease of operation and maintenance, longevity of equipment, and safety to personnel,” says Thompson. “It's proven technology and it's robust.” Construction began in September 2008 on the plant, two pump stations, and separate pipelines to convey municipal and industrial wastewater.



"I remember when our operators first went on call after the new SCADA system was started up. They could just as well have spent the night at the plant for all the instrumentation/control and automation bugs that had to be worked out."

COLLEEN THOMPSON

Superintendent Colleen Thompson with the industrial final clarifier (Walker).

GOOD PLANNING

Long before construction began, Thompson wanted her staff involved. In 2005, she formed a team from the operations staff: operator Terry Thole, working foreman/lab technical manager Jim Gauer, and maintenance mechanic Paul Marcus.

"During the planning phase, the four of us held five workshops with a team from the city and consulting engineer, Donohue & Associates," says Thompson. "During the design phase, we held 11 workshops and 50 meetings." In the construction phase, Thompson attended at least three meetings a week for about a year and a half.

Marcus brought the maintenance perspective to the table, and Thole represented the operators' point of view. Gauer offered his computer and electrical experience. For example, he worked with the engineers on the SCADA system design to ensure compatibility with the SCADA that controlled 25 lift stations in Willmar and Eagle Lake.

Biosolids coordinator Jason Lindahl and lab technician/quality manager Jim Werder attended meetings pertaining to their specialties. "Those meetings took a lot of our time and were just the beginning of what would be a tremendous effort from all my staff," says Thompson. "This is what makes our team special. We knew we were going to put in extra time during this project, but we were all committed and innovative, and we worked well together."

Donohue & Associates communicated the plant's progress to the operations team and the city. "Communication was one of the key components of the program's success, making sure all stakeholders were on the same page," says Thompson. "I relied on Terry, Paul and Jim to share information with our staff."

TRANSITION CHALLENGES

Operators and lab technicians faced some challenges during construction and startup. They included developing a transition plan for the new laboratory. "The new lab had to be proven before we started to direct the flow from the old to the new plant," says Thompson. "We hired Graham Connections to rewrite the standard operating procedures and quality manual before we set up the new lab in the administration building."

The lab staff worked overtime during the period when both plants were sharing the treatment load with separate discharges. The Minnesota Pollution Control Agency required effluent figures from both discharge points. "That really burdened our lab staff, as it doubled their workload," says Thompson. "Jim Werder, our lab technician, and assistant Les Lange went above and beyond to keep up with the regulatory requirements and paperwork."

Another challenge was seeding the new facility. For that purpose, the team used a trash pump to deliver solids from the old plant's gravity thickener into a nearby sanitary sewer manhole, and from there it traveled to the new site.

"By using our conveyance system, we eliminated the need to have seed solids trucked to the new plant," says Thompson. "Our staff had to start and stop the trash pump daily during this process. We also had to make sure the solids were replenished every day in the thickener. It was a well-thought-out plan by the engineering firm and the city."

EXTENSIVE TRAINING

The startup plan included classroom training for plant staff, provided by Donohue and the equipment vendors. Operators had to learn about the activated sludge process, as they had no experience with it. Donohue wrote 30 standard operating procedures for the equipment and conducted training on all of them.

"Our operators spent numerous training hours learning about the new equipment, for which there were about 60 operation and maintenance manuals," says Thompson. "That translated into about 60 days of training over three months. It was very intense to take in all this information, and it consumed a lot of staff time."

The engineering firm also conducted hands-on training and, once the plant was started up, the consultants were available to answer questions, even visiting the plant when requested. "Staff attendance at the training sessions was based on workload and whether the session pertained to their job duties," says Thompson.

STARTUP DEMANDS

Once all the flow from the old plant had been redirected to the new plant, things became a bit easier for the operators and laboratory technicians. They no longer had to operate two plants at once or test effluent at two discharge sites.

Still, there were other demands. "The biggest challenge was going from a trickling filter/RBC digester system with chlorine disinfection to an oxidation ditch/selector basin with UV disinfection," recalls Thole. "Only one person here had operated that type of system, and that was 20 years ago. It took some book studying and trial and error to understand the new process and to operate and maintain it."

The team also had to deal with the new SCADA system. "I remember when our operators first went on call after the new system was started up," says Thompson. "They could just as well have spent the night at the plant for all the instrumentation/control and automation bugs that had to be worked out. It took a good four to six weeks before the operators felt comfortable being on call."

The majority of issues were related to alarm time-out settings, and which alarms should be classi-

Willmar Wastewater Treatment Plant PERMIT AND PERFORMANCE (monthly averages)		
	PERMIT	EFFLUENT
CBOD	15 mg/L	2.69 mg/L
TSS	30 mg/L	6.69 mg/L
Ammonia nitrogen	5 mg/L	<0.22 mg/L
Phosphorus	1 mg/L	0.710 mg/L
Fecal coliform	200 cfu/100 mL	87.2 cfu/100 mL
pH	6.0-9.0	Compliant

fied as critical or non-critical. "Another problem was with the smart devices on our motor control centers, which were tripping out equipment while trying to start," says Thompson. "That was an occasional problem that took time to identify."



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NOTED FOR PERFORMANCE

Even before the new Willmar Wastewater Treatment Plant went online, the city's treatment team had a reputation for excellence. The old plant won numerous honors, including 16 Minnesota Pollution Control Agency compliance awards between 1989 and 2009, and a U.S. EPA Region 5 Operation and Maintenance Excellence award in 1993.

Staff members have taken part in professional organizations such as the Minnesota Wastewater Operators Association and Central States Water Environment Association and have given presentations at those groups' conferences. They plan to resume presentations now that the new plant's challenges are largely behind them.

Plant superintendent Colleen Thompson leads the team; she has worked at the Willmar plant for 26 years and holds Class A wastewater, Class IV waste disposal, lab technical manager and special engineer boiler licenses. Other staff members are:

- Jim Gauer, working foreman/lab technical manager, 23 years, Class A wastewater, Class IV waste disposal, special engineer boiler and Class A master electrician.
- Chris King, operator, 5 years, Class C wastewater, Class A journeyman electrician, special engineer boiler.
- Les Lange, safety coordinator/assistant lab technician/lab technical manager, 25 years, Class A wastewater, Class IV waste disposal, special engineer boiler.
- Jason Lindahl, biosolids coordinator, 15 years, Class B wastewater, Class IV waste disposal, special engineer boiler.
- Paul Marcus, maintenance mechanic, 22 years, Class D wastewater, Second Class A steam engineer.
- Doug Ruter, operator, 6 years, Class D wastewater, special engineer boiler.
- Allen Schueler, operator, 9 years, Class C wastewater, Class IV waste disposal, special engineer boiler.
- Tom Templer, lift station mechanic, 16 years, Class B wastewater, special engineer boiler.
- Terry Thole, operator, 9 years, Class C wastewater, special engineer boiler.
- Jim Werder, lab technician/lab quality manager, 22 years, Class B wastewater, certified laboratory, special engineer boiler.

NEW PLANT

The plant went online in August 2010. It includes an administration building that houses maintenance, laboratory, control systems and staff. There is also a biosolids storage/truck loading area and a new electric power building. Equipment includes:

- Three chemical feed systems: ferric chloride for phosphorus removal, magnesium hydroxide for pH control, and sodium hypochlorite for disinfecting recycled effluent.
- Industrial treatment influent selector (634,000-gallon tank and two blowers).
- Municipal pretreatment equipment: EPIC Landustrie Archimedes screw pumps, Vulcan fine screens and washer/compactor, KSB submersible pumps, and a selector.
- Two municipal and two industrial oxidation ditches (WesTech), each with two aerators.



ABOVE: Working foreman/lab technical manager Jim Gauer, left, and maintenance mechanic Paul Marcus monitor the standby generator control panel (Power Systems Solutions). RIGHT: Operator Allen Schueler checks the ferric chloride chemical feed system (Pulsafeeder).



- Two municipal and one industrial clarifier (Walker), five return pumps (Flygt – a xylem brand).
 - UV disinfection system (TrojanUV).
 - One municipal and two industrial biosolids storage tanks (Aquastore – CST Storage).
 - Biosolids belt press (Ashbrook).
- The industrial wastewater stream is pumped to the plant in a force main, and the municipal stream flows by gravity. Effluents from the two streams are combined before discharge to Hawk Creek.

Biosolids are applied to farmers' fields after being tested for parameters regulated by the MPCA and the U.S. EPA. The plant also includes a receiving station for trucked-in wastes such as septage and landfill leachate. There is also a dumpster for recreational vehicle wastewater.

PROBLEMS SOLVED

Today, the plant is operating well and meeting its permit requirements. "We're starting to feel more comfortable with the new plant now that a year has passed and we've experienced the seasonal changes," says Thompson. The separation of the incoming streams has reduced odors considerably. "That prevents the volatile organic compounds (VOCs) from forming," says Thompson.

The plant's four operators keep busy with equipment operations, preventive maintenance and grounds work, while maintenance mechanic Marcus repairs, fabricates and rebuilds major equipment. Operators continue to fine-tune the process by monitoring and observing pH, suspended solids and volatile solids, conducting regulatory and process testing, and modifying equipment.

Two laboratory technicians test for CBOD, TSS, phosphorus, ammonia and fecal coliform in the regulatory lab, and for mixed liquor suspended

solids, volatile solids, settleability, alkalinity and percent solids in the process lab.

The operations staff reports jointly to Thompson and Gauer, who helps organize the process and regulatory data and the wasting schedule for solids stabilization. "The operations staff does all the process testing and shares many ideas and solutions to make the plant run smoothly," says Gauer. "I am very proud of them for their dedication and common effort to preserve and protect the environment." **tpo**

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Operators Chris King, left, and Doug Ruter take samples at the municipal oxidation ditch (WesTech OxyStream, WesTech).

Swing-Shift Yoga

A SOLIDS OPERATOR AT A WISCONSIN WASTEWATER TREATMENT PLANT
TURNS HER HOBBY OF STAYING HEALTHY AND ACTIVE INTO ANOTHER CAREER

By Briana Jones

Wanda Schnetzer has taken her hobby to a new level. As a solids operator at the 11.7 mgd (average) City of Appleton (Wis.) Wastewater Treatment Plant, she started doing yoga six years ago. “I truly believe I am stronger, especially core-wise, and am much more centered and grounded,” Schnetzer says.

Always involved in aerobics, spin classes, marathons and even 100-mile bike rides, Schnetzer prides herself on staying active. “Especially with working the swing shift, I found I needed to have a strict schedule and stay healthy,” she explains. After a graveyard shift, her first yoga experience wasn’t exactly what she expected. “Whoa! This is going to put me to sleep,” she recalls.

TURN UP THE HEAT

Schnetzer tried Midwest Power Yoga, owned by Deborah Williamson. The yoga center offers faster-paced classes in rooms where temperatures reach 90 degrees F. “Wow! This is my style of yoga,” she says. “I love the heat aspect of it because you really can get so much more flexibility and toxins out of your body. I couldn’t go back to the normal yoga classes in the cold rooms.”

Williamson and the instructors at the yoga center regularly take trips around the world for team building and life coaching. “I thought, these instructors are so much fun, I want to travel with them,” says Schnetzer. She took her first trip with them to Costa Rica and tried the life coaching exercises. “They have you get up in front of a class and teach a yoga pose. I freaked out!” she says. But her fear quickly turned into excitement.

When she returned from a second trip in Bali, “It just kind of hit me. I love yoga,” she says. “I need to do teacher training at Midwest.

I’m doing it. I’m going to face the fear. I still have a fear every time I get up in front of a class, but I’m using that fear and excitement to motivate my students. Being able to take that excitement in the teaching and give it to other people is what I love.”

HELPING OTHERS

Schnetzer took the eight-week training course led by Williamson. “I

work by myself, so I practiced my yoga practical for when I was training to become an instructor,” she says. “I talk aloud while I’m hosing at the plant!”

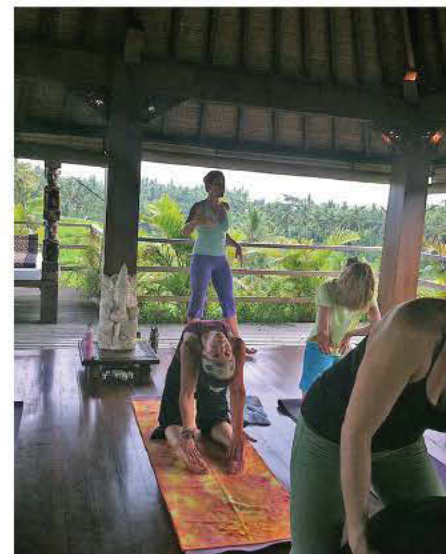
Now a certified yoga instructor, Schnetzer has to balance a swing shift as an operator. “When I’m on 3 to 11 p.m. shifts, I’m trying to promote an 11:30 p.m. class for swing-shifters and other crazy peo-

In her spare time, Wanda Schnetzer, solids operator at the City of Appleton Wastewater Treatment Plant, educates students about the benefits of yoga.

PHOTOS COURTESY OF WANDA SCHNETZER



ABOVE: Schnetzer took part in teacher training sessions through Midwest Power Yoga. RIGHT: Schnetzer leads a yoga class during a trip to Bali.



ple,” she says. “I have an 8 a.m. Body Boot Camp class when I’m on graveyard shift. I sub whenever needed. Because I do the swing shift, I’m able to help out other instructors. I can fill in for other classes.”

Schnetzer’s plant co-workers aren’t yet on board with her hobby. “Most of the operators at my plant are runners,” she says. “They don’t think they can do yoga. I thought of doing an introduction class for everyone.”

Although she doesn’t have a huge following of potential students at the treatment plant, Schnetzer continues to motivate and educate them and others outside the plant about the benefits of yoga. “Turning valves, running up and down stairs, and just being ‘one of the guys,’ I need to stay in shape and on the ball!” **tpo**

What’s Your Favorite R&R?

R&R (for rest and relaxation) is an occasional feature in *TPO* that looks at how clean-water operators enjoy their spare time. Feel free to share with us your hobbies, community or charitable efforts, volunteer activities, and other outside-of-work pursuits as possible story subjects for the magazine.

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WATER AND WASTEWATER TREATMENT SOLUTIONS



More than 350 third-grade students per year tour the Gem Pond at Sewerage Agency of Southern Marin's wastewater treatment plant.

PHOTOS COURTESY OF SEWERAGE AGENCY OF SOUTHERN MARIN

Creating a Gem

A POND ORIGINALLY INTENDED AS A STORAGE FACILITY FOR INCOMING WASTEWATER BECOMES A MAGNET FOR WATERFOWL AND A FAVORITE SPOT FOR WILDLIFE WATCHERS

By Jeff Smith

An unintended consequence of a decision made in the 1980s by the Sewerage Agency of Southern Marin, Calif., turned out to be beneficial to the agency's urban wastewater treatment plant and the surrounding community of Mill Valley.

Faced with too much inflow to the agency's 3.6 mgd biotower/trickling filter wastewater treatment plant during the winter rainy season, officials created two dry ponds for temporary storage of wastewater. The ponds were built between the plant and the entrance to a nearby multi-use community park. Although plant general manager Steve Danehy wasn't on the staff at the time, he knows of the ensuing controversies and the results.

"No one could have predicted this kind of outcome," says Danehy. One pond serves the dual purpose of providing temporary storage of wastewater, while normally holding clean effluent to sustain plants and wildlife habitat.

BUILT FOR STORAGE

Effluent leaves the plant through a 36-inch pipe near the ponds, starting a 6-mile trip to final discharge in San Francisco Bay. However, during a dry season just after a plant upgrade, a break developed in the effluent pipeline. While the leak was being repaired, final effluent was diverted and temporarily stored in the dry south pond.

"It took a while to sort out the cause of the leak, which was attributed to an outside contractor," Danehy says. "During the time it took to negotiate action on the repair, waterfowl and shorebirds discovered the pond, and it turned into a nesting habitat." Cattails and other native plants took hold, and suddenly the pond became a popular destination for birdwatchers and nature lovers, who unofficially called it Gem Pond.

USAGE CONFLICTS

Controversy erupted in the early 1990s when a group asked the plant to create a skateboard park by cementing over the dry north pond area. But those who enjoyed the south pond objected to the potential for noise and disturbance to wildlife. The dispute was settled when the sewerage agency found it could not get insurance for a city-sponsored skateboard park.

Over time, vegetation began to overrun the south pond, and the agency's board reconsidered whether the 2-acre pond was suited for dual use. A proposal to drain it and return it to its original purpose drew another public outcry. This time the agency created a management plan for maintenance of the pond that includes mowing and periodic clearing of cattails.

In 2000, the board was confronted with the need to increase the pond's wastewater storage capacity. "The ponds are earthen, and over the years the sides settled," says Danehy. With little objection from activists, they decided to raise the berm around the pond instead of permanently lowering the normal level of treated water and threatening the wildlife habitat.

Since then, a sign has been installed in a kiosk that lists more than 120 species of native and migratory birds pond visitors have seen there. And a change in insurance regulations has allowed a skateboard park to be built near the Mill Valley Middle School, away from the pond. **tpo**

Share Your Ideas

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AN AWARD-WINNING WATER RECLAMATION FACILITY IN CHANDLER, ARIZ., GARNERS MORE THAN \$86,000 IN UTILITY REBATES FOR ITS MANY AND VARIED ENERGY EFFICIENCY PROGRAMS

By Doug Day

None of the wastewater treated at the Ocotillo Water Reclamation Facility in Chandler, Ariz., is sent to a receiving river or lake. All of the plant's 8.6 mgd of effluent is reused — for aquifer recharge, urban and farm irrigation, or industrial process water.

It's not surprising that a community in the Sonoran Desert would place a high value on water. Chandler, a Phoenix suburb, gets about nine inches of rain a year. Even in March, the wettest month, it only gets about an inch. All new developments are required to use reclaimed water whenever possible. Reclamation is also cost-effective, as it would cost millions to build an effluent pipeline to the nearest river more than 20 miles away.

The Ocotillo facility, one of three wastewater plants in the city, has been operated by Severn Trent Services since 1999. In 2007-08, the plant

"We use as much of the utility program as we possibly can to achieve lower electrical costs with high-efficiency equipment and lighting."

KEITH GREENBERG



Grade 4 operator Jodey Lane checks the new high-efficiency blowers from HSI. Replacing the blowers earned the plant an \$86,300 rebate from the local electric utility.



PHOTOS COURTESY OF SEVERN TRENT SERVICES

The Ocotillo Water Reclamation Facility was at first privately built and operated and is named after the large subdivision it was designed to serve.

used the company's Site Energy Management Plan (SEMP) to improve its energy efficiency, leading to the 2010 Large Wastewater Treatment Plant of the Year award from the Arizona Water Association.

"SEMP evaluates the treatment process as a whole to see where efficiencies can be achieved," explains Severn Trent senior area manager Keith Greenberg.

AERATION IMPROVEMENTS

Continued effort toward efficiency at the Ocotillo biological nutrient removal plant was a key factor in winning the award. Of special note was an aeration blower replacement in 2010 that earned an \$86,300 rebate from Salt River Project, the local electrical utility. Three existing aeration blowers were replaced with high-efficiency blowers from HSI of Houston.

Using air bearings and high-efficiency motors, the blowers are 30 to 35 percent more efficient than the plant's original 25-year-old blowers, according to Greenberg. Replacing the 300 hp conventional centrifugal blowers with the same size high-speed turbo blowers is projected to reduce overall plant energy use by 1 million kWh or more. With a total cost of \$720,000, the project has an expected payback of 7.7 years. That doesn't include the \$30,000 annual savings from decreased maintenance on the blowers.

"The original plant blowers were very mechanical with a lot of moving parts, and they required ongoing service from an outside vendor for routine maintenance," says Greenberg. The bearings on the new blowers are cushioned by air, which reduces friction. The motors are also made of rare earth metals, whose magnetic characteristics and light weight reduce energy use and wear.

INCREASING REVENUE

"Determining the exact effect the blowers had on reducing the overall use of electricity is very complex," notes Greenberg. "However, there is no doubt that we have reduced energy costs through the implementation of the SEM and by installing high-efficiency blowers. The total

What's Your Story?

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

plant electric use is substantially less than it would have been had the original blowers not been replaced.”

Another aeration improvement was switching to LDO probes from Hach Company in place of older membrane probes. “They’re much more efficient and much more accurate,” says Greenberg. “They allow better control and better utilization of the air that is available, and you don’t have to replace the membranes.”

The Ocotillo facility also takes part in a utility program called PowerPartner, designed to reduce energy use during times of high demand. By agreeing to curtail its energy use, the plant receives an incentive payment from Salt River Project both for participating and for its actual performance during curtailment events.

“It brings in \$10,000 to \$11,000 per year, and the savings are shared with the city,” says Greenberg. “If called upon, we have to reduce our power use by 300 kW.”

That is achieved in several ways, including shutting off pumps, reducing dissolved oxygen to the minimum needed for treatment, and cutting demand throughout the plant by minimizing the use of lights and other electrical equipment.

The agreement with the electric utility restricts the number of curtailment events to one a day, no more than three times in seven days, up to four hours at a time, and no more than 60 hours per year.

FROM SPRINKLERS TO COMPUTER CHIPS

The Ocotillo Water Reclamation Facility was originally a privately built and operated wastewater treatment plant, the first in the nation, and is named after the large subdivision it was designed to serve.

All residents and businesses in the subdivision use its reclaimed water for lawn and garden irrigation, as does the subdivision’s golf course. The Ocotillo Community Association manages 167 acres of lakes and water features that are fed by reclaimed water, along with 14 pump stations to feed the irrigation system. The subdivision uses as much as 8 mgd from its lakes for irrigation in summer.

There are purple signs, valve boxes and sprinkler heads all around Chandler, indicating reclaimed water from Ocotillo and two city-operated reclamation plants. Intel has used more than 4.5 billion gallons from Ocotillo over the past ten years to run cooling towers at three computer chip fabrication plants. The Gila River Indian Community also receives plant effluent for residential and agricultural irrigation. The remainder of Ocotillo’s effluent is used for recharging the aquifer.

There is no penalty if Ocotillo can’t cut its use by 300 kW, but that would reduce its incentive payment. Greenberg says anything more than two hours becomes difficult for the plant to meet, but most curtailment events haven’t lasted that long. In 2011, the plant was asked to reduce its power consumption only once.

The details of such curtailment programs vary with the utility. One limiting factor for a wastewater plant is the time of peak flows compared to the peak demand for the electric utility. “Our flow starts picking up about 10 a.m. and we peak from about noon to 3 p.m.,” says Greenberg. “We usually get called for curtailment early in the morning.”

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Jodey Lane checks an LDO probe from Hach.

rebate standards for high efficiency," says Greenberg. That includes a recent project that relit an entire building with LED lights. The city also takes part in the utility's premium efficiency motor rebate program and looks for applications for variable-frequency drives.

In the planning stages is a total upgrade of the plant's HVAC system to switch to high-efficiency air conditioners and control valves. "We use as much of the utility program as we possibly can to achieve lower electrical costs with high-efficiency equipment and lighting," says Greenberg.

The plant's odor control system has also been improved to reduce impact on the neighborhood. "We optimized our system with hydrogen sulfide detectors for direct gas sampling that will trigger sodium

hypochlorite use instantaneously, so that we use the right amount and use it only when we have to," says Greenberg.

The plant also uses a "green" bioremediating parts washing system, the ChemFree SmartWasher, which combines a biodegradable solvent with microbes to eliminate parts washer waste. Greenberg says it all shows that energy efficiency is just one aspect of green operation. A holistic approach has helped the plant conserve critical water resources in the desert while reducing its impact on the planet. **tpo**

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An Extra Measure

A FLORIDA COLLEGE OFFERS AN ONLINE ASSOCIATE DEGREE PROGRAM THAT INCLUDES PREPARATION FOR WATER AND WASTEWATER OPERATOR LICENSING

By Ted J. Rulseh

Wastewater operator training often consists of stand-alone courses designed solely to impart the basic knowledge and skills needed to pass a state licensing exam. Now, Florida Gateway College is raising the bar.

This state college, based in Lake City, now offers a two-year Associate of Science degree in environmental science technology that includes preparation for state wastewater treatment and water treatment licensing. Its proponents say the associate degree provides an opportunity for aspiring and veteran operators to earn greater recognition and attain personal and professional pride.

While created for Florida residents, the program is offered online and so is accessible to anyone in the country, and even worldwide. John Rowe, Ph.D., professor of water resources, and Tim Atkinson, director of water resources training programs, talked about the offering in an interview with *Treatment Plant Operator*.

tpo: What was the rationale for creating this degree program?

Rowe: About 10 years ago, we started teaching a 15-week wastewater treatment class that is required by the State of Florida for an operator to become certified. We offered classroom instruction, generally meeting in the evenings, four days a week.

Over time, we saturated the market here. When I visit wastewater plants in our area, most operators are people we trained. About four years ago, with encouragement from the state Department of Environmental Protection (DEP), we began teaching the course online, so that now we can offer it not only for our area but for the entire state. In fact, we've had operators come in from all over the United States.

Now we have a two-year Associate of Science degree in environmental science technology that has embedded within it the pre-licensing course for wastewater treatment and water operations. It includes the training that's required to sit for the licensure exam, along with the hands-on experience needed to get the license.

tpo: How does a Florida-based licensure course help prospective operators from other states?

Atkinson: The pre-licensure courses are specifically approved by the Florida DEP. Since Florida uses the Association of Boards of Certification (ABC) Need-to-Know Criteria, our course would be helpful to any student in any state that uses those criteria in its exams. That includes 46 states, all Canadian provinces, and several foreign countries.



Tim Atkinson, director of water resources training programs, left, with student intern Kaleb Giebeig, and John Rowe, Ph.D., professor of water resources.

From other states, we're finding experienced operators who want to come to Florida but have to take the pre-licensure course and the examination, because Florida doesn't offer reciprocity. So we have students all across the country who were referred to us because they can take the entire pre-licensure course online and qualify to sit for the Florida exam.

Speed is highly valued by folks who are trying to get to Florida for job opportunities, particularly in South Florida. We also have students from other states who are preparing to sit for their own state exams and who choose to take our course as part of their exam preparation.

tpo: Why would there be demand among wastewater operators for an associate degree program, rather than simply operator training?

Atkinson: It was our theory from the time we introduced the noncredit pre-licensure courses that there would be a percentage of operators who would value an Associate of Science degree for their own personal and professional satisfaction. We found that to be the case.

We established our credibility as a provider of water and wastewater training. And when we announced that the associate degree was available, we began to get responses from operators. Often the response was that finally someone had come up with a college degree recognizing that what operators do is rigorous, involving

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heavy science, heavy math and heavy technology. A number of people entering the associate degree program are seasoned operators.

Rowe: Several folks entered the associate degree program after they had their licenses with the aim of enhancing their advancement opportunities where they work. We are also promoting it as a means of succession planning for utilities and operating companies.

tpo: What exactly does the associate degree include?

Rowe: It's a general view of environmental technology that includes soils and air but is directed primarily toward water. There are core general education requirements that go with a two-year degree program. The courses required for our particular degree are Introduction to Environmental Science, Chemistry and Biology of Natural Water, Introduction to Water Treatment Systems, Treatment of Water and Wastewater, Water Analysis and Monitoring, and Environmental Sampling and Analysis I and II.

We also offer some electives, including the pre-licensing courses for water and wastewater. A person doesn't have to enter this program and come out as a water or wastewater operator, but that is really our focus.

tpo: Do you see interest in the associate degree among high school students?

Atkinson: That is part of the strategy we are now enacting. The early strategy with the licensure course was directed primarily at adults in the field who didn't have a license or who, because of the recession, needed to retool and reinvent themselves and get into a sustainable career. It was for adults whose personal circumstances didn't lend themselves to keeping a college student's schedule.

We then activated the associate degree program. When we first

started at this, we had no young people interested. If I were to speak to a person under age 25 about a career in wastewater operations, there was no connection whatsoever.

Now we have agreements with high schools in our area — and for that matter outside our area because the program is online — that will be attractive to high school students. We helped the state Department of Education create three high-school-level courses that are

“It was our theory from the time we introduced the noncredit pre-licensure courses that there would be a percentage of operators who would value an Associate of Science degree for their own personal and professional satisfaction. We found that to be the case.”

TIM ATKINSON

approved so that any high school in the state can use them. These courses will prepare a person to sit for the state exam.

We have worked out an agreement between our college and the high schools so that if a student successfully completes those three courses, passes the state exam, and enrolls in our associate degree program, we will give them 12 college credit hours. So we're helping to create a pipeline of high school students into the associate degree program by way of water and wastewater operator training.

Rowe: This was something the industry was asking for. People in the industry were concerned that young people weren't coming into the field.

Atkinson: Another way we're taking this to the high schools is by offering dual enrollment. This allows high school students with certain grade level attainment who have passed a basic college preparatory test to take college credit courses and get college and high school credit. We are offering our associate degree in environmental science technology to high school students, and we have at least one and perhaps two high schools ready to enact that program.

"This was something the industry was asking for. People in the industry were concerned that young people weren't coming into the field."

JOHN ROWE

tpo: Are there future plans to offer more advanced degrees?

Rowe: From the associate degree program, as we create a pool of folks who have that degree and are interested in moving on, we will roll out a Bachelor of Science degree in environmental management. That would involve additional licenses, such as solid waste management, pesticide management, and probably upper levels of water and wastewater licensing.

tpo: Speaking strictly about the pre-licensing course, how would an operator from outside Florida be able to complete the work experience component of licensing through your program?

Rowe: For those who don't live in Florida, we would certainly make it available to them where they are. I would contact a wastewater facility in their region and see if we could institute the internship with them.

We'd tell them that the student has passed our pre-certification course for wastewater treatment and our courses in environmental

science. We'd be able to give them a resume of who they would be getting. It certainly takes some of the guesswork out of whether a new hire is going to make it or not.

Atkinson: The practicum course calls for 10 to 40 hours of on-the-job experience per week during the 15-week term. In Florida, we are finding very positive response to this from treatment plants eager to take on trainees whom they will be able to evaluate and possibly consider for future employment. They see it as a recruitment mechanism. Some of the treatment plants are actually hiring the practicum students as entry-level workers. For others, it's unpaid practicum experience.

tpo: How is the online course structured?

Rowe: Our online course is accessible anytime. No student has to go online at any particular time because we use a learning platform where students post their work online, so that all students in the class as well as the instructor can review it. Part of the course requirement is for each student to critique responses from other students. That helps create a virtual classroom environment.

Atkinson: You are in a class with other students. The course has a start date and an end date. The only time requirement is that you keep up with the weekly assignments so that you start and finish with your class.

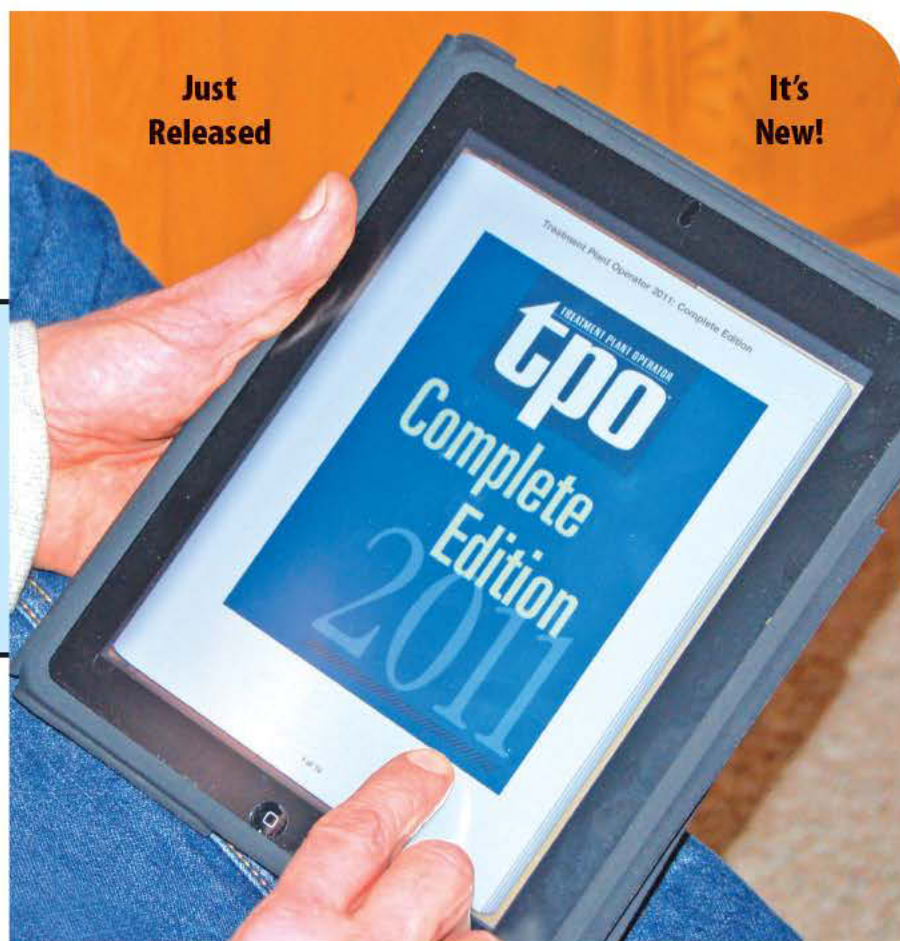
tpo: How many students are enrolled in the licensure course and associate degree program now?

Atkinson: There are about 80 students enrolled, of whom 25 are in the associate degree program. **tpo**

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Where Have All the Solids Gone?

TINY, SHORT-LIVED FLYING INSECTS CREATED A SERIOUS PROCESS PROBLEM AT A SMALL PACKAGE-TYPE ACTIVATED SLUDGE TREATMENT PLANT

By Ron Trygar, CET

Early one morning, the Lab Detective received a call from a local operator, who described an extended aeration activated sludge package-type wastewater treatment plant serving a small community, with a permitted capacity of about 50,000 gpd.

The operator said the plant had been running well, producing quality effluent with discharge values well below the state permitted levels. When the operator came in to service the facility after a recent weekend, the effluent looked cloudy, with a hazy brown coloration.

He described the aeration tank's appearance: The mixed liquor suspended solids (MLSS) looked thin, as if most of the solids had disappeared. The return activated sludge (RAS) flow from the clarifier was also thin and watery. He noted that sludge clumps were seen in the aeration tanks that looked gray, like shaggy mop heads rising and sinking again (Figure 1).

SOLIDS WASHOUT?

The Lab Detective arrived at the plant and found the operator's description accurate. One theory discussed with the operator was the possibility of a hydraulic washout of the mixed liquor solids, but further investigation of the chlorine contact tank and the effluent discharge into a percolation pond found no evidence of such an event.

There were several sludge clumps in the corner of an aeration tank near the surface. The detective picked up a long-handled pool-cleaning brush and broke up the clump releasing a massive number of small red worms. Acting on a hunch, he assembled his core sampler, a clear plastic device for measuring the sludge blanket.



FIGURE 1: Sludge clumps in the aeration tanks looked gray, like shaggy mop heads rising and sinking.

What's Your Lab Story?

The Lab Detective feature in *TPO* will help operators learn analytical techniques that help diagnose and solve treatment problems. Are you struggling with a process issue?

Send a note to editor@tpomag.com. Your question may become the topic of a future column.

Using the sampler in various locations around the actively mixing aeration tanks, he located the missing mixed liquor solids. As the Lab Detective poked the sludge core sampler all around the bottoms of the tanks, large amounts of bubbles were released, and clumps of dark brown to gray sludge rose to the surface.

As the clumps surfaced, the detective stirred the clumps with the pool brush, again releasing large numbers of red worms that began wiggling throughout the tank. He identified the worms as midge (*Chironomid*) fly larvae. These larvae, commonly called bloodworms, range from a few fractions of an inch to as long as one inch, depending on where they are in their life cycle (Figure 2).

SHORT LIFE CYCLE

Like most flying insects, *Chironomids* go through metamorphosis from egg to adult. Male midges gather in a mating swarm that can be readily seen near standing water, ponds, creeks and streams, and there may be 100 or more males flying around in the group. When a female enters the swarm, a male and the female will mate.

As they descend together to the water surface, the female deposits her clutch of fertilized eggs onto the still water surface (most likely a secondary clarifier in this case). The egg mass sinks into the settled sludge or clings to the algae that grow on the tank walls. As the eggs incubate, they become tiny larvae.

The larval midge has a sticky outer layer covering its body, and the very fine suspended solids surrounding the young midge begin to accumulate on its exterior, forming a kind of tube. The young midge also feeds on decaying organic matter, so it grows and grows as it collects the silt-like organic material that enters the tube.

As the midge larvae mature (anywhere from two to seven weeks), they transform into pupae. After several days, the pupae emerge from the tube and swim to the surface, where they become adults after a few hours. The adult midge flies up into the air, enters a mating swarm, and the whole cycle begins again.

Adult midges live only a few days. Each adult female can lay an enormous number of eggs, from 100 to 3,000, depending on the species of *Chironomid*. The adult midge looks very similar to a mosquito (some folks call them blind mosquitoes), but they do not bite, and male midge flies have distinct feather-like antennae (Figure 3).

TIME TO PUMP

The operator of this small wastewater treatment plant had expe-

PHOTO BUCKET/KYLEGRAF1



FIGURE 2. Midge (*Chironomid*) fly larvae range from a few fractions of an inch to one inch, depending on where they are in their life cycle.



FIGURE 3. The adult midge looks very similar to a mosquito (some folks call them blind mosquitoes), but they do not bite, and male midge flies have distinct feather-like antennae.

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FIGURE 4. When a product is used that forms a monomolecular film (MMF), mosquito and midge larvae, pupae and adults cannot cling to the liquid surface and essentially drown.

rienced a midge fly invasion. As the midge eggs were laid in the clarifier, the return activated sludge (RAS) airlift pump sent the egg-filled sludge into the aeration tank. Since the solids were so thick with sticky egg masses, the end result was like adding a coagulant (polymer) to the basins.

Piles of settled solids were gathered in the aeration tanks and clarifiers. A condition known as coning had been occurring in the clarifier, where thick solids would not move toward the airlift return sludge pump suction. That allowed a thin sludge to flow over and around the thick sludge to the pump suction.

To remedy the situation, the operator called in a sludge hauler to pump out the thick, midge-infested solids from the aeration tank bottoms and clarifiers. He re-seeded the treatment plant with fresh, healthy return activated sludge from another nearby treatment plant. The facility recovered quickly and began producing a good-quality effluent within a few days.

NUISANCE ON THE WING

Midge flies can be a significant nuisance. Operators can breathe them in or get them in their eyes or mouths while walking around treatment plant grounds. Swarms can affect residents of surrounding neighborhoods. Midges provide food to spiders and other insects, so equipment, handrails, pumps, motors and light fixtures can quickly become filthy. So how can midge flies be controlled? There are several methods:

- Minimize plant lighting at night. Operate outdoor lighting at treatment units, filters and tanks only when needed. This may save a few dollars on the electric bill, too.
- Keep treatment units clean. Control algae buildup and keep areas of standing water clean.
- Use a product that contains Bti (*Bacillus thuringiensis israelensis*), a group of bacteria that produce toxins that only affect the larva of flies. Bti is an active ingredient in a product called Mosquito Dunks, produced by Summit Chemical. This product can be found at most home-improvement stores or by contacting a local aquatic insect control agency near you. It has been used to control all kinds of mosquitoes and midges.
- Use a product containing methoprene, a chemical that mimics a juvenile growth hormone that inhibits midge larvae from becoming adult midges, breaking the life cycle. Methoprene is found in a product called Strike by Zoëcon. It has been used successfully in the wastewater treatment industry to control trickling filter flies and midges.
- Use a product that forms a monomolecular film (MMF). A thin film spray-applied to standing water, reducing the surface tension. Mosquito and midge larvae, pupae and adults cannot

cling to the liquid surface (Figure 4) and essentially drown. Cognis Corporation produces a product called Agnique MMF that has been used for this purpose.

- Introduce a natural predator, the Gambusia, better known as the mosquitofish (Figure 5). They can be found in most shallow freshwater habitats, where they are safe from larger predators. Gambusia feed on mosquito and midge fly larvae, pupae and adults. They are resilient to harsh environments (such as low dissolved oxygen and temperature variations) and are considered by some to be the most widespread freshwater fish.

Mosquitofish can be harmful to native fish in streams and ponds, but for use in a wastewater secondary clarifier, that probably won't be an issue. The Lab Detective has used this method at a small package-type treatment plant with some success. He released 20 mosquitofish into a midge- and mosquito-infested clarifier. Several days later, most all the



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FIGURE 5: Gambusia, better known as the mosquitofish, is a natural predator of midges.

Midge flies can be a significant nuisance. Operators can breathe them in or get them in their eyes or mouths while walking around treatment plant grounds.

larvae were gone, and the fish looked as if they had gained 10 pounds.

Whatever the method of *Chironomid* control you choose, it's always a good idea to check with your local and state regulatory authorities to be sure it is approved and will not harm the environment, the treatment plant or the public in any way. Check with other users of the chosen products to get their input on dosage and efficacy. As always, use chemicals with care and practice safe handling.

ABOUT THE AUTHOR

Ron Trygar is senior training specialist in water and wastewater at the University of Florida TREEO Center and a certified environmental trainer (CET). He can be reached at rtrygar@treeo.ufl.edu. tpo

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Odor Control and Disinfection

By Briana Jones

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FUME HOODS SUPERSTRUCTURE

The UniFlow Aire-Stream fume hoods superstructure from HEMCO features unitized dual wall construction for chemical resistance, strength and durability. It is performance tested to ASHRAE 110-1995, UL 1805 certified for fume hoods and cabinets, SEFA1 recommended practices for fume hoods, and greener product certified. Custom sizes can be modified to suit special needs. The hoods include low flow constant-volume and variable-air volume models. Process-specific models are PVC-, phenolic-, or stainless steel-lined for perchloric acid or acid digestion. **800/779-4362; www.hemcocorp.com.**



UniFlow Aire-Stream fume hoods superstructure from HEMCO

LAUNDER COVERS

Laundry Cover Systems from NEFCO are designed to inhibit growth of algae on launder trough and weir surfaces by blocking sunlight. Without sunlight, the algae are largely eliminated or reduced to a light film easily washed away with a hose.

The covers contain odors produced when effluent breaks over the weir or can operate with scrubber systems that draw the trapped gases off and treat them. The covers are designed to meet specified load requirements with safety factors and can accommodate safety railings where necessary. The covers also keep ice, snow and debris from the launders. **561/775-9303; www.nefcoinnovations.com.**



Laundry Cover Systems from NEFCO



TrojanUVSigna from Trojan Technologies

MAXIMIZED DISINFECTION

The TrojanUVSigna from Trojan Technologies includes the TrojanUV Solo Lamp technology. It reduces cost of ownership and simplifies operation and maintenance. Disinfection is maximized with a staggered, inclined lamp configuration and bank walls.

The unit is well suited for large facilities wanting to upgrade disinfection systems or convert from chlorine. **888/220-6118; www.trojanuv.com.**

UV LAMP AND SLEEVES

4000L medium-pressure ultraviolet lamp and 4000Q quartz sleeve assemblies from UV Superstore, designed by First Light Technologies, for microbiological control are designed to fit model UV4000 UV wastewater treatment disinfection systems. The HID 3.2 kW lamps and sleeve assemblies are individually packaged for maximum protection. **770/307-3882; www.uvsuperstore.com.**



4000L ultraviolet lamp and 4000Q quartz sleeve assemblies from UV Superstore

BIO-OXIDATION SYSTEM

Bio-sumpVENT from Met-Pro Environmental Air Solutions is a lightweight, modular bio-oxidation system for odor control at lift stations, sewer vents, and other small, contained processes. The exterior is fiberglass plastic (FRP) with a sealed lid that houses an internal framework to support BioAIRSpheres organic media for the adsorption and digestion of odorous compounds. The system can handle H₂S and other odor compounds (mercaptans) in airflows up to 200 cfm. Single-stack or multi-vessel systems are available.

The system can be combined with a Bio-Pro bioscrubber when higher levels of H₂S are present in applications such as headworks, clarifiers, biological and solids processing and collection facilities. The combination of the bioscrubber with the organic media-based bio-oxidizer provides complete odor control for H₂S and organo-sulfur compounds. **503/691-2100; www.mpeas.com.**



Bio-sumpVENT from Met-Pro Environmental Air Solutions

(continued)

TABLET CHLORINATION

The Accu-Tab tablet chlorination system from PPG Industries offers a safe, simple solution for disinfecting water and wastewater. The system combines engineered chlorinators with 3-inch controlled-release 68 percent calcium hypochlorite tablets to deliver consistent, controllable levels of chlorine residual. Solution output is controlled by a diaphragm valve. The system can be integrated with an existing system. Once in place, the tablet system runs with little or no maintenance. **800/245-2974; www.ppgaccu-tab.com.**



Accu-Tab tablet chlorination system from PPG Industries

CYCLONIC SEPARATION UNIT

The Hurricane Filtration System from Harmsco combines cyclonic separation, cartridge filtration, and up-flow technology in a compact filter housing. The system separates dense solids before cartridge filtration for extended cartridge life, increased dirt holding capacity and reduced operating costs. The up-flow design prevents air entrapment, and rotational flow around the cartridge improves cartridge-load performance.

Liquid flows into the housing through a tangential entry and is channeled between the outer housing and the inner housing wall. The inner wall rises from the base to just below the top of the housing so that liquid must flow around and then over the inner wall before entering the

cartridge-filtration area. The outer flow creates a cyclonic effect, and a combination of kinetic energy and centrifugal forces combine to make dense solids bounce along the outer casing and lose velocity. The tangential entry is located high on the housing to reduce the velocity of liquid flow in the bottom of the outer chamber and promote settling of the dense solids. **800/327-3248; www.harmsco.com.**



Hurricane Filtration System from Harmsco

ODOR ABATEMENT

Biological Air Treater (BAT) from Purafil provides efficient and cost-effective odor abatement and VOC treatment. With blends of polyurethane-foam cubes and polypropylene spacers, the unit offers a fixed-film biotrickling filter technology. The mixture of cubes and spacers prevents plugging and channeling, providing a lower pressure drop. The natural biotrickling microbial process, with stable biofilms resistant to fluctuations, requires little maintenance. The mixed media has been proven in various odor-control applications.

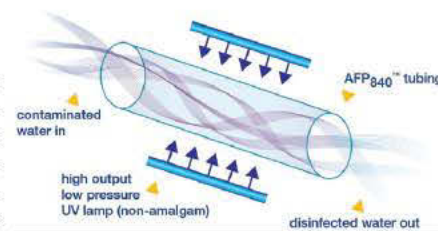


Biological Air Treater (BAT) from Purafil

The design offers a small footprint, and users can include a chemisorptive polishing media for higher contaminant and odor removal. Applications include wastewater treatment plants, food and agriculture, chemical and pharmaceutical, and petrochemical. **800/222-6367; www.purafil.com.**

NONCONTACT DISINFECTION

ENAUQA noncontact systems are nearly maintenance free, low-cost solutions designed for sequencing batch reactors with up to 24 on/off cycles per day.



Noncontact systems from ENAUQA

Water is directed through Activated Fluoropolymer (AFP) tubes, with dry UV lamps on the outside. Banks of lamps surround the tubes so that each tube is exposed to UV light from all sides, allowing for rapid lamp changes without the need to clean the quartz tubes. There is no need to interrupt or remove any hydraulic seals during lamp maintenance. The tubes need never be replaced or removed from the system.

The AFP tubes ensure that algae does not grow in the system, making it well suited for lagoons. The systems do not require weirs. **800/321-4989; www.enaqua.com. tpo**

NATIONAL ASSOCIATION OF WASTEWATER TRANSPORTERS, INC.

UPCOMING TRAINING & EVENTS

<p>Inspector Training & Certification: May 30-31, 2012 - Santa Rosa, CA Instructors: Jacque Sommers and Kit Rosefield Go to www.COWA.org</p> <p>June 18, 2012 - Albuquerque, NM POWRANM & NAWT - Recertification - Contact: Bill McKinstry at (505) 989-7676 or admin@powranm.org</p> <p>June 22-23, 2012 - Waco, TX Instructors: Jim Anderson and Dave Gustafson Go to www.NAWT.org</p> <p>August 27-28, 2012 - Casa Grande, AZ Univ. Of AZ - NAWT Contact: Kitt Farrell-Poe at (520) 621-7221</p> <p>Installer Workshops June 27, 2012 - San Diego, CA NAWT & NWA 2012 AEC Instructors: Jim Anderson and Dave Gustafson</p> <p>October 15, 2102 - Dover, DE DOWRA Conference Contact Hollis Warren at (302) 284-9070 or Htwarren43@aol.com</p> <p>October 25-26, 2012 - Lakewood, CO CHURCH Onsite Wastewater Consultants Contact: Kim Seipp (303) 622-4126 or highplains@ttds.net</p>	<p>Operation & Maintenance Training Certification: September 12-13, 2012 - Mill Valley, California Operation & Maintenance, Level 1 Instructors: Mike Treinen or Kit Rosefield Go to www.COWA.org</p> <p>November, 2012 - (TBA) California Operation & Maintenance, Level 2 Instructors: Nick Weigel or Kit Rosefield Go to www.COWA.org</p> <p>CEU's for NAWT Recertification May 7-8, 2012 - Payson, AZ - Univ. Of AZ - NAWT 7th - Inspection Pumps & Design 8th - Inspection Subsurfacing Drip System Contact: Kitt Farrell-Poe at (520) 621-7221</p> <p>July 26, 2012 - Sacramento, CA COWA - NAWT - Low Pressure Pipe Drainfield & Drip Design - Go to www.COWA.org</p>
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Biofilter absorbs gases

Problem

The Karcher Creek Wastewater Treatment Plant in Port Orchard, Wash., needed to control odors and had no room to expand.

Solution

Engineers chose a **biofilter system from Bohn Biofilter Corp.** that treats 200 ppm hydrogen sulfide. The biofilter, built on the roof of the solids storage tank, accommodates large mixers penetrating through the roof into the tank below.



RESULT

The system provides odor control and was shut down only once in seven years for fan maintenance. **520/624-4644; www.bohnbiofilter.com.**

Insulated cover seals in odors

Problem

Odors from the Southwest Water Reclamation Facility in Bradenton, Fla., bothered golfers on a nearby course and local residents.

Solution

The Manatee County Public Works Department selected the **LemTec modular insulated cover from Lemna Technologies** to cap the 244-foot circular equalization tank. Individual casings of 1-inch closed-cell insulation sealed between two sheets of 40 mil HDPE geomembrane minimizes odors while adjusting to fluctuating water levels.



RESULT

The product proved cost-effective and maintenance-free. **612/253-2000; www.lemnatechnologies.com.**

Ozone chamber controls odors

Problem

Engineers at the 333 mgd North Side Water Reclamation Plant in Skokie, Ill., proposed ozone to reduce odor complaints.

Solution

They chose an **odor control system with corrosion-resistant fiberglass contact chamber from Ozonology.** The chamber, sized for the exhaust air volume, detains hydrogen sulfide for 30 seconds, in which time it reacts with ozone and controls odor. A monitor regulates ozone production to match odor loads.



RESULT

The system has controlled odors for six years. **866/998-8808; www.ozonology.com.**

Oxidation technology controls odor

Problem

For 20 years, hydrogen sulfide odor from 8.5 miles of sewer made life unpleasant for neighborhoods and small businesses in Clarksville, Ind. Wastewater Treatment Department personnel struggled to find a cost-effective solution.

Solution

A Source Technologies representative recommended the VSP superoxide process. It



combines the VSP catalyst, a complex organic compound, with oxygen generated on site using a molecular sieve and the two chemistries combine to oxidize the sulfide in the water within minutes, preventing the formation of hydrogen sulfide in the lines.

RESULT

Since its installation in February 2010, the area has been odor free. Clarksville town council president Greg Isgrigg received the 2010 Collection Systems Small Facility Award from the Indiana Water Environment Association for solving the problem. **859/223-1444; www.sourcetechnologiesllc.com.**

Activated carbon ensures fresh air

Problem

A 30 mgd municipal wastewater treatment facility in a Connecticut neighborhood wanted to minimize odor breakthrough while reducing activated carbon changeout frequency to lower costs.

Solution

Operators chose **DARCO H₂S**, a nonhazardous lignite-based activated carbon from **NORIT**. The product's natural catalytic capabilities required no impregnation to achieve optimal porosity and maximum hydrogen sulfide absorption.



RESULT

The facility extended its carbon filter bed life from four to more than 18 months, and the initial fill was still usable. Over five years, operators eliminated more than 12 changeouts, saved more than \$360,000, and reduced odor-testing expenses by nearly 50 percent. **800/641-9245; www.norit-americas.com.**

System stops odors, reduces FOG

Problem

Residents complained of sewer odors in neighborhoods near the Howell Avenue pump station in Riverhead, N.Y. The two wet wells also had large amounts of fats, oils, and grease.

Solution

Parkson Corp. proposed an **OHxyPhogg V80 system** with one standard nozzle per wet well. The Sewer District installed it in July 2011.



RESULT

Odor complaints ceased and FOG was reduced despite additional grease being diverted from other pump stations. Operators found the system easy to operate and maintenance requirements minimal. **888/727-5766; www.parkson.com.**

Device controls odor and corrosion

Problem

A southern Arizona municipality had a two-mile force main with hydrogen sulfide peaking at 3,400 ppm and averaging 340 ppm at its outfall. Daily temperatures reached 110 degrees F.

Solution

Operators installed the **FORSe 5 odor and corrosion control system** from **Anue Water Technologies** in the line at the wet well and downstream from the check valve. The device diverts a fractional flow, infuses it with oxygen and ozone, then returns it to the force main.



RESULT

Five days after installing the device, hydrogen sulfide levels dropped from 17 mg/L to less than 0.2 mg/L. Vapor measurements decreased from greater than 3,400 ppm to less than 10 ppm. **760/476-9090; www.anuewater.com. tpo**

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McCrometer adds Live Chat to website

McCrometer added Live Chat to its website, www.mccrometer.com, enabling customers to directly communicate with flow measurement experts in the oil/gas and municipal water and wastewater industries during regular business hours. The chat icon can be found on the product pages.



Pasteurization Technology secures \$1 million investment

Pasteurization Technology Group secured a \$1 million investment from EIC Ventures, an early-stage venture capital investment fund. PTG's innovative disinfection process uses digester gas, a natural byproduct of wastewater treatment, as fuel to drive a turbine that generates electricity.

Standard Methods manual updated

Standard Methods for the Examination of Water and Wastewater has been expanded and revised. Published by the American Public Health Association, the American Water Works Association and the Water Environment Federation, the publication is in its 22nd printing. One change in the edition is an emphasis on quality assurance/quality control practices. The book is available by calling 888/320-2742, emailing apha@pbd.com or visiting www.aphabookstore.org.

Koch Membrane hires commercial manager

Koch Membrane Systems hired Ravichandran Subramanian as regional commercial manager. He will be responsible for developing the markets for all KMS products in Southeast Asia for both the Water & Wastewater and the Industrial & Life Sciences divisions. Subramanian has 15 years of industry experience in sales, management and product management.

Pump Solutions acquires the Maag Group

Pump Solutions Group, a business unit within the Engineered Systems segment of Dover Corp., acquired the Maag Group, headquartered in Zurich, Switzerland, for \$285 million. The acquisition includes Maag Pump Systems, Automatik Pelletizing System and Maag Filtration Systems. The Maag Group will operate as a business unit within PSG.

AWWA publishes water, wastewater design-build book

The American Water Works Association published *Design-Build for Water and Wastewater Projects*. The book provides utility managers, operators and water quality staff, city officials and others with information on when design-build project delivery is a good choice for a water or wastewater utility. It also outlines how to plan, procure and execute a DB project. Black & Veatch senior water process engineering manager Holly Shorney-Darby, Ph.D., P.E., managed and edited the book.

Emerson Bearing forms wastewater division

Emerson Bearing of Boston formed a dedicated wastewater division. Richard Furtado, a senior sales expert who has been with the company for 30 years, will head the division.

Atchia, SJE-Rhombus recognized for technical leadership

Julian Atchia, director of engineered products for SJE-Rhombus, was recognized by the Hydraulic Institute for technical leadership and contributions to the creation of ANSI/HI standards. Atchia worked to update the standard for Rotodynamic Submersible Pumps for Hydraulic Performance, Hydrostatic Pressure, Mechanical and Electrical Acceptance tests, ANSI/HI 11.6-2011.



Julian Atchia

The revised standard changes direction and represents a departure from the previous standard (ANSI/HI 11.6-2001) in that the submersible pump is guaranteed and tested as a complete close-coupled unit.

RedZone receives investment funds

RedZone Robotics Inc., designer and manufacturer of wastewater inspection technologies, received a \$6.5 million investment from Waste Resources Fund L.P., managed by FourWinds Capital Management, and a \$2 million investment by Smithfield Trust Co. FourWinds' Valerie Daoud Henderson will join RedZone's board of directors.

Metrohm creates young chemist award

Metrohm will present \$10,000 to a graduate, post-graduate or doctoral student in North America performing research in the fields of titration, ion chromatography and/or electrochemistry. Candidates can submit their research abstract/summary for consideration at www.metrohmusa.com/youngchemist.

Parkson appoints Turpin vice president

Parkson Corp. named Mark Turpin vice president of strategic marketing and business development. Turpin joined the company in 2007 and most recently served as vice president and general manager of aftermarket and services.

CSI Controls' representative expands territory

The 419 Group LLC expanded its CSI territory, becoming the wholesale factory representative for CSI customers in North and South Carolina. The group also serves as a CSI representative in Virginia.

VerderGPM becomes Verder Inc.

VerderGPM changed its name to Verder Inc. The company sells Verderflex brand hose and tubing, Verderair air-operated diaphragm pumps and SSP Alfa Laval rotary lobe and dual disc pumps.



Participants of the SSPMA forum in Indianapolis included, from left, David Frame, Bob Frame Plumbing; Charles White, vice president of technical and code services for Plumbing Heating Cooling Contractors National Association; Jeff Hawks, Champion Pump and SSPMA's moderator; Stephen Pfendler, P.I.P.E. Inc., and William Ciriello, Wm. J. Ciriello Plumbing Co.

SSPMA welcomes Superior Pump, holds spring meeting

The Sump and Sewage Pump Manufacturers Association (SSPMA) welcomed Superior Pump of Minneapolis, Minn., to its membership. Superior manufactures sump, sewage, effluent, utility and backup pumps.

The association also held its spring meeting in February in Indianapolis. The program featured four plumbing contractor representatives from the Indiana Plumbing Heating Cooling Contractors Association. Topics included industry trends, pump distribution, training and education needs for employees and time demands for handling service calls.

Synagro appoints Zimmer president, CEO

Synagro Technologies Inc. appointed Eric Zimmer president and chief executive officer. Zimmer has 22 years experience in the environmental services industry. He joined the company in 2011 as executive vice president of Synagro's services division and succeeds Bill Massa who resigned in October.

Microsol acquires SOLON and subsidiaries

Microsol, a United Arab Emirates-based solar cell manufacturer, acquired components of the insolvent SOLON SE and its subsidiaries, including U.S.-based SOLON Corp. The main sites in Germany, the United States and Italy will be maintained. The purchase price was not disclosed.

American Flow Control names sales manager

American Flow Control, division of American Cast Iron Pipe Co., named John Hagelskamp division sales manager. He will work with current sales manager Walter L. Cooper, who is retiring in 2013.

Netsch Pumps names vice presidents

Netsch Pumps North America named Julio C. Ferreira vice president of sales and John Maguire vice president of operations and product management. Ferreira has 30 years of industry experience. Maguire has been with the company for 20 years, most recently as vice president of sales. **tpo**

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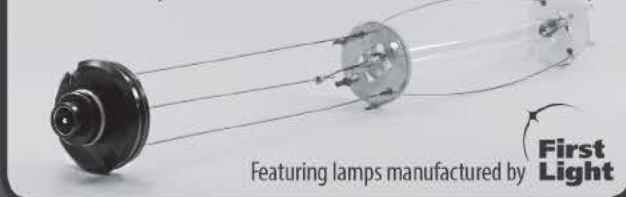
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1. HAYWARD GF-PP BASKET STRAINERS

GF-PP (glass-filled polypropylene) SB Series basket strainers from Hayward Flow Control are available in sizes from 1/2 to 4 inches with true union threaded or flanged end connections. They have a maximum pressure rating of 150 psi and service temperature of 240 degrees F. Features include UV resistance, FPM or EPDM O-rings and seals, inline or loop connections, external cover threads, integral flat mounting bases, 1/32-inch perforation baskets for 1/2- to 1-inch sizes and 1/8-inch perforations for 1 1/4- to 4-inch sizes. **888/429-4635; www.haywardflowcontrol.com.**

2. NEPTUNE HYDRAULIC METERING PUMPS

The 500-D Series of hydraulic diaphragm metering pumps from Neptune Chemical Pump Co. feature EZE-CLEAN valve cartridges that can be removed from the pump head without disturbing piping and Variable Oil bypass stroke adjustment for improved valve performance. Other standard features include double ball-check valves, internal relief valve and hydraulically balanced Teflon diaphragm for extended life. Options include automatic flow rate adjustment using an electronic stroke controller and variable-frequency drives. **215/699-8700; www.neptune1.com.**

3. KROHNE CHLORINE MEASURING SYSTEM

The OPTISENS AAM 1100 preassembled and tested chlorine measuring system from KROHNE features a membrane-free sensor and automated cleaning for low maintenance. Integrated temperature compensation and flow control maintains the integrity of the chlorine signals under all ambient and process conditions. Optional pH compensation for fluctuating pH values above 7.5 is available. **800/356-9464; www.krohne.com.**

4. OPTO 22 TEMPERATURE SENSING MODULE

The SNAP-AIRTD-iK, two-channel, isolated analog input module from Opto 22 is made for use with 1,000 ohm platinum resistance temperature detectors (RTDs). The module has a nominal input temperature range of -328 to 1,562 degrees F and input range of 0-4,000 ohms. Used primarily with RTD probes to provide temperature inputs, the module can be used for making high-resolution resistance measurements. **800/321-6786; www.opto22.com.**

5. SEL 24-PORT ETHERNET SWITCH

The SEL-2730M managed 24-port Ethernet switch from Schweitzer Engineering Laboratories Inc. is built for harsh environments and supports high-speed control, real-time automation and SCADA traffic. The switch withstands vibration, electrical surges, fast transients, electrostatic discharge and extreme temperatures. **509/332-1890; www.selinc.com.**

6. SIEMENS MONITOR/CONTROL SYSTEM

The Link2Site cellular-based monitoring and control system from Siemens Water Technologies lets users control, monitor and enhance lift

station equipment and facilities. The system is modular and easy to configure and install. It is available with flexible service plans to meet system needs. **800/875-7873; www.siemens.com/water.**

7. SENSOREX POLYCARBONATE PH/ORP SENSORS

S150C and S151C-ORP polycarbonate body 12 mm pH/ORP electrodes from Sensorex can be used with any pH or ORP meter. User-friendly and maintenance-free, they are shipped in a soaker bottle for immediate use. The S150C has a measurement range of 0-14 pH. The S151C-ORP has a measurement range of $\pm 1,999$ mV for ORP and offers a pH response rate of greater than 90 percent in one second. The electrode operates up to a maximum temperature of 140 degrees F and maximum pressure of 50 psig. **714/895-4344; www.sensorex.com.**

8. INDUSTRIAL SCIENTIFIC MULTI-GAS DETECTOR

The Ventis LS multi-gas detector from Industrial Scientific Corp. uses Wi-Fi and location-based technologies to remotely monitor workers in potentially hazardous environments. The system can detect up to four gases, including H₂S, O₂, LEL, CO, SO₂ and NO₂. In potentially hazardous conditions, the device alerts users through audible, visual and vibrating alarms. Gas level information is transmitted over a wireless network using the device's integrated Wi-Fi tag and sent to a control room. A separate alert would be sent if lack of motion is detected or if the detector's panic button is activated. **800/338-3287; www.indsci.com.**

9. IVC LONGWATCH SOFTWARE VERSION 5.4

Longwatch software version 5.4 released by IVC offers real-time data overlays, quality video over low bandwidth links, streamlined clip extract and H.264, megapixel, certified camera support. The latest version of software can be part of a comprehensive video monitoring solution when combined with IVC's line of industrial IP video cameras. **781/255-7400; www.ivcco.com.**

10. DUST CONTROL EVAPORATOR

The DriBoss DBE-750 evaporator from Dust Control Technology features a water fracturing design driven by a 25 hp industrial-grade motor. Designed to eliminate wastewater quickly and cost effectively, even without large evaporation ponds, the 75 hp submersible pump is attached to a frame that floats on polyethylene pontoons filled with closed-cell urethane foam. The evaporator can pass particles up to 3/16 inch in size without clogging or fouling nozzles, reducing the need for pre-filtering or cleaning dirty elements. **800/707-2204; www.driboss.com.**

11. MOYNO SERIES 3 C3A CHANNEL GRINDER

The Series 3 C3A channel grinder from Moyno features one-piece casting top plate with adapter cover, top stack tightening, shrouded seal design and hardened couplings. **937/327-3111; www.moyno.com.**

(continued)

product spotlight

Flowmeter and Conditioner Ensure Accurate Aeration

By Ed Wodalski

The ST98 thermal mass flowmeter from Fluid Components International, when combined with the Vortab Insertion Panel (VIP) flow conditioner, provides an accurate, economical way to measure air/gas flow in sometimes challenging pipe configurations.

Flowmeters installed in the aeration systems of activated sludge wastewater treatment plants measure the airflow microorganisms need to thrive. Elbows, valves and shorter-than-optimum upstream straight-pipe runs create flow disturbances that can prevent meters from delivering precise readings on the air reaching the basin.

"Say you have an aeration system where large blowers are providing air to several basins through a network of progressively smaller-diameter pipes along with elbows and valves," says Don Lundberg, product engineer for FCI/Vortab. "It's critical to have the proper amount of air circulating through the aeration basin to sustain the microorganisms.

"Engineering wants to put flowmeters on the various lines, but unfortunately, due to space limitations, the pipe runs will come out of the ground or out of a manifold, then through a couple of 90-degree turns and valves that can leave under 10 diameters of straight run at any part of the process. That is inadequate for any flowmeter."

Installed immediately after flow disturbances, the VIP flow conditioner neutralizes the disturbances, reducing the amount of straight-pipe run needed for accurate readings. Besides saving floor space, the flow conditioner can save hundreds of thousands of dollars in piping and retrofitting costs. It also has a very low pressure drop, potentially saving thousands of dollars in energy costs, according to Lundberg.

The thin, lightweight conditioner can be installed between flanges or welded in place. Made of 316L stainless steel, it is available for standard pipes from 2 to 40 inches. Other materials and larger sizes are available. The flow conditioner requires minimal maintenance. "Depending on the cleanliness of the process, it might require an occasional visual inspection," Lundberg says. "If it's a filtered environment, there would be no inspection requirements at all."

Able to operate over a wide flow range, the flowmeter has no moving parts. A thermal dispersion mass flow sensing element provides accuracy within 1 percent of reading and 0.5 percent of full scale and is reliable in harsh environments.

A two-way HART interface enables engineers to receive multiple process variables and configure the meter remotely. The insertion-style flowmeter can be installed without shutting down the process by using an NPT fitting, ball valve or hot tap. **800/854-1993; www.fluidcomponents.com.**

ST98 thermal mass flowmeter from Fluid Components International

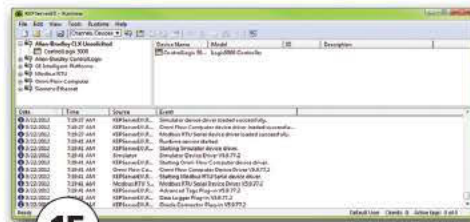




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12. CRANE SUBMERSIBLE SOLIDS HANDLING PUMPS

Non-clogging Barnes submersible solids handling pumps from Crane Pumps & Systems are available in 3-, 4-, 6- and 8-inch discharge sizes with motors ranging from 2 through 60 hp, flows to 3,400 gpm and heads over 260 feet. **937/615-3544; www.cranepumps.com.**

13. BEL-ART WIRE RACK LABELS

Polypropylene Scienceware wire rack I.D. tags from Bel-Art Products Co. snap onto any wire rack made of 1/8- or 3/16-inch wire. The tags can be wiped clean and reused, and labeled with a dry-erase marker, permanent marker or pressure-sensitive adhesive label. **800/423-5278; www.belart.com.**

14. MELTRIC RECEPTACLE BOX WITH CIRCUIT PROTECTION

The receptacle/wall box combination with integral circuit protection from Meltric Corp. combines the safety of a pre-wired DSN Series switch-rated receptacle with the convenience of local circuit protection in a compact package. The receptacle, which has a dead front safety shutter for protection from live parts and arc flash, is pre-mounted to the box and wired to the circuit protection device for easy installation. Fuse-holder models are available with 20A or 30A receptacles and have a blown fuse indicator light for each pole. **800/433-7642; www.meltric.com.**

15. KEPWARE SERVER, DRIVERS

The KEPServerEX 5.8 from Kepware Technologies features an Allen-Bradley ControlLogix unsolicited driver for expanded connectivity and Fisher ROC and ROC Plus controllers for enhanced interoperability. Other features include Modbus Channel Serialization, and Device Level Communication Diagnostics to aid with performance tuning and assist with troubleshooting. **888/537-9273; www.kepware.com.**

16. WILDEN STAINLESS STEEL AODD PUMP

The PX800 Advanced series stainless steel air-operated double-diaphragm pump from Wilden is center-ported and features a 2-inch flow

path and threaded 2-inch horizontal fluid connections. The pump has BSPT or NPT threaded inlet/discharge connections and a variety of elastomer options, including neoprene, Buna-N, EPDM, PTFE and Viton. Pumps deliver flow rates up to 176 gpm at operating pressures up to 125 psig. **909/422-1730; www.wildenpump.com.**

17. UNIVERSAL FLOW MONITORS PLASTIC TRANSMITTERS

P420 series plastic, vortex-shedding flow rate transmitters from Universal Flow Monitors Inc. offer metering in corrosive fluids, water, brine and low-viscosity fluids in water treatment applications. The series includes models with wetted parts made entirely of PVC or CPVC for greater heat resistance. The CPVC monitors can transmit fluids with a maximum operating temperature of 180 degrees F. Available in five pipe diameters (1/2, 3/4, 1, 1 1/2 and 2 inches), the monitors provide a flow range of 12 to 200 gpm. **248/542-9635; www.flowmeters.com.**

18. PENTAIR SOLAR COMBINER BOX

The Hoffman solar combiner box from Pentair Technical Products combines electrical inputs for photovoltaic applications into a single output. The box is available in non-metallic POLYPRO and 14-gauge mild steel models. POLYPRO boxes provide an overlapping tongue-and-groove raised cover and gasket for a secure seal and are Type 4X rated. Steel models feature continuous hinges, oil-resistant gaskets and Type 4 rating. Both versions are available in 6- and 12-string configurations. **763/421-2240; www.hoffmanonline.com.**

19. HACH PORTABLE VELOCITY FLOWMETER

The FH950 portable velocity flowmeter from Hach Flow Meter Products & Services features an electromagnetic sensor. The step-by-step interface simplifies programming, delivers real-time data and downloads direct to a PC. The unit automatically calculates total discharge based on USGS and ISO methods, while real-time velocity is graphed on a color display. **800/368-2723; www.hachflow.com. tpo**

BUSINESSES

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DRAINFIELD RESTORATION

Soil Shaker 2000. Universal skid steer attachment for drainfield restoration. Buy factory direct: \$6,250. www.soilshaker.com or call 320-293-6644. (P1-12)

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)

MISCELLANEOUS

UV DISINFECTION EQUIPMENT: Attention: Small wastewater treatment plant owners and operators. Very easy installation. Brand new product. US patent pending. callagher@sbcglobal.net, www.thefecalfighter.com. (oBM)

TRUCKS (DUMP, SEPTIC, MISC.)

FOR SALE: 1998 International, single axle patrol truck, model 2554, 6-speed Allison auto. This truck comes fully equipped with a 12' Monroe reversible front plow, 11' reversible underbody, 8' wing and a 9" tailgate spreader. This truck has only 41,841 miles and has been well taken care of. Asking price is \$30,000. For more information contact John Stevens Pine Lake Town Shop Foreman at 715-362-2657. Pictures can be seen at www.townofpinelake.com/truck.html. (OCMPTGI-BM)

WATERBLASTING

WATER JETTING EQUIPMENT: We sell, repair and retrofit water blasters. Visit us at: www.waterjettingequipment.com or phone 714-259-7700. (CPBM)

2009 NLB model 10275, 325 hp, diesel powered, on trailer, like BRAND NEW, Lance hose, foot valve, 10k head and also 24k head, 710 hours. Price: \$72,500. Canada. Jason: info@accuworx.ca, 416-410-7222. (P06)

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The **City of New Port Richey (Fla.) Wastewater Treatment Facility** received the Department of Environmental Protection's Domestic Wastewater Plant Operations Excellence Award.

The **City of Cranbrook (B.C.) Wastewater Improvement Program** received the Federation of Canadian Municipalities Sustainable Communities Award.

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

education

Michigan

The Michigan Water Environment Association has a Collection Systems Seminar on Sept. 6 in East Lansing. Visit www.mi-wea.org.

Mississippi

The Mississippi Water Environment Association has a Biosolids course on June 5. Visit www.mswea.org.

New York

The New York Water Environment Association has these courses:

- June 20 – Confined Space Awareness, Fishkill
- June 26 – Operation and Maintenance Training, Wallkill

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

- Aug. 29 – Fundamentals of Wastewater Asset Management, Potsdam
Visit www.nywea.org.

Texas

The Water Environment Association of Texas has a Laboratory Topics Seminar June 6-7 in Austin. Visit www.weat.org.

Virginia

The Virginia Water Environment Association has an Operators Training Conference June 13-14 in Roanoke. Visit www.vwea.org.

Wisconsin

The Wisconsin Wastewater Operators Association is offering these courses:

- June 7 – Classic Collection System Seminar, Watertown
- July 26 – Northwood's Collection System Seminar, Marshfield
- Aug. 13 – Microscopic Examination of Activated Sludge, Birnamwood
Visit www.wwoa.org.

The Wisconsin Department of Natural Resources is offering these courses:

- June 6 – Customer Service, Richfield
- June 7 – Treatment Processes, BNR and Troubleshooting WW Problems
Visit www.dnr.wi.gov.

The University of Wisconsin Department of Engineering-Professional Development has a Processes, Design and Operation Seminar Sept. 25-27 in Madison. Visit www.epdweb.engr.wisc.edu. **tpo**

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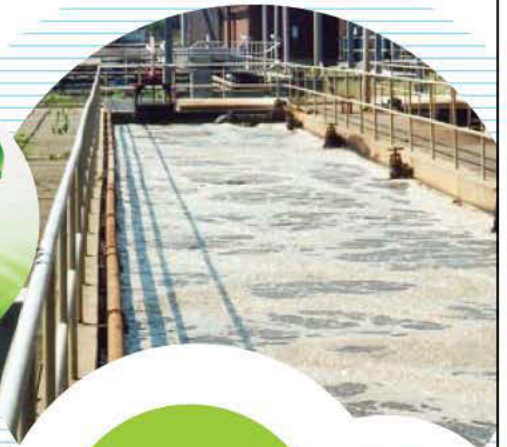
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CALENDAR OF EVENTS

June 3-6

Water Environment Federation Collection Systems 2012: Show Me The Green — Confluence of Planning, Implementation and Regulations, St. Louis Convention Center. Call 703/684-2441 or visit www.wef.org.

June 3-6

New England Water Environment Association Spring Conference, Newport (R.I.) Marriott. Visit www.newea.org.

June 3-6

Pennsylvania Water Environment Association Annual Technical Conference and Exhibition, Penn Stater Conference Center and Hotel, State College. Call 570/549-2204 or visit www.pwea.org.

June 4-6

New York Water Environment Association Spring Conference and Exhibition, Hyatt Downtown, Buffalo. Call 315/422-7811 or visit www.nywea.org.

June 5-8

Mississippi Water Environment Association Annual Conference, Hollywood Casino Meeting Center, Bay St. Louis. Visit www.mswea.org.

June 19-21

Ohio Water Environment Association Annual Conference, Bertram Inn and Conference Center, 600 N. Aurora Road, Aurora. Call 440/829-8405 or visit www.ohiowea.org.

June 24-27

Michigan Water Environment Association Annual Conference,

Boyne Mountain Resort, Boyne Falls. Call 517/641-7377 or visit www.mi-wea.org.

July 15-18

Georgia Association of Water Professionals Annual Conference & Expo, Savannah International Trade & Convention Center, Savannah. Visit www.gawponline.org.

July 19-20

Nebraska Water Environment Association Heartland Operators Conference, Holiday Inn, Kearney, Neb. Visit www.ne-wea.org.

Aug. 26-29

American Public Works Association Expo, Anaheim (Calif.) Convention Center. Visit www.apwa.net/congress.

Sept. 9-12

Rocky Mountain Water Environment Association Annual Conference, Copper Mountain, Colo. Visit www.rmwea.org.

Sept. 12-14

South Dakota Water and Wastewater Association Annual Conference, Ramkota Convention Center, Rapid City. Visit www.sdwwa.org.

Sept. 13-14

New York Water Environment Association Science and Technical Conference, Hotel Thayer, West Point. Visit www.nywea.org.

Sept. 29-Oct. 3

Water Environment Federation WEFTEC 2012, New Orleans Morial Convention Center. Visit www.weftec.org.



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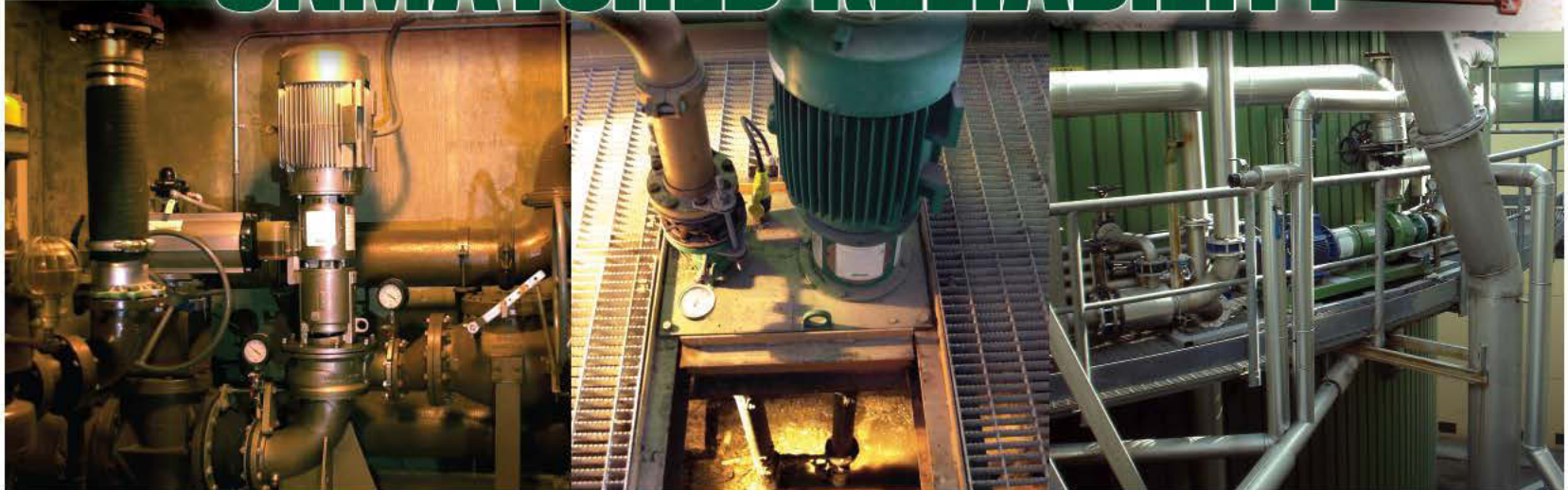
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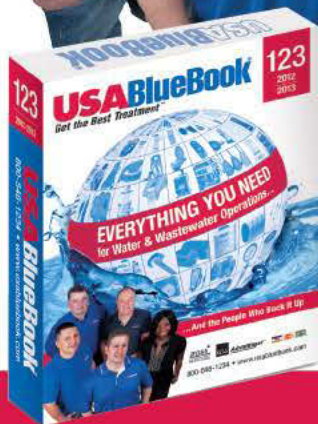


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