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OCTOBER 2015

**How We Do It:
Out with *Microthrix*
in Pueblo, Colorado**

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Superintendent
Fairborn, Ohio

Leadership With Heart

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WITH MENTORING AND PEOPLE SKILLS**

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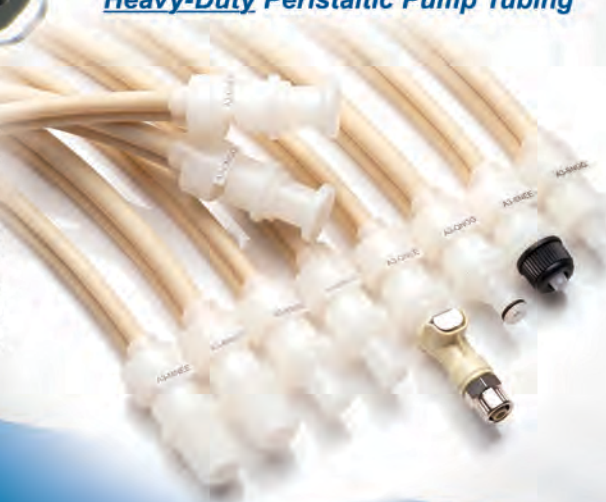
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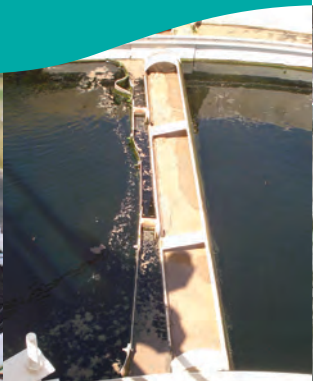
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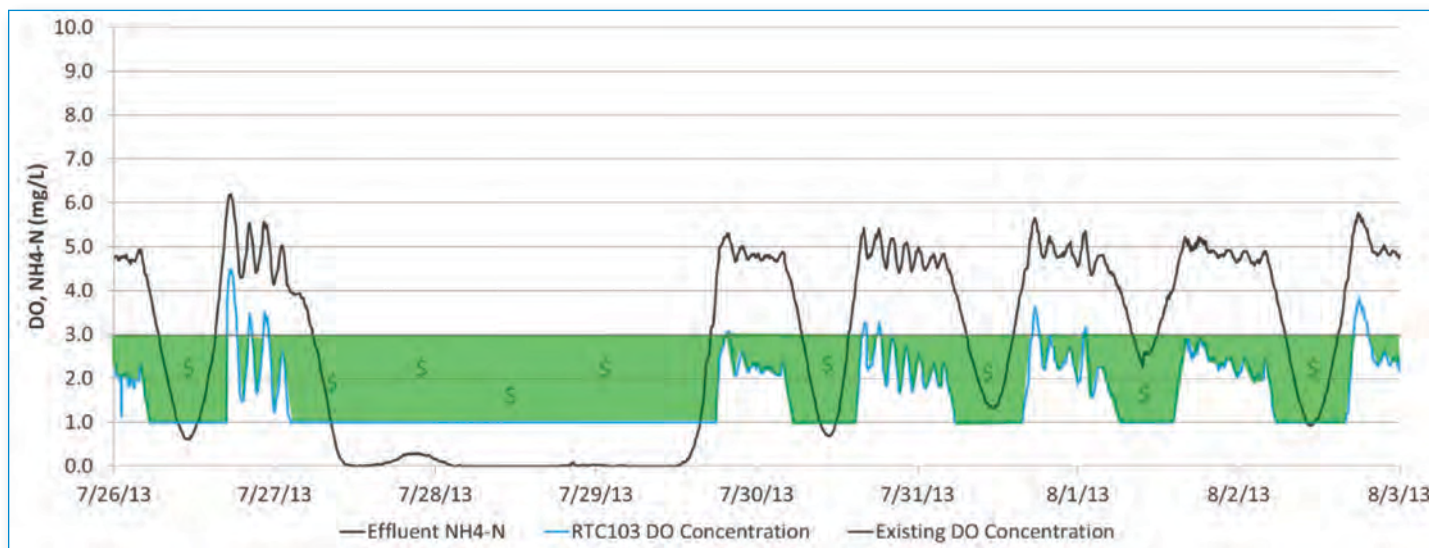
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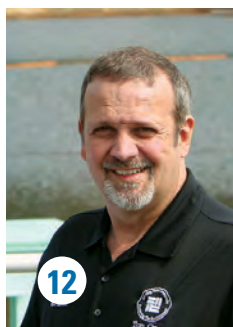
To learn your savings potential with RTC, visit: hach.com/RTC



Phosphorus Removal | Nitrification Control | Sludge Treatment



Be Right™



on the cover

Karen Hawkins has made concern for employees and customers a cornerstone of a 29-year career in water and wastewater in Fairborn, Ohio. Since 2005, she has headed operations that include a 6 mgd wastewater treatment plant, a 6.5 mgd water plant, and a state-certified chemical/bacteriological laboratory. (Photography by Amy Voigt)

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Consider the Source

To deal effectively with criticism of biosolids, it's essential to be well-informed about the facts and the people behind the claims.

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By Tom Jenkins, P.E., Karl Nowak, P.E., and Tim Hilgart

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- » Let's Be Clear: When a colleague cuts corners
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 - Wastewater Plant: Brownsburg (Indiana) WWTP
 - Water Plant: Waimea WTP, County of Hawaii
 - Operators: John Pottenger/Ross Campbell, Riggins, Idaho
 - Water Operator: Leslie Carreiro, Asheville, North Carolina
- » How We Do It: A better bar screen
- » Hearts and Minds: Brunswick, Maine, Sewer District leverages Smart technology to highlight the water treatment cycle
- » Sustainable Operations: Hydroturbine power in Portland, Oregon
- » PlantScapes: Constructed wetland in Richmond Hill, Georgia
- » Technology Deep Dive: Hand-held multiparameter water analyzer

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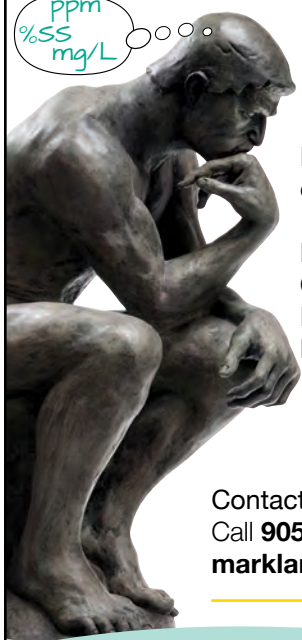
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let's be clear

Consider the Source

TO DEAL EFFECTIVELY WITH CRITICISM OF BIOSOLIDS, IT'S ESSENTIAL TO BE WELL-INFORMED ABOUT THE FACTS AND THE PEOPLE BEHIND THE CLAIMS

By Ted J. Rulseh, Editor



From time to time you probably receive email warnings about various computer viruses. They are almost always hoaxes, and they tend to have one thing in common: a statement that the virus “was discussed just this morning at Microsoft” or “has raised serious concern among engineers at Symantec.”

Most likely you’ve also seen stories about “miracle” diets. One that comes to mind is the Mayo Clinic cabbage soup diet.

Do you see a trend here? The purveyors of these scams drop the names of highly recognized and reputable organizations. In reality, Mayo Clinic has nothing at all to do with the cab-

bage soup diet, and the “viruses” in question have never been mentioned at Microsoft or Symantec — because they don’t exist.

WHO SAYS SO?

The point is that when considering information about any topic, it’s essential to consider the source. That’s abundantly true in the case of biosolids. Those who oppose beneficial uses like composting and land application often cite sources connected with major universities or government agencies.

Sometimes the information is real but has been completely removed from its context. Other times the author of an article or paper has cherry-picked data, including only negatives about biosolids and omitting anything positive.

It’s also true that some people who work for (or once worked for) prestigious universities or government departments who speak against biosolids have limited or no scientific credentials, or do have such credentials but also have anti-biosolids agendas.

One biosolids critic lacking credentials (or in this case with misleading credentials) is Caroline Snyder, quoted by a biosolids opponent in a comment on a recent TPO article published on the magazine’s website (www.tpomag.com). She is advertised as having a Harvard Ph.D., and that in itself is true. But it turns out that her doctoral degree is in Germanic languages and literature; she is not a scientist and has done no research of her own on biosolids.

HORROR STORIES

Questionable sources aside, there are also questionable stories about the supposed horror biosolids have caused.

One such story involves a farm in Georgia where a prize-winning dairy herd was wiped out, allegedly because the cows ate forage grown on land that had been fertilized with biosolids. A judge actually awarded damages to this farmer and another.

Leave aside that the biosolids program in question was far from ideally managed. Also leave aside that reputable researchers found the science behind the farmer's claims at best highly questionable. Simply consider the thousands of farms on which biosolids are applied, and have been applied for years, with highly beneficial results. If biosolids are so harmful, why were there problems on only this farm? Does it not seem likely that something else was at work?

The trouble is that most people are not steeped in science and are deeply (and rightly) concerned for their families' health. Many tend to take claims about the dangers of biosolids at face value, regardless of their sources and the science (or lack of) behind them. That can make things difficult even for extremely well-managed and highly reputable programs.

WHAT'S TO BE DONE?

So, what happens if your biosolids program comes under attack? What should you do? How can you prepare for that possibility? A few basics come to mind. First and foremost, run an exemplary program, one that does more than just what the law requires. Second, line up beneficiaries of your product to talk on your behalf. These may be farmers, landscapers, golf course owners or even homeowners who use Class A materials on their own gardens.

Third, study up on what critics say about biosolids and be ready to present the counter-argument. Know in detail what to say when, for example, someone mentions the Georgia dairy farm case or asks why Whole Foods won't sell produce grown with biosolids.

The trouble is that most people are not steeped in science and are deeply (and rightly) concerned for their families' health. Many tend to take claims about the dangers of biosolids at face value, regardless of their sources and the science (or lack of) behind them.

Fourth and finally, resist the temptation to dismiss critics as screwballs or crazies. Those who oppose biosolids are mainly, at heart, parents who want to protect their kids, or just people who want a clean environment and a safe food supply. Naturally, you want those things, too. So address people with empathy.

One good technique is the "feel, felt, found" progression. In essence, it says that when someone raises a concern, you respond by saying, "I can appreciate how you feel. I have felt that way myself at times. But when I looked at the issue carefully, here is what I found ..." The technique isn't always appropriate, but in the right situation it can help put a person at ease.

Finally, when it comes to empathy, remember this quotation, attributed rightly or wrongly to a great many people, but no less true for its suspect origins: People don't care how much you know until they know how much you care. **tpo**

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HEAD OF THE CLASS

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OVERHEARD ONLINE

"This program is one example of where the private sector has a solution and the public sector has an opportunity to put an emerging technology to use."

The Power of Many: Can Biosolids Become a Regional Commodity?

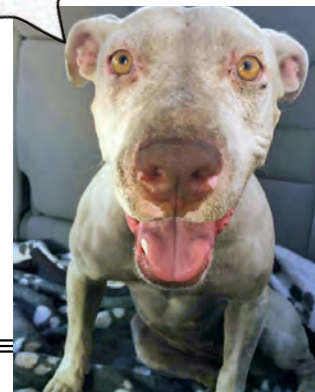
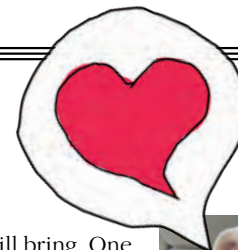
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RESCUE DOG

Three Woofs for Operators!

You never know what a day will bring. One minute you're making rounds at your plant, and the next you're lassoing an exhausted puppy from a treated wastewater basin. Well, maybe that doesn't happen to everyone, but it's how things rolled at the City of Phoenix (Arizona) Water Service. Find out how a team of operators helped a pup find her forever home.

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TRAVELING TAP

Better Than Bottled?

"Bottled water is ridiculous," says Ed St. Peter, the general manager of Kenosha (Wisconsin) Water Utility. That's the message he's hoping to spread through the utility's Traveling Tap. Equipped with eight taps and a watering bowl for pets, the Traveling Tap is already making a splash. Take a look at how Kenosha is combining public education with refreshing water breaks through this snazzy marketing tool.

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STORY: Trude Witham

PHOTOGRAPHY: Meg McKinney



Shades Mountain plant senior superintendent
Darin Roberson, left, and chief operator Wendell Cox.



“The turbidity goal is more stringent than the regulations. We try to keep turbidity below 0.05 NTU 95 percent of the time.”

WENDELL COX

BIGGER ISN'T ALWAYS BETTER, UNLESS YOU'RE THE Shades Mountain Water Treatment Plant.

This 80 mgd facility in Birmingham, the largest water plant in Alabama, has won numerous awards, including the 2014 Best Operated Plant from the Alabama/Mississippi Section AWWA. The operators' experience and passion for the job are keys to the plant's success.

“The professionals at Shades Mountain are allergic to average and not satisfied with good,” says Darryl Jones, assistant general manager of operations and technical services. “They are committed to greatness.”

Darin Roberson, senior plant superintendent, adds, “In this field you have to be passionate about the job, and our operators are.”

Recent upgrades and an optimization program have also played a role. An online total trihalomethane analyzer (Aqua Metrology Systems) added in 2012 allowed operators to reduce finished water TTHM levels by 30 percent. The staff has also worked hard to meet a 20 percent turnover goal for the distribution system's 28 storage tanks. This rate — which means the water completely turns over every five days — is crucial for keeping TTHMs in check.

A switch from lime oxide to liquid lime has improved operations by reducing the potential for sediment associated with quicklime from collecting in the finished water clearwells. The plant also converted from chlorine gas to sodium hypochlorite disinfection, for public safety reasons.

The plant has been part of the U.S. EPA Area-Wide Optimization Program (AWOP) since 1998 to limit the threat of microbiological contamination by reducing filtered water turbidity. “The turbidity goal is more stringent than the regulations,” says Wendell Cox, chief operator. “We try to keep turbidity below 0.05 NTU 95 percent of the time. It's a challenge because we have 46 filters and raw water turbidity that can change from 10 NTU to 400 NTU in a few hours.”



The brick and glassed doors of the sodium hypochlorite feed building reflect classic architecture.



Shades Mountain Water Treatment Plant, Birmingham, Alabama

BUILT: | 1888

POPULATION SERVED: | 338,000

SERVICE AREA: | **Downtown Birmingham, Mountain Brook, Homewood, Hoover, Inverness, Moody and North Shelby County**

SOURCE WATER: | **Cahaba River (also Lake Purdy in summer)**

TREATMENT PROCESS: | **Conventional**

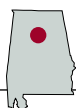
DISTRIBUTION: | **3,250 miles of pipeline**

SYSTEM STORAGE: | **44.8 million gallons**

KEY CHALLENGE: | **Keeping TTHMs in check, meeting storage tank turnover goal**

WEBSITE: | **www.bwwwb.org**

GPS COORDINATES: | **Latitude: 33°28'6.65"N; longitude: 86°45'38.84"W**



The optimization program has been successful: Shades Mountain received the Optimized Plant Award from the state Department of Environmental Management in 2011-13 and Best Operated Plant Award for 2013 and 2014 from the Alabama Water and Pollution Control Association (AWPCA).

IMPROVING THE PLANT

The Shades Mountain facility is owned by the Birmingham Water Works Board (BWWB), the state's largest water utility with four plants that serve some 650,000 customers. Shades Mountain provides just over half the total water produced and is interconnected in the distribution system with the Western (60 mgd), Putnam (24 mgd) and Carson (25.9 mgd) plants.

Built in 1888 as a settling plant, Shades Mountain has been upgraded

ABOVE: Andrew Smith records the online readings for chlorine and turbidity (CL-17 chlorine analyzers, 1720e turbidimeter and sc200 controller by Hach Company).
RIGHT: Lab testing includes checking for chlorine residual.

many times to improve operations and meet regulations. In 2009, it added the sodium hypochlorite facility, which includes four 15,000-gallon storage tanks, a 2,000-gallon day tank and four pumps (Watson-Marlow Fluid Technology Group). The system can switch feed points for flexibility. The climate-controlled building is designed for future on-site generation and enhances safety for nearby schools, hospitals and malls.

Another project, completed in 2012, includes two 6-million-gallon finished water storage tanks, a new pump building with horizontal split pumps (Pentair - Fairbanks Nijhuis), electrical upgrades, a new transfer pump station, a Cal~Flo liquid lime feed system (Burnett) and new chemical injection points. "The new lime system is more efficient than the old one," says Roberson. "It allows operators to better control the pH and reduce disinfection byproducts. It also requires less maintenance."

Today, on a 50-acre site, the plant treats an average of 50 to 60 mgd and nearly 80 mgd in the summer. Source water from the Cahaba River is pumped



over the ridge of Shades Mountain to the plant, where it undergoes pre-sedimentation, rapid mixing, flocculation, sedimentation with a 4.5-acre earthen-bottom basin, and filtration with dual-media, high-rate filters.

Ferric sulfate is added as a coagulant. Primary disinfection and pH adjustment are completed downstream of the filtered water transfer station, just before the clearwells. A 2,126-foot-long by 12-foot-diameter inclined tunnel, built in 1888, houses the 36- by 42-inch water main that brings water from the plant to downtown Birmingham. Other service areas are supplied by the finished water pump station.

During summer, Lake Purdy supplements the water supply. The plant reduces pumpage during times of peak power demand to reduce electricity costs. The utility's other plants provide water to various pressure gradients by way of automated pressure-reducing stations and various pump stations.

"The Shades Mountain and Western plants can assist each other in operating the West End booster station, which can be configured to pump to Shades Mountain or Western," says Cox. "This can reduce pumpage of either plant by 14 mgd depending on the configuration."

HIGHLY EXPERIENCED

A staff of 22, including 10 operators, keeps the plant running around the clock. Each eight-hour shift includes a lead operator and an operator I or trainee. Maintenance staff members work Monday through Friday. Two people are on call after hours and on weekends. Roberson, with the plant for 27 years, holds Grade 4 certification. Cox, also Grade 4 certified, has been with the plant for 24 years. Other staff members include:

- Lead operators (Grade 4): John Gilreath, 31 years; Dewayne Deramus, 28 years; and Jamie Urbanski, 10 years.
- Operators (Grade 4): Justin Morrow, five years; Christopher Gormley, two years; and Ronald Brock, two years.
- Trainees: Tommy McRae, Grade 4, one year; Jonathan Bittles, four years; and Annette Robertson, two years.
- Maintenance: Crew leader James Smith, Grade 4, 18 years; supervisor Jarrod Shotts, Grade 4, 11 years; workers Chris Ashmead, Andrew Smith, Nick Webb, Josh Templeton and Bill Hynes (Grade 4).
- Solids handlers: Michael Skinner, 41 years; LaTonya Black, four years; Richard Harless, two years; and Jonathan Pearson, one year.

Lead operators monitor and operate the distribution system, inspect and adjust process equipment, perform water-quality analyses, check turbidimeter accuracy, receive bulk chemical deliveries, and supervise the assistant operators. Assistants' duties include calibrating and verifying lab equipment, collecting and analyzing water samples, collecting bacteriological samples, and doing minor maintenance and housekeeping.

A shadowing program helps trainees learn the ropes from experienced operators. New hires train on maintenance tasks like equipment oil changes and calibration and gravity filter maintenance, then train with an assistant operator on plant operation, and finally with a lead operator on the distribution system.

MEETING CHALLENGES

Shades Mountain operators face many challenges,

“We produce 15,000 to 25,000 pounds of solids per day. Our team does an exceptional job in processing these and keeping the settled basin cleaned. They always step up and work extra hours when needed to complete the job.”

WENDELL COX

from dealing with turbidity, alkalinity and conductivity fluctuations in source water to simultaneously monitoring the plant and distribution system and interfacing with operators at the other plants.

"The alkalinity and conductivity in Lake Purdy is much higher than in the Cahaba River and requires a higher dosage of ferric sulfate to treat the

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Chris Ashmead checks bearings in the pump room (horizontal split pumps by Pentair - Fairbanks Nijhuis).

increase in dissolved solids,” says Cox. Since the river water turbidity can increase to 300 to 400 NTU within hours of heavy rainfall, operators feed a cationic polymer to the pre-sedimentation basin, reducing turbidity to 40 to 50 NTU before primary coagulant is added at the flash mixer.

Monitoring and control of TTHMs poses another challenge, especially since the distribution system contains 11 pressure gradients, 19 remote pump stations and 45 pumps. “Operators have to strike a balance between system demands and meeting the desired turnover every day in each of the storage tanks,” says Cox.

Each shift is assigned a portion of the tanks to cascade, with help from operators at the other plants. “When summer demand is high, cascading has to be balanced with demand,” says Cox. “We do this by having operators at the automated pressure-reducing stations and pump stations move water from other plants into the Shades Mountain plant gradients to keep the water age

low. With a distribution system this size, and with a terrain of mountain ridges around valleys, it takes a lot of coordination between plants to keep disinfection byproducts from becoming a problem.”

The plant continuously reduces TOC by 60 percent; the goal is 1.60 ppm or lower at all times. An online TOC analyzer (GE Intelligent Platforms Sievers Series 900) is key to reducing disinfection byproducts. Operators can precisely adjust the chemical dosages to prevent increases in finished water TOC and sustain lower TTHMs leaving the plant. Says Cox, “Operators shift the chlorine application points and optimize coagulant dosages to reduce TOC levels before the water contacts the disinfectant.”

“Our job is always changing, and I’m proud of our team’s adaptability.”

DARIN ROBERSON

REMOVING SOLIDS

Shades Mountain has one 5-acre settled water basin with no continuous solids removal. Its large size makes it vulnerable to adverse surface currents caused by wind. “If solids are allowed to accumulate, it can cause density currents that result in higher settled water turbidity, which in turn causes extra gravity filter loading,” explains Cox.

Solids are removed from the basin with a Mud Cat diesel auger dredge (Liquid Waste Technology), then pumped to the plant’s solids residuals facility and processed with a plate-and-frame press (Bilfinger Water Technologies). The solids are transported to the utility’s landfill for use as a soil amendment.

“We have to take special care when operating the auger dredge, since moving it too fast can disperse more solids in the water than the dredge can vacuum up,” says Cox. “This can cause an increased settled water turbidity reading in the plant, which could result in problems for the filters if not conditioned properly.”

Birmingham Water is replacing the plate-and-frame press with two centrifuges (Centrisys). Engineer Jeff Cochran tested different dewatering equipment and found that the centrifuge produced the best results in dewatering ferric sulfate solids. “We produce 15,000 to 25,000 pounds of solids per day,” says Cox. “Our team does an exceptional job in processing these and keeping the settled basin cleaned. They always step up and work extra hours when needed to complete the job.”

TRAINING OPERATORS

Birmingham Water reaches out to the community in several ways. The

(continued)



The sign at the Shades Mountain plant is on a rock facing Birmingham’s Highway 280.

THE ROCK

The Shades Mountain Water Treatment Plant covers roughly 50 acres. That tested the staff’s endurance before the plant acquired an all-terrain vehicle in 2008 to help operators make their scheduled rounds.

“The operations staff inspects the equipment and process every two hours and receives as many as 80 truckloads of bulk chemicals a month,” says Wendell Cox, chief operator. “I remember that one employee wore a pedometer during his shift, and it registered 14 miles in eight hours.

“When I first bid on a position at Shades Mountain 24 years ago, a fellow employee commented, ‘I heard you’re going to The Rock!’” Cox believes the nickname came from the increased workload at Shades Mountain compared to the three other treatment plants in the Birmingham system. Or perhaps it is because of the large boulders that sit on the hillside at the entrance to the pre-sedimentation basin and bear the plant’s sign.

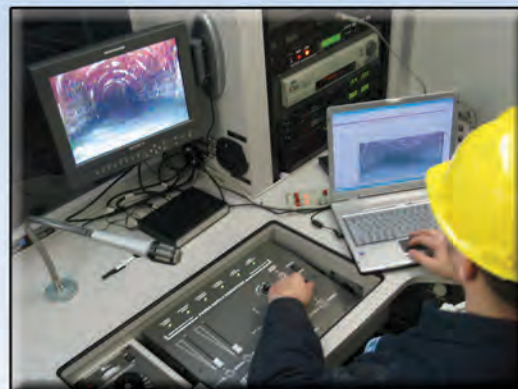
“One thing I know for sure,” Cox says, “new employees start dropping belt sizes and getting better reports from their doctors not long after they start working here.”

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The Shades Mountain plant was named 2014 Best Operated Plant by the Alabama Water and Pollution Control Association. Team members include, first row, from left, Wendell Cox, Tommy McRae, Annette Robertson, Chris Ashmead, Jonathan Bittles, Dewayne Deramus and Darin Roberson; second row, Jonathan Pearson, James Smith, Stan Brock, Jarrod Shotts, Scott Gormley and Josh Templeton; third row, John Gilreath, Justin Morrow, Antonio Chaney and Andrew Smith.

Young Water Ambassadors program allows 100 high school juniors and seniors to spend their summers working in and learning about the waterworks and its operations.

College students can intern through the Ambassadors in Training program while earning college credit. "This is a wonderful program where a young person can work under an operator and find out if this is a career they want to pursue after graduation," says Roberson. "We've had several students come back and work for us. Jarrod Shotts started as an intern through this program."

The staff is also involved with the Alabama/Mississippi Section AWWA. "We send operators to the national conference so they can see new technology and attend technical programs presented by other water professionals," says Roberson. "This is where we first saw the online TTHM analyzer we have."

The future holds new challenges. "At the end of this year, we'll be constructing a brand-new filter building with 16 dual-media filters so we can treat 80 mgd in one building instead of two," says Roberson. "The filters will be equipped with air scour technology and configured so that we can switch to granular activated carbon (GAC) in the future." A GAC pilot test showed that the plant could get an additional 10 to 15 percent organics reduction

that would help with any future disinfection byproduct regulations. The plant will also be upgrading the 50-year-old coagulant feeders.

Bad weather is another challenge. "We got hit by a tornado in April 2000 that shut down the plant for several hours," he recalls. "A tree ruptured the fluoride line and the water ran into the sedimentation basin. That could have been a problem, but we recycled the water back to the pre-sedimentation basin, which diluted the fluoride concentration. Our job is always changing, and I'm proud of our team's adaptability." **tpo**

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Sharing the Wealth

A SMALL MARYLAND CITY'S CLEAN-WATER PLANT PROVIDES A SITE FOR A 2.1 MW SOLAR PHOTOVOLTAIC SYSTEM WITH BENEFITS THAT SPREAD THROUGHOUT THE COMMUNITY

By Doug Day

The Pocomoke City Wastewater Treatment Facility isn't the only beneficiary of a new solar photovoltaic installation in its small Maryland community. The 2.1 MW solar plant, the state's largest municipally owned system, benefits other city facilities while also helping several nonprofit organizations save on their electric bills.

For Russ Blake, city manager, the savings are even sweeter because the system cost the city nothing up front. Standard Solar of nearby Rockville proposed the development in 2014 after meeting with Bruce Morrison, mayor of Pocomoke City (population 4,300), at the 2013 Maryland Municipal League conference.

"All we had to do was supply the land," says Blake. "We had surplus land at the treatment plant because we had two 40-acre lagoons until about 10 years ago. It was perfectly located, was zoned appropriately and was already cleared with no trees."

GROWING MARKET

SunEdison funded the fixed-array solar facility in exchange for a long-term lease at \$1 per year and a 20-year net metering power purchase agreement. Standard Solar did the installation and will maintain the 6,350 solar panels on 10 acres. "It's a very attractive deal, I think, for any wastewater plant," says Blake. "There is no cost, and you can get the benefit of a lower electric rate."

The developers are assured of a customer for the power and receive federal subsidies and tax incentives for the project's construction. As long as those remain available, Blake expects competition for such facilities to increase. "Other communities might consider looking around and shopping this to other companies," he says. "We didn't do that, but we'd been talking to them for more than a year. The market is evolving quickly, and I think there's



The 2.1 MW solar plant is the largest municipally-owned system in Maryland. It will help power the wastewater treatment plant and other buildings in the city, reducing the municipal electric bill by about 17 percent.

going to be more competition."

The power from the solar panels flows to the grid, so the discounted rate of 7.8 cents per kWh, with a 1 percent annual escalation, will benefit all city buildings through net metering.

WIDESPREAD BENEFITS

While the water and wastewater treatment plants will see the most benefit, the deal will reduce the city's overall electric bill by about 17 percent, or \$40,000 a year in the first year, over the rates charged by Delmarva Power, a division of Pepco. "The beauty is that we know what our rates and electric costs will be for 20 years, and as utility rates go up, ours won't increase more than 1 percent," Blake says.

The city's electric demand determined the solar plant size. "We totaled up how many megawatt-hours we use in a year, and they designed the solar plant around how much we need," says Blake. "They don't overbuild. If we only need about 2.1 MW, they're not going to build a 4 MW plant."

Some local nonprofit organizations are included in the net metering arrangement and will also get reduced rates. The Worcester County Developmental Center, MARVA Theater, Samaritan Shelter and the Delmarva Discovery Center will collectively save about \$15,000 a year.

The solar power will also have environmental benefits: Standard Solar says it will offset 2,067 metric tons of carbon dioxide, equal to the CO₂ emissions from the electricity used by 284 homes for one year, or the annual carbon offset from a 1,639-acre forest. The facility went online last December, six months after groundbreaking.



Russ Blake, city manager



One of the control panels at the Pocomoke City Wastewater Treatment Facility.



The treatment facility was converted five years ago from biological nutrient removal to a Biolac enhanced nutrient removal process (Parkson Corporation). It reduced pond storage space from 80 acres to 2 acres and allowed one pond (right) to be used for flow equalization.

What's Your Story?

TPO welcomes news about environmental improvements at your facility for the Sustainable Operations column. Send your ideas to editor@tpomag.com or call 877/953-3301.

“In addition to the annual cost savings, this project demonstrates our commitment to clean, renewable energy and provides educational value for area students and residents.”

RUSS BLAKE

TEACHING TOOL

“We are pleased to partner with SunEdison and Standard Solar to bring our new solar project online,” Blake says. “In addition to the annual cost savings, this project demonstrates our commitment to clean, renewable energy and provides educational value for area students and residents.”

As is often the case, the 1.47 mgd (design) clean-water plant (average flow of 0.7 mgd) is the city’s largest electricity user. About five years ago, the plant was converted from biological nutrient removal to a Biolac enhanced nutrient removal process (Parkson Corporation). UV disinfection was added a few years ago, and the plant is upgrading its programmable logic control panel for better process control.

Blake says the plant operates well with a staff of six serving the water and wastewater sides. The city took second place in the National Rural Water Association’s drinking-water taste test last year. Michael Phillips, plant superintendent, is a past Maryland Rural Water Operator of the Year, Valerie Miller has won the Water Clerk of the Year award, and Blake was the group’s Decision Maker of the Year two years ago.

A new lab building is in the works this year, and the city has converted about a third of its water meters to automated meter reading. Part of that funding came from a state grant, and the city used nearly \$1 million in federal stimulus funding for a new drinking-water well. The water plant also installed a new backup generator this year.

Are there more renewables in the city’s future? Blake won’t be there to decide because he retires this year, but he hopes so: “You have to be open to those types of things now and be aware of the opportunities. There is definitely going to be a payoff for us.”

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From School to Stream

A NEW HAMPSHIRE PROFESSIONAL USES TROUT IN THE CLASSROOM TO TEACH KIDS ABOUT THE IMPORTANCE OF A QUALITY ENVIRONMENT

By Craig Mandli

Last May, students from Keene Montessori School said bon voyage to dozens of friends. We're not talking classmates — the goodbyes were for trout fingerlings the children had raised from tiny eggs.

One by one, the students lined up to dump a cup of water containing a trout into Beaver Brook. Helping was Eric Swope, industrial pretreatment coordinator at the Keene (New Hampshire) Wastewater Treatment Plant. Swope considers it part of his job to teach school children the value of clean water.

START THEM YOUNG

"I feel it's important that students learn from a young age that what gets poured down the drain will eventually end up in streams and the water supply," says Swope. "Everyone is responsible for water quality."

During the four-month program, the students learn about the life cycle of trout while caring for the fish until they are large enough to release. In February, the school received a cooler with 100 eggs from New Hampshire Fish & Game. The students sorted through the eggs and moved the viable



Eric Swope (green shirt and waders) helps students release trout as part of the Trout in the Classroom program.

(continued)

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ABOVE: Swope helps a student release a trout fingerling. RIGHT: Two students get a close look at a water sample from Beaver Brook.

ones into a classroom aquarium. Of those, 40 survived — a solid success rate, according to Swope, who has been involved with the Trout in the Classroom program since 2006.

Between the arrival of the eggs and the release of the fingerlings, the students learned many lessons. That is Swope's favorite aspect of the program, which began with one school and has expanded to six. "It gives us the opportunity to talk about water-quality issues and pollution," Swope says. The kids start to realize the storm drains in the street are directly tied to the brook.

"I do lessons in protecting our streams and show the students the amount of wildlife that relies on clean water. We also discuss aquatic invasive species and the threat they pose to a watershed."

DAILY CARE

Along with the book lessons, the children do plenty of hands-on work as they head toward the release date. They share tasks that include testing the water, monitoring temperature and feeding the trout. Swope sees the program's benefits yearly.

“I do lessons in protecting our streams and show the students the amount of wildlife that relies on clean water. We also discuss aquatic invasive species and the threat they pose to a watershed.”

ERIC SWOPE

"I enjoy seeing students who love the outdoors get excited about coming to school," he says. "Not every topic in school appeals to every child. This project captures some students' interests and it helps motivate a handful of kids. That alone is worth doing it."

Swope realizes today's students will become tomorrow's leaders. This was the first year in which he has worked with pre-school students. He says no age is too young to learn about each person's impact on the environment. "Teaching them about conservation is critical to me. First and foremost, I want them to understand that just because we have something in our environment now, that does not mean we always will unless today's and future generations take care of it."

ESSENTIAL PARTNERSHIPS

Although New Hampshire Fish & Game supplied the fish eggs, a partnership with the Monadnock Chapter of Trout Unlimited helps supply the program equipment. "We kicked off the program with a watershed grant, and New Hampshire Fish & Game and volunteers from Trout Unlimited have been instrumental in keeping it afloat," he says.

"City leaders in Keene have been behind us every step of the way. To make it a success, you need funding first, then a solid connection to the education system, and most importantly, enthusiastic volunteers to make it go."

Although Swope is deeply involved in community outreach, he says the students' enthusiasm for Trout in the Classroom makes it the most fulfilling: "When these kids realize that the water they drink and what goes down the drain is directly connected to the health of the environment, it's almost like you see a lightbulb come on. Just seeing the connection the kids form with those little trout is a fun way to interact with the community and to get kids to understand the importance of stewardship." **tpo**

What's Your Story?

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





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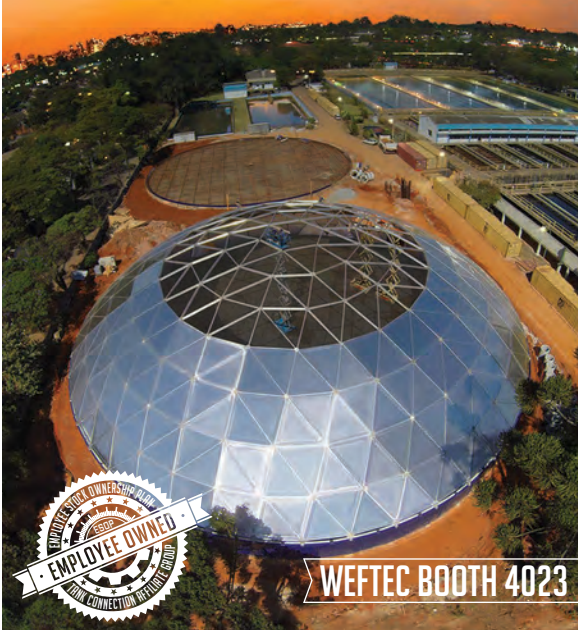
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Extensive landscaping makes the City of Athens Wastewater Treatment Plant appealing to the eye.

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ARE JUST SOME ACCOMPLISHMENTS OF THE INGENIOUS STAFF IN ATHENS, ALABAMA

STORY: **Trude Witham**
PHOTOGRAPHY: **Sanford Myers**

VISITORS TO THE ATHENS (ALABAMA) WASTEWATER Treatment Plant may feel that they are entering a botanical garden: Its lush landscaping makes it inviting.

But there's more to this plant than a pretty setting. The staff has raised the bar in important ways, exceeding permit requirements by producing effluent with 6.2 mg/L TSS and 2.7 mg/L CBOD.

They reuse the effluent for landscape irrigation and in-plant needs. They're reducing energy costs with LED lights on motion detectors and with more efficient equipment operation. The utility is also replacing 60- to 100-year-old leaky clay sewer pipes, which will help reduce inflow and infiltration.

It's a huge improvement over the previous 7 mgd trickling filter plant, built in the late 1950s. Even with two major upgrades, the old plant was limited by peak flows and outdated equipment that was difficult to maintain.

The new 9 mgd (design) activated sludge plant started up in September 2009. It presented some training and startup challenges, including a foaming issue in the aeration basins and an increase in effluent TSS. The operations staff solved those problems by diligently tracking operations data and staying proactive.

Staff members work well together and take pride in a job well-done. Their work has paid off in 2013 and 2014 Best Operated Plant awards (5.1 to 10 mgd category) from the Alabama Water and Pollution Control Association (AWPCA).

Athens (Alabama) Wastewater Treatment Plant

BUILT: | **1950s; latest upgrade 2009**

POPULATION SERVED: | **7,200**

EMPLOYEES: | **12**

FLOWS: | **9 mgd design, 5.8 mgd average**

TREATMENT LEVEL: | **Secondary**

TREATMENT PROCESS: | **Activated sludge**

RECEIVING WATER: | **Town Creek**

BIOSOLIDS: | **Stored in lagoons**

ANNUAL BUDGET: | **\$410,000 (operations, maintenance, laboratory)**

WEBSITE: | **www.athens-utilities.com**

GPS COORDINATES: | **Latitude: 34°46'34.29"N; longitude: 86°59'53.87"W**



The plant also received a 2014 Alabama Water Environment Association (AWEA) Award of Recognition.

BETTER PERFORMANCE

The plant is operated by Athens Water Services, a division of the City of Athens Utilities. The utility provides water to 10,600 customers and sewerage service to 7,200. The original trickling filter plant was upgraded in 1973

“This process produces next to zero biosolids. The remaining biosolids stay in the two lagoons totaling 20 acres and 10 feet deep. We expect this to be sufficient until 2029.”

VIRGIL WHITE

Virgil White, plant superintendent, explains a graph of effluent data.

with three more clarifiers, trickling filters and digesters. Activated sludge and final clarification were added in 1988, along with UV disinfection (TrojanUV) to replace chlorine gas.

I&I was a problem: The collections system delivered flow that the main lift station couldn't pump, and the lift station pumping capacity was already greater than the plant could handle. "This was an issue when I started at the plant in 2004 and is the main reason we built the new facility," says Virgil White, plant superintendent.

The new process is more streamlined and is computer-automated. Raw

water flows through two screens (Andritz Separation), then through two grit collectors (Smith & Loveless), two grit slurry pumps (WEMCO), two grit cyclone separators (WEMCO) and two grit classifiers (Smith & Loveless).

Three pumps introduce return activated sludge to the raw water flow, creating mixed liquor that flows to three aeration basins and then to two clarifiers (Evoqua Water Technologies). Clarifier effluent is sent to UV disinfection. "Our plant reuse water is collected after disinfection but before our Parshall flume total plant effluent flow measurement," says White.

Plant reuse water is delivered through two 40 hp pumps (Patterson Pump



“We are open and honest with each other. If someone has a gripe, I tell them to talk to the other person. I don’t need to be in the middle.”

VIRGIL WHITE

The plant team includes, from left, Jason Fielding, relief operator; David Oliver, laboratory technician; Skylar King, relief operator trainee; and Virgil White, superintendent.

Athens (Alabama) Wastewater Treatment Plant PERMIT AND PERFORMANCE (2014 yearly averages)

	PERMIT	EFFLUENT
CBOD	11 mg/L	2.7 mg/L
TSS	30 mg/L	6.2 mg/L
Ammonia nitrogen	1.0 mg/L	0.2 mg/L
Dissolved oxygen	6.0 minimum	7.6
E. coli	126/100 mL	18/100 mL
pH	6.0-8.5	Compliant

Company) to a strainer (S.P. Kinney Engineers) that removes particles that could clog the equipment spray nozzles. The entire measured effluent flow is discharged to Town Creek.

Waste activated sludge is sent to two lagoons, and the supernatant is recycled to the plant effluent stream. “This process produces next to zero biosolids,” White says. “The remaining biosolids stay in the two lagoons totaling 20 acres and 10 feet deep. We expect this to be sufficient until 2029.”

DEALING WITH I&I

Although the increased capacity and collections system improvements reduced I&I, operators still have to deal with peak flows during heavy rains. “January is our rainy month,” says White. “Last year, our average flow was 5.8 mgd, and in January 2015 it was 8.7 mgd.

“We can handle peak daily flows up to 20 mgd for short periods since we can send around a quarter of that directly to the fourth zone of our aeration

basin trains just before clarification. This allows us to send what is mostly rainwater through one aerated zone and mix that back into the portion of the flow from the aeration process.”

The collections team is about halfway through a project to replace leaky clay piping. There are two lift stations at the treatment plant. The main station has two 140 hp ABS pumps (Sulzer Pump Solutions) and a 47 hp ABS pump (Sulzer Pump Solutions) programmed through the SCADA system to run as needed with fluctuating flow rates. The Braly station has 15 hp and 20 hp pumps (Flygt, a Xylem Brand) that cycle alternately.

The collections team maintains 10 other lift stations and 152 miles of pipe. Although most pipe is less than 20 years old and in good shape, about 20 percent is more than 60 years old. The team works eight hours a day, five days a week to replace old pipe with PVC lines.

“So far we’ve replaced 4 to 5 miles of sewer line in the last several years,” says Jon Lewonczyk, collections and maintenance superintendent. “We have

about 38 miles of clay pipe still in the ground and will continue to replace leaking lines as long as we have funding. We perform a lot of maintenance, and that's how we learn where the problems are."

GROWING PAINS

As for the new treatment plant, startup went smoothly; various equipment vendors came to train the operators. "We experienced some growing pains when we converted all our flow from the old plant to the new," says White. "For example, we noticed a foaming issue in the aeration basins. After some research, we increased the return activated sludge flow ratio and reduced the mean cell residence time (MCRT) through increased wasting of activated sludge."

Another issue was an increase in effluent TSS: "We built our MCRT back to a higher point while stopping short of where we were when the foam was there. That seemed to work for a few months." But in fall and spring, the foam was back. Operators traced it to seasonal filamentous bacteria.

"This is the time of year when the MCRT should be adjusted because of weather, rainfall and flow changes, and we weren't changing with the weather like we should," says White. "We needed to anticipate it and keep it from forming."

Operators developed a spreadsheet with mixed liquor pH and temperature, daily high and low ambient temperatures, rainfall and flow fluctuations, daily mixed liquor TSS data, and whether foam was present. "We examine this data daily, and over time we learned how to go from one flow pattern to the other without having to react to changes in our water," says White. "Nothing has been as helpful as keeping up with our own plant conditions and data, so that there are no surprises."

DUAL CERTIFIED

Seven operators, a laboratory technician and four maintenance technicians take care of the plant. Three

dual-certified relief operators work there and the 13 mgd water plant, spending six weeks at each. John Stockton, water services manager, developed a plan to cross-train operations and maintenance personnel. All operators hired since 2002 are required to become dual certified. Maintenance technicians are encouraged to train and work as operators as needed.

White holds Grade IV wastewater and water operator certification and has been with the utility for 11 years. Other team members are:

- Tim Norman, chief operator, Grade IV wastewater
- Robert Shar, Michael Mewbourn and Cody Brown, Grade IV wastewater operators
- Roger Miller, Jason Fielding and Eric Morell, Grade IV relief operators
- David Oliver, laboratory technician, Grade IV wastewater
- Dale Putman (Grade IV wastewater), Michael Furline (Grade IV water), Tommy Williams and Frankie Ezell, maintenance technicians

(continued)



E. coli tests use the standard membrane filter method.

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David Oliver sets up a CBOD test.

White says the team's greatest strength is communication: "We are open and honest with each other. If someone has a gripe, I tell them to talk to the other person. I don't need to be in the middle. If they're working different shifts, I suggest they write a note. They may not see each other face to face, but one of them is going to get a note."

USING INGENUITY

Team members are encouraged to make suggestions to improve operations. When Mewbourn had been at the plant for just two weeks as an operator trainee, he helped resolve a pump programming issue. The SCADA system had been programmed to work based on pump output percentage. When a second pump came online, the flow increased while the total pump output percentage dropped.

When two pumps at 70 percent output pumped more than one pump at 100 percent output, the screen channel gate would see the percentage drop and begin to close. "Operators found that they had to start controlling the

gates in local/manual mode, rather than letting the SCADA control them," says White. "That was inconvenient, as they had to walk 200 yards to the equipment and flip switches, usually in the rain, thunder and lightning, while the water continued to get deeper."

The plant has float ball switches that trigger alarms to tell operators when the water upstream of the screens is deeper than desired. So, Mewbourn suggested programming the SCADA to open both screen channel gates so that both screens would come online if either of the three float balls triggered a high-level alarm. This solved the problem.

It was Norman's idea to color code the valve covers to show their functions: "We call him the label master because he has labeled almost everything — valves, lab drawers, process gates and equipment. It makes the plant more user-friendly."

SAVING ENERGY

Meanwhile, the staff is reducing energy use through thoughtful equipment operation and better use of SCADA controls and alarm setpoints. They work with Gary Huffman of Krebs Engineering to determine which equipment they can take out of service and still maintain adequate treatment.

Projects include switching to more energy-efficient lighting in the plant's 50 pole lights and in the three maintenance buildings' bay lights. "We are about halfway through that project and have replaced more than 30 100-watt high-pressure sodium lamps with 20-watt LEDs, an 80 percent energy savings," says White. The team has also replaced three 400-watt high-pressure sodium lamps with 150-watt LEDs, a 62.5 percent energy reduction.



Virgil White is proud of the plant's extensive landscaping.

TENDING THE GARDEN

Operations team members at the Athens (Alabama) Wastewater Treatment Plant feel fortunate. They enjoy a fairly new plant and a supportive management team and community. They also work in a facility that looks more like a park than a treatment plant, with 4 acres of lush vegetation that they help maintain.

The foliage starts at the entrance road and continues along the plant's fences. "We have many types of redbud trees, perennial flowers, camellias, liriope, juniper, hydrangeas, daylilies, various boxwood and nandina shrubs, and cypress trees," says Virgil White, plant superintendent.

It's all possible because of John Stockton, Athens Utilities water services manager, who felt a more inviting atmosphere would benefit employees and visitors. "John loves plants," says

White. "He and a landscape architect visited the facility and developed the blueprint for this."

The operators enjoy taking care of the grounds. "We start our trimming in February, and we mulch, weed and prune," White says. "The employees are really proud of the way this plant looks, and it's just one more reason they love working here."

(continued)

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Jason Fielding works on an *E. coli* test.

The team is also involved in outreach. That includes helping attract young people to the profession to offset retirements. White attends water conferences that reach out to college students and has presented at high school career preparation classes.

He also would like the community to understand and appreciate more fully what he and his team members do: "We're seen as the people who keep digging up the roads. Maybe we should get a sign that says, 'Please pardon our progress while we work tirelessly to keep sewage from backing up into your homes.'" **cpo**

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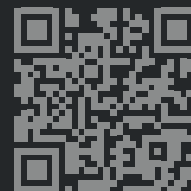


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Control in Real Time

AN ILLINOIS SANITARY DISTRICT GAINS MAJOR EFFICIENCIES BY REPLACING MANUAL SAMPLING AND ANALYSIS WITH AN AUTOMATED PROCESS LINKED TO SCADA

By Rob Smith

The Springfield (Illinois) Metro Sanitary District was formed in 1924 to address the challenges of a growing community where raw sewage flowed into streams and ditches, threatening the drinking water supply and creating unpleasant conditions.

The district's first action was to build the Spring Creek Wastewater Treatment Plant, which came online in 1928 to serve Springfield and surrounding towns. As the population grew and the Spring Creek plant reached capacity, the district commissioned the Sugar Creek Wastewater Treatment Plant in 1973.

The two plants now serve more than 150,000 people, and the district has invested heavily in upgrades to bring both facilities up to current standards and technology. The upgrades include technology that automates sampling and analysis, and enables the process to respond quickly and automatically to changing conditions.

TIMES HAVE CHANGED

The Spring Creek plant was built as a conventional activated sludge facility. In 2012, it was converted to vertical-loop reactor (VLR) technology, essentially an oxidation ditch turned on its side. The process consists of a series of reactors operated in aerobic, anoxic and anaerobic conditions to facilitate and optimize the removal of organics and nutrients.

At the original facility, plant operators and support staff manually pulled samples for laboratory analysis from the various treatment stages numerous

“The IQSN system provides a whole new world of treatment capabilities compared to the traditional manual process.”

BRIAN TUCKER

times a day to confirm that the plant was performing in accordance with its permit. The lab measurements also enabled operators to monitor process efficiency and make needed adjustments. The process was effective but labor-intensive and based on methods developed decades ago when treatment requirements were less stringent.

In the early 2000s, the district began planning the upgrade and renovation of the Spring Creek plant to address increased demand and meet new regulatory guidelines for phosphorus and nitrogen. Along the way, the staff looked at new automated technology that could accurately measure dissolved oxygen (DO), oxidation-reduction potential (ORP) and pH, and would easily integrate with the new plant's SCADA system (Siemens).

TO SCADA AND BEYOND

Ultimately, the team selected the IQ SensorNet (IQSN) monitoring and



The sensor network integrates with the facility's SCADA system.

control system from YSI, a xylem brand. This modular, plug-and-play system has an innovative network configuration that facilitates simple extension. It provides real-time, continuous monitoring anywhere in the process for up to 20 wastewater parameters.

Today, the system continuously monitors DO, pH and ORP at various process stages to maintain optimum conditions for nitrification, denitrification and biological phosphorus removal. The IQSN 2020XT controller can monitor up to 20 parameters per network, reducing hardware requirements.

The primary capability of value to the Spring Creek team was the system's ability to communicate with the SCADA system over Profibus. It was important to monitor the parameters necessary to meet the new permit limits, but tying the data back into the SCADA for ultimate control brought the renovated plant to a new level of efficiency and effectiveness.

MONITORING AND CONTROL

For Brian Tucker, SMSD operations supervisor, the automation and efficiency that the YSI IQSN provided, and the ease with which it is installed and implemented, meant a level of monitoring and control that wasn't possible earlier in his career.

“The IQSN system provides a whole new world of treatment capabilities compared to the traditional manual process,” says Tucker. “And that's just



IQ SensorNet probe/arm assemblies monitor dissolved oxygen, pH and oxidation-reduction potential.

for monitoring. In the past, the control component would typically be based on trend data instead of actual, real-time measurements. That requires a fair amount of educated guesses as to what was actually happening in the basins and throughout the plant. The IQSN changes all that.”

Tucker and his team can now set the required parameter levels at the various locations throughout the facility. Tying that data back into SCADA, the system can turn mixing equipment on or off, open and close control valves, and increase or decrease return rates on the fly, responding in real time to what is happening in the process. Most of the sensors are self-cleaning, so very little maintenance is necessary.



The Spring Creek Wastewater Treatment Plant in Springfield treats 32 mgd with vertical-loop reactor technology.

Being able to fine-tune the entire process, from influent through the final discharge into Spring Creek, means significant cost savings, mostly in energy reduction. Blowers and motors run only when needed, at specific levels and speeds. Mixing equipment can mostly shut down overnight, when nutrient levels are down and flows are lowest. As the sensors monitor DO at the cas-

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cade post-aeration basin, the SCADA system can increase or decrease blower power. Optimized use of the blowers further enhances efficiency.

NIGHT SHIFTS

The IQ SensorNet system monitors the plant and controls the process with precision around the clock, every day of the year. During daytime hours, the system allows Tucker and his staff to address other duties in and around the plant, saving the significant costs of manual sampling and analysis. “For a plant of our size (32 mgd), it would take two to three full-time staff members to perform a regimen of sampling and analysis to maintain compliance,” says Tucker. “It’s a comprehensive process that is very labor-intensive.”

Overnight, the system enables Tucker to maintain a skeleton crew on the second shift and run the plant unattended on the third shift. The system has built-in alarms that notify staff to any condition that falls outside the set parameters. Team members have remote access to system dashboards via smartphone, tablet or PC. “This system is a big part of my second shift and is really my third shift, the night watchman of today,” says Tucker.

Tucker is in the early stages of the renovations at Sugar Creek. That 17.5 mgd plant will get a \$54.4 million upgrade that includes an IQ SensorNet monitoring and control system, tied into SCADA. In the end, both Springfield plants will have up-to-date technology to carry them well into the 21st century.

Share Your Ideas

TPO welcomes news about interesting methods or uses of technology at your facility for future articles in the How We Do It column.

Send your ideas to editor@tpomag.com or call 877/953-3301.

ABOUT THE AUTHOR

Rob Smith is application engineer – wastewater for YSI, a xylem brand. He can be reached at robert.smith@xyleminc.com or at 937/767-7241. tpo

LEADERSHIP WITH HEART

KAREN HAWKINS' CARING-APPROACH MANAGEMENT INCLUDES DRIVE
AND THOROUGHNESS COMBINED WITH STRONG MENTORING AND PEOPLE SKILLS

STORY: **Jack Powell**
PHOTOGRAPHY: **Amy Voigt**

CARING. KAREN HAWKINS AND CO-WORKERS USE THAT WORD A lot. As superintendent of Fairborn (Ohio) Utilities, Hawkins has made concern for employees and customers a cornerstone of a 29-year career.

Since 2005, Hawkins has headed operations in Fairborn, a city of 32,000 near Dayton and Wright-Patterson Air Force Base. She's responsible for a 6 mgd wastewater treatment plant, a 6.5 mgd water plant and a state-certified chemical/bacteriological laboratory. Her team also takes care of a 150-mile sanitary sewer system; a water distribution system with 11 wells, three booster stations and four water towers; and the stormwater network of inlets, pipes and drainage ditches.

Such a big job would be overwhelming if not for Hawkins' laser focus on skills development and a commitment to providing the best water and wastewater services for more than 13,000 customers. Over three decades, she has earned Class IV Water Supply, Class I Wastewater and Class II Collections certifications. She has also instilled a growth ethic in the 33 people she supervises, including seven operators at the wastewater plant, five at the water facility and 21 others in collection and distribution.

Her collaborative leadership style helped her win the 2014 Operator Meritorious Award from the Ohio Section AWWA for outstanding contributions to water treatment plant operations. In 2010, Hawkins, the first woman chair of the Southwest District of the Ohio Section as well as a past chair at the state level, received the Richard F. Melick Award for contributions to water plant personnel education and training.



Karen Hawkins, utilities superintendent for the Division of Water and Sewer in Fairborn, Ohio.

Lance Livesay, water plant manager, calls Hawkins' style "a great mix of the collaborative and authoritarian. She engages all her managers, especially when it comes to decisions about the plants. When the need arises, she'll say, 'Here's what we have to do,' but we know she'll always support us."

Hawkins observes, "You can't get awards like these without great support. That includes people in my personal life like my husband, our son and daughter, supervisors and colleagues in my work life, and those in AWWA and the Ohio Water Environment Association. I appreciate that they think I'm worthy."

THE RIGHT MOVES

Hawkins' career is a story of determination, mentoring and self-made breaks. An "Air Force brat" (her father was a lieutenant colonel) who lived all over the United States and in England, she started out as a police dispatcher in Fairborn. Then, looking to get off shift work, she jumped at a secretarial job at the Division of Water and Sewer. Encouraged by former superintendents Moe Jennings and Bob Sowers, whom she calls "two great mentors," she took water treatment classes through the Operator Training Committee of Ohio (OTCO) and the OAWWA section, learning all aspects of the business while preparing for the next step up the ladder.

In 1991, Hawkins became a project coordinator, working in water treatment, distribution and collection. One of her first tasks was to develop a backflow prevention program in 1992-93, even before the Ohio EPA required



Hawkins, right, takes pride in mentoring team members including Jeremy Billetter, center, lead operator, and Gary Bunnell, maintainer.

Karen Hawkins, City of Fairborn, Ohio



POSITION: | Superintendent, Fairborn Utilities
EXPERIENCE: | 29 years in water/wastewater industry
DUTIES: | Oversee entire water, wastewater and stormwater systems
EDUCATION: | Wright State University, numerous professional development courses
CERTIFICATIONS: | Class IV Water Supply, Class I Wastewater, Class II Collections
MEMBERSHIPS: | AWWA, Ohio Section AWWA, WEF, Ohio Water Environment Association
GOALS: | Continue programs to strengthen water and wastewater operations
GPS COORDINATES: | Latitude: 39°49'46.77"N; Longitude: 84°01'36.99"W

“Karen wants her people to succeed, whether that involves getting you the information you need to finish a project or urging you to go and get your certifications. She always wants you to better yourself as a professional and as a person.”

TERRY ADKINS



From left, Lance Livesay, water manager, Marcus Lehotay, assistant utilities superintendent, and Hawkins look over plans for an upgrade project.



CAREER BUILDING STEP BY STEP

Pursuing a successful career in the water and wastewater business takes skill, patience and desire. While working in or managing a plant is rewarding, it can also be demanding.

"Water and wastewater is a great career, but it takes the right person to do it well," says Karen Hawkins, Fairborn Utilities superintendent. "You have to be prepared to give up some of your personal life at times. I enjoy it because there's always something new happening every day, especially at small utilities where you have to play many roles. Here we have to oversee treatment and collection and distribution and now wastewater, so there are always new challenges."

Although water and wastewater jobs typically have been male-dominated, Hawkins is proof that women can succeed. She admits encountering a few people with reservations about working with a woman, but overall the industry has been very welcoming: "I've seen a big difference since I started nearly 30 years ago. When I'd go to a meeting I'd be one of maybe five females there. Now, the industry is a lot more mixed. Besides, I'm not the type who'd let anyone hold me down."

One of the things Hawkins wants is people who aren't afraid to work. That means coming in at all hours to fix a broken water main or working at the wastewater plant and dealing with odors. She looks for people who want to further themselves by taking training programs and courses to get higher certifications and enhance their performance. She recommends networking with professional organizations to sharpen skills and make the connections needed to grow in a career.

"Basically, we're after hard workers, people who will go out in zero-degree weather or get their hands dirty working in the sewer system," says Hawkins. "We want our residents to be able to turn on their taps or flush their toilets without any problems. We need people who care about our system."

The Fairborn Division of Water and Sewer staff includes, from left: Jeremy Billetter, lead operator; Chuck Mifflin, operator II; Karen Hawkins, utilities superintendent; Marcus Lehotay, assistant superintendent; Lance Livesay, water plant manager; and Gary Bunnell, maintainer.

it. The program said every new home must have backflow devices. Hawkins trained operators in backflow prevention through OTCO and OAWWA.

Hawkins, who became an Ohio-certified backflow tester and instructor in backflow courses, calls the program "robust" and credits good communication with homeowners for its success. During her 14-year tenure, she also oversaw a range of upgrades to the water treatment and distribution systems and made employee training a top priority, even to the point of rotating crews every six months to keep everyone fresh and motivated.

"I benefited from training courses, and I want my team to do the same," says Hawkins. "Caring is important to being a good leader. If you care, you communicate things effectively. If you care, you provide opportunities, you take care of your employees and you look out for their best interests. That's why I try to get operators certified — so we have that next group of people ready to take over. It's vital that we have people who care about the system."

MAKING A DIFFERENCE

Beyond training, Hawkins as superintendent has made a powerful impact on Fairborn's water and wastewater operations. Emphasizing renewal and redundancy, she and her staff:

- Completed an \$827,000 water plant upgrade in 2011 that increased capacity from 5.4 mgd to 6.5 mgd. The project included piping changes, pump upgrades and a new post-chlorination facility.
- Oversaw installation of a new wellfield in 2008, a \$1 million project that added a new power building and two wells.
- Provided a booster station in 2013 that increased water pressure from 35 psi to 60 psi.
- Completed a water tower renovation in 2013 that saw the Fairfield Park tower place fourth in the Tnemec national Tank of the Year contest. A patriotic-themed logo with a stylized eagle underscores the city's support for the Air Force base.
- Oversaw a 2013-14 restructuring that brought the city's wastewater treatment plant and

“Caring is important to being a good leader. If you care, you communicate things effectively. If you care, you provide opportunities, you take care of your employees and you look out for their best interests.”

KAREN HAWKINS

sanitary and storm sewer systems under her division.

- In 2014-15 added a 400 kW generator (KOHLER) at the water treatment plant, a 500 kW generator (KOHLER) at the primary wellfield and a 300 kW generator (KOHLER) at the booster station for standby power.
- In 2014 executed a \$1.2 million sewer interceptor project across the Air Force base that dramatically reduced inflow and infiltration.

On those projects, Hawkins gives the credit to the city council and Deborah McDonnell, city manager, for “understanding the importance of keeping an older system up to date and providing the redundancy we need.” But her boss, Pete Bales, public administrative services director, gives Hawkins the honors.

“To say that Karen is dedicated is a huge understatement,” says Bales. “She always has the best interest of the city and her employees in mind. Karen is a caring person, and you can see that in the way she works. You have to be caring about the city to do the superintendent's job because it requires so much of you. I go to sleep every night not worrying a lick about the condition of our water and sewer departments because of Karen and her team.”

PRAISE IN ABUNDANCE


Her employees are equally generous in their praise for her leadership abilities. They routinely point to her dedication, thoroughness and knowledge as keys to the department's success. Many cite

her fairness, honesty and communication skills, adding a mixture of fun with serious work in supplying clean, safe water and protecting the environment.


Terry Adkins, water and sewer foreman and a Fairborn employee since 2000, calls Hawkins “a wonderful person to work for.” After four years as a maintainer, an entry-level job, he took a new role as a water department crew leader. Sent overseas on military deployment in 2007, he came back a year later. In 2014, when two foremen retired, he was promoted to foreman.

With Hawkins' encouragement, Adkins took courses in distribution and got his Class I Distribution certification. Instead of going through the Class II Distribution program, he took an OTCO water treatment class and earned his Class I Water Treatment license. He later earned a Class II Collections certification.

Adkins observes, “Karen wants her people to succeed, whether that involves getting you the information you need to finish a project or urging



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you to go and get your certifications. She always wants you to better yourself as a professional and as a person.”

Marcus Lehotay, assistant superintendent of Fairborn Utilities, calls Hawkins “excellent as a manager.” Two years into the job, he deeply appreciates things she has taught him, even though he’s a 20-year water and wastewater veteran: “She’s as thorough as a human being can be when it comes to reviewing proposals for different projects, and is as fair and honest as a person can get. That’s why the crew genuinely likes her as a person and as a boss.”

STILL MUCH TO DO

Although she’ll be eligible to retire this year and a succession plan is in place, Hawkins is in no hurry to leave. She and the team are designing a secondary waterline (the main line crosses the Mad River to convey water 2 miles to the plant) that will provide redundancy in case something happens to the main line, and will give the city

Karen Hawkins and Lance Livesay look over the AUMA valve automation system recently installed.



“I go to sleep every night not worrying a lick about the condition of our water and sewer departments because of Karen and her team.”

PETE BALES

additional capacity. They’re also working on a program to identify older, problematic water and sewer lines to target for replacement or renovation. Other projects in the works include finalizing a sanitary sewer master plan, undertaking a stormwater master plan and completing an operations and maintenance manual for the water distribution system.

Hawkins is part of a close family: her husband, Roy, works in management for the Kroger grocery chain; her daughter, Amanda, is a fourth-year student at the University of Cincinnati Medical School; and her son, Stephen, is a sophomore student in mechanical engineering at Wright State University. Meanwhile, Hawkins continues her education by taking advanced wastewater classes. Although she didn’t finish college, she says that’s definitely on her “bucket list.”

She’s also active in OAWWA and OWEA and volunteers her time freely. That includes training future water workers through participation in the City of Dayton’s Annual Children’s Water Festival.

Looking back, Hawkins is pleased with her own and her colleagues’ accomplishments: “I’ve always been fortunate with opportunities, and I’ve tried to provide them for those who work for me. Fairborn is a good place to raise a family, and the city is a great place to work. I feel blessed every day that I have a job here.” **tpo**

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Out With *Microthrix*

OPERATORS AT A COLORADO PLANT BEAT BACK WINTER FILAMENTOUS BACTERIA OUTBREAKS BY FEEDING A POLYALUMINUM CHLORIDE SOLUTION

By **Scottie Dayton**

Winter blooms of *Microthrix parvicella* at the James R. Dilorio Water Reclamation Facility caused extreme slowing of the 30-minute solids settling rate. The increase from 100 to 300 sludge volume index (SVI) led to additional wasting and more solids to dewater.

The tangle of brown, matted foam formed a scum cap on the center ring of the secondary clarifiers at the plant in Pueblo, Colorado. As proteins in the bacteria degraded, they emitted an odor operators found revolting. “We tried chlorination, but it didn’t cause a die off,” says John Millard, the plant’s assistant superintendent. “That’s partly because much of the bacteria floats and doesn’t come in contact with the chlorine.”

Operators also installed water spray bars in the mixed liquor return box on either side of the eight anoxic basins. The spray broke up the foam, which released trapped air and prevented the foam from escaping. Then superintendent John Lindstrom read a case study done by Denver Metro Wastewa-

“Watching an SVI pushing 300 drop under 200, then down to 100 within two and a half months was exciting. We also saw phosphorus levels drop from 1.4 mg/L to 0.104 mg/L.”

JOHN MILLARD

ter Reclamation District on FEX-208, liquid polyaluminum chloride (PAC) from Kemira. The chemical controlled the foam.

In a 72-day trial of the product in 2014, Millard’s laboratory staff watched the filament count go from “excessive” (present in all flocs, appears more filaments than flocs, or filaments growing in high abundance in bulk solution) to “some” (filaments commonly observed, but not present in all flocs). “We were back to the level at which wastewater plants must operate.”

NASTY CHARACTERS

The 19 mgd (design) activated sludge plant averages 10.5 to 11 mgd. *Microthrix* blooms began after a 2011 upgrade to biological nutrient removal. Temperatures just below 60 degrees F triggered the bacteria’s proliferation, usually in late October or early November.

Outbreaks began with nuisance foam but accelerated to the “very com-



Foam on the surface of the anoxic reactor tank is bulking sludge caused by a booming *Microthrix parvicella* population.



After 72 days of feeding Kemira FEX-208, the anoxic reactors are back to normal with no traces of *Microthrix* bacteria.

mon” and then “abundant” stage at 57 degrees F. As *Microthrix* entered the mixed liquor, it slowed the settling rate. “Our remedy was to increase wasting and do borderline nitrification because we have a higher ammonia limit,” says Millard. “However, the plant isn’t very stable with partial nitrification.”

The blooms made sludge light and fluffy, dropping its return wasted volume from 5,300 mg/L to 3,900 mg/L. To compensate, operators increased wasting from 150 to 200 gpm. Of even greater concern was the *Microthrix* entering the four anaerobic digesters. “In severe outbreaks, foam enters and plugs the gas lines and can even blow off the domes,” says Millard.

In summer, operators dewater biosolids in drying beds, but they use two

Humboldt centrifuges in winter. During the *Microthrix* upset, they increased feed to the units from 170 to 250 gpm.

SILVER BULLET

Lindstrom discussed the plant's condition with Tafadzwa "Tee" Mariga, Kemira applications manager. Mariga did numerous jar tests because operators were also concerned about phosphorus levels. "By the time Tee entered the picture, the demand for Kemira tanks and pumps had outstripped the supply," says Millard. "Tee rented similar equipment, and the Kemira field services team set up the feed pumps to ensure accurate dosing."

Kemira set the chemical storage tank on a concrete pad alongside the pre-anoxic, anoxic and anaerobic complex, then ran the feed line sleeved in a second hose to the return activated sludge channel in the pre-anoxic basin. The storage tank holds 47,000 pounds of chemical. The trial used 148,144 pounds, or 13,158 gallons.

Operators began feeding FEX-208 at 12 gph on Dec. 20, 2014. They reduced the amount to 9.6 gph on Dec. 31 and lowered it to a maintenance dose of 5.6 gph on Jan. 15. "Watching an SVI pushing 300 drop under 200, then down to 100 within two and a half months was exciting," says Millard. "We also saw phosphorus levels drop from 1.4 mg/L to 0.104 mg/L."



The FEX-208 storage tank and dosing equipment.

OFFENSIVE STRATEGY

Staying alert to changing plant conditions is the operators' strongest game. Every shift checks the basins for signs of foam and does a settleometer test. If the settling rate increases significantly, they check the SVI and do a microscopic examination to count and identify the filaments.

At the first sign of trouble, operators are ready to administer a maintenance dose. Last summer, a contractor converted the chlorine feed room to hold the PAC storage tank with lines to the return activated sludge pumps. A tank of acetic acid will introduce carbon to the anoxic zone to increase denitrification.

"My best advice to operators is if you had trouble last winter, call Kemira," says Millard. "Get your name on the list early to test the system using their tanks and pumps. If you must rent equipment, let Tee help find the proper vendor. He is hugely responsible for our success."

The rental equipment from a local company cost \$10,000. The chemical for the trial cost \$45,920.

"These expenditures make a lot more sense than being fined by the EPA for permit violations," says Gene Michael, wastewater director.

According to Mariga, if operators had been able to feed a maintenance dose a little sooner last year, they may not have had to hammer the outbreak as hard, and the cost could have been lower.

Millard isn't bothered by what might have been. He's happy, relieved and proud of his staff: "They did a wonderful job with the drawdowns and remain vigilant on their rounds." **tpo**

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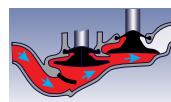
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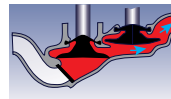
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Old Technology, New Economics

A ST. LOUIS PLANT TEAM, CONSULTANT AND MANUFACTURER TEAM UP WITH AN INNOVATIVE SOLUTION TO EXTRACT BETTER EFFICIENCY AND PROCESS CONTROL FROM AN OLDER AERATION BLOWER

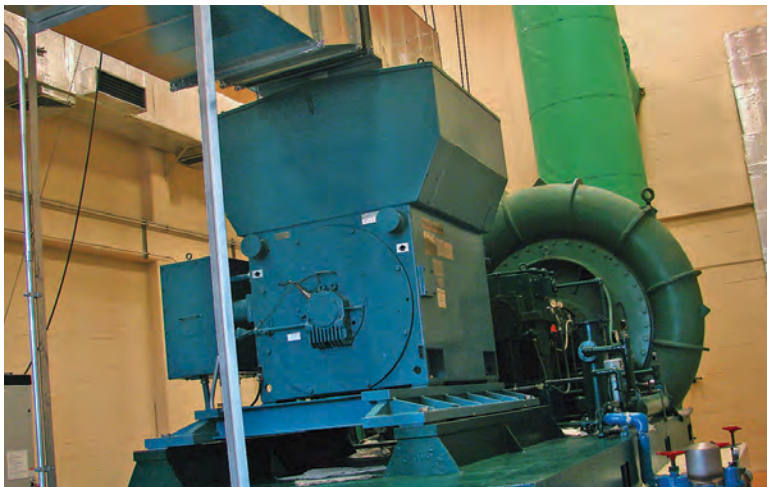
By Tom Jenkins, P.E., Karl Nowak, P.E., and Tim Hilgart

Variable-frequency drives (VFDs) have been used for decades to control multistage centrifugal blowers. The increasingly popular turbo blowers also use VFDs for flow control and energy optimization.

VFDs have not been applied to geared, single-stage centrifugal blowers — economic rather than technical obstacles have limited such applications to smaller blowers. Recently, however, the staff at the Lemay Wastewater Treatment Plant in St. Louis has shown that changing economics can enable a cost-effective, energy-efficient application of VFDs to large blowers.

BACKGROUND

Two types of single-stage centrifugal blowers are commonly used in wastewater aeration. They include large blowers that use a conventional AC motor and a speed-increasing gear set to obtain high impeller speeds and achieve required discharge pressures, and turbo blowers that use direct-coupled impellers and synchronous motors. In turbo blowers, a VFD provides very high-frequency power to rotate the motor at several thousand rpm. They are generally limited by bearing considerations to less than 400 hp.



A project at the Lemay Wastewater Treatment Plant in St. Louis gave new life to an old aeration blower.

The 167 mgd (design) Lemay plant is the second-largest wastewater facility operated by the St. Louis Metropolitan Sewer District. The original process design dates to the mid-1980s and consists of conventional activated sludge with plug flow reactors. Six of the eight aeration basins — those in continuous operation — are equipped with fine-pore diffusers. The other two, used during high-flow loading periods, are being converted to fine-pore diffusers.

Four Howden Roots single-stage blowers provide the air. Originally, all four blowers were identical, rated for 57,000 scfm at 8.0 psig discharge pressure, with 3,000 hp/4,160 V electric motors. Design inlet conditions were 100

degrees F and 80 percent relative humidity, with an inlet pressure of 14.2 psia.

The plant's aeration control strategy was fairly standard. Dissolved oxygen (DO) was the primary control variable. The DO loop cascaded to basin airflow control logic with 32 electrically operated flow-control valves. The blowers were controlled to maintain a constant 7.0 psig discharge pressure. Inlet guide vanes (IGVs) modulated blower airflow in response to pressure variations.

TOWARD OPTIMIZATION

After 10 years of operation, the fine-pore diffusers were installed and two blowers were modified with new impellers to match the air supply to reduced demand. Capacity was reduced to 32,000 scfm, but rated discharge pressure and design inlet conditions were unchanged. IGVs were retained for modulating airflow.

The Lemay staff knew the blower characteristics and controls were not optimized for process or energy efficiency. Matching air supply to process demand required turndown beyond the available blower capabilities. The actual required discharge pressure was 6.5 to 7.0 psig, lower than the typical operating setpoint. Although the IGV control conformed to standard practice, the staff knew variable-speed control was more efficient.

Throttling a blower's inlet is both the least expensive and the least efficient method of airflow control. The inlet valve creates a pressure drop, reducing flow by taking some of the blower pressure rise at the inlet, increasing total pressure drop and shifting the flow to the left on the blower curve. The inlet throttling also reduces inlet density, decreasing the pressure capability of the blower for a given flow.

IGVs cause a spin, or prerotation, of the air at the eye of the blower impeller, reducing the pressure rise through the blower. The IGVs also obstruct the inlet flow stream, resulting in some throttling of the blower. Variable-diffuser vanes (VDVs) on the discharge side of the impeller are available for some blowers and are used to modulate the blower by changing the flow/pressure characteristics. The blowers at the Lemay plant had IGV control only.

LOOKING TO VFDs

Variable-speed control is the most efficient method of modulating blower output, as the flow can be directly modulated by changing blower speed. Energy is saved because there is no parasitic pressure drop from throttling. Instead, the variable-speed blower is modulated so that only the pressure required to overcome the system resistance to airflow is created.

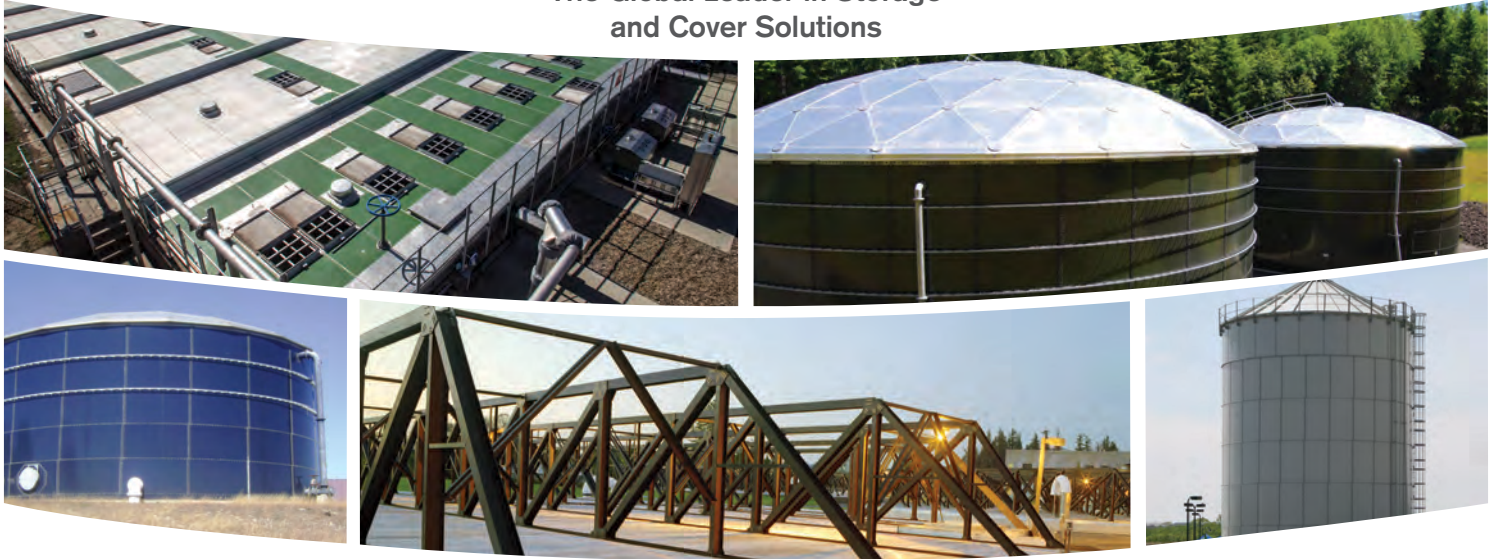
Most single-stage blowers are supplied with medium-voltage motors (600–6,000 V). Since these are often larger than 1,000 hp, medium voltage is more cost-effective for constant-speed operation. The cost of medium-voltage VFDs rated for the required power was historically very high, making IGV and VDV control the most cost-effective for single-stage blowers.

However, advances in technology, increased competition and more demand have significantly reduced the cost of medium-voltage VFDs in recent years.

(continued)



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New variable-frequency drives have significantly improved the old blower's efficiency by enabling modulation of blower output.

The Lemay plant staff recognized that they could significantly improve process performance and energy savings by using VFDs to control the blowers.

A 2009 evaluation of blower performance and system demand found that the discharge pressure and operating airflow range exceeded the actual aeration requirements. Based on the projected cost of modifying the blowers and controls and a current power cost of \$0.05/kWh, the engineering evaluation indicated a simple payback on energy efficiency of about six years.

SYSTEMS APPROACH

The existing blowers were about 30 years old, but inspection showed that they were in excellent shape mechanically, and experience indicated they could easily last 20 more years.

A system approach to blower modifications is necessary to make sure process concerns, equipment operation and control considerations are properly coordinated. In 2011, the staff made modifications to Blower 2 that included:

- New impeller to adapt the blower airflow and discharge pressure to actual operating conditions, which differed from the original design requirements. The new impellers were custom-engineered by Howden Roots.
- A new high-efficiency 2,000 hp 4160 V motor, sized to match the revised blower performance.
- A new 2,000 hp medium-voltage, liquid-cooled VFD.
- A new blower control panel to provide proper control of the variable-

The variable-speed operation of the Lemay single-stage aeration blowers is an innovative application of established technology. The project was implemented because the Lemay staff was willing to examine changing economics and take a system approach to the aeration process.

speed blower, including sequencing of start and stop functions. Howden Roots provided a proprietary control algorithm, based on extensive on-site testing, to optimize the coordination of the IGV and VFD controls for improved efficiency and turndown.

- SCADA and supervisory control modifications, including most-open-valve (MOV) control and blow-off during low-flow operation. This is provided for both the constant-speed and the variable-speed blowers. The plant staff has been able to reduce the discharge pressure to 6.1 psig and lower the minimum speed from 52 Hz to 50 Hz.

MEETING CHALLENGES

There were many challenges to overcome during implementation. The electric utility offered a rebate for the upgrade, but to get it the plant had to complete the project on a tight schedule.

Heat dissipation from the VFD, motor and blower represented a chal-

lenge: Even a few percent inefficiency at 2,000 hp creates significant unwanted thermal energy. The selection of a water-cooled VFD required an air-to-water heat exchanger outside the blower building. The existing overhead crane and structures within the blower building created challenges in locating equipment and ductwork.

Despite these challenges, the project has been a success. Because electric rates have increased almost 50 percent since the 2009 evaluation, payback has been excellent. Improved process flexibility has allowed the plant to more closely match the air supply to aeration system demand. The MOV logic has meant discharge pressures from 6.1 to 7.0 psig, a significant improvement over the previous constant-pressure system.

Improved blower system efficiency was a primary objective. To verify the savings, the blower power demand for one year of operation was recorded by the SCADA system. The aeration system operates across a range of flows, discharge pressures and inlet temperatures, and each parameter affects blower power. To minimize variations, the isentropic efficiency was calculated and plotted for each blower.

The average "wire-to-air" isentropic efficiency of the variable-speed Blower 2 was higher than the average efficiency of the other two blowers operated during the same period. Even more important, the unmodified blowers had their best efficiency point (BEP) near the highest airflow. Because of the backward-curved impeller designed by Howden Roots for the modified Blower 2, peak efficiency occurs at the midrange of airflow, where the blower most often operates. This further improved the variable-speed blower's efficiency.

BETTER PAYBACK

The installed cost was within a few percent of the estimate, totaling just over \$1 million, including the SCADA changes and control wiring that were provided by plant personnel. Because of higher electricity cost and a financial incentive provided by the electric utility, the payback was reduced to about four years, clearly demonstrating the impact of changing economics on the feasibility of VFD control for single-stage blowers. As with any new application, lessons were learned:

- Before replacing existing aeration blowers, it is important to find out if it is more cost-effective to optimize current equipment.
- A system approach to evaluation and design is beneficial. It is especially important for the engineering team to consider and integrate process, blower characteristics and control systems.
- The solution to heat dissipation from the VFD and motor required out-of-the-box thinking. The staff has developed solutions that would enable the use of air-cooled VFDs.

As often happens when energy conservation becomes a priority, the Lemay plant team identified other projects and modifications to the aeration system. The blower motor is being ducted to the outside of the blower room to reduce the building heat load. Howden Roots is examining the control strategy to further optimize turndown and energy consumption. Separate low-pressure blowers are being investigated for the aerating influent and effluent channels, reducing energy consumption and lowering the air demand on the aeration blowers.

The variable-speed operation of the Lemay single-stage aeration blowers is an innovative application of established technology. The project was implemented because the Lemay staff was willing to examine changing economics and take a system approach to the aeration process. The results can provide guidance for other municipalities seeking to improve their energy and process performance.

ABOUT THE AUTHORS

Tom Jenkins, P.E., (tom.jenkins.pe@gmail.com) is a consultant specializing in aeration system energy and controls. Karl Nowak, P.E. (knowak@stlmsd.com), is plant engineer for the Lemay Wastewater Treatment Plant. Tim Hilgart (timothy.hilgart@howden.com) is wastewater vertical sales leader for Howden Roots Blowers and Compressors. **tpo**

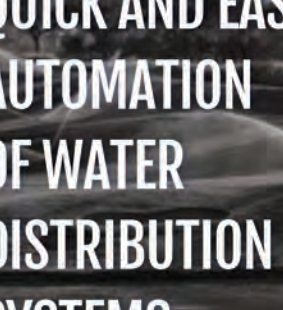
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A 3D isometric view of a pump assembly mounted on a blue metal frame. The assembly includes a green electric motor (4), a blue pump body, and various pipes and valves. Dimensions are provided: 85.0 (height), 21.6 (width), 185.0 (length), and 71.6 (height). Callouts include 20, 18, 19, 12, 8, 11.6, and 10.0. Labels include 'FLOW INLET', 'FLOW OUTLET', and 'WARNING: HOT SURFACE'.



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PERFECT FIT

AN ELECTRICAL ENGINEERING DEGREE HELPED MIKE WELKE SLIP COMFORTABLY INTO A ROLE OVERSEEING BIOSOLIDS PRODUCTION AND GENERAL MAINTENANCE OF AN OLDER FACILITY

STORY: **Scottie Dayton**
PHOTOGRAPHY: **Amy Voigt**

UNTIL THE UPGRADE FOR THE WARREN (OHIO) WATER POLLUTION Control facility becomes reality, Mike Welke and his crews nurse and coerce every piece of aging equipment.

The plant was upgraded in 1988, and the biosolids facility went online in 1998. “Our greatest challenge is age,” says Welke, biosolids manager and maintenance supervisor. “Each day I walk in wondering what’s next. I’ve sweated out how to do things more often than I care to admit.”

Ingenuity and an associate degree in electrical engineering technology from Youngstown State University have been strong assets for Welke, enabling him to work with the resources at hand. His ability to keep equipment running and the plant compliant is one reason he won the 2014 F. D. Dean Stewart Award from the Ohio Water Environment Association (OWEA) recognizing exemplary efforts in plant operations, maintenance and recordkeeping.

TREATMENT TRAINS

Built in 1962, the 16.5 mgd (design) activated sludge plant averages 12 mgd from more than 15,800 customers in Warren, Champion and Lordstown. Wastewater flows past a raw influent sampler (Hach), over two catenary bar screens and a manual bar screen (E & I Corp., a Division of McNish Corp.), and into four Detritor tanks (Ovivo USA).

Leaving the tanks, liquid passes through five primary settling tanks. Secondary treatment occurs in four aeration tanks and a mixed liquor chan-



Mike Welke, biosolids manager/maintenance supervisor at City of Warren Water Pollution Control.

nel. After four final clarifiers, a chlorine contact tank and two post-aeration tanks, the effluent discharges to the Mahoning River.

Sludge passes through a gravity thickener into a holding tank. The biosolids facility is designed to process 240 wet tons per day, yielding Class A exceptional quality biosolids. It has two 2-meter Klampress belt presses (Alfa Laval Ashbrook Simon-Hartley), dual conveyors (Serpentix Conveyor Corp.) and an EnVessel Pasteurization system (RDP Technologies) that uses electric heat and hydrated lime. The facility won first place in the U.S. EPA 1999 National Biosolids Exemplary Awards.

Welke was a maintenance mechanic 3 when the biosolids plant went online. Then Director Tom Angelo moved him to the Biosolids Division and shared his goal of aggressively marketing the product using the brand name Nature’s Blend. “His ideas intrigued me, and I became very interested in the beneficial reuse of biosolids,” says Welke.

As a biosolids technician, he worked with engineers as they finished the build. The experience solidified his understanding of how components operated, and that helped him through

the startup phase. Welke worked with the electrical engineer to verify that the circuits met plant specifications. Later, he explained situations over the phone to engineers, then implemented their suggestions.

“It was hands-on work — just what I went to school for,” says Welke, who has 27 years with the city. “I initially envisioned myself as the person who

Welke has earned awards for his success in keeping the facility running smoothly and in compliance.

“This is one of those weird life situations that worked out well. My training transitioned seamlessly into the wastewater industry, and I wouldn’t change a thing.”

MIKE WELKE



Mike Welke, Warren (Ohio) Water Pollution Control



POSITION: | **Biosolids manager and maintenance supervisor**

EXPERIENCE: | **27 years**

DUTIES: | **Operate and maintain facility and pump stations; oversee fleet maintenance, expenditures and budgets**

EDUCATION: | **Associate degree, electrical engineering technology, Youngstown State University**

CERTIFICATIONS: | **Class III Wastewater Operator**

MEMBERSHIPS: | **Water Environment Federation, Ohio Water Environment Association**

GOALS: | **Obtain Class IV license; become a better leader and teacher**

GPS COORDINATES: | **Latitude: 41°10'43.12"N;
Longitude: 80°48'19.39"W**



UP THROUGH THE RANKS

Many people doubt they can lead an organization, let alone run meetings, but Mike Welke, biosolids manager and maintenance supervisor for the City of Warren, Ohio, has the solution: Become active in a state association.

Welke began by serving as chair of the Ohio Water Environment Association Biosolids Committee. After four years, he moved to the Northeast Section OWEA Executive Committee, learning about the organization as he worked his way through first, second and third chair, then secretary and vice president.

"By networking, I gained a better understanding of the problems and solutions we're all seeing in the industry," he says. "I loved learning about different processes." After six years advancing through the executive committee, Welke served as section president for 2010-11.

"It was an exciting experience, as each position required different skills," he says. "Now I don't blink an eye when asked to set up a meeting, arrange for speakers, write their biographies, or submit the paperwork for operators to receive their CEUs."

As Welke gained confidence, his professional persona improved. In 2012, he returned as chair of the Biosolids Committee and became co-chair of the Safety Committee. What he learned from those involvements led to his appointment as the Northeast Section delegate to OWEA.

"It's a bigger organization with higher skill sets," says Welke. "With the continued support of Director Edward Haller, I'll be a delegate for four years, then hopefully become president of OWEA in another seven years."

From left, Mike Welke with his crew: Dewey McCoy, maintenance mechanic 1; Paul Geist, lead maintenance mechanic 3; and Mike Zambelli, maintenance mechanic 1; in the Nature's Blend biosolids area.

built and tested prototypes based on engineers' designs of amplifiers or circuits, then suggested modifications if they didn't work," he says. "This is one of those weird life situations that worked out well. My training transitioned seamlessly into the wastewater industry, and I wouldn't change a thing."

DUTY CALLS

Welke joined the city in 1988 and worked his way up to his present position. He manages the biosolids facility and 14 people who maintain the collections systems, seven lift stations, and treatment plant equipment. His degree allows him to maintain the facilities' electrical systems.

Because of time constraints, Welke relies on versatile Paul Geist, lead maintenance mechanic 3, and Jim Valentine, maintenance mechanic 3, to manage daily treatment plant operations. Tom Yaeger, lead wastewater operator, monitors the treatment process and alerts Welke to major changes that would require his presence. Welke depends heavily on Ryan Hathhorn, lead biosolids technician, to oversee production and two other technicians. When situations turn difficult, though, Welke gets down and dirty with his crews.

One example was Christmas Eve 2010, a Friday. A pipe clamp had loosened in an inground pump station, allowing sewage to flood the dry well and short out the two 40 hp pumps. Welke responded with his crew. He called John Silbaugh of the Sewer Division, who brought the city's Vactor combination truck and its crew. After they lowered the level in the dry well, they shut off the power and closed the inlet valve.

"We started portable heaters and used dielectric sprays to dry out panels, contactors and circuits," says Welke. "If I couldn't dry one of the motors

“I still have to turn the material into cake before landfills will accept it. Last year’s figures show it is at least \$200,000 cheaper to hold our course. We’re much further ahead and we believe beneficial reuse is the responsible choice.”

MIKE WELKE

enough to start the pump, there wasn’t a spare at the shop and no stores would open until Monday.”

Jim Wilden, plant superintendent, was also present. While components baked, workers tightened the pipe clamp and cleaned. Around midnight, Welke restored power and switched on the redundant pump. It ran. “John and his men stayed with me the whole time,” says Welke. “I was proud of my crew, because many were newer and hadn’t seen this before.”

QUALITY PRODUCT

Welke devotes most of his attention to the biosolids plant. The dual train can process 240 wet tons per day, but the treatment plant averages 36 to 40 wet tons. The extra capacity was designed for redundancy and to accommodate material from other municipal plants that contracted with Nature’s Blend processing facility.

“We can make anything into Class A exceptional quality material, but it must have a marketable appearance,” says Welke. “Therefore, we conducted trials with material from local facilities and New York City.” The latter produced a sloppy product with high ammonia, both unacceptable to farmers. Because correcting the situation would mean extra processing and increased costs, city officials stopped receiving material from New York.

While the price partners paid covered production costs and was less than the landfill tipping fees, most facilities had no way to ship sludge. “Once we added transportation costs to production costs, communities chose to landfill,” says Welke. “The bottom line blinded them to the benefit of reuse.”

That left Warren to market its own product. Most went to farmers for \$1 per dry ton, but some was mixed into Nature’s Blend potting soil. Between 2000 and 2007, 450 Giant Eagle grocery stores sold 6-pound bags of the product in four states.

The program ended when the U.S. EPA held Warren accountable for a misstatement in its biosolids management plan that said all products would meet 503 regulations for all parameters including pH. “Officials wanted the potting soil to have a 10.5 pH, which would have burned every plant it touched,” says Welke. “Potting soil needs a neutral pH of 7.”

Today, farmers apply the plant’s annual production of 2,500 to 3,000 dry tons. “We start with 4.5 to 5.5 percent feed solids that dewater to 24 percent cake,” says Welke. “After pasteurization, the granules are 36 to 40 percent solids.

“Besides the EPA, our greatest obstacle was and remains the municipal mentality of how quickly and cheaply can I get rid of this,” he continues. “We never convinced partners and potential partners that if they put a value on their product, others would eventually believe it.”

POSITIVE REINFORCEMENT

Setbacks in the program haven’t stopped Welke

from talking about biosolids to grade school students during Earth Day. One of his favorite demonstrations involved Nature’s Blend potting soil. He gave classes little growing pots and some sunflower and marigold seeds, then asked the kids to plant them in the organic fertilizer. “One class sent a picture of marigolds growing so well that the kids gave them as presents for Mother’s Day,” he says.

Welke needed figures, not flowers, to convince some council and community members to stay the course. “We average 8,000 to 10,000 wet tons of



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Aerial photos of City of Warren Water Pollution Control before and after the Nature's Blend facility was built on the property.

biosolids per year, and in 2014, it cost \$34 to \$59 per wet ton to process,” he says. “Selling the product to farmers generated \$11,865, which didn’t offset production costs. However, even Milorganite, the most successful biosolids program in the nation, doesn’t generate enough income to cover production.”

A recent decrease in landfill tipping fees reopened the conversation. “While fees of \$40 to \$50 per ton sound enticing, I still have to turn the material into cake before landfills will accept it,” says Welke. “Last year’s figures show it is at least \$200,000 cheaper to hold our course. We’re much further ahead and we believe beneficial reuse is the responsible choice.” **cpo**

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View of John Brown's Ferry crossing from the Moccasin Bend Wastewater Treatment Plant outfall.

Growing New Scenery

A TENNESSEE TREATMENT PLANT NEIGHBORING A HISTORIC AREA UNDERTAKES TREE PLANTINGS TO ENHANCE VISUAL APPEARANCE AND BUILD FAVORABLE PUBLIC PERCEPTIONS

By Jeff Smith

The City of Chattanooga's Moccasin Bend Wastewater Treatment Plant sits on 184 acres in the National Park Service's Moccasin Bend Archeological District, a unit of the 956-acre Chickamauga and Chattanooga Military Park in Tennessee.

It wasn't always that way. When built in 1961, the plant sat alone across the river from the city's downtown on the peninsula formed by a major bend in the Tennessee River. There was no park. "The military park has just kind of grown up around us," says Michael Patrick, superintendent of the plant (140 mgd design flow, 65 mgd average).

As a result, Patrick and his staff care deeply about the plant's appearance and public perceptions of it. In years past, landscaping was not a high priority. Now, a major tree planting initiative and an odor-control project are underway.

“We are very aware of the importance of our location.”

MATTHEW SNYDER

to about 20 feet tall in five years. In addition, several dozen American holly trees are being strategically planted to provide balance and pattern to the landscape. After the trees are established, the plant staff will handle maintenance, including trimming and mowing.

The federal government maintains its hold on the river bend to preserve and protect the vast archeological resources and Civil War sites there. Two of them — John Brown's Homestead and Brown's Ferry crossing — are near the treatment plant property. Each played an important role in the history

PRESERVING HISTORY

This fall, more than 200 Leyland cypress trees are being planted to shield the plant from the roadway that passes in front of it. Saplings 6 to 8 feet tall will be spaced 6 feet apart and are expected to grow



of removing the Cherokee tribe from the Tennessee Valley to Oklahoma before the Civil War era. A portion of a federal road system known as the Trail of Tears is next to the Moccasin Bend property.

TEACHING MOMENTS

Matthew Snyder, sewer project coordinator, facilitates the plant's public outreach program, aimed at educating the public about wastewater treatment and demonstrating commitment to preserving the site's history. More than 3,000 school children, college students, community group members, summer camp attendees and general public visitors have toured the plant. The outreach program is key to maintaining the plant's Platinum Level of the ISO 14000-based National Biosolids Partnership certification.

"We are very aware of the importance of our location," says Snyder. In addition to the Moccasin Bend plant, a golf course and a mental health hospital occupy the peninsula. Creation of the military park began in 1986. The National Park Service plans to develop a visitor's center for the archeology district about a mile away from the treatment plant. It includes an improved gateway corridor to the center with multiuse trails.

"The park is really just beginning, and they don't have a visitor's center yet," Patrick says. "But obviously the park will affect our future landscaping and operations." **tpo**

Share Your Ideas

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

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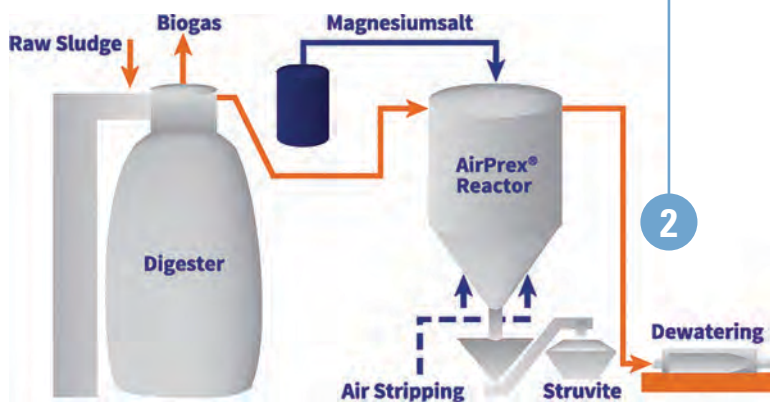
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- 1) Struvite crystals settle to the bottom portion of the reactor for removal.
- 2) Simplified flow diagram of the AirPrex process.
- 3) AirPrex technology has been commercially deployed at several facilities in Europe.

Struvite Solution

THE AIRPREX PROCESS HELPS TREATMENT PLANTS ENHANCE BIOSOLIDS DEWATERING AND REDUCE POLYMER CONSUMPTION WHILE PRODUCING A MARKETABLE PHOSPHATE FERTILIZER

By Ted J. Rulseh

Struvite is a persistent concern in many clean-water plants. The substance (chemical name magnesium ammonium phosphate) can build up inside anaerobic digesters and in pipes, pumps and other solids processing equipment.

Struvite accumulation can reduce flow through digester piping, thus limiting plant capacity. It can also reduce dewatering efficiency and increase phosphate loading in the return liquor, leading to less efficient phosphorus removal.

CNP-Technology Water and Biosolids Corp. now offers the AirPrex process for removing struvite from the biosolids stream. It is designed as a complete biosolids optimization and phosphorus recovery system, installed after anaerobic digestion but before dewatering.

While the process can yield a high-phosphate dry solids material with potential to generate revenue from sales, the manufacturer says the main benefits are biosolids that contain less water and so cost less to handle and transport, and substantially lower polymer usage. The process also reduces phosphorus recycle loading to the treatment process and cuts the cost of maintenance related to struvite buildup. Gerhard Forstner, company president, talked about the technology in an interview with *Treatment Plant Operator*.

tpo: What are the basic operating problems this technology aims to solve?

Forstner: When plants use biological phosphorus removal, phosphorus accumulates in the waste activated sludge, which then goes to anaerobic digestion. Phosphates stabilize the water/sludge matrix, making it harder to squeeze the water out in a press or centrifuge. The dewaterability drops by 3 to 5 percentage points as opposed to a facility using ferric chloride for phosphorus removal. Cake solids may drop from, say, 25 percent to 20 percent. That makes a large difference in handling costs.

Second, having the phosphorus in the sludge means up to 30 percent more polymer may be needed to get the free water out. And third, during anaerobic digestion, the phosphorus combines with ammonia and magnesium to form struvite that will precipitate out between the digester and the dewatering process. It creates scale that can block piping or block centrifuge centrate lines. It's almost impossible to remove.

tpo: There are other struvite removal processes on the market. In a basic sense, how is your process different?

Forstner: Our process comes after anaerobic digestion but before dewatering. Removal of the phosphorus before dewatering enables us to improve

(continued)

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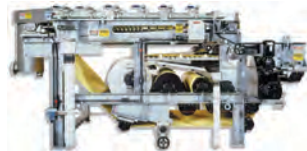
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sludge dewaterability, reduce polymer consumption and remove the struvite at an earlier stage to eliminate struvite-related maintenance.

tpo: How would you characterize the economic benefits of the Air-Prex process?

Forstner: The biggest share of savings, about 70 percent, comes from reducing the biosolids handling costs and polymer costs. About 20 percent of savings come from lower maintenance associated with struvite. About 10 percent is potential revenue from fertilizer sales.

tpo: In simple terms, how does the process work?

Forstner: Material from the anaerobic digester is fed to a reactor, at the bottom of which is a coarse-bubble aerator. The introduction of air imparts an up-and-down circular mixing motion and strips out CO₂, increasing the pH from 7 to about 8. We then dose the reactor with magnesium chloride. Basically, we create ideal conditions for struvite to form in the reactor. After a few hours, the ammonia, phosphorus and magnesium form struvite crystals. Once the crystals are heavy enough, they fall out and settle into the conical portion of the reactor.

tpo: How are the struvite crystals removed from the process?

Forstner: A few times per day, the bottom of the reactor is opened for a minute or two and a mixture of organic material and struvite crystals is released to a pump, which delivers it to a grit washer. The washer dislodges the organics, which float to the top of the washer and are decanted back to the treatment plant headworks. The mineral fraction falls to the bottom of the washer and is augered out into a container. It comes out about 85 percent dry. The biosolids, with about 95 percent of the orthophosphate removed, goes on to dewatering.

tpo: What is your commercial experience with this technology?

Forstner: We started in Germany in 2007. Our first big installation was at a 120 mgd treatment plant in Berlin. The next was in 2009 at a 70 mgd plant in Monchengladbach, close to the border with the Netherlands. More recently we've had installations at a 170 mgd plant in Amsterdam, a 30 mgd plant also in the Netherlands, a 120 mgd plant in China, and two more plants in Germany. In the United States, we will start piloting in October of this year.

tpo: Can you cite specific results from any of these projects?

Forstner: The plant at Monchengladbach has achieved 90 percent phosphate removal and regularly sells the struvite as a high-phosphate fertilizer. The plant's dewatering rate has improved by 4 percentage points, and the facility has saved more than \$850,000 per year in operating costs, as opposed to phosphorus removal with ferric chloride. The Amsterdam plant has improved its dry cake solids by about 5 percentage points and has achieved about 20 percent polymer reduction, saving more than \$550,000 in hauling and polymer costs per year.


tpo: What happens if a facility wants struvite removal but is not interested in marketing a fertilizer product?

Forstner: We have the option to do a two-pronged approach. We can build the initial system without struvite harvesting. If a customer simply wants to dewater the biosolids and discharge the struvite with the cake, we can build the system without the washing unit.

By designing for a shorter hydraulic retention time, making the reactor tank smaller and taking the washer away, we can save quite a bit of capital cost while giving the owner improved dewaterability, lower polymer cost and struvite scaling prevention. Finer, smaller struvite crystals go with the biosolids directly to dewatering. Then in three or four years, if they come back and say that now they want to harvest the struvite product, we say, "No problem." We add a second tank, add the washer and they are ready to go. **tpo**

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An Advocate for Operators

JACKIE JARRELL LOOKS TO ELEVATE THE WATER AND WASTEWATER OPERATIONS PROFESSION IN HER DUAL ROLES AS A WEF TRUSTEE AND AS A LEADER WITH CHARLOTTE WATER

By Ted J. Rulseh

How well does your organization support operations professionals? For that matter, what have you done lately to help your colleagues advance in their careers? Or to elevate the profession in general? Or help bring new people into the business?

A June blog item by Jackie Jarrell on the Water Environment Federation (WEF) website provided food for thought on such topics. In “Support Your Local Operations Professionals,” Jarrell noted that operators are “the foundation of a strong, resilient and sustainable water resource recovery facility.” She would say the same for operators on the drinking water side.

Jarrell, operations chief with Charlotte Water (the new branding of North Carolina’s Charlotte-Mecklenburg Utilities), offered some of her own prescriptions for raising the profile of the profession and attracting new blood as experienced operators retire.

Jarrell has a unique perspective on operations, having come from the engineering side. She joined her organization as an engineer doing hydraulic modeling on the drinking water system, then moved to industrial pretreatment on the wastewater side. For the past 16 years, she has overseen that area as well as operations for Charlotte Water’s five activated sludge wastewater treatment plants (123 mgd total permitted capacity) and its residuals program, which handles 90,000 wet tons of biosolids per year.

Jarrell shared her thoughts on professionalism in water and wastewater operations in an interview with *Treatment Plant Operator*.

tpo: What led you to publish such a strong piece of advocacy for operations professionals?

Jarrell: I am in my first year on the WEF Board of Trustees, and we’ve been talking about initiatives for operators. That has always been very

“I think if we can promote the value of water to people and show how they can contribute to it, we can attract more people into the ranks of operators, and mechanics, too.”

JACKIE JARRELL

important to me, because I see so much potential in the people I work with at Charlotte Water. As part of the discussions we’ve been having at that level, I saw an opportunity to speak up about how important it is that we support our operators.

tpo: What attracted you to the operations side?

Jarrell: After graduating from college in engineering and working in the engineering division here, I didn’t imagine myself being in operations. Now I can’t imagine not being in operations. I get to see how things really work — the real, practical side. It’s very rewarding to see things get accomplished. It’s the whole idea of problem-solving — just working things out

with a team and making an operation or process better.

tpo: What key needs and challenges do you see operators facing now?

Jarrell: One challenge has to do with certification. Another is about attracting people to the profession. On the certification front, that’s tough because there are many types of treatment plants with different technologies and needs, and the types and levels of operators needed for those plants are different as well. Even in different parts of the country, facilities have different needs.

So it’s difficult to create a certification program that would work across the country. Still, I believe there is a need for some baseline foundation of certification that could allow more reciprocity, so that operators working in a given state could have flexibility to move to another state and be recognized as professionals for the certifications they bring with them. A lot of good efforts are being put toward that now, and I know that WEF in particular very strongly supports the certification and credentialing of operators.

tpo: What about the challenge of revitalizing the profession as long-time operators transition into retirement?

Jarrell: The wave of baby boomer retirements is happening with operators, too, and it’s harder and harder to find people who want to become treatment plant operators, probably just because they don’t really understand what the career is about. I think if we can promote the value of water to people and show how they can contribute to it, we can attract more people into the ranks of operators, and mechanics, too.

tpo: So, you see mechanics as another career path on the operations side?

Jarrell: When people think about mechanics, they picture industrial mechanics or auto mechanics, but there is also a big need for mechanics in our treatment plants. They are a big part of the operation. It’s important to help people see that as an opportunity and as a really good career that they can take anywhere. That has been a challenge. We used to stay in the background, but now there is push to be out in front and tell people about what we do.



Jackie Jarrell

tpo: What is Charlotte Water doing to help promote operator certification?

Jarrell: In our department, when you're hired as an operator, you're expected to reach all the certification levels, whether you're on the water or wastewater side. You are expected to reach the highest level, and you have about six years to complete that. As operators progress to the higher levels, their pay increases. We help them prepare by sending them to school. North Carolina has a state certification school that is very strong. We have several schools through the North Carolina AWWA-WEA. A number of our operations staff volunteer — they teach, help coordinate the schools, and attend the schools.

tpo: What about programs to advance operators' skills?

Jarrell: We have an Operations Challenge competition at our state conference, and the winner goes to the national at WEFTEC. In Charlotte, we've had a team for several years, and it includes a combination of mechanics and operators. Our laboratory staff has helped train them on how to run the lab tests that are part of the event. They learn how to do process control, and they prepare for the safety event. They learn all kinds of things through it and become a stronger team by working together.

We are also certified under ISO 14001 (the international environmental management standard). Three of the five plants are under our corporate certification and so is our residuals program. Over the next few years, the other two plants will also be certified. ISO 14001 is really a good grass-roots program. It's teaching our people about continuous improvement focused on protecting the environment. It helps them understand the value of the job they do.

tpo: As a WEF trustee, what do you see the federation doing to elevate the operations professions?

Jarrell: To cite one example, there is a task force in the WEF House of Delegates working to develop what they call a Knowledge Framework. It's a body of knowledge spelling out what operators need to know. They are working to identify what that includes, and from there they will look at how they can fill gaps in knowledge where they exist.

WEF also believes strongly in standardization of certification, wants to be a leader in that area, and works with other groups to support it. In addition, WEF has a Professional Operators Committee that is doing a number of things to promote the advancement of operators. WEF also offers a lot of training. There are free webinars that any member can take advantage of. Then there is the Utility of the Future initiative. Part of that is Operator of the Future, giving operators the tools to be ready for the future and to handle the new technology. The more restrictive the regulations become, the harder it is to treat the water. We need to be sure that operators are equipped to handle that.

tpo: How is Charlotte Water helping to attract new operators to the field?

Jarrell: We go out to schools. We're involved in career fairs. When we go to career fairs, we take microscopes so the kids can see the organisms and appreciate that a wastewater treatment plant is a living, breathing facility. We have operators on hand to talk to the students about what they do and how they do it. We've had a strong intern program for several years with the University of North Carolina-Charlotte. Interns work on different projects that we've initiated, or they just work with us for a summer or a semester.

We've had students who didn't necessarily aspire to working in our field but found it very interesting and then decided to pursue it. A couple of those people have come to work for us. The last two operators we hired have been college graduates. In the past, new operators weren't necessarily coming out of college. They might have come with two-year degrees or from high school, and that's all good. What's neat about the profession is that it can be a great career regardless of your level of education coming in.

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“In the past, new operators weren't necessarily coming out of college. They might have come with two-year degrees or from high school, and that's all good. What's neat about the profession is that it can be a great career regardless of your level of education coming in.”

JACKIE JARRELL

tpo: Does the recent rebranding as Charlotte Water help your organization along the lines we've been discussing?

Jarrell: I think so. What we're trying to do more than anything is let the public know we're here to help protect the environment and provide good, clean drinking water.

tpo: What advice would you give to water and wastewater agencies that may not have the resources of a Charlotte Water? What can they do to help elevate the operations professions and attract new talent?

Jarrell: Get involved with professional organizations like WEF and with professional operator associations. Be active in your local and statewide training programs. Go into the high school and talk to students. I think that's where it really starts, at the high school level, showing students that we offer opportunities for careers.

tpo: What would you say to help entice a young person to explore a career in water or wastewater operations?

Jarrell: I would say that if you want to get involved in something that really helps society and serves others, then water or wastewater operations is a great career. It enables you to work with a team in a meaningful way to protect the environment and public health. You play a big part in helping people to always have clean drinking water, and to always know their environment is being protected as well as it can be. **tpo**

Tough on Trash

VOGELSANG'S INLINE GRINDER CHEWS UP WIPES AND OTHER DEBRIS WITH A DESIGN THAT MINIMIZES WEAR AND TEAR AND MAINTENANCE

By Craig Mandli

The “flushables” problem isn’t going away. Hundreds of hygiene products claim to be safe to flush but often clog pipes and equipment, leading to high maintenance costs. The RotaCut Inline Grinder, displayed in the Vogelsang booth at the 2015 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show, offers a solution.

Solids such as plastic fragments, rubber, hair, wipes, applicators, plastic pens, string, wood and bones are drawn through the cutting screen and cut by self-sharpening rotary blades to a size that can pass through downstream equipment. “This product was designed to grind up rags for treatment facilities,” says Mike Colbert, product and field service manager. “It’s actually a product that we’ve been selling since 1998, but a lot of upgrades have made it more user-friendly.”

Features include AutoReverse, Auto Cut Control (ACC) and reversible cutter screens. The unit is rebuildable inline; cutter cartridges need not be sent out for reconditioning. When placed on the suction or discharge side of a pump, the device helps to eliminate ragging, reduce solids and protect downstream equipment from clogging. It helps prevent damage to belt and plate-and-frame presses, and helps efficiently balance centrifuge feed. Heavy solids are captured in a collection basin and eliminated from the liquid.

“Constant pressure on the blade leads to optimum cutting.”

MIKE COLBERT

AutoReverse helps handle large objects, reversing blade rotation until the object is cleared, reduced and passed through the screen. It engages at preset intervals, keeping blade wear even. The trailing edge of the blade is sharpened as a natural effect of cutting. When the rotation is reversed, a fresh edge enhances the cutting quality.

To maximize blade life, the ACC automatically adjusts the blades as normal wear progresses. It eliminates manual maintenance of the cutting-head tension. The entire process is controlled externally, minimizing the need to open the unit. “Constant pressure on the blade leads to optimum cutting,” says Colbert.

Maintenance can be performed inline without removing any connected piping. The hinged cutting head can be accessed by disengaging one or more hand latches. The head is disassembled by removing the Allen bolt that holds the assembly together, allowing routine service such as blade or screen changes to be performed quickly.

Screens come in several patterns that produce a designated particle size that will pass through downstream machinery. The rotational speed of the



PHOTO BY CRAIG MANDLI

Mike Colbert, left, discusses the RotaCut Inline grinder with WWETT Show attendees. The grinder's Auto Cut Control (ACC) function uses a hydraulic unit to monitor and correct the tension between the blade assembly and cutting screen, optimizing cutting performance and wear component life.



Water & Wastewater Equipment,
Treatment & Transport Show
www.wwettshow.com
Education Day: Feb. 17, 2016
Exhibits: Feb. 18-20, 2016
Indiana Convention Center, Indianapolis

cutting head also influences the solid size. All screens are reversible to allow for a fresh cutting surface without buying new parts.

The device is used in applications including primary and secondary sludge, sludge transfer, and dewatering feed. According to Colbert, the ability to specify how fine the particles are shredded is convenient for wastewater operators. “All plants have varied specifications regarding how small the particles need to be to get through the rotating equipment without clogging it,” he says.

Colbert was enthused by the response from WWETT 2015 attendees; he talked with “many more” plant operators than in the past. “I think changing the name played a big role, as I saw more people on the municipal wastewater side than ever,” he says.

Vogelsang plans to come back with an expanded offering in 2016, including products geared toward small treatment systems. “This show brings people from all over, with a lot of interest in the industry,” he says. “We’re hearing a lot of feedback that we can bring back and use in the future.” **800/984-9400; www.vogelsangusa.com. tpo**

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"There are a lot of people depending on us for clean drinking water. That's one thing I like about the water treatment business. You can take a lot of **pride** in your job."

Don Gariepy
Water Treatment Plant Mechanic
Charlotte-Mecklenburg (N.C.) Utility Department

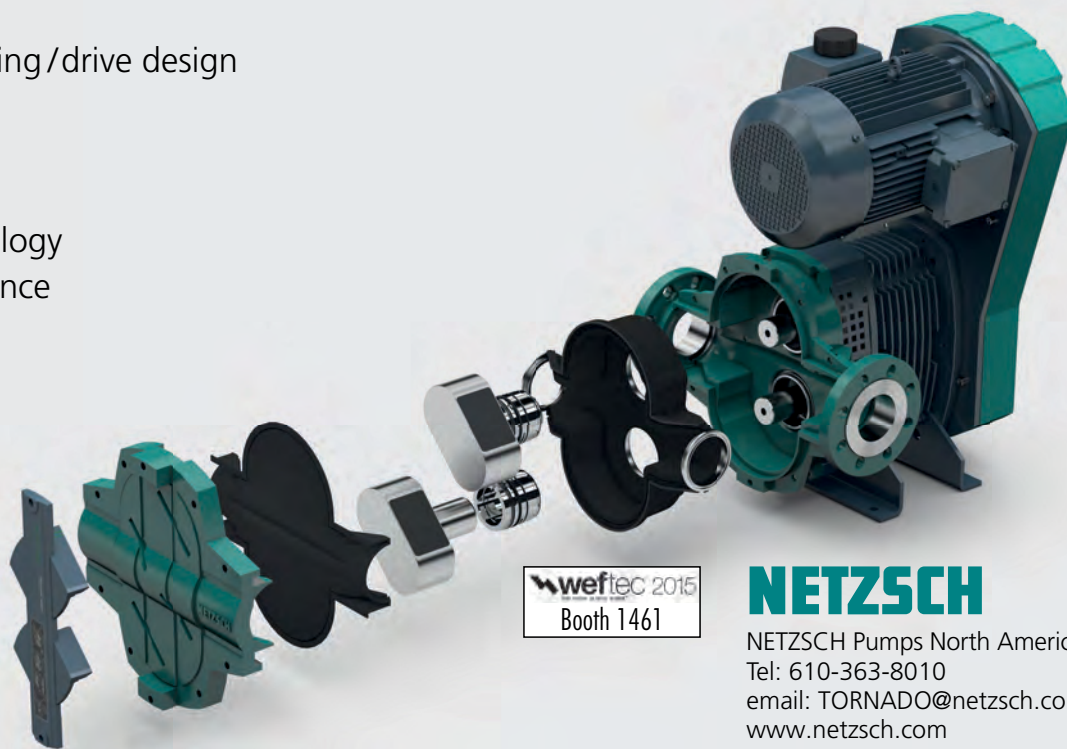
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FREE INFO – SEE ADVERTISER INDEX

Tanks, Structures and Components

By Craig Mandli

Bins/Hoppers/Silos

FLOWPOINT SYSTEMS SEWAGE GENERAL

The Sewage General automated turn-key septage receiving station from Flowpoint Systems allows operators to monitor previously uncontrolled access points to the collections system. Each system is self-contained, insulated and maintenance-friendly. Systems may be heated, cooled or both, and come complete with an electric-actuated plug valve, 316 stainless steel piping, magnetic flowmeter, hauler access terminal and field terminal box. Options include an automated flushing system, automated refrigerated sampler, grinder, rock trap, hose reel, receipt printer, online pH monitor and hydrocarbon sensors. Stations can be used to receive and monitor fat, oil and grease. All come with the Septage+ software package to reduce administration, allow for the remote monitoring of all transactions and control all parameters. **877/655-5585; www.flowpointsystems.com.**



Sewage General septage receiving station from Flowpoint Systems



Spiralift SR septage receiving system from Franklin Miller

FRANKLIN MILLER SPIRALIFT SR

The Spiralift SR septage receiving system from Franklin Miller features an optional automated rock-removal system. An automated gate valve opens on a pre-planned cycle, enabling rock to fall into an enclosed screw conveyor and drop in a bin for disposal. **800/932-0599; www.franklinmiller.com.**

IMPERIAL INDUSTRIES DRY BULK STORAGE

Welded, one-piece dry bulk storage silos from Imperial Industries can be customized. Bulk silos and tanks need minimal maintenance and save material-handling costs over many years of use. Tanks are available in carbon steel, stainless steel and aluminum, in silo diameters to 16 feet, and in capacities to 12,000 cubic feet. Paint finishes for the Imperial standard or customer paint specifications are available on carbon steel silos. Standard guardrail and ladder assemblies in aluminum, carbon steel and galvanized steel ensure easy assembly and maintenance-free durability. **800/558-2945; www.imperialind.com.**



Dry bulk storage silos from Imperial Industries

SCREENCO SYSTEMS DUAL SCREEN SYSTEM

The high-capacity Dual Screen System from Screenco Systems is constructed of aluminum with stainless steel screens, with a collection sump and a high-capacity 6-inch drain. The screen has two 3/8-inch-gapped stainless steel bar screens at opposing angles, with the front



Dual Screen System from Screenco Systems

area allows for continued use and is easy to rake clean to the garbage drain tray. It can treat over 500 gpm. Various-gapped screen sizes are available. **208/790-8770; www.screencosystems.com.**

Buildings/Structures

LEGACY BUILDING SOLUTIONS TENSION FABRIC STRUCTURES

ISO 9001:2008 and CSA 660 certified tension fabric structures from Legacy Building Solutions incorporate structural steel I-beams instead of open web trusses, providing flexibility for a variety of building applications. The solid structural frame are not vulnerable to unseen corrosion originating inside the tube. The structural steel has multiple coating options including hot-dip galvanizing and powder coat paint. Buildings can be customized beyond the confines of standard sizes to the exact width, length and height required. The design allows for wide doors and side doors. Structures may be modified to provide desired overhangs and interior columns, and engineered to handle additional collateral loads for conveyors, cranes and fire suppression systems. Fabric cladding eliminates corrosion concerns. Legacy's patented fabric attachment system increases safety and decreases construction time. **877/259-1528; www.legacybuildingsolutions.com.**



Tension fabric structures from Legacy Building Solutions

Clarifiers

HEADWORKS INTERNATIONAL BIO ACTIVEFLOAT DAF

Bio ActiveFloat DAF technology from Headworks International is designed for use with the ActiveCell MBBR and IFAS process, and delivers reliable solids separation with low chemical consumption.



Bio ActiveFloat DAF technology from Headworks International

It can be efficiently customized to treat a variety of flow and loading conditions. The self-aspirating recycle pump eliminates the need for compressed air supply or saturation tanks. It offers high-performance solids-removal rates within a very small footprint, with a skid-mounted design that's easy to operate with minimal maintenance. It has standard SS304 construction with reliable, continuous operation and maximum system uptime. **713/647-6667; www.headworksintl.com.**

KUSTERS WATER HI-TECH

Hi-Tech spiral blade clarifiers from Kusters Water are commonly used in primary, secondary and final clarification. Mechanical or hydraulic drive systems are available. Materials are offered in painted, galvanized or stainless steel to meet specific project requirements. **205/987-8976; www.kusterswater.com.**



Hi-Tech spiral blade clarifiers from Kusters Water



Spiraflo clarifier from Lakeside Equipment Corporation

LAKESIDE EQUIPMENT CORPORATION SPIRAFLO CLARIFIER

Influent enters the periphery of the Spiraflo peripheral-feed, center-takeoff clarifier from Lakeside Equipment Corporation, with the flow moving to the center for removal by a centrally located effluent trough.

This flow pattern is the opposite of a center-feed clarifier, where the influent enters at the center of the tank and moves radially outward from the center-feed well to the effluent weir located around the periphery of the tank. 630/837-5640; www.lakeside-equipment.com.

LEOPOLD - A XYLEM BRAND CLARI-DAF SYSTEM

The Clari-DAF System for the pretreatment of rapid gravity-filter feedwater for drinking water and wastewater applications from Leopold - a Xylem Brand provides consistent water quality and high sludge solids while operating at increased loading rates. It offers a lowered cost of operation through an optimized point of addition of all chemicals and optimized, efficient mixing energy. Proven clarification technology removes low-density particulates as well as *Giardia* and *Cryptosporidium*. Its use enables lower chemical cost, less time to dewater and lower energy costs. The enhanced, consistent clarification of low-density solids results in extended filter runs, improving complete system operational efficiency. 855/995-4261; www.fbleopold.com.



Clari-DAF System from Leopold - a Xylem Brand



Peripheral drive clarifiers from Schreiber

SCHREIBER PERIPHERAL DRIVE CLARIFIERS

Peripheral drive clarifiers from Schreiber are designed for applications such as storm-water and primary and secondary clarification. The peripheral drive system uses leverage rather than center-drive torque to rotate the scraper and skimming assembly, resulting in a simplified mechanical system. All the equip-

ment necessary for the continuous removal of floatables and settled solids is suspended from either a rotating bridge or, for smaller units, a lightweight rotating beam arm. The rotating skimming equipment removes floatables regardless of wind direction, and the helical scrapers transport settled solids to the center of the basin in a single revolution. The design allows for the lifting of equipment above the water level for inspection or maintenance without having to dewater the basin. 205/655-7466; www.schreiberwater.com.

SMITH & LOVELESS CLAR-I-VATOR

The CLAR-I-VATOR from Smith & Loveless is a high-rate solids-contact clarifier used for economical and efficient chemical precipitation. It combines flash mixing, flocculation, clarification, sludge collection and sludge thickening in one operating unit. Also available are circular clarifiers, center and peripheral feed systems, parallel plate separators, solids-contact clarifiers, thickeners, and rectangular scraper systems. Diameters range from 10 to more than 100



CLAR-I-VATOR from Smith & Loveless

feet with half-bridge and full configurations. Tank design options consist of concrete, mild steel, stainless steel and nonmetallic. Complete project oversight and turnkey field erection and field service support is available, along with full upgrade and retrofit options for drive heads, scum skimmers, baffles and weirs. 800/898-9122; www.smithandloveless.com.

Clarifier/Digester/Tank Cleaning

WESTECH ENGINEERING ZICKERT SHARK

The ZICKERT Shark sludge scraper from WesTech Engineering provides efficient sludge removal for new and retrofit sedimentation basins and clarifiers. It can be used in wastewater treatment plants, drinking-water purification plants and industrial processes. This easy-to-install system provides complete sludge transport, leaving no dead zones and creating no turbulence. 801/265-1000; www.westech-inc.com.



ZICKERT Shark sludge scraper from WesTech Engineering

Coatings and Linings



LUMIFLON fluoroethylene vinyl ether resins from AGC Chemicals Americas

AGC CHEMICALS AMERICAS LUMIFLON

LUMIFLON fluoroethylene vinyl ether resins from AGC Chemicals Americas impart corrosion resistance when formulated into coatings, sealants and paints. The topcoats can be used for tanks in the water treatment industry because they do not

degrade from UV light, wind, rain or corrosion. The solvent-soluble fluoropolymer resin for coatings can be cured at room temperature or at elevated temperatures. Because the resins do not require heat curing, these topcoats can be applied in the factory or in the field. They can be formulated to last 30 years or more, depending on the substrate and environment. As transparent fluororesins, the resins can be used to make both clear and pigmented coatings in more than 230 colors in high gloss to flat finishes. 800/424-7833; www.agcchem.com.

AMTECH TANK LINING & REPAIR DURACHEM 580

DuraChem 580 corrosion-resistant tank liner from AmTech Tank Lining & Repair protects the tank substrate from corrosive degradation. Formulated to resist the liquids and gases found in wastewater streams, it is a 100 percent solids tank lining with adhesion characteristics up to 1,000 psi. Applied at a high temperature, it cures instantly, bonding to tank substrates and minimizing operational downtime, extending the life of new or existing vessels. It contains no VOCs. 888/839-0373; www.amtechtanklining.com.



DuraChem 580 tank liner from AmTech Tank Lining & Repair

INTERNATIONAL PAINT - DEVOE COATINGS INTERSLEEK FOR PC 381/425

Intersleek for PC 381/425 from International Paint - Devoe Coatings is a two-component silicone elastomer coating system that pro-

vides foul release performance on static structures. Applications include coating of steel and concrete surfaces in the water and wastewater market on assets such as water intakes and trash



Intersleek for PC 381/425 from International Paint – Devoe Coatings

grates, clarifier tanks, penstocks and water channels. It is suited for static structures which are prone to zebra and quagga mussel attachment, or areas requiring frequent cleaning for algae or biofouling buildup. It is environmentally friendly with no harm to sea life and no biotoxins. It has good abrasion resistance, long-life coating systems and low VOC formulation. 440/234-

2900; www.international-pc.com/northamerica.

Covers/Domes

INDUSTRIAL & ENVIRONMENTAL CONCEPTS FLEXIBLE CLARIFIER COVER

The Flexible Clarifier Cover from Industrial & Environmental Concepts can be used on clarifiers and tanks of all sizes. It is constructed of industrial-strength, UV-protected geomembrane, with an anticipated service life of 15 to 20 years. It is available in gray or green colors, and each cover is custom designed for local wind, rain and snowfall conditions. Stainless steel ratchets provide tensioning from the central cone downward, distributing it around the tank's circumference. If the gearbox or other equipment needs to be removed, the cover can be disassembled and removed in approximately four hours with three laborers and a crane. A lockable entrance is available. 952/829-0731; www.ieccovers.com.



Flexible Clarifier Cover from Industrial & Environmental Concepts



Domes and roofs from United Industries Group

UNITED INDUSTRIES GROUP DOME

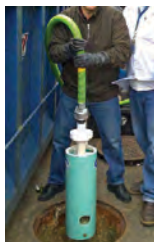
Aluminum and stainless steel domes and roofs from United Industries Group are a system of triangular panels designed to fit any shape tank or reservoir, whether round, square, rectangular or angular. They can be built in a very flat, low profile up to a high dome profile for more internal clearance. They are engineered with a clear-span design and integral tension

ring, eliminating intermediate columns and reinforcement of the tank walls and allowing for spans over 300 feet. The alloys virtually eliminate the need for periodic roof maintenance, coatings or paint over the life of the structure. 949/759-3200; www.unitedind.com.

Digesters

DO2E WASTE WATER TREATMENT LITTLE JOHN DIGESTER

The Little John Digester system from DO2E Waste Water Treatment is designed for the oxidation and removal of fats, oils and grease (FOG), matting, and odor in commercial and residential lift stations, grease traps, and wet wells. It achieves the oxygen transfer required for the breakdown of FOG particulates, which are converted on contact



Little John Digester system from DO2E Waste Water Treatment

into suspended microfine particulates. The unit keeps the particulates in constant suspension and prevents them from reforming in the discharge lines. The unit operates with low-pressure, high-volume airflow provided by a regenerative blower located outside the pumping station. It has no moving parts and is available with advanced oxidation processing, a hybrid ozone with hydroxyl radicals to help with hydrogen sulfide issues and other problematic situations. 251/626-6550; www.do2e.com.

Grating/Handrails/Ladders

FIBERGRATE COMPOSITE STRUCTURES COMPOSITE CROSSOVER LADDER

Pre-engineered composite crossover ladders from Fibergrate Composite Structures are available in a variety of heights that address most standard clearances below the crossover (12, 18, 24, 36, 48 and 60 inches). They are constructed from fiberglass-reinforced plastic products that are lightweight and corrosion-resistant. Molded grating and stair treads, both with a meniscus surface, are used for the walking surface and provide slip resistance. Dynaform structural components and Dynarail ISOFR guardrail are used for the structure of the crossover ladder, creating a durable, safe and low-maintenance solution. 800/527-4043; www.fibergrate.com.

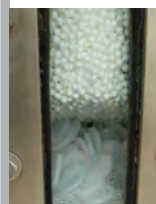


Composite crossover ladders from Fibergrate Composite Structures

Media

KRUGER USA BIOSTYR DUO

The BIOSTYR DUO system from Kruger USA integrates biological aerated filter and moving bed biofilm reactor (MBBR) technologies. Biological treatment and filtration occur simultaneously within the system, and two separate media types are contained within the same treatment cell. Wastewater first flows through an MBBR media layer, which provides a large surface area for biofilm growth and treatment. Flow then passes through the BIOSTYRENE media layer, which provides additional fixed-film treatment and filtration as the water

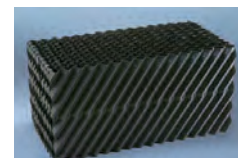


BIOSTYR DUO system from Kruger USA

flows up through the fixed bed. The buoyant BIO-STYRENE media is retained by a concrete deck with multiple strainers, and the system uses a gravity-driven backwash for excess solids removal with no pumping. It offers significantly increased BOD and ammonia loading rate capabilities, while maintaining low effluent BOD, TSS and ammonia values. 919/677-8310; www.krugerusa.com.

RASCHIG USA DURA-PAC

Dura-Pac modular PVC corrugated media from Raschig USA is designed for fixed-film biological treatment applications. With a minimum void to volume ratio of 95 percent, it allows for uniform redistribution of wastewater and air while maximizing contact between the biomass and the wastewater. Modules are composed of thermoformed PVC sheets that are UV protected and resistant to rot, fungi, bacteria, acids and alkalines commonly found in wastewater. The PVC compound is nontoxic to microorganisms and formulated to resist long-term creep and cracking under continuous loading. Available in cross flow (XF) and vertical flow (VF)



Dura-Pac modular PVC corrugated media from Raschig USA

designs, it includes a full range of modular PVC media geometries for wastewater treatment including complete secondary treatment, nitrification, denitrification, industrial roughing filters, submerged fixed beds and anaerobic treatment systems. **540/862-8426; www.raschig-usa.com.**



Mixers

AQUATURBO SYSTEMS MIX-AER-GS

The MIX-AER-GS unit from AQUATURBO SYSTEMS provides low-speed bottom mixing and aeration that operate independent from each other, providing economical surface mechanical mixing and aeration. The Screweller design ensures high oxygen transfer and is completely non-ragging. For troublesome floatables management, the FRED (floatables re-entrainment device) unit re-entrains floatables while also providing downdraft mixing. **479/927-1300; www.aquaturbousa.com.**

MIX-AER-GS unit from AQUATURBO SYSTEMS

FLYGT - A XYLEM BRAND 4400 SERIES

The 4400 Series low-speed mixers from Flygt - a Xylem Brand gently mix large volumes or when horizontal flow is essential. Engineered for providing highly efficient thrust and bulk flow, lowest energy consumption, and positioning flexibility, the large-diameter mixer provides a mixing solution for activated sludge treatment, including aerobic, anoxic and anaerobic zones, oxidation ditches, sludge treatment, ice prevention, and oxygenation in lakes and harbors. The large-diameter, low-speed, gear-driven combination provides an efficient, clog-free solution for continuous-duty, large-scale applications. Its hydraulically optimized propeller ensures efficiency. An easy-access design and installation method provides for simple maintenance. **855/995-4261; www.flygtus.com.**



4400 Series low-speed mixers from Flygt - a Xylem Brand

JDV EQUIPMENT CORPORATION NOZZLE MIX SYSTEM

The Nozzle Mix System from JDV Equipment Corporation is a dual zone mixing system that provides uniform mixing patterns that produce even distribution and a stable environment. The system is designed with pumps installed outside the tanks to facilitate maintenance. The pumps are typically



Nozzle Mix System from JDV Equipment Corporation

chopper pumps or pumps incorporating inline grinders that prevent fibrous materials from accumulating and causing plugging problems. The application dictates which type(s) of the many varied pump options that can be used. High-velocity nozzles are mounted inside the tank and oriented to discharge in a flow pattern that completely mixes the tank contents. **973/366-6556; www.jdvequipment.com.**

Storage Tanks

C&E PLASTICS MOBILE LIQUID STORAGE TANKS

Mobile liquid storage tanks from C&E Plastics are made out of polypropylene, a corrosion-resistant, extremely durable and long-lasting plastic. They are inher-



Mobile liquid storage tanks from C&E Plastics

ently well insulated and come standard with 23-inch manways for ease of use. A smooth interior design and sloped floors for easy cleaning are incorporated. The encapsulated steel corrugation of the outside walls prevents any weakness in structure. Custom designs are available to meet unique specifications. **724/947-4949; www.ceplastics.com.**



Storage tanks from Fisher Tank Company

FISHER TANK COMPANY STEEL STORAGE TANKS

Field-erected welded steel storage tanks from Fisher Tank Company provide safe, reliable and economical storage and process solutions for wastewater treatment facilities. Services include in-house design engineering, custom fabrication and turnkey construction for tanks, digesters, clarifiers, hoppers, bins and silos. Options such as ladders, handrails, agitator bridges, linings, domed roofs and tank covers are available. **610/494-7200; www.fishertank.com.**

GEOMEMBRANE TECHNOLOGIES VSO BIOGAS TECHNOLOGIES GASHOLDER

VSO Biogas Technologies double-membrane gasholders from Geomembrane Technologies hold valuable methane gas, a naturally occurring component of biogas generated from anaerobic digestion. They can safely store and regulate the usage of collected biogas in order to produce heat and electricity at a plant, or in some cases sell the energy to a local utility for profit. Tapping into this sustainable, renewable energy source can help lower operational costs while protecting the environment by reducing greenhouse gas emissions. **855/484-4630; www.gticovers.com.**



VSO Biogas Technologies gasholders from Geomembrane Technologies



Folding frame tanks from Husky Portable Containment

HUSKY PORTABLE CONTAINMENT FOLDING FRAME TANK

Folding frame tanks from Husky Portable Containment are available in steel or aluminum frames, with multiple size and material options, including EXLON. They include easy-lift handles mounted on the floor, making them easy and quick to fold and permitting easy removal of liquids. The folding frames are pinch-free. **800/260-9950; www.huskyportable.com.**

MID-STATE TANK CO. / ARTHUR CUSTOM TANK STORAGE TANK

Mid-State Tank / Arthur Custom Tank manufactures aluminum and stainless steel tanks for storage. Leg tanks and flat-bottom tanks are available. Several options are available to satisfy particular requirements. Tanks are built in an authorized ASME vessel manufacturing facility, and are UL 142 authorized and ISO 9001-2008 QMS registered. **800/722-8384; www.midstatetank.com.**



Tanks from Mid-State Tank / Arthur Custom Tank

PARKER BOILER CO. HOT-WATER STORAGE TANK

Hot-water storage tanks from Parker Boiler Co. are available from 4.6 to 2,530 gallons in ASME code construction up to 200 psi



Hot-water storage tanks from Parker Boiler Co.

for storage, expansion, air separation, distribution for hot or cold water, glycol mixtures or thermal fluids to 600 degrees F. They are registered with the National Board of Pressure Vessel Inspectors. Heat exchangers and tank heater bundles in ASME construction for steam or water are available.

323/727-9800; www.parkerboiler.com.

TANK CONNECTION BOLTED STORAGE TANK

Tank Connection bolted storage tanks for water and wastewater have bolted rolled, tapered panel sidewall construction, an LIQ Fusion 7000 FBE coating system, a concrete foundation with base setting ring, and an aluminum geodesic dome cover. Aluminum geodesic domes are available for water and wastewater storage tank applications. In clear-span designs, dome structures are all aluminum, maintenance-free and corrosion-resistant. 620/423-3010; www.tankconnection.com.



Bolted storage tanks from Tank Connection



Water storage tanks and ponds from Westeel

WESTEEL WATER STORAGE TANKS

Water storage tanks and ponds from Westeel are a durable means to store water for treatment, municipal and residential reserves, firefighting, rainwater collection, agriculture, greenhouses, and garden centers. Easy to erect and expand, they are an option when flexibility and cost of installation and transportation are key factors. Open- and closed-top options are available. 800/665-2099; www.westeel.com.

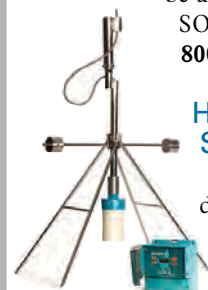
Tank Inspection/Repair

FORCE FLOW SPILLSAFE DRUM SCALE

The SpillSafe Drum Scale from Force Flow accurately monitors the amount of chemical used and the quantity remaining, while providing security against uncontained chemical spills. It can detect a leak and provide early warning to the operator, and it complies with local regulations by containing 120 percent of the drum capacity by deploying a polyethylene bladder bag. It can be used with Wizard 4000 and SOLO G2 digital displays. 800/893-6723; www.forceflow.com.



SpillSafe Drum Scale from Force Flow



Sultan Sonar from Hawk Measurement America

HAWK MEASUREMENT AMERICA SULTAN SONAR

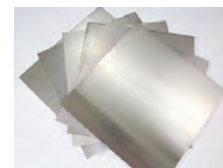
Sultan Sonar from Hawk Measurement America was designed to provide reliable and accurate sludge level measurement on various clarifier processes. The versatile, powerful 150 kHz transducer can measure down to the sludge bed layer or up to the light flocculent layer. It propagates a high-frequency sound pulse from a submerged transducer to

the interface or bed level. Using time-of-flight calculations, the sound signal is reflected, interpreted by the transducer and sent to the transmitter. User-friendly configuration and easy calibration allow tracking of specific densities dependent on the process. The maintenance-free impact plate scum cleaner uses the surface sweeper mechanism common to most tanks to keep the sensor face clean without interrupting the measurement. A range of communication options and 3G remote support capabilities are available. 978/304-3000; www.hawkmeasure.com.

Tanks/Tank Components

CROMPION INTERNATIONAL CROMGARD SPECIALTY STAINLESS STEEL

Cromgard Specialty Stainless Steel from Crompton International can be integrated as components in numerous treatment plant applications, from design of new equipment to ongoing maintenance. The costs for inspection and repair and fixed equipment due to corrosion of common initial materials of construction, like austenitic stainless steel, painted carbon steel, galvanized steel and concrete, is reduced due to metallurgy providing affordable, corrosion-free performance. This ultimately increases equipment reliability and decreases maintenance cost by reducing inspections, repairs and replacements. 225/343-4219; www.crompton.com.



Cromgard Specialty Stainless Steel from Crompton International



Package wastewater treatment system from Pollution Control Systems

POLLUTION CONTROL SYSTEMS PACKAGE SYSTEM

The package wastewater treatment system from Pollution Control Systems produces an environmentally safe non-potable reuse discharge. It offers the end user an effective method of treating wastewater with an aerobic process. A modular approach to wastewater treatment provides the user with a compact, easy-to-operate unit. The biological wastewater treatment system emulates nature's cycle of cleansing bacteria by using a multi-step treatment process to achieve the desired final discharge requirements and eliminate pathogenic germs. Each system is designed and sized specifically to handle a variety of influent flow rates and BOD loadings, as well as meet a multitude of mandated discharge parameters. 513/831-1165; www.pollutioncontrolsystem.com. tpo



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01015

Covered beds eliminate odor issues

Problem

The Northern Moraine Wastewater Reclamation District serves three Illinois communities, a total population of 12,000. The 1.1 mgd plant had stored treated and dried biosolids outside. "The material got wet every time it rained or snowed, causing odor concerns and raising handling costs," says Todd Sheridan, operations supervisor. The facility needed covered storage space for the drying beds.

Solution

Sheridan purchased two 65- by 70-foot **Hercules Truss Arch Buildings** from **ClearSpan Fabric Structures**.



RESULT

Sheridan is pleased with the buildings: "They were assembled in less than a week. The light that comes through the covers is great." Both structures now store biosolids, but Sheridan says, "I'm sure we will find more uses for the buildings down the road." 866/643-1010; www.clearspan.com.

Prestressed concrete tank replaces aging infrastructure

Problem

The Anaheim (California) Public Utilities Department found that a 1935 concrete-lined earthen reservoir had reached its end of life. It did not meet current seismic codes and needed extensive rehabilitation. In addition, the pumping capacities would not meet future demands.

Solution

DN Tanks was engaged to build and prestress an **AWWA-D110 circular prestressed concrete tank**. Because the tank would likely

experience high seismic forces during its life, it was built with a proven seismic design. The core-wall was prestressed vertically and circumferentially. Vertical prestressing used threadbars embedded in the wall; circumferential prestressing used a prestressing machine to continuously monitor and provide accurate applied stressing force on the galvanized strand as it was applied to the tank core wall. After prestressing, the strand was encased and protected with shotcrete.



RESULT

The new 4-million-gallon tank provides safe, reliable water storage to meet current and future capacity requirements, operational needs and seismic performance standards. 800/227-8181; www.dntanks.com.

Water tower helps meet water need for growing population

Problem

In 2012, Midland, Texas, was experiencing its third-worst drought ever. Its reservoirs were running low while the town was growing rapidly. The city decided to tap the aquifer located beneath the T-Bar Well Field. The city needed a large-capacity water tower.

Solution

Along with various treatment infrastructure and 67 miles of pipeline, an elevated water tank was built on site just off of Highway 191. "Throughout the years, the engineer has come to trust **Tnemec Company** as both a supplier and technical resource for coating needs," says Lane Salvato, coating consultant with The Barry Group. "We were able to recommend low-maintenance coating systems." The tank included a concrete pedestal and a steel bowl. Interior and exterior steel was primed with zinc-rich urethane, Series 91-H2O Hydro-Zinc, an NSF/ANSI Standard A 61 certified primer. The tank's interior steel was then lined with two coats of Series 20 Pota-Pox. After the exterior's prime coat, an intermediate coat of Series 1075 Endura-Shield II and a finish coat of Series 700 HydroFlon were applied.



RESULT

The project, recognized with the Tnemec 2014 Tank of the Year award, was completed in less than 12 months. The tank is expected to last 25 years. 800/863-6321; www.tnemec.com.

Wastewater facility selects geomembrane to reline pond

Problem

Built in the early 1970s, the Water Pollution Control Plant Northside Facility in Danville, Virginia, treats up to 24 mgd of domestic and industrial wastewater. In 2009, a 325,000-square-foot treatment pond lined with unsupported PVC had deteriorated beyond repair and needed a new liner system.

Solution

Dewberry Engineers selected **XR-3 reinforced geomembrane** from **Seaman Corporation**. Based on XR technology using ethylene interpolymers, it is highly resistant to UV light and harsh climates. The reinforced 30 mil liner provides high strength. To minimize seams, the engineers specified large prefabricated panels, up to 20,000 square feet each.



RESULT

The liner system continues to hold up well, requiring little maintenance and repair. 800/927-8578; www.xr-technology.com.

Coating helps restore and maintain wastewater containment tanks

Problem

The Englewood (Florida) Wastewater Processing Facility had tank interiors and catwalk lip edges that were deteriorating and exposing reinforcing steel to hydrogen sulfide and other substances. The previous coating and repairs done years ago were failing and had serious spalling conditions.

Solution

Valcon Industries provided a single source supply for cleaning and deodorizing (GELTEKK), surface preparation and profiling (ETCHEX), concrete stabilization and restoration (Restructor and Flexcrete), and final surface sealing and waterproofing (Liquaseal). The products are VOC compliant, safe and permanent, and are easy for contractors or maintenance engineers to use. The line is designed to provide long-term protection in aggressive conditions.



RESULT

The coatings stabilized and restored the concrete walls, and provide a new surface with long-term protection. **866/311-9737; www.valcon-industries.com.**

Dewatering improves solids handling

Problem

The 8 mgd Bluebonnet Water Supply Corp. Water Treatment Plant in Temple, Texas, generated up to 106 million gallons of spent backwash water and clarifier sludge annually, storing it in three concrete lagoons. Solids in the settling lagoon never dried well enough for effective removal. Handling a monthly average of 266,000 pounds and paying a hauler was a major effort and expense.

Solution

Bluebonnet added three modified sludge collection basins with vacuum transport units, two lift stations, and the Poly-Mate polymer system and Sludge-Mate dewatering containers from **Flo Trend Systems**. Material settles in the bottom to a depth of no more than 1 foot before the sludge is transferred. When the collections system activates, 19,600 pounds of solids flow by gravity to the first lift station, where the material is dewatered to 15 percent solids cake. Filtrate drains to the second lift station and is returned to the headworks.



RESULT

Damon Boniface, chief of operations, and his staff stay ahead of sludge production and control disposal costs. **713/699-0152; www.flotrend.com.**

Product improves total solids destruction in aerobic digester

Problem

Operators in an east-central Missouri city wanted better digester performance in the cold months, when low volatile solids destruction and frozen soils did not allow land application of biosolids. The team wanted better settling, increased decant and more digester space.



Solution

After six months of trials, the operators discovered that **BIO ENERGIZER** from **Probiotic Solutions** could accelerate endogenous respiration by improving cell wall permeability, thus increasing biomass metabolism and reducing volume.

RESULT

The product created nearly 85 percent volatile solids destruction in 27 weeks and improved decants. It led to greater digester capacity, better settleability and better overall digester operation. **800/961-1220; www.probiotic.com.**

Building erected to house hydrofluorosilicic acid

Problem

Treatment facilities in Sacramento County, California, disinfect with sodium hydrochloride and fluoridate using hydrofluorosilicic acid. Both hazardous chemicals needed to be confined; hydrofluorosilicic acid and the fumes emitted during the fluoridation process erode surfaces. Since both processes happen at the well site, the equipment needed to be contained separately.

Solution

Sacramento County Water Agency turned to **Shelter Works** to upgrade 32 old redwood buildings. "It was important that they work with a company that had specific quality-control procedures in place," says Tracy Switzer, Shelter Works president. "The interior partition wall created an airtight environment that met their needs perfectly."



RESULT

Nine shelters were placed at water treatment plants and 23 at well sites throughout the county. Being located in residential neighborhoods, they had to be attractive as well as corrosion-resistant. Shelter Works supplied a series of multi-room fiberglass buildings to contain fumes in one room and allow other equipment to be protected in another room. Airtight partitions separate the equipment and protect each from harmful effects of the other. **800/794-8037; www.shelterworks.com.** **tpo**



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Pentair Environmental launches website

Pentair Environmental Services launched a new website, www.pentairenvironmental.com, featuring products, design references and technical content.

Spirax Sarco facility focuses on energy management

Spirax Sarco, provider of steam system products and services, is changing the focus and direction of its facility in Longmont, Colorado, to expand application and engineering support for energy monitoring and management for the United States. The company will cease production of metering products at the location and expand its application engineering support.

Legacy Building receives ISO quality certification

Legacy Building Solutions, designer, manufacturer and installer of tension fabric buildings, received ISO 9001:2008 quality-management certification. As part of the ongoing certification process, Legacy will undergo an annual quality audit to ensure that every level of the organization is working toward greater customer satisfaction.

Hyundai Construction names service, marketing managers

Hyundai Construction Equipment Americas named Ernesto Lopez service manager, construction equipment, and Corey Rogers marketing manager. Lopez will head the HCEA service, warranty and training teams that support the company's dealers and customers, while Rogers will lead all brand, product marketing and communications for Hyundai's construction equipment and forklift product lines.

YSI launches product website

YSI, a xylem brand, launched a new website, www.ysi.com. The site provides product information and support from any electronic device, including smartphones, tablets and desktop computers.

Graco acquires Machine Technologies

Graco, manufacturer of fluid-handling equipment, acquired Machine Technologies, a Texas-based manufacturer of mortar pumps and continuous mixers. Machine Technologies' products will become part of the product portfolio of Graco's Applied Fluid Technologies Division.

Asahi/America opens new headquarters

Asahi/America held a ribbon cutting and open house in April to celebrate the opening of its new headquarters in Lawrence, Massachusetts. The 200,000-square-foot facility includes corporate offices, warehousing, valve and actuation assembly shops, fabrication, skid assembly, powder coating, clean room and machine shop.



BCR Environmental launches NuTerra Management

BCR Environmental launched NuTerra Management at the Water Environment Federation (WEF) Water and Energy 2015 Conference. The project company serves the less than 15-dry-ton per day market, recycling nutrients into marketable end products.

Pure Technologies names vice president

Pure Technologies named Randall Moore vice president of market development in North America. He will focus on developing network optimization programs with utilities across North America and increase the company's role on industry committees for the American Water Works Association.

Private equity group acquires Anua

Charles Ray and Colin Bishop, industry entrepreneurs and veteran employees, acquired the Western Hemisphere assets and rights to Anua from Bord na Mona with support from Justin DaMore, an industry insider, and his private equity associates. Terms of the sale were not disclosed. The new company will continue using the trade name Anua. The purchase includes the assets, rights, trademarks and intellectual property to Anua, as well as Puraflo, Platinum, PuraMax, Compact Monafil and Compact Monashell technologies.

Enviro-Care named FSM Frankenger distributor

Enviro-Care Co. received North American sales distribution rights for FSM Frankenger GmbH & Co. KG of Pohlheim, Germany. FSM designs and manufactures mechanical water and wastewater treatment equipment.

Creative Microsystems launches product website

Creative Microsystems redesigned the website, www.loadman.com, for its flagship LoadMan brand of onboard scales. The site includes a parts store, user manuals, dealer locator, and product and industry trends. **tpo**



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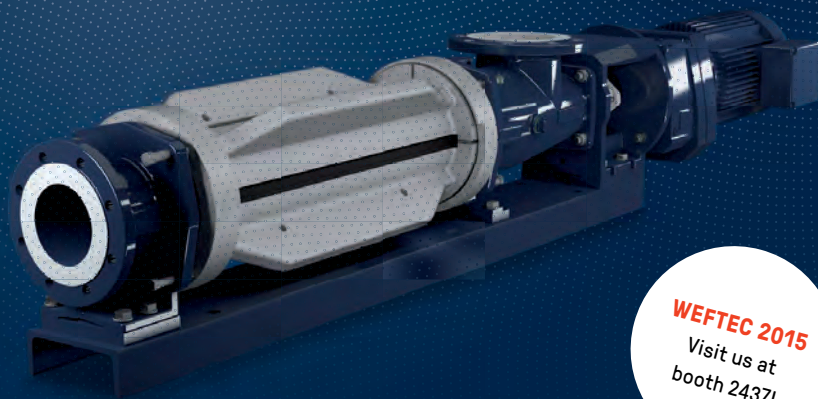
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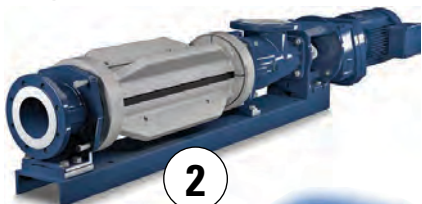
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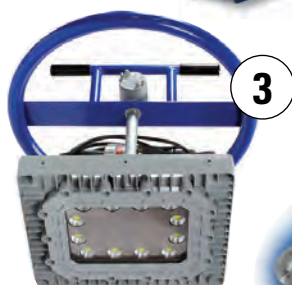
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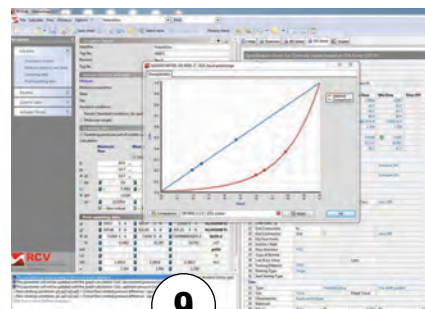
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9

1. IN-SITU REMOTE WATER MONITORING SITE

HydroVu, a website for remote water monitoring from In-Situ, enables users to view and analyze data and minimize data gaps by receiving customizable alarm notifications. The site provides continuous data backup, unlimited storage, multiple methods to view and filter data, and customizable alarms delivered by email. **800/446-7488; www.in-situ.com.**

2. SEEPEX PROGRESSIVE CAVITY PUMPS

Progressive cavity pumps from SEEPEX feature Smart Conveying Technology in one-stage (up to 60 psi) and two-stage (up to 120 psi) designs. **937/864-7150; www.seeplex.com.**

3. LARSON ELECTRONICS MANHOLE LIGHT

The 150-watt, explosion-proof LED temporary manhole light fixture from Larson Electronics features a 21-inch manway support bracket. The fixture provides 13,000 lumens of light and is IP-67 rated. The cast aluminum body provides durability and resistance to vibration and impact. **800/369-6671; www.magnalight.com.**

4. FCI THERMAL MASS FLOWMETER

The MT91 Series flowmeter from Fluid Components International features smart digital flow transmitter and advanced thermal dispersion technology flow-sensing elements. The meter with multi-port averaging thermal mass flow sensor has no moving parts, operates over a wide temperature range up to 850 degrees F, and meets federal environmental requirements for CEMS per CFR Title 40, Part 75. **800/854-1993; www.fluidcomponents.com.**

5. ASSMANN MOLDED-IN FULL DRAIN OUTLET

The molded-in full drain outlet from Assmann Corporation of America is designed for 2,500-gallon and larger tanks. The outlet enables the tank to be drained without mechanically installed nozzles. It can be

used where heavy solids or salts might accumulate in the bottom of a tank. The 3- or 4-inch outlet is available in variations of 315 stainless steel, titanium and hastelloy. **888/357-3181; www.assmann-usa.com.**

6. WACHS VALVE IDENTIFICATION SYSTEM

The Valve ID from E.H. Wachs is designed to identify and delineate valves based on size, function, pressure boundaries or direction of closure. The one-size-fits-all application ensures the correct valves are being cycled and the direction of closure is never in doubt. **866/392-1060; www.turnvalves.com.**

7. TELEDYNE ISCO SYRINGE PUMP

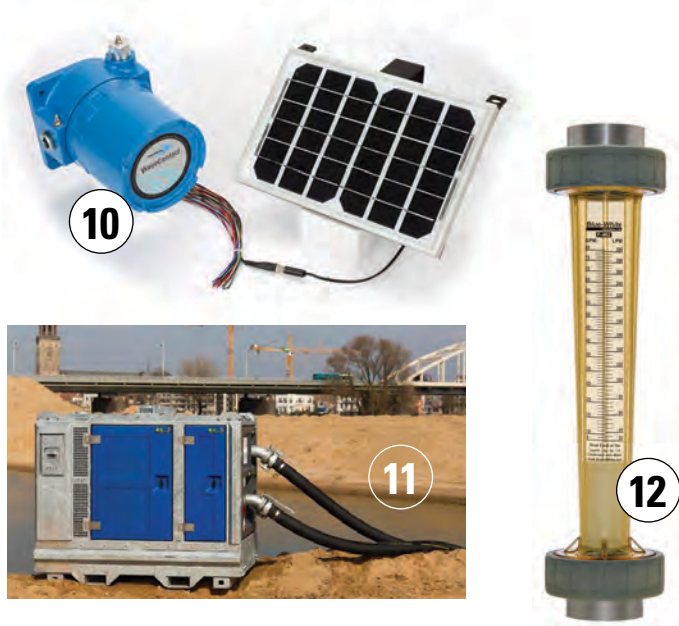
The Model 30D D-Series syringe pump from Teledyne Isco enables users to reach and duplicate ultra-deep well conditions up to 30,000 psi. Features include a smart key pump controller. To operate, the user sets the flow rate and presses run. During operation the flow rate can be adjusted without having to restart the program. Auto-lubricating gears reduce maintenance and extend pump life. **800/228-4373; www.isco.com.**

8. SENSOREX ONLINE PROCESS TRANSMITTERS

TX2000 and CX2000 intelligent pH/ORP and conductivity transmitters from Sensorex can be programmed for online measurements. Features include dual 4-20mA current outputs and two adjustable alarm or control relay contacts. A large, backlit LCD screen displays both the measured parameter and temperature. Results are delivered to automated process control systems. **714/895-4344; www.sensorex.com.**

9. BADGER METER VALVE-SIZING SOFTWARE

RCVcalc sizing software for research control valves (RCV), available for download from Badger Meter, enables users to graphically visualize operation setpoints and review various trims and characteristics that are dynamically filtered based on selections. For low-flow calcula-



tions, RCVcalc features advanced formulas to serve transitional and laminar flow situations. **800/876-3837; www.badgermeter.com.**

10. FREEWAVE TECHNOLOGIES DATA LOGGER

WaveContact data logger functionality from FreeWave Technologies provides Class 1, Division 1 and Division 2 certified wireless I/O

solutions for industrial machine-to-machine and Internet of Things applications. The feature enables it to serve as both a master radio and data logger, eliminating the need for third-party data loggers, remote terminal units or programmable logic controllers that only log inputs. **800/548-5616; www.freewave.com.**

11. BBA PUMPS 4-INCH SOLIDS HANDLING PUMP

The BA100K diesel-driven 4-inch solids handling pump from BBA Pumps delivers 836 gpm with a maximum head of 73 feet. The dry self-priming dewatering and sewage pump is driven by a single-cylinder diesel engine. The pump offers 1,500 hours of operation between service intervals, has a sound attenuated canopy and hot-dipped galvanized steel frame, and composite doors and panels. **843/849-3676; www.bbapumps.com.**

12. BLUE-WHITE METAL-FREE WETTED PARTS FLOWMETER

Made of molded polysulfone, F-462N Series flowmeters from Blue-White Industries feature metal-free wetted parts for ultrapure applications where contact with metal could contaminate fluid. Maximum fluid temperature is 200 degrees F at 0 psi. Maximum working pressure is 150 psi at 70 degrees F. Calibration range is 2 to 80 gpm. Features include 2-inch F/NPT fittings with FKM O-rings and half-union adapter connections (socket fusion fittings are available). **714/893-8529; www.blue-white.com.**

(continued)

water: product spotlight

Ozone testing kit using Indigo method eliminates need to measure reagent volume

By Ed Wodalski

The **Ozone Vacu-vials Kit** from **CHEMetrics** enables water producers to test for residual ozone following the disinfection process using the Indigo method.

Commonly used in Europe, ozone disinfection is gaining acceptance in the United States and other countries as water utilities move away from chlorination, says Henry Castaneda, vice president of marketing and technology, CHEMetrics.

"The problem with chlorination is it may form byproducts that have been known to be hazardous and in some instances suspect carcinogen precursors. In the case of ozone, it's a compound that breaks down into oxygen."

However, because ozone is a gas, it quickly separates from water, making it difficult to measure. Typically, two methods are used to measure ozone in the treatment process: DPD and the Indigo method.

"In the case of municipalities, if they're trying to measure the effectiveness of the ozone-generating equipment, they are probably going to be reading about 1 or 3 ppm and using the DPD method to measure the residual ozone concentration," Castaneda says. "If they happen to be chlorinating at the same time, typically they're going to use the Indigo method."

Using the DPD method, potassium iodide is added to the sample before analysis. Ozone reacts with the iodide, releasing iodine, which reacts with DPD (N, N-diethyl-p-phenylenediamine) to form a pink color.

With the Indigo method, the Indigo trisulfonate reagent immediately reacts with the ozone. The color of the blue reagent decreases in intensity



Ozone Vacu-vials Kit from CHEMetrics

in proportion to the amount of ozone present in the sample. The test reagent is formulated with malonic acid to prevent interference from up to at least 10 ppm of chlorine.

"What makes us distinctive is how we do the testing," Castaneda says. "We use a liquid reagent in a vacuum-sealed ampoule to produce a color reaction. Most other techniques use a powder or tablet reagent that requires mixing and compromises the ozone concentration in the sample. Basically, the way it works is the ampoule, which looks like a pencil with a tapered tip, is placed at the bottom of the sample. When the tip is snapped, the ampoule aspirates the precise amount of sample. The operator does not have to measure sample volume."

With Indigo chemistry, CHEMetrics' self-zeroing technology eliminates the need to generate a reagent blank for each test. Only one ampoule is required per test. Results can be read in any spectrophotometer that accepts a 13 mm cylinder, enabling operators to use existing laboratory equipment.

The Indigo Vacu-vials Kit has a range of 0 to 0.75 ppm. Additional kits are available for testing fluoride and other compounds by using different reagents. **800/356-3072; www.chemetrics.com.**



13. NIDEC CAST IRON VERTICAL FAN-COOLED MOTOR

The U.S. Motors brand cast iron frame 6812, vertical-enclosed, fan-cooled motor from Nidec Motor Corporation is designed for applications in the desalinization, water, wastewater, mining oil and gas industries. The tubeless motors have a ball type, non-reverse ratchet for less service and downtime. **888/637-7333; www.usmotors.com.**

14. ELECTRO STATIC HIGH-FREQUENCY GROUND STRAPS

Aegis high-frequency ground straps from Electro Static Technology ensure a low-impedance path to ground for high-frequency currents generated by VFD-driven motors and systems. The 12-inch, flat-braided, tinned copper straps are designed with a circular hole on one end for easy installation around the foot mounting screw of NEMA- or IEC-frame motors and a ring terminal on the opposite end. Custom lengths and terminations are available. **866/738-1857; www.est-aegis.com.**

15. ENDRESS+HAUSER LIQUID LEVEL SWITCHES

The Liquiphant FTL31 liquid level switch from Endress+Hauser is based on vibrating tuning fork technology. Designed for the chemical, oil and gas industries, the switch can be installed in any vertical or horizontal position in a vessel, pipe or tank. It has a 316L stainless steel housing and works in process temperatures up to 302 degrees F and pressures to 580 psi. **888/363-7377; www.us.endress.com.**

16. BIONOMIC PACKED TOWER SCRUBBERS

Series 5000 packed tower scrubbers from Bionomic Industries feature maximum throughput Hi-Flow random or structured packing, high-efficiency mist eliminator designs, and clog-resistant liquid distribution systems. An optional dual packed bed arrangement enables removal of multiple contaminants using different scrubbing reagents within the same unit. Engineered for use with water, reactive chemical reagents or special sol-

wastewater: product spotlight

TKN digester operates automatically, heats up to 450 degrees C

By Ed Wodalski

The **HotBlock TKN (total Kjeldahl nitrogen) digestion system** from **Environmental Express** is preprogrammed to automate digestion protocols (EPA Method 351.2) for determining organic nitrogen. It can heat up to 450 degrees C (842 degrees F). The optional touch-screen controller can store up to eight programs, including TKN. Up to 20 steps can be set up automatically for each digestion procedure.

The controller is programmed to ramp the temperature of the block to 160 degrees C and hold that temperature for 60 minutes. It then automatically ramps to 380 degrees C over 60 minutes and holds that temperature for an additional 30 minutes.



HotBlock TKN from Environmental Express

"The TKN method requires a temperature of up to 380 degrees C," says Joe Boyd, tech specialist with Environmental Express. "Most heating blocks don't go that high. This one will achieve that temperature with the accuracy that's required by the method."

To withstand the high temperature and highly corrosive nature of the TKN procedure, the block, tube stand and cooling rack are constructed of 316 stainless steel.

"There is a second distillation step that may be required in the TKN method," Boyd says. "Our glassware will fit directly into our Simple-Dist System and do the distillation in the same glassware, so you eliminate a transfer step going from one set of glassware to the next."

The system is available with 28- (22 1/2 inches wide by 16 inches high by 12 inches deep) or 54-well heating blocks (22 1/2 inches wide by 16 inches high by 14 1/2 inches deep).

HotBlock TKN can also be used for total phosphorus digestion and TKP (total Kjeldahl phosphorus) analysis. **800/343-5319; www.envexp.com.**

vent scrubbing liquids, the scrubbers provide up to 99 percent removal efficiency and are available in a range of sizes for gas flow rates from 30 cfm through 300,000 cfm. **800/311-6767; www.bionomicind.com.**

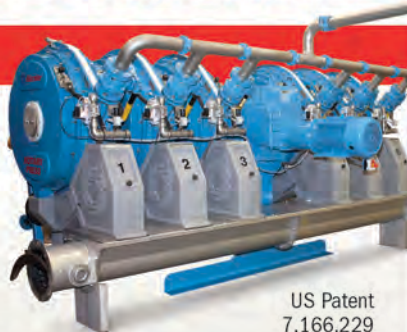
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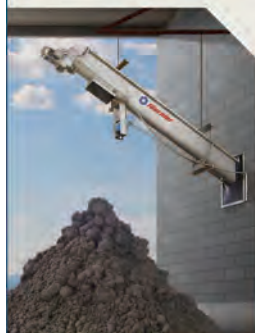
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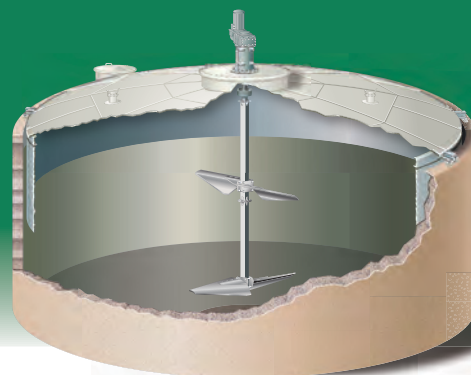
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- ☐ 2. SEEPEX progressive cavity pumps
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- ☐ 4. Fluid Components International MT91 Series flowmeter
- ☐ 5. Assmann Corporation molded-in full drain outlet
- ☐ 6. E.H. Wachs Valve ID
- ☐ 7. Teledyne Isco Model 30D D-Series syringe pump
- ☐ 8. Sensorex TX2000 and CX2000 transmitters
- ☐ 9. Badger RCVcalc valve-sizing software
- ☐ 10. FreeWave Technologies WaveContact data logger
- ☐ 11. BBA Pumps BA100K solids handling pump
- ☐ 12. Blue-White Industries F-462N Series flowmeters
- ☐ 13. Nidec Motor Corporation U.S. Motors brand vertical motor
- ☐ 14. Electro Static Technology Aegis high-frequency ground straps
- ☐ 15. Endress+Hauser Liquiphant FTL31 liquid level switch
- ☐ 16. Bionomic Industries packed tower scrubbers
- ☐ 17. Franklin Electric FPS IGPH Series high-head grinder pumps
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people/awards

John Riehl, longtime president of AFSCME Local 207, passed away at the age of 63. Riehl worked at the Detroit Wastewater Treatment Plant for 34 years where he served as an elected union steward.

Jeffrey Van Landuyt was named public works director for the City of Woodstock, Illinois. He previously served as the assistant public works director. Van Landuyt started in the department's wastewater treatment division in 1981.

The West County Wastewater District Board in Richmond, California, selected **Burl Toler Jr.**, a construction project manager for the City of San Francisco, to fill the seat left vacant by the death of longtime board member George Schmidt.

American Water was awarded a research grant from the WaterReuse Research Foundation to investigate human pathogens removal through various wastewater treatment processes. The project, titled "Establishing Pathogen Log Reduction Credits for Wastewater Treatment Processes (WWTPS)," will be led by Dr. Zia Bukhari, senior environmental scientist.

The Minnesota Pollution Control Agency recognized the **Alexandria Lake Area Sanitary District**, the **City of Garfield**, **Boise Paper**, the **City of St. Peter** and the **City of Belle Plaine** for maintaining perfect wastewater treatment permit compliance during 2014.

Tampa Electric received the Edison Electric Institute's 2015 Edison Award, the electric power industry's highest honor, for its innovative design and construction of a cutting-edge wastewater treatment system at its Polk Power Station in Polk County, Florida.

The **Macon Water Authority's Lower Poplar Water Reclamation Wastewater Treatment Plant** received a Gold Award from the Georgia Association of Water Professionals.

Jerry Ussher was named the wastewater treatment plant superintendent for the City of Zanesville, Ohio. He had been plant superintendent in Springfield, Ohio.

CH2M appointed **Dr. David Parry** to its Global Water Business Group as a key senior fellow technologist and vice president on the firm's Global Wastewater Service team.

Harold Henderson, an operator at Valdosta's Mud Creek Wastewater Treatment Plant, received the TopOp Award for District 7 from the Georgia Association of Water Professionals.

Stanley Consultants of Muscatine, Iowa, received two Engineering Excellence Awards for the design of the wastewater treatment expansion at the South Plant in Iowa City. The project received a National Recognition Award from the American Council of Engineering Companies (ACEC) and an Honor Award from ACEC-Iowa.

Gene Koontz of Harrisburg, Pennsylvania, was named president of the American Water Works Association.

The Oklahoma Environmental Training Center at Rose State College presented its first Oklahoma awards, "Celebrating Centers of Excellence." Those honored included the **City of Norman**, Governmental Water Excel-

lence Award; **Quinton Lane**, Outstanding Water Student of the Year; **Sheena Zahler**, Water Stewardship Award; **Chris Wisniewski**, Water Legacy Award; and **Veolia Water North America**, Water Contractor of the Year.

CH2M received the 2015 Stockholm Industry Water Award for developing and advancing methods to clean water, and increasing public acceptance of recycled water.

Officials in La Crescent, Minnesota, dedicated the city's water treatment plant to former city employee **Michael Albrecht**, who died in September 2014. He was a longtime maintenance department supervisor and was integral to the water treatment plant's installation and success.

Dan Mulhern of the Arlington Water Utility received the 2015 District Operator of the Year award from the Wisconsin Rural Water Association.

Mark Lavenberg was appointed director of the New Brunswick (New Jersey) Water Utility.

The **Three Rivers Water Filtration Plant** in Fort Wayne, Indiana, received the 15-year Director's Award from Partnership for Safe Water.

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

education

AWWA

The American Water Works Association is offering these courses:

- Oct. 5-23 – High-Tech Operator Course 2, online
- Oct. 7 – Mixing to Improve Tank and System Water Quality Webinar, online
- Oct. 8-9 – Identification of Tidal Wetland Plants, Tuckerton, New Jersey
- Oct. 20-23 – Methodology for Delineating Wetlands, Basking Ridge, New Jersey
- Oct. 21 – Introduction to Wetland Identification, Basking Ridge, New Jersey
- Oct. 21 – 21st Century Management for Successful Water Agencies Webinar, online
- Oct. 26 – Understanding Advanced Stormwater Management Techniques, New Brunswick, New Jersey
- Oct. 28 – How Do I Monitor My Distribution System — and Why? Webinar, online

Visit www.awwa.org.

Alaska

The Alaska Department of Environmental Conservation Division of Water is offering these courses in Anchorage:

- Oct. 5-6 – Basic Electricity for the Non-Electrician
- Oct. 7-8 – Electrical Troubleshooting and Preventive Maintenance
- Oct. 19-20 – Pump Repair and Maintenance
- Oct. 26-29 – ARWA 17th Annual Training Conference
- Oct. 28-29 – Arc-Flash Electrical Safety NFPA 70E
- Oct. 28-30 – Arc-Flash Electrical Safety NFPA 70E with Skills and Certification

Visit www.dec.alaska.gov.

Arkansas

The Arkansas Environmental Training Academy is offering these courses:

- Oct. 6-8 – Intermediate Water Treatment, Russellville
- Oct. 13-15 – Advanced Water Distribution, Springdale
- Oct. 20 – Basic Water Math, Hot Springs

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- Oct. 21 – Applied Water Math, Hot Springs
 - Oct. 22 – PWS Compliance, Hot Springs
- Visit www.sautech.edu/aeta/.

The Arkansas Rural Water Association is offering these courses:

- Oct. 6-8 – Advanced Treatment, Lonoke
 - Oct. 12 – Backflow Tester Recertification, Lonoke
 - Oct. 12-16 – Backflow Certification, Lonoke
 - Oct. 28 – Energy Conservation/Water Loss, Huntsville
- Visit www.arkansasruralwater.org.

California

The California-Nevada Section AWWA is offering these courses:

- Oct. 3 – Exam BF, Reno, Nevada
 - Oct. 3 – Exam BF, Escondido, California
 - Oct. 6 – Exam BF, Watsonville, California
 - Oct. 6 – Water Use Efficiency Grade 3 Workshop, West Sacramento, California
 - Oct. 7 – Exam BF, Modesto, California
 - Oct. 9 – Exam XCC, Fair Oaks, California
 - Oct. 10 – Exam BF, Sunnyvale, California
 - Oct. 16 – Backflow Refresher, West Sacramento
 - Oct. 17 – Exam BF, West Sacramento
- Visit www.ca-nv-awwa.org.

Illinois

The Illinois Section AWWA is offering these courses:

- Oct. 1 – Water Operator Exam Refresher for Class A and B, Elgin
 - Oct. 6 – Practical Solutions for External Corrosion Problems on Buried Water Mains, Elk Grove
 - Oct. 6 – Hands-On Waterline Location, Macomb
 - Oct. 7 – Water Operator Exam Refresher for Class C and D IEPA, Chicago
 - Oct. 8 – Chemical Properties, Equipment, Safety and Security, Greenville
 - Oct. 12 – Field Sampling and Analysis Webinar, online
 - Oct. 14 – Lock Out Tag Out Training, Rockford
 - Oct. 15 – Hands-On Basic Water Quality Testing, Peoria
 - Oct. 20 – Telemetry: A Detailed Look at Telemetry, Benton
 - Oct. 22 – Annual Regulatory Update, Elgin
 - Oct. 27 – Concrete Pipe: Selection, Installation, Inspection, Recent Developments, Lombard
 - Oct. 29 – Water/Sewer Plans 101, O'Fallon
- Visit www.isawwa.org.

The Illinois Environmental Resources Training Center is offering these courses:

- Oct. 5 – Class C Water Operations 1, Edwardsville
 - Oct. 6 – Class C Water Operations 2, Edwardsville
 - Oct. 13-16 – Cross Connection Control, Joliet
 - Oct. 27 – Class C Water Operations 1, Geneva
 - Oct. 28 – Class C Water Operations 2, Geneva
- Visit www.siu.edu.

Kentucky

The Kentucky Water and Wastewater Operations Association is offering a Confined Space Training seminar on Oct. 22 in Bowling Green. Visit www.kwwoa.org.

Michigan

The Michigan Water Environment Association is offering:

- Oct. 15 – Fundamentals of Activated Sludge II, Linden
 - Oct. 28 – Health and Safety Seminar, East Lansing
- Visit www.mi-wea.org.

events

Oct. 4-6

AWWA Southwest Section Annual Conference, Shreveport, Louisiana. Visit www.swawwa.org.

Oct. 4-6

Nebraska Section AWWA Annual Conference, Younes Conference Center, Kearney. Visit www.awwaneb.org.

Oct. 4-7

Atlantic Canada Section AWWA Annual Conference, Delta St. John's Hotel and Conference Centre, St. John's, Newfoundland. Visit www.acwwa.ca.

Oct. 6-8

North Dakota Water & Pollution Control Conference, Ramkota Hotel, Bismarck. Visit www.awwand.org.

Oct. 6-8

Iowa Section AWWA Annual Conference, Cedar Rapids Convention Complex. Visit www.ia-awwa.org.

Oct. 6-8

World WaterTech North America, Hyatt Regency, Toronto, Ontario. Visit www.worldwatertechnorthamerica.com.

Oct. 11-13

Alabama-Mississippi Section AWWA Annual Conference, Beau Rivage Resort & Casino, Biloxi, Mississippi. Visit www.almsawwa.org.

Oct. 12-14

Kentucky Water and Wastewater Operators Association North Central/Eastern Fall Wastewater Conference, Lexington. Visit www.kwwoa.org.

Oct. 13-16

2015 Water Infrastructure Conference, Bethesda North Marriott Hotel & Convention Center, North Bethesda, Maryland. Visit www.awwa.org.

Oct. 16-17

AWWA Regional Meeting of Section Officers, Wilmington, Delaware. Visit www.awwa.org.

Oct. 25-28

Canadian Water and Wastewater Association National Water and Wastewater Conference, Fairmont Chateau Whistler Resort, Whistler, British Columbia. Visit www.cwwawatergo.com.

Oct. 26-29

California-Nevada Section AWWA Annual Fall Conference, Tropicana Resort, Las Vegas. Visit www.ca-nv-awwa.org.

The Michigan Section AWWA is offering these courses:

- Oct. 6 – Fall Regional Meeting, Livonia
 - Oct. 7 – Fall Regional Meeting, Kalamazoo
 - Oct. 13-15 – Distribution System Short Course at Gull Lake, Hickory Corners
 - Oct. 13-15 – Limited Treatment Short Course at Gull Lake, Hickory Corners
 - Oct. 20 – Fall Regional Meeting, Gaylord
 - Oct. 21 – Fall Regional Meeting, Mt. Pleasant
- Visit www.mi-water.org.

(continued)

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Wastewater Treatment Superintendent, City of San Diego. Requires a valid Grade V Wastewater Treatment Plant Operator certificate issued from the California State Water Resources Control Board and two years experience supervising the operations of a wastewater treatment plant. Application period: 07/03/15 - 08/31/15. Salary range: \$81,577.60 - \$98,675.20. Apply at: <http://agency.governmentjobs.com/san-diego/default.cfm> (o10)

The Borough of Edinboro, Pennsylvania is seeking applicants for Wastewater Treatment Plant Operator or Assistant Operator positions. PA Wastewater Treatment Operator's Certification required. Driver's license required and Class B PA Commercial Driver's License required within 6 months. Position requires weekends, holidays, on-call duty, and emergency work. Successful candidate must pass complete background investigation including reference, employment, criminal, driving, and personal records check and a pre-employment physical and drug-screening test. Positions covered by a CBA. Job descriptions and official application online at www.edinboro.net. Questions, call 814-734-1812. (o10)

The Borough of Edinboro, Pennsylvania is seeking applicants for Assistant Water Operator position. PA Water Operator's Class B, C, or E license REQUIRED. Required Class B with subclasses 7-8-10-11 within one year of employment. Includes operation of light to heavy equipment and trucks as a regular part of assigned duties. PA Commercial Driver's License required within 6 months. Successful candidate must pass complete background investigation including reference, employment, criminal, driving, and personal records check and a pre-employment physical; subject to random drug and alcohol testing. Position covered by a CBA. Job description and official application online at www.edinboro.net. Questions, call 814-734-1812. (o10)

Senior Wastewater Operations Supervisor, City of San Diego. Requires a valid Grade IV or higher Wastewater Treatment Plant Operator Certificate issued from the California State Water Resources Control Board. Application period: 07/03/15 - 08/31/15. Salary range: \$70,699.20 - \$85,529.60. Apply at: <http://agency.governmentjobs.com/san-diego/default.cfm> (o10)

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New Jersey

The New Jersey Agricultural Experiment Station Office of Continuing Professional Education is offering these courses in New Brunswick:

- Oct. 5-7 – OSHA 24-Hour HAZWOPER Training
- Oct. 5-8 – OSHA 40-Hour HAZWOPER Training
- Oct. 7-9 – Stormwater Management for Engineers
- Oct. 9 – OSHA Eight-Hour HAZWOPER Training
- Oct. 14 – Geology, Hydrogeology and Chemistry
- Oct. 26 – Understanding Advanced Stormwater Management Techniques
- Oct. 29 – New Jersey Department of Environmental Protection Case Study Training for Licensed Site Remediation Professionals

Visit www.cpe.rutgers.edu.

The New Jersey Water Environment Association is offering an Onsite Wastewater Disposal Systems seminar on Oct. 5-6 in Bordentown. Visit www.njwea.org.

New Hampshire

The New Hampshire Department of Environmental Services is offering a two-day Advanced Activated Sludge Process Control and Optimization Class Oct. 20-21. Visit www.nhwpca.org.

New York

The New York Water Environment Association is offering:

- Oct. 22 – Anaerobic Digestion, Babylon
 - Oct. 28 – Fundamentals of Wastewater Asset Management, Monticello
- Visit www.nywea.org.

The New York Section AWWA is offering these courses:

- Oct. 6 – Operator Ethics and Applications / Algae/UCMR, Watertown
- Oct. 7 – Operator Ethics and Applications, Melville

- Oct. 20 – Basic Laboratory Skills, Peru
 - Oct. 20-21 – Cross-Connection Control, Kingston
 - Oct. 21 – Water Storage Tank O&M/Algae/UCMR, Peru
 - Oct. 22 – Basic Laboratory Skills, Ogdensburg
 - Oct. 27 – Basic Laboratory Skills, Bayshore
- Visit www.nysawwa.org.

North Carolina

The North Carolina Section AWWA-WEA is offering these courses:

- Oct. 24 – Model Water Tower Competition, Raleigh
- Oct. 29 – NCWTFOCB Exams, Morganton, Snow Hill, Raleigh

Visit www.ncsafewater.org.

Ohio

The Ohio Water Environment Association is offering a Plant Operations/Lab Analysis Workshop on Oct. 21-22 in Lewis Center. Visit www.ohiowea.org.

Oklahoma

The Oklahoma Environmental Training Center in Midwest City is offering a C Water Operator course Oct. 19-20. Visit www.rose.edu.

Accurate Environmental in Oklahoma is offering these courses:

- Oct. 2 – Open Exam Session, Tulsa
- Oct. 20-22 – “D” Water and Wastewater Operator, Tulsa

Visit www.accuratelabs.com/classschedule.php.

Texas

The Texas Water Utilities Association is offering these courses:

- Oct. 5 – Instructional Design and Evaluation, Austin
- Oct. 6 – Surface Water Production I, San Marcos
- Oct. 13 – Chlorinator Maintenance, Gatesville
- Oct. 20 – Activated Sludge, Longview
- Oct. 20 – Surface Water Production II, Victoria
- Oct. 27 – Activated Sludge, Austin

Visit www.twua.org.

Wisconsin

The University of Wisconsin-Madison Department of Engineering Professional Development is offering these courses:

- Oct. 14-15 – Instrumentation and Control for Water and Wastewater Processes, Milwaukee
 - Oct. 21 – Leadership Skills for Supervisors, Fond du Lac
 - Oct. 26-30 – Cross-Connection Control and Backflow Prevention, Madison
 - Oct. 29 – Wisconsin Refresher Course: Cross-Connection Control and Backflow Prevention, Madison
 - Oct. 30 – ASSE Backflow Prevention Assembly Tester Exam, Madison
- Visit www.epdweb.engr.wisc.edu.

The Wisconsin Rural Water Association is offering these courses:

- Oct. 8 – Cross-Connection Control Assembly Tester Refresher, Plover
- Oct. 12 – Cross-Connection Control Assembly Tester Certification, Plover
- Oct. 13 – Excavation “Competent” Person, Plover
- Oct. 14 – Wells and Pumps, Waupun

Visit www.wrwa.org.

The Wisconsin Department of Natural Resources is offering these courses:

- Oct. 13 – Surface Water Certification, West Bend
- Oct. 21 – Distribution Certification, Fond du Lac
- Oct. 28 – Iron, Zeolite and VOC Certification, Chippewa Falls

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

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Bob Gentile
Superintendent
Struthers WWTP
Struthers, OH

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

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

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

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100 Gallons	30" x 37 1/2"	38792	429.95				

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Suitable for use with: aluminum sulfate (alum), ammonium chloride, ammonium hydroxide, ammonium sulfate, calcium hypochlorite, 26% fluoride, 48% hydrochloric acid, methanol, sodium bisulfate, 50% sodium hydroxide (caustic) and 16.5% sodium hypochlorite. **Call us about compatibility with any chemicals not on this list!**



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