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**GARRY HOUSTON AND HIS
TEAM GET THE MOST FROM A
MICROFILTRATION WATER PLANT**

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Natural pest control**

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Big benefits from a filter change**

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Garry Houston
Senior Plant Operator
Abilene, Texas


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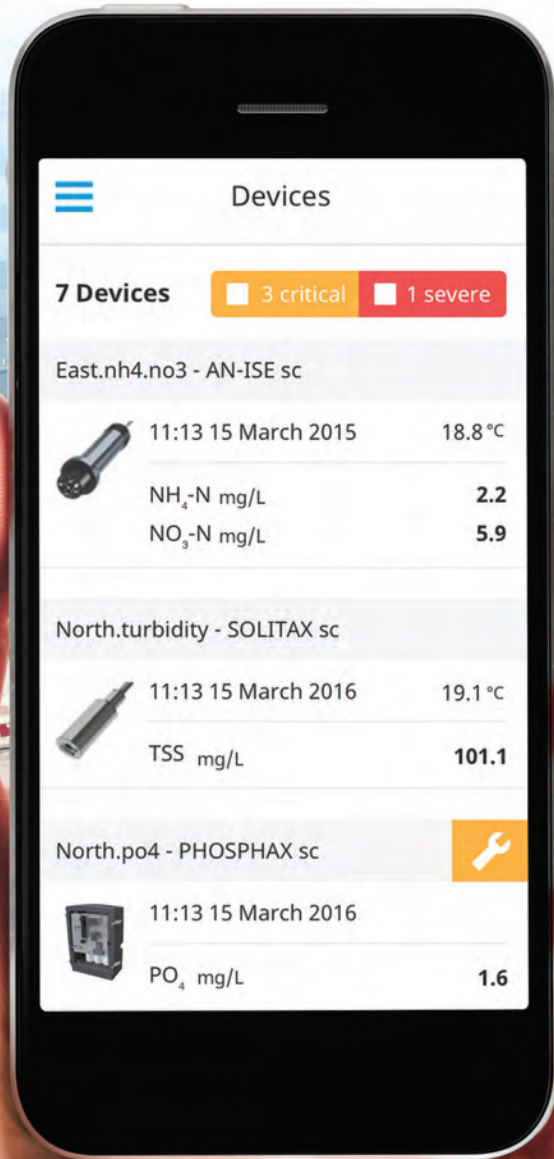
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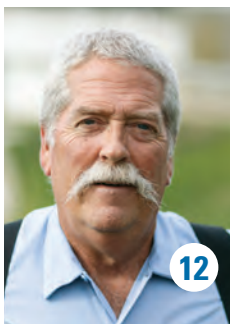
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on the cover

Garry Houston's curiosity helped him quickly absorb the training and gain the experience to earn his state's highest water operator certification and learn to operate a new membrane filtration plant. He received the 2016 Outstanding Plant Operator Award from the South Central Membrane Association. (Photography by Paul White)

top performers:

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Great Taste, No Chemicals

The Big Sky County Water & Sewer District chose UV disinfection to avoid adding chlorine to water that won a national taste competition.

By Jim Force

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Stepping Up in Class

A plant upgrade in Mechanicsburg included a switch from Class B Biosolids to producing and marketing Class A compost as a soil additive.

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The water and wastewater sectors are home to some of the most ingenious professionals to be found in any industry.

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Wastewater Plant: MBR treatment in the town of Davie, Florida

Wastewater Operator: John Adie, Concord, New Hampshire

Water Operator: Mark Knudson, Tualatin Valley (Oregon) Water District

» How We Do It: End-to-end flow and level monitoring

» Sustainable Operations: Energy audit insights in Stratford, Ontario

» In My Words: An intriguing remedy for staffing shortages

» PlantScapes: Rain gardens for runoff control in Hoboken, New Jersey

» Hearts and Minds: Social media and mobile gaming in Athens, Georgia

» Technology Deep Dive: Grit and grease removal in a single process

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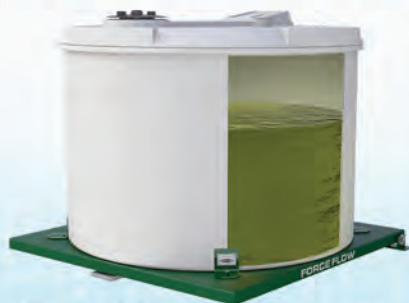
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let's be clear

A Creative Profession

THE WATER AND WASTEWATER SECTORS ARE HOME TO SOME OF THE MOST INGENUOUS PROFESSIONALS TO BE FOUND IN ANY INDUSTRY

By Ted J. Rulseh, Editor

When faced with a plague of insects around a facility, plant managers in many industries might resort by reflex to the obvious remedy: Spray a chemical insecticide.

If Tad Eaton thought of chemicals when confronted with clouds of flies around the biosolids drying beds at his clean-water facility in San Antonio, Texas, he must have stopped and said to himself, “Not so fast.”

Eaton, manager in charge of the biosolids program at Dos Rios Water Recycling Center, owned by the San Antonio Water System, found a better way. He installed nesting boxes for purple martins, which gobble up thousands of flies every day from February through July. After the birds migrate out, he deploys parasitic wasps that attack the flies.

“Natural is always better,” says Eaton, profiled in this month’s Sustainable Operations feature.



INNOVATIVE SOLUTIONS

In fact, this issue contains several examples of water professionals, from operators to product suppliers, finding creative ways to solve problems and make operations better. A good share of the time, those solutions tend toward the natural side. They also run the gamut from operational to purely aesthetic.

What, for example, is a clean-water plant to do with an unsightly concrete wall that gave passersby a negative impression? The obvious answer might be just to paint it, or plant trees in front of it. The team at the Crosstown Water Treatment Plant in Peachtree City, Georgia, had a better idea.

They hired an artist to cover the wall in front of the plant’s settling basins with a 98-foot-long, 12-foot-high mural that shows the water cycle along with images of fish and wildlife, and of people drinking clear water. Now it’s something “people want to stop and take a picture of,” says Lee Pope, director of the Fayette County Water System, which owns the plant.

TASTE COMES FIRST

The team at the Big Sky County Water & Sewer District in Montana pushed aside another obvious choice when faced

with a new state requirement to disinfect the drinking water supply. Chlorine was the cheapest option, but the district had recently won the 2015 national AWWA Best of the Best Tap Water Taste Test, and the plant team didn't want to adulterate the water with a chemical. So they chose more costly UV disinfection.

Says Ron Edwards, water and wastewater system manager, "We bent over backward and spent more just to keep from having to add chlorine." Surely local residents and visiting skiers appreciate that choice.

At the Crown Point (Indiana) Wastewater Treatment Plant, a little creativity in upgrading tertiary filters ended up saving time and money while improving effluent quality. Instead of simply replacing the filters, which had reached end of life, the city made a change in technology, from pressure filters to disc filters that flow by gravity.

At the Crown Point (Indiana) Wastewater Treatment Plant, a little creativity in replacement of tertiary filters ended up saving time and money while improving effluent quality.

The change eliminated seven pumps in all, including a 200 hp backwash pump, and all the related operation and maintenance costs, amounting to some \$70,000 per year. The installation also cost significantly less up front than upgrading to a new pressure filter system.

THE VENDOR SIDE

Creativity isn't limited to the operations side of the water professions. Equipment and technology vendors are definitely in the mix. To cite one example, Ovivo has developed a solids pretreatment process that uses a special form of algae to help make sludges more digestible and so shorten the time required to produce biogas and biosolids.

The process uses phagotrophic algae, which can consume particulate matter including oil droplets, bacteria and viruses. The net outcome is faster digestion, which can allow a plant to use smaller digesters (saving on capital costs), expand the capacity of existing digesters, or extend retention time, increasing solids reduction and reducing biosolids volume.

So, we've always said people in the water professions were among the most dedicated, most team-oriented, most down-to-earth and most skilled in any sector. Who knew they were also among the most creative? **tpo**



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SUSTAINABLE MANAGEMENT

The One Water Roadmap

Communities around the nation are struggling with an aging water infrastructure, while regional issues like rising sea levels, flooding and droughts also are taking a toll. That's why the US Water Alliance has released a comprehensive plan called "One Water Roadmap: The Sustainable Management of Life's Most Precious Resource" to take on the nation's biggest water challenges.

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TIMES CHANGE

Surviving Modernization

Anyone entering the wastewater field who is lucky enough to be paired with an old-timer should take the opportunity to learn something about the history of their treatment plant. These wastewater veterans have struggled with outdated equipment, cleaned up untold amounts of sloppy messes and they've managed to stay safe doing it.

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OVERHEARD ONLINE

"At dusk or dawn, with the right mix of sky light and site lighting, the plants just glow."

Beautifying Wastewater Treatment Plants One Photo at a Time
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EDITOR'S CHOICE

Top Headlines of 2016

From the Flint water crisis to a nine-point buck getting rescued from a clarifier, Tpmag.com has reported some fascinating water and wastewater news this past year. If you missed any of the key headlines, now is your chance to get up to speed. Take a look at our online editor's top 10 headlines from 2016.

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Compost is processed to remove larger wood pieces before being considered final product.

Stepping Up in Class

A PLANT UPGRADE IN MECHANICSBURG INCLUDED A SWITCH FROM CLASS B BIOSOLIDS TO PRODUCING AND MARKETING CLASS A COMPOST AS A SOIL ADDITIVE

STORY: **David Steinkraus**

PHOTOGRAPHY: **James Robinson**

LANDFILL SPACE WAS AT A PREMIUM. LAND APPLICATION of Class B biosolids faced public skepticism and rising costs. So the Mechanicsburg (Pennsylvania) Sewer Department turned to producing Class A compost.

In the bargain, the department erased its landfill costs and now markets its biosolids product to the public as a soil additive. It all happened without the addition of staff and with a relatively small investment in equipment.

The composting operation took advantage of a supply of wood waste available nearby. The end product is sold in bulk to a landscaper and to the general public for \$10 per cubic yard, enough to offset administrative costs.

Branded Waste-No-More after a public naming contest that drew 26 entries, the compost has been well accepted. The department received a 2015 Beneficial Use of Biosolids Award from the Pennsylvania Water Environment Association.

UPGRADING THE PROCESS

The 2 mgd (design) Mechanicsburg Wastewater Treatment Plant uses the modified Ludzack-Ettinger (MLE) secondary treatment process. Before entering that process, the wastewater passes through an aerated grit-removal system and trickling filters (both from Envirodyne Systems). Effluent is discharged

Mechanicsburg (Pennsylvania) Wastewater Treatment Plant

COMMISSIONED: | 1950

POPULATION SERVED: | 14,000

FLOWS: | 2 mgd design, 1 mgd average

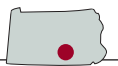
BIOSOLIDS PROCESS: | Anaerobic digestion and static pile windrow composting

BIOSOLIDS VOLUME: | 140-150 dry tons per year

BIOSOLIDS USE: | Soil enhancement

WEBSITE: | www.mechanicsburgborough.org/sewer

GPS COORDINATES: | Latitude: 40°12'42.37"N; longitude: 77°1'30.51"W



to a tributary of the Susquehanna River, which feeds the Chesapeake Bay. The Mechanicsburg plant faced major renovations to comply with strict nitrogen limits in keeping with the Chesapeake Bay Watershed Initiative. Ron Adams, plant superintendent, decided to revisit the biosolids process at the same time. The contractor handling biosolids hauling for the borough had to travel increasing distances, 15 miles or more, to landfills that would accept the material as cover or to farmland where solids could be applied.

“ We just build the piles now, and it’s easy.
But it was hard at first because we had to come up
with the right recipe and the correct amount of air.”

RON ADAMS

Rod Westhafer operates a specialty truck (Roto-Mix) which mixes biosolids with wood waste and builds piles where it can cure.





The 2 mgd (design) Mechanicsburg Wastewater Treatment Plant serves a population of about 14,000.

“ I’ve worked here so long I’m nose blind, and I needed independent verification. We may be a wastewater treatment plant, but we don’t get a lot of odor complaints, and I want to keep it that way.”

RON ADAMS

TRIAL AND ERROR

“Starting a biosolids composting project is more art than science,” says Ron Adams, superintendent of the Mechanicsburg (Pennsylvania) Sewer Department. “We just build the piles now, and it’s easy. But it was hard at first because we had to come up with the right recipe and the correct amount of air.”

The Mechanicsburg team started by attending conferences, reading and talking to consultants at Material Matters of Elizabethtown, Pennsylvania. They ran a scale model experiment to ensure that the process would work, but the full-scale project still required about six months of fine-tuning, and even that required some instinct.

For each pile, technicians mix one-third biosolids, one-third fresh woody waste and one-third older woody waste, screened to remove small pieces. The larger pieces improve air flow.

At first, the piles didn’t work: They would come up to tempera-

ture and then cool off. “We were looking at all the possibilities: whether it was some kind of inhibition from a chemical, or not enough nitrogen,” says Adams. “Finally it came down to a gut feeling. I said I wanted to try a pile where we don’t add any air.”

It worked, because too-frequent use of a blower in previous piles provided too much oxygen; bacteria used up all the food in too short a time. “With or without the blower, you still have convection operating,” says Adams. “Think of a chimney. What’s happening here is that as the pile heats, it draws air through the covering blanket of woody waste and through the blower system even when that isn’t on.”

Now the blower is attached to a simple timer that turns it on for about 10 seconds every two hours. The piles heat up and hold temperatures for days as they should.

Most of the raw material for biosolids production comes from the primary clarifiers. Solids are pumped to gravity thickeners and then into the anaerobic digester. Digestion produces about 10,000 to 15,000 cubic feet of biogas per day. About one-third of that is used to heat the digester. In summer the balance is flared, and in winter it is used to heat plant buildings. Solids leaving the digester are dewatered in belt presses (Ashbrook Simon-Hartley), yielding 140 to 150 dry tons per year (1,000 tons of cake).

THE EASY CHOICE

It was easy access to wood waste that inspired Adams to look at composting. Next to the treatment plant is a yard waste composting site run by Silver Spring Township and Mechanicsburg, and created with the encouragement of the state, which emphasizes all forms of recycling to reduce reliance on landfills.

A specialty truck (Roto-Mix) first moves the Mechanicsburg solids to the composting site to pick up wood waste. It then heads to the hoop barn, where the biosolids compost piles are built. A key step for Adams and his team was to make sure the composting plan would work. "We had wood waste, but we couldn't say for certain that because someone's wood waste would work, our wood waste would work," he says.

It was critical for the process to work year-round, even through the winter. So a couple of years ago, starting in October and stretching into November, plant team members tested the process. They bought a blower, laid piping, built a small-scale pile, and watched what happened. As long as they put a blanket of wood waste on the outside of the pile, the internal temperatures met state requirements. The blanket thickness varies. In summer, six inches is enough, but in winter it takes a foot to keep internal temperatures acceptable.

Adams also went to the borough office and asked administrative assistants to visit the experimental pile and judge the odor. "I've worked here so long I'm nose blind, and I needed independent verification," he says. "We may be a wastewater treatment plant, but we don't get a lot of odor complaints, and I want to keep it that way."

COST CONTROLS

A key goal for the composting project was to hold the number of personnel steady. The Mechanicsburg plant operates with a staff of eight: Adams and assis-



A specialty truck (Roto-Mix) is loaded with biosolids to which wood waste is later added.

tant superintendent Curtis Huey; Jeff Bricker, head operator; Frank Guswiler, collections system operator; Vanessa Moore, lab technician; and technicians Mark Wills, Rod Westhafer and Jim Boyer.

The one major piece of equipment the department purchased for composting was the Roto-Mix truck. Before composting began, the belt press fed cake into dump trucks. "The operator who used to run the belt press and drive the dump truck now runs the belt press and drives the compost truck," Adams says. "We got rid of the dump truck and bought a Roto-Mix."

Inside the truck box are mixing paddles and an auger that feed a conveyor chute. The operator picks up a load of biosolids and drives to the yard waste site to add woody material. While he drives to the composting barn, the paddles mix the load. Inside the barn, he engages the auger and drives slowly across the floor to build a pile. The exterior blanket of wood particles is added with a front-end loader.

(continued)

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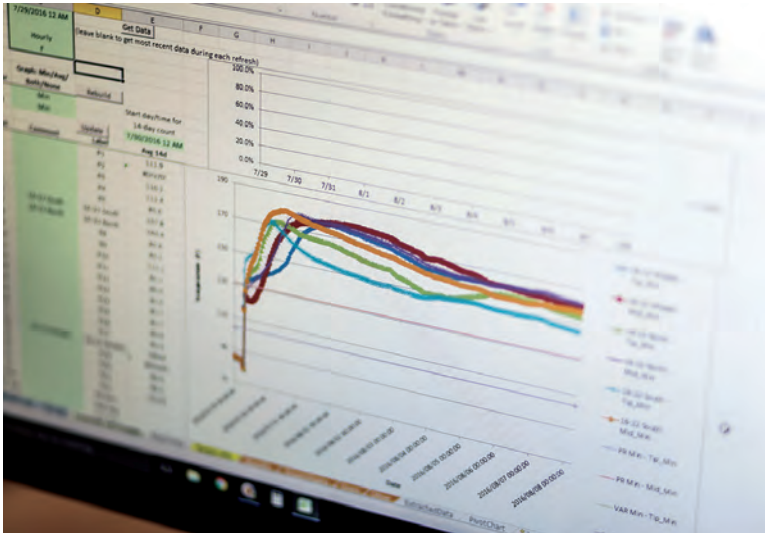
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The Mechanicsburg Wastewater Treatment Plant produces 140 to 150 dry tons of biosolids per year.



The internal temperatures of the compost piles are monitored automatically.



Ron Adams,
Mechanicsburg
Sewer Department
superintendent

“By buying this equipment we don’t have to mix, and we don’t have to build piles by hand because this truck does all that for us,” Adams says.

To kill pathogens, Pennsylvania rules say the temperature in a compost pile must exceed 131 degrees for three days; over 14 days it must be warmer than 104 and average 113 degrees. Mechanicsburg piles are above 131 degrees for all 14 days and have an average temperature of 150 degrees. Independent lab analysis confirms the absence of pathogens.

YOU BUY IT, YOU HAUL IT

When the finished material comes out of the composting barn, it is sold to the public in bulk; bagging is not feasible. Most of the product goes to a landscaper, but residents also take it to apply to lawns and gardens. “We’ve sold every pound we’ve made of the composted biosolids, and our landfill costs have dropped to zero,” Adams says.

The product naming contest helped raise public awareness of the new product and engage people in the project. The Waste-No-More name was submitted by resident George Elliot; as a prize he received a truckload of product delivered by borough Mayor Jack Ritter. Elliot and the next top four award winners in the contest received garden tools and a product sample.

After the naming contest, Adams took advantage of the annual Earth Day celebration on the town square. He took burlap bags of Waste-No-More and set up next to a group handing out tree seedlings. As people passed him, he handed them samples and advised them to mix it with the soil when they planted the tree. At the end of the day, all the samples were gone. After that, marketing took care of itself through word-of-mouth.

“We’ve sold every pound we’ve made of these composted biosolids, and our landfill costs have dropped to zero.”

RON ADAMS

PART OF A TREND

There’s a trend toward Class A biosolids in Pennsylvania. Some treatment plants use composting while others are shifting to thermal drying and pelletizing. “We’re not cutting edge, but then we’re not lagging behind either,” Adams says.

The Mechanicsburg biosolids equipment is sized to meet the treatment plant’s design capacity. Since the plant’s average flow is now about half the design flow, capacity exists to accept outside waste for processing. Adams isn’t moving in that direction.

“We’re in a good place, and we’re not in competition with anyone,” he says. “This is the advantage of being a borough. We can look ahead 20 years when making an investment like this because we don’t have to turn a profit in two years or go out of business.” **tpo**

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Pest Control — Naturally

BIRDS, BUGS AND BACTERIA CONTROL FLIES AROUND BIOSOLIDS DRYING BEDS AT THE DOS RIOS WATER RECYCLING CENTER IN SAN ANTONIO

By Doug Day

The air around the biosolids drying beds at the Dos Rios Water Recycling Center used to be thick with flies.

They were a nuisance to neighbors and staff, and the pesticides used to kill them contaminated the biosolids and interrupted work for several hours. Today, flies aren't a problem. Tad Eaton, the manager in charge of the biosolids program at Dos Rios, found a better way.

"Natural is always better," he says. He's been using some strategies for years, but has learned more about sustainable ways to control what can be a problem at plants using outdoor drying beds.

The 125 mgd Dos Rios facility in San Antonio, Texas, produces 160,000 wet tons of biosolids per year. Some is dewatered on belt filter presses, but much of it goes to 132 sand drying beds that, at 84 by 100 feet, occupy 25 acres. "I'm trying to manage the solids and the flies. It's quite a feat," says Eaton. "It makes it a whole lot easier to work out here, but we do it mainly for the neighbors."

He started with birds for fly control in 1995 at Leon Creek, another San Antonio Water System (SAWS) facility, where he was in charge of composting biosolids. "The very first thing I did was introduce purple martins, and



Purple martins eat flies and other flying insects. The Dos Rios plant has 50 martin houses with 12 rooms each and attracts up to 600 breeding pairs.



Aerial view of the Dos Rios Water Recycling Center.

that worked really well," he says. The birds are voracious, eating thousands of flying insects every day.

KNOWING PREDATORS

Over the years, Eaton has developed a well-rounded, three-pronged attack on the flies at Dos Rios, where he has worked since 1992. When he got there, the drying beds were used very little because of the flies. The city fogged the beds with pesticides.

"That's bad for the biosolids and the water," Eaton says. "We're here to protect the environment, not make it worse. It also hampered the guys who were trying to work out there because when we fogged, we had to be out of the area for about four hours."

Today, the natural approach still starts with the purple martins. Dos Rios has 50 purple martin houses,

each with 12 rooms, for a population of about 600 breeding pairs. But they only live in Texas from late February to July, leaving Eaton without a solution for much of the fly season. So, he found other natural tactics.

"I did some research and found out about parasitic wasps that directly attack the flies," he says. "I introduced those and we put them out during the hot season, from about March to October."

Every week, the Dos Rios plant puts out 60 units of the wasps. With 80,000 to 100,000 in each unit, that's 4.8 to 6 million planted throughout the drying beds. Eaton gets the pupae from a company that breeds them commercially: "I receive the parasitic wasps unhatched. They're ready to hatch a day or two after I get them."

There are three species of the wasps. Once hatched, the tiny wasps, about the size of a pinhead, seek out fly pupae and lay their eggs; the wasp larvae consume the fly pupae.

This year, to protect the wasps from ants and birds before they hatch, Eaton built 600 protective houses. That solved a problem he had been strug-



Along with birds and wasps eating flies, Dos Rios uses Strike Ultra (Central Life Sciences), a fly growth regulator, and Gnatrol, a natural soil bacteria that kills gnats.

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gling with for a long time. “It’s a four-inch PVC pipe about 20 inches long with about 8 inches of sand and a cap that lets the wasps in and out and keeps out the ants and birds,” he says.

The drying beds are also a breeding ground for fungus gnats. Eaton hasn’t found a cost-effective predator for them other than the martins, but he uses Gnatrol, a natural soil bacterium. He spreads it throughout the biosolids, and the gnats consume it while feeding. It forms a crystal in their stomach and kills them.

He also uses Strike Ultra (Central Life Sciences), a product certified for use around wastewater treatment facilities and ponds whose active ingredient keeps insects from developing into adults.

NOT MUCH LABOR

Eaton says his pest-control methods don’t take much time. Gnatrol powder and Strike Ultra liquid are injected into the biosolids from a chemical batch tank; preparation takes about five minutes. Planting the parasitic wasps takes about an hour a week and has become part of the normal work sched-

“ I’m trying to manage the solids and the flies. It’s quite a feat. It makes it a whole lot easier to work out here, but we do it mainly for the neighbors.”

TAD EATON

ule. “We usually get them on Wednesday and plant them first thing in the morning on Thursday or Friday,” Eaton says. The martin houses are cleaned and disinfected every year after the birds move on.

There are still some flies, of course, but Eaton considers the problem well under control. That sometimes forces the martins to look for food elsewhere. “At one point this year for about a month, we just didn’t see them,” Eaton



Up to 6 million tiny parasitic wasp larvae are planted every week during the hot season. The wasps lay their eggs in fly pupae; their larvae kill the flies before they hatch.

says. “They were taking off early in the morning and would come back once or twice during the day, but they weren’t flying in swarms around here like they normally do.”

Eaton uses fly traps to check on his success. He used to buy them but now builds his own. “We put them around to monitor where the fly activity is,” he says. “We have them out there right now and there’s nothing in them. That’s not to say you can walk around and not see flies or gnats, but I remember years ago when you could put out a fly trap and you’d have thousands of them in there by the end of the day.”

More evidence of the methods’ effectiveness is the lack of complaints from neighbors. “We meet with them now and then,” says Eaton. “We have good relations with the neighbors. We work hard and we care about what we do out here.” **tpo**

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.

Simple Yet Powerful

IMPROVEMENTS AT AN INDIANA TREATMENT PLANT AND COLLECTIONS SYSTEM
SAVE OPERATING COSTS AND FORESTALL CONSTRUCTION OF A NEW PLANT

By Doug Day

A simple change in effluent filters at the wastewater treatment plant is saving the Indiana city of Crown Point money, time and labor while improving effluent quality. The city is also taking steps to reduce stormwater flows and inflow and infiltration into its combined sewer system, helping delay the \$30 million cost of a new treatment plant.

“Our original tertiary filters had gone beyond their useful life,” says Chris Previs, plant superintendent. “They were 30 years old, and needed to be replaced.” Switching filter technology is projected to save \$70,000 a year on operations and maintenance.

NEW DISC FILTERS

Commonwealth Engineering oversaw the replacement of the plant’s five pressure filters with three Hydrotech disc filters (Veolia Water) in summer 2015. The project had a snowball effect in the plant because the reduction in pressure needed for the filtration also made it possible to feed the filters by gravity instead of using a series of pumps. Because, unlike the old filters, the disc filters don’t need backwashing, the flow returning to the headworks from the filters has been reduced by 300,000 gpd.

“We eliminated five 30 hp pumps, took out a 200 hp backwash pump, and removed a 15 hp surface wash pump,” says Previs. “We’re not doing maintenance on those seven pumps. The old filters also had seven valves each that we had to operate during normal flow and backwash, and all of that is gone. So that frees up some time.”

“Our effluent TSS is right around 1 ppm. We’re allowed 10 ppm, and were able to meet that limit most of the time. But with the filters not working as well as they should have, we were violating our TSS limit during some rainstorms.”

CHRIS PREVIS

It took significant demolition and concrete work to make the effluent channel about a foot deeper to enable gravity feed, but that ended up being an economical choice. Upgrading to a new pressure filtering system would have cost about \$400,000 for pumps and piping around the plant; deepening the channel cost just \$50,000.

SAVING ENERGY

The new filtration system also reduced electricity usage by 60 percent, earning a \$29,640 energy efficiency rebate from Northern Indiana Public Service Company.



New disc filters (Veolia Water) have reduced power use at the Crown Point plant, saving the city about \$70,000 a year.



One of five pressure filters is removed from the Crown Point plant to make room for the new disc filters.

The filters also improved treatment performance, helping protect water quality in Lake Michigan. “Our effluent TSS is right around 1 ppm,” says Previs. “We’re allowed 10 ppm, and were able to meet that limit most of the

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time. But with the filters not working as well as they should have, we were violating our TSS limit during some rainstorms.”

The \$4 million project was funded with a low-interest loan from the State Revolving Loan Fund through the Indiana Finance Authority. It also included a new mixer on a digester and a new sludge pump.

KEEPING CLEAR WATER OUT

Meanwhile, due to a history of combined sewer overflows, Crown Point faced the prospect of separating its storm and sanitary systems and building a new wastewater treatment plant. The current plant averages 3 mgd flow; it has a design capacity of 5.1 mgd and a peak capacity of 8.1 mgd.

The city has completed a number of projects to reduce I&I and stormwater flows. Those include repairing cracked sewer lines, improving stormwater storage ponds, replacing missing and damaged manhole covers, and eliminating illegal culverts that were contributing to runoff entering the sewers.

“We have two basins we can fill with stormwater,” says Previs. “We’re reconfiguring them so we can use both at the same time. We’re also increasing our pumping capacity into them so we can keep flows in the plant down and reduce the amount we put out during storms.”

The basins provide 8 million gallons of storage; stormwater is retained in them for later treatment under normal flow conditions. The final cost of the CSO improvements hasn’t been determined, but the city expects to save about \$16 million over the \$36 to \$40 million cost to separate the sewers and build a new plant. **tpo**

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.

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Great Taste, No Chemicals

Ron Edwards, general manager of Big Sky County Water & Sewer District, examines one of two new wells. In the background is Big Sky's iconic Lone Peak.

THE BIG SKY COUNTY WATER & SEWER DISTRICT CHOSE UV DISINFECTION TO AVOID ADDING CHLORINE TO WATER THAT WON A NATIONAL TASTE COMPETITION

STORY: **Jim Force**

PHOTOGRAPHY: **Rich Addicks**



WHEN YOUR DRINKING WATER HAS WON 2015 STATE and national AWWA taste awards, why change anything?

That was a question the Big Sky County (Montana) Water & Sewer District wrestled with last year before deciding to avoid chlorination and install a UV system to meet new disinfection requirements.

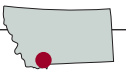
The district drilled two new groundwater wells to meet a growing summer demand for water. “The new wells had a static water level of around 15 feet below grade,” says Ron Edwards, water and wastewater system manager and winner of Montana’s 2015 William D. Hatfield Award. “Because the static water level was less than 25 feet deep, new wells were subject to disinfection requirements.”

The Big Sky water board had no interest in adding chemicals to the clean, clear water available in this high-mountain community. “Chlorine was the cheaper option, but we had just won awards for the taste of our water, so we bent over backward and spent more just to keep from having to add chlorine,” Edwards says.

The purity of the nearby Gallatin River, a world-class trout stream, reinforced the district’s wish to avoid chemicals. The UV unit, supplied by Atlantium of Israel, achieves 4-log removal of viruses and provides real-time tracking and monitoring of critical data. It performed fairly smoothly last summer and proved easy to operate and maintain. It is the first Atlantium system used on groundwater for a public water system in Montana.

BIG SKY, PURE WATER

The Big Sky district was formed as a special-purpose county unit of government in 1993. It comprises 228 square miles and serves 2,600 customers



Big Sky County (Montana) Water & Sewer District Water Treatment Plant

BUILT: | **1973, expanded 2015**

SERVICE AREA: | **228 square miles**

CUSTOMERS: | **2,600**

SOURCE WATER: | **14 groundwater wells**

TREATMENT PROCESS: | **UV disinfection**

SYSTEM STORAGE: | **3.99 million gallons**

DISTRIBUTION: | **15.5 miles of distribution lines**

ANNUAL BUDGET: | **\$900,000 (operations)**

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ZERO DISCHARGE

In Montana's high country, concern for the natural environment is also lofty. The Big Sky County Water & Sewer District's wastewater treatment operation, formerly consisting of aging aerated lagoons, was upgraded in 2004 to biological treatment. All effluent is stored during winter and is later used for golf course irrigation. No effluent is released to area waters, which include the Gallatin River, a famous trout stream.

Wastewater flows by gravity to the plant, where it is treated in a compact 600,000 gpd sequencing batch reactor (Aqua-Aerobic Systems). Average flow is closer to 300,000 to 400,000 gpd. Decanted water is filtered in Trident units (Evoqua Water Technologies) before discharge to two lined storage ponds with 130 million gallons combined capacity.

Solids from the process are digested and then composted with sawdust and wood chips. The cured compost is sold in bulk at \$25 per cubic yard. "It's used as a soil amendment and fertilizer," says Ron Edwards, water and wastewater system manager.

in the mountainous country 45 miles southwest of Bozeman. The plant lies 6,200 feet above sea level, and some of its service area — the downhill ski community in particular — is at 7,500 feet.

Water is drawn from a series of wells (Nic Wellenstein is the well operator) and is stored in several surface tanks and one fully buried concrete tank. Pipelines bring the water to the treatment plant and transport the treated

The team at the Big Sky County Water & Sewer District includes, from left, Marlene Kennedy, administrative assistant; Grant Burroughs, wastewater superintendent; Jim Muscat, water superintendent; Ron Edwards, general manager; Nic Wellenstein, well operator; Eric Daniels, operator assistant; and Terry Smith, financial officer. Not pictured is Peter Bedell, water and sewer operator.

water to customers. Pressure-relief valves control downhill pressures in the steep terrain.

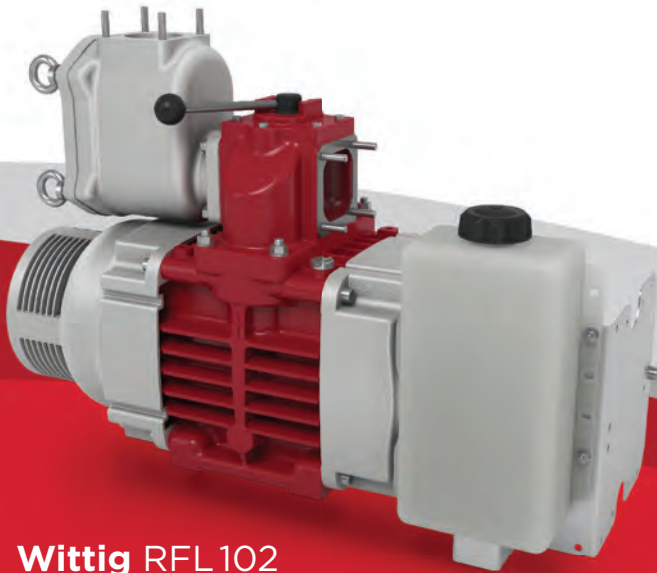
Jim Muscat, water plant superintendent, explains how the expansion of the well system made the move to disinfection necessary. "We have a number of wells in the Meadow Village area that draw from the alluvial aquifer, as well as several wells in the higher-level Mountain Village ski area that draw from a bedrock aquifer," he says. "Our biggest demand for water comes in the summer when residents use it for lawn and garden irrigation."

The demand created the need for two more wells in the Meadow Village area. Since the water from those wells is blended with water from the existing wells, Big Sky was required to add disinfection to the entire flow, in accordance with U.S. EPA national groundwater rules, when either of the two new wells run. So far, the new wells run only in summer.

"We have great water here," says Edwards. "We had detected no coliform in the existing wells for over 40 years, and we petitioned the state for a deviation, but it was denied. That triggered a disinfection study."

The choice of the Atlantium UV equipment (total project cost \$650,000) was driven by its small footprint and the fact that it required only two main UV channels to treat the full flow. "That makes the system easy to get at," says Muscat. That is important when bulbs need changing or when the system requires acid cleaning or other maintenance. *(continued)*

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EFFICIENT DISINFECTION

Each channel handles 1,000 gpm, and Big Sky runs one train at a time. Quartz tubes containing the UV lamps extend diagonally across each channel. “It’s easy to pull a tube and clean it,” says Muscat.

Muscat also likes the controls and the reports the system generates. “The UV system validates the 4-log removal of viruses and 5-log removal of microbials in real time,” he says. The system has two sensors per lamp and measures three critical parameters: UV intensity, UV transmittance and water flow rate, also in real time.

In addition, the system provides the minimum required dosage, rather than an average dose. It consumes only as much power as needed to achieve 4-log removal based on flow rate. UV lamp power is adjusted according to data feeds. “There’s no wasted power,” says Muscat.

The reports are just what the state regulatory agency wants. Each report verifies the disinfection levels and tracks key data; compliance reports can be generated at the push of a button. “We met with state officials to determine what data they would want,” Muscat says.

The Atlantium software interfaces with a Micro Comm SCADA system and delivers data to the operator’s laptop computer. “Initially, we had some issues running both systems,” says Muscat. “It was a bit of challenge but it’s going well overall.”

“Chlorine was the cheaper option, but we had just won awards for the taste of our water, so we bent over backward and spent more just to keep from having to add chlorine.”

RON EDWARDS

Flow rates are measured by a Badger Meter system. All controls are mounted on the interior wall next to the UV system. The choice of UV over chlorine has another benefit: The district doesn’t have to worry about chlorine residual requirements, which would be challenging to meet in the far-flung distribution system. *(continued)*



ABOVE/BELOW: Jim Muscat looks after the UV disinfection system (Atlantium Technologies), first of its kind in the state, inside the Spotted Elk Well House.





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The Big Sky County Water & Sewer District received 2015 state and national AWWA taste awards.

ATTRACTIVE BUILDING

To house the UV system, the district added on to its treatment plant, essentially doubling the size of the building. The structure's design is compatible with the architecture in the mountain community: "We're part of the neighborhood," says Edwards.

The Big Sky plant also fills a critical need for firefighting. "We're surrounded by national forest," says Edwards. In case of a wildfire, the plant and the storage system are available to supply water needed to control the blaze.

Water demand in summer is about 10 times what it is in winter. The district uses tiered rates to reward water conservation. Still, Muscat observes, "People come out here from the Midwest and they like to have lawns like they have back home."

People also come in winter to ski at Big Sky Resort, one of the most popular downhill ski areas in the western United States. Created in 1973, it was originally owned by the late television news anchor Chet Huntley. Today, the

“ We had detected no coliform in the existing wells for over 40 years, and we petitioned the state for a deviation, but it was denied. That triggered a disinfection study.”

RON EDWARDS

Big Sky area as a whole has more than 5,800 acres of skiable slopes, 300 runs and 34 lifts on four mountaintops.

The Big Sky Resort ski bases are at 6,800 and 7,500 feet; the highest elevation is at 11,166 feet. Average snowfall is more than 400 inches per year.

The Powderhounds website describes Big Sky Resort this way: "The skiable terrain is the biggest of the Montana ski resorts at 3,832 acres, and when you include the interconnected Moonlight Basin ski resort, you get another 1,900 acres of terrain. The two resorts form a colossal ski area — the second biggest in North America and the largest in the USA. The vertical drop, at 4,366 feet, is also one of the biggest in North America."

The website doesn't say it, but Big Sky also has the country's best-tasting water. **tpo**

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Jim Muscat,
water superintendent



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The River Is Ours

THE ALBUQUERQUE WATER AUTHORITY RECEIVES A PUBLIC EDUCATION AWARD FOR AN EVENT THAT TEACHES FOURTH-GRADERS ABOUT THE VALUE OF WATER

By Craig Mandli

Who really owns a river? Technically, the answer is no one. But employees of the Albuquerque Bernalillo County (New Mexico) Water Utility Authority believe their river, the Rio Grande, belongs to everyone. And with ownership comes great responsibility.

With that in mind, the authority developed an annual outreach program focused on fourth-graders, with a field trip called the River Is Ours (RIO). It brings about 7,000 kids to the river and includes follow-up class presentations and wastewater tours.

“The most powerful idea behind the program is simply to get these kids outside and excited about nature,” says Erin Keck, education coordinator. “Our goal is for each student to take ownership in the river and the environment surrounding it.”

“The most powerful idea behind the program is simply to get these kids outside and excited about nature. Our goal is for each student to take ownership in the river and the environment surrounding it.”

ERIN KECK



PHOTOS COURTESY OF THE ALBUQUERQUE BERNALILLO COUNTY WATER UTILITY AUTHORITY

The cottonwood trees in the Bosque both depend on clean water from the Rio Grande and provide an ecosystem for plants and wildlife.

BACK TO NATURE

The River Is Ours emphasizes the precious nature of water resources in an area where awareness and sustainability are important. Activities include tours of water-sensitive environmental areas, video presentations, puppet shows

and songbooks, all to engage and inform people from early youth onward. Results include a substantial reduction of per capita water usage since the program began.

“We also give the children pre- and post-tests to gauge their buy-in,” says Keck. “It’s important to have some viable

results to grow the program and evolve it over time. The River Is Ours has changed a lot in eight years.”

All fourth-grade classes in the Albuquerque Public Schools system are invited on a field trip to the river. The water authority provides free bus transportation to one of three locations: the Rio Grande Nature Center, the ABQ BioPark Botanic Garden and the National Hispanic Cultural Center. Each class has a water authority guide who leads the class in three activities.

The Albuquerque Rivers environmental organization teaches where the water in the rivers and aquifers comes from. Students learn how precious their water is, especially in their desert climate hit hard by drought. Students learn about cultural water use, New Mexico’s water history, and how technology in the water system predicts where and when water is used or consumed.

The students’ favorite is a hike in the Bosque, a dense cottonwood forest in the heart of Albuquerque. Students use tablets to take pictures of things on a scavenger hunt list and learn how each item connects directly to the Rio Grande.

The River Is Ours (RIO) program brings 7,000 fourth-graders to the Rio Grande.

“I worked in the elementary classroom setting for three years, and reaching kids in that 9- and 10-year-old age group can be extremely powerful.”

ERIN KECK

“The students learn that the animals and plants living in the Bosque depend on the health of the cottonwoods,” says Keck. “Olive trees and coyote willow need the cottonwoods’ shade, and many birds nest high up in the cottonwoods to be safe. Those cottonwoods depend on the clean water provided by the Rio Grande.”

FOLLOW-UP EDUCATION

Back in class, students learn more about the plants and wildlife they saw, using an interactive RIO Field Trip Field Guide, written in English and Spanish and illustrated with many students’ photos. Before or after the field trip, classes can use a RIO Field Trip In-Class Curriculum of four lessons with reading and writing components.

“I worked in the elementary classroom setting for three years, and reaching kids in that 9- and 10-year-old age group can be extremely powerful,” Keck says. “When those kids are engaged, they take home what they learned and share it with their parents, so we see quite a bit of auxiliary education. When you drive home those concepts at a young age, hopefully they are more firmly set in.”

The River Is Ours program earned the authority a 2016 Public Education Award from the Water Environment Federation. Several employees attended WEFTEC 2016 in New Orleans to accept the honor.



Students take an educational hike along the Rio Grande.



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“Being recognized is great because it lets our community and decision-makers know that what we are doing is working,” says Keck. “It empowers us to keep building on the program, which continues to grow as part of Albuquerque’s 100-year plan.

“I’m inspired daily by a Baba Dioum quote: ‘In the end, we will conserve only what we love; we will love only what we understand, and we will understand only what we are taught.’ That is such a powerful idea, and it’s up to us as water professionals to see that through.” tpo

What’s Your Story?

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



A student works on a scavenger hunt worksheet during a Bosque hike.

FAST TRACK

TAMMY HAMBLEN ROSE QUICKLY FROM STREET DEPARTMENT EMPLOYEE TO WASTEWATER TREATMENT SUPERVISOR AND LEADER OF A PLANT TEAM

STORY: **Scottie Dayton** | PHOTOGRAPHY: **Denny Medley**

WORKING 10 YEARS FOR THE STREET DEPARTMENT IN THE Missouri city of Carrollton didn't prepare Tammy Hamblen for her move to the wastewater treatment plant in 2006. "It's two miles out in the country and I had to ask for directions," she says. "I'd never been there."

Attending the 12-day class for her Class D wastewater operator license changed Hamblen's life. She was fascinated by how much there was to the treatment process: "I had found my career. It's been a nonstop climb up the ladder ever since."

The climb was faster than she expected. After only seven years at the facility, Mayor Bryan Mathis promoted Hamblen to wastewater supervisor. She wasn't sure she was ready for the advancement, especially in the middle of a plant upgrade, but Mathis reassured her, positive that she would "do great."

Hamblen lived up to his expectations. In 2015, co-workers nominated her for special recognition at the Missouri Water and Wastewater Conference. The inscription on her Outstanding Supervisor award reads in part: "For 18 years of dedicated service to the water and wastewater industry and for leading her fellow operators by example, giving and receiving respect for hard work, dedication, and a job well done."

TREATMENT TRAIN

Built in 1980 and upgraded in 2013, Carrollton's 1.5 mgd (design) activated sludge plant treats an average of 980,000 gpd from 3,600 residents. Grit is removed as wastewater enters the main pump station in town. Three 70 hp pumps send the flow two miles to the plant. During rainstorms, three 25



Tammy Hamblen, wastewater supervisor, Carrollton (Missouri) Wastewater Treatment Plant

hp pumps (all Flygt - a Xylem brand) send excess flow to a 1-million-gallon equalization tank next to the building. As the flow at the plant subsides, operators slowly release the contents of the tank into the system.

At the plant, wastewater passes through a grit vortex chamber (Kusters Water, a division of Kusters Zima Corp.), then enters three 30-foot-deep aeration basins, each with two cells and a blower. From there, splitter boxes direct the water to three final clarifiers. Secondary effluent is pumped to a UV disinfection chamber (Glasco Ultraviolet) and a Parshall flume before discharge to Wakenda Creek. Liquid solids from the clarifiers are land-applied or pumped to two anaerobic digesters, thickened and dried in eight beds before land application. Design biosolids production is 1,320 dry tons per year.

Most laboratory testing is done in-house with various equipment. Inovatia Laboratories in Fayette handles tests requiring a certified technician.

Becoming a supervisor was a goal Hamblen had kept in the back of her mind. She took every class and test offered, knowing that older operators were approaching retirement and the city would need replacements. "Did I think I'd be promoted as quickly as I was? Never in a million years," says Hamblen, age 41.

With little guidance from the previous supervisor or his assistant before they left, Hamblen used their files to teach herself what to do and how to do it. When in doubt, she called the state Department of Natural Resources, as regulation complexities surpassed the knowledge of her staff — two Class D operators and one laborer.

Hamblen believes in leading by example and often pitches right in with team members on challenging tasks.



“If they have to go into the main pump station’s 40-foot-deep wet well, I’m going in first. My guys appreciate that I lead by example and don’t mind getting dirty.”

TAMMY HAMBLEN



**Tammy Hamblen,
Carrollton (Missouri)
Wastewater Treatment Plant**

POSITION: | Supervisor

EXPERIENCE: | 20 years

EDUCATION: | Tina-Avalon High School

CERTIFICATIONS: | Class A (highest) wastewater treatment, Class C collections systems

MEMBERSHIPS: | Missouri Water Environment Association, Missouri Water and Wastewater Conference Northeast Section

GOALS: | Ensure the safety of employees and citizens, discharge the cleanest water possible, keep effluent in compliance

WEBSITE: | www.carrolltonmo.org

GPS COORDINATES: | Latitude: 39°20'18.61"N;
Longitude: 93°29'26.81"W



Hamblen and team members, from left, Allen “Cookie” Jones, James Mason and Chad Winfrey.

ACE IN THE HOLE

“Our Street Department is the source for all wastewater personnel,” says Hamblen. “When I worked there, I cleaned sewers with Chad Winfrey, who became my best friend. Now he is one of the two Class D operators.”

The city owns a RamJet jetter truck (Vactor Mfg.) with 1,800-gallon water tank and 50 gpm/2,000 psi pump, and a FX25 trailer-mounted vacuum excavator (Ditch Witch) with 800-gallon debris tank. The first summer Hamblen and Winfrey cleaned sewers together, they pulled 15 tons of grit and gravel from the clay tile mains installed in 1938. They also rebuilt by hand eight disintegrated brick manhole chimneys. Winfrey joined the treatment plant in 2010.

As supervisor, Hamblen has made it a point not to ask workers to do something she won't do. “If they have to go into the main pump station's 40-foot-deep wet well, I'm going in first,” she says. “My guys appreciate that I lead by example and don't mind getting dirty.” The pump station, built using components from the decommissioned 1980 wastewater plant, tested both of them.

One night a 70 hp pump in the station went down. Hamblen, Winfrey and a laborer responded to an emergency call about sewage in the station basement. “Fortunately, the pump controls were upstairs, so we were able to shut down everything,” says Hamblen.

Following proper confined-space entry procedures, Winfrey and Hamblen went into the basement to close the inflow valve, but it was rusted tight. To reach the pump, the two waded through neck-deep wastewater, then removed the mounting nuts and bolts and attached the hoist chain. “We were working blind because we couldn't see a thing,” says Hamblen.

Using the pulleys and chain upstairs, the laborer raised the pump, enabling the team to replace the bad impeller with one cannibalized from a defunct pump. Hamblen and Winfrey returned to the flooded basement, then used their fingertips to find the bolt holes and mount the pump. “It had to run,” she says. “Even though flow was low, sewage from town kept coming and the storage tank was full.”

Winfrey is working toward his Class C license in collections systems and wastewater. “I'm 100 percent positive I could leave this place for a week and Chad could run it,” says Hamblen. Last July, on Hamblen's recommendation, the city council promoted Winfrey to assistant supervisor.

WORKING SUPERVISOR

James Mason, the second Class D operator, has saved the city thousands of dollars by tackling many small electrical jobs and maintaining the pumps. “He's been here five years, and knows a lot about how the plant operates and how to maintain those operations,” says Hamblen. “James is my Mr. Fix-It.”

His helper is often laborer Allen “Cookie” Jones, who spent 30 years at the Street Department before being transferred to the plant in 2014. “Cookie does exactly as he is told, and if he doesn't know how to do something, he asks,” says Hamblen. When his rotation came to work in the laboratory, Jones was nervous because he wasn't skilled in math.

After giving a pep talk, Hamblen took Jones into the lab and taught him how to test solids. “Cookie worked on that for a week until he was comfortable, and then we moved to testing pH,” she says. “Step by step, he learned how to do the test at each station, and he does them flawlessly now.”

The biosolids drying beds at the Carrollton plant.



SIMPLE FIX, BIG RESULTS

Operators at the Carrollton (Missouri) Wastewater Treatment Plant strive to improve efficiency while figuring out easier ways to do things. For example, they rely on eight 20- by 100-foot drying beds to handle liquid solids for most of the year.

One day it dawned on supervisor Tammy Hamblen that the beds seemed sluggish. A little research in the office files revealed the sand hadn't been changed in 30 years. “We borrowed a backhoe from the Street Department and began removing sand and a little surface gravel,” she says. “Then we hauled four tons of new sand for each bed. The entire change-out took a year, but it made a world of difference. Now the sludge dries so much faster.”



In 2015, co-workers nominated Tammy Hamblen for an Outstanding Supervisor award.

While the plant's daily routine is seldom mundane, it ratchets up when biosolids application season arrives in late September. “Once the crops are off the fields, we take turns hauling from daybreak to dark and through week-

ends until we finish near the end of October,” says Hamblen. “Fortunately, we don’t have far to go, as the fields are alongside the plant.”

Liquid solids are spread on 20- by 100-foot drying beds. If the beds are full, biosolids are stored in the 280,000-gallon digesters and from there land-applied as liquid. Once the digesters are empty, the crew removes the dehydrated biosolids from the beds; it is land-applied using a sander truck from the Street Department.

ADDRESSING I&I

Hamblen and her team retain responsibilities upstream of the treatment plant. While the \$7 million plant upgrade in 2006 was intended partly to meet higher disinfection standards, Hamblen believes the storage tank and a third final clarifier would not have been necessary if the city had addressed inflow and infiltration. When it rains, flows in excess of 1 mgd hit the main pump station.

One day in late August 2016, a supercell storm dropped 11 inches of rain. “Although we pumped as much water as possible to the plant and storage tank, it still poured over the wet well’s walls,” says Hamblen. Since then, the city has received a grant from the DNR to assess the collections system and prioritize repairs.

Hamblen was too distracted by everything going on at the plant to become suspicious when Mayor Mathis asked her to attend a meeting in his place and

“Our Street Department is the source for all wastewater personnel. When I worked there, I cleaned sewers with Chad Winfrey, who became my best friend. Now he is one of the two Class D operators.”

TAMMY HAMBLÉN

bring back the information. “He told me to spend the night in Jefferson City and to attend classes at the state Water and Wastewater Conference while there,” she says. “I knew nothing about the special award and was flabbergasted when I received it.”

Studying and working to master her new position on the ladder of success left Hamblen little time to believe bigger dreams were possible. Then two months after becoming supervisor, she had another life-changing encounter. A DNR wastewater facility inspector announced that he would arrive in 30 minutes. Rather than becoming a moment of despair, the meeting proved inspirational. “He spent two days helping me,” Hamblen says.

She discovered that the plant was making substantial headway. The previous inspection report had listed 30 violations. This time there were only eight, and she rectified them within a month. The experience gave Hamblen a glimpse into her possible future. “I would love to be an inspector,” she says. **tpo**

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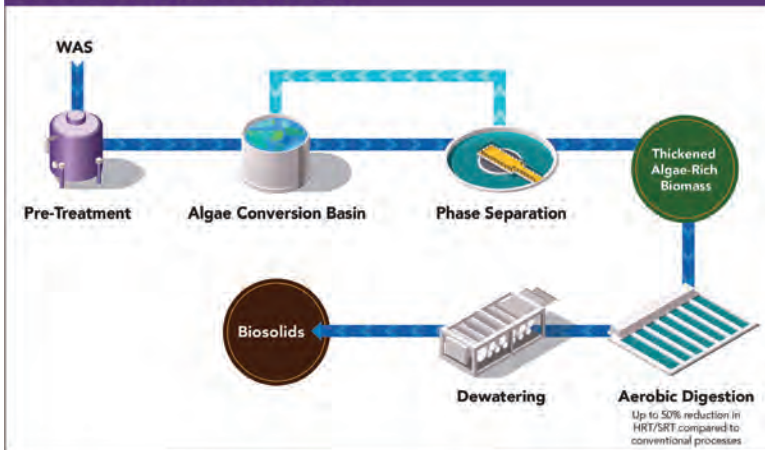
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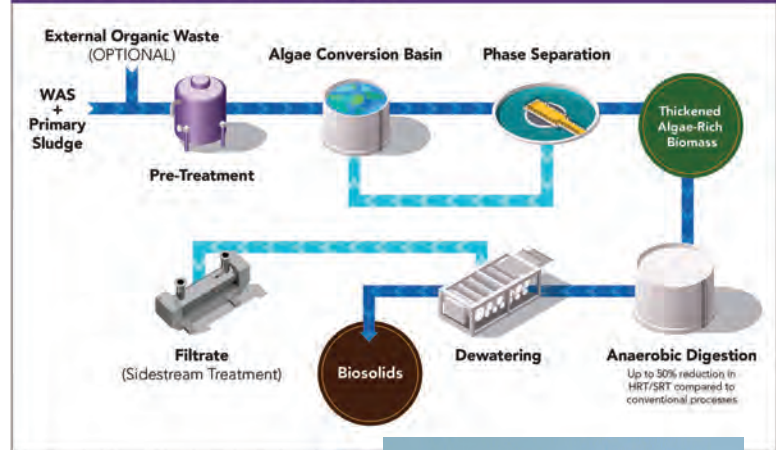
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ALGAE-BASED AEROBIC DIGESTION

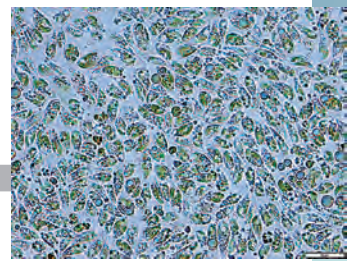


1. Flow diagrams represent how algae can be used in municipal aerobic and anaerobic applications.
2. A close-up view of phagotrophic algae used in the BioAlgaNyx system.
3. The phagotrophic algae can consume particulate matter in addition to dissolved organics in wastewater.

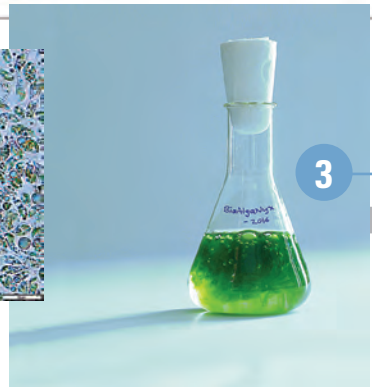
ALGAE-BASED ANAEROBIC DIGESTION



2



3



Putting Algae to Work

A PRETREATMENT PROCESS USING PHAGOTROPHIC ALGAE SHOWS POTENTIAL TO HELP WASTEWATER TREATMENT PLANTS BOOST EFFICIENCY IN AEROBIC AND ANAEROBIC DIGESTION

By Ted J. Rulseh

Clean-water plants increasingly look beyond the treatment of wastewater and toward resource recovery. A variety of technologies coming to market in recent years are designed to help further that objective.

Such processes are not limited to the liquid side of treatment. Solids treatment is a costly process in its own right, and plant operators and researchers are looking for ways to make it more efficient and increase its yield of usable products.

Now Ovivo has developed a solids pretreatment process that uses a special form of algae to help make sludges more digestible. The BioAlgaNyx process can shorten the time required to produce biogas and biosolids, bringing a range of potential benefits. Hiren Trivedi, director of strategic development for Ovivo's municipal division in North America, talked about the process in an interview with *Treatment Plant Operator*.

tpo: What are the drivers behind bringing this technology to commercialization and into the wastewater treatment market?

Trivedi: Looking at the wastewater industry, we envision that in the next five to 10 years we will see more changes than in the previous 100 years. The primary reason is that we now realize that wastewater is not a nuisance — it contains valuable resources, and technologies are being put forward to recover them. The BioAlgaNyx technology is a step in that direction.

tpo: In the most basic sense, how does this technology work?

Trivedi: We use a unique form of algae called phagotrophic algae. Until now, most of the research done in the wastewater industry has been with photo-

synthetic algae, with the main objective of recovering nitrogen and phosphorus. Our main objective is not nutrient recovery but organic carbon recovery.

tpo: What exactly do you mean by phagotrophic algae?

Trivedi: Phagotrophic algae is a type that can consume not only dissolved organics in water but also particulate matter. That particulate matter can include organic carbon in the form of oil droplets, as well as organic carbon within bacteria cells and viruses. The algae cells have the capability to engulf bacteria, viruses and other small organic particles.

tpo: In the context of the wastewater treatment market, how do these algae function?

Trivedi: If you expose high-strength wastewater or municipal sludge to these algae, the algae cells will feed off the organic particles, bacteria and viruses and convert the carbon into fat, also known as lipids. Typically, the lipid content of the algae cells will be five to 15 times higher than that of a bacterial cell.

tpo: What practical applications does this have?

Trivedi: One is to capture organic carbon from high-strength industrial wastewaters along with the algae and make a saleable product. On this we are doing fundamental research at the university level, and the results have been fairly promising. So a juice manufacturer, for example, or a refinery, would be able to harvest the algae, and the fat content could be extracted to manufacture bioplastics or biofuels, or it could be used as animal feed additive.

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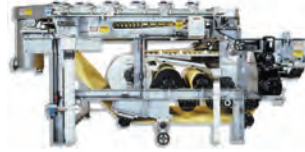
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The other involves biological sludge generated by municipal wastewater treatment plants. As a rule of thumb, a 1 mgd plant can generate a ton of solids every day. Stabilization of that sludge is time-consuming and expensive. We can expose the sludge to the algae before either aerobic or anaerobic digestion. We convert some of the organic content, bacteria and viruses into algae biomass and send the mixture on to the digester. Because these algae cells have a high fat content, it makes the whole mass more biodegradable.

“Phagotrophic algae is a type that can consume not only dissolved organics in water but also particulate matter.”

HIREN TRIVEDI

tpo: What is the benefit to the digestion process?

Trivedi: The digestion is very fast. We have done both aerobic and anaerobic digestion based on algae-converted biomass and have compared that to digestion of normal biological sludge. We find that we can speed up the digestion process by more than 50 percent.

tpo: How does that translate to an advantage for the wastewater treatment plant?

Trivedi: It's twofold. If it's a new plant, then there is a straight capital savings because they can start with smaller digesters. If it's a retrofit, then within the same infrastructure they can get an expansion of capacity, or a longer retention time, which means higher volatile solids reduction and less biosolids to haul out.

tpo: How is the algae introduced to the process?

Trivedi: It's a pretreatment process that involves a few steps. There could be a pH adjustment before we expose the biomass to the algae. Also,

the biological sludge is flocculated, and we need to disturb that floc to get the particles and bacteria cells into the water where the algae can engulf them. Then there is the algae conversion step, which is an aerobic process. And then we thicken the sludge before sending it to the digester.

tpo: Are there any particular-size plants for which this is the most advantageous?

Trivedi: Our initial commercial applications will start with smaller plants, but actually the larger plants would have more benefit because they typically have anaerobic digestion with the objective of capturing organic carbon. Algae pretreatment should speed up that process and provide better organic carbon recovery. In addition, if they are doing co-digestion, bringing in food-grade waste, that becomes another source of organic carbon recovery.

tpo: In anaerobic digestion, how does the algae pretreatment affect biogas production?

Trivedi: It would speed it up, but it would not change the amount of biogas generated.

tpo: What has been done to test and prove out this approach?

Trivedi: We started more than two years ago working with the University of Akron where the concept was initiated. We have been funding research at the university level. We have done a nine-month pilot at the Canton Wastewater Treatment Plant in Ohio, and now we are running a pilot at the Akron Wastewater Treatment Plant. We are also doing laboratory-scale research on the use of algae with high-strength wastewater in different industries. Commercially, we are ready to move to market in applications involving enhancement of aerobic digestion. **tpo**

ONLY THE BEST

GARRY HOUSTON AND HIS TEAM IN ABILENE CONQUER SOURCE WATER CHALLENGES
IN GETTING THE MOST FROM A MICROFILTRATION WATER TREATMENT PLANT

STORY: **Scottie Dayton** | PHOTOGRAPHY: **Paul White**

WANTING TO KNOW THE “WHY” BEHIND EVERYTHING has dominated Garry Houston’s life. When hired to work at the newly completed micro-filtration Hargesheimer Water Treatment Plant in 2003, Houston rapidly absorbed the training and gained the experience to earn a water Operator IV (highest) rating from the city of Abilene and a Texas Class A (highest) water operator license.

“The other operators have been here three to five years, so they depend on me to learn the peculiarities or technicalities of the different equipment,” says Houston. “They also know I will not settle for second-best. Either they do it correctly or they aren’t going to work for me.”

Rodney Taylor, director of Water Utilities, says Houston readily shares his knowledge with co-workers through mentoring and training, and takes great pride in running a tight ship. “Garry assumed a leadership role early in his career as operators struggled with the sometimes fickle membranes while receiving little outside support,” says Taylor.

Richard Williams, Water Treatment Division program manager, nominated Houston for the 2016 Outstanding Plant Operator Award from the South Central Membrane Association. Williams wrote on the nomination form, “Garry has been a positive influence to our organization from the day he was hired. He’s on call 24 hours a day and is someone the city can always count on.”



Garry Houston, senior plant operator at the Hargesheimer Water Treatment Plant

Houston says, “I consider the award a great honor because it comes from my peers; but truthfully, I’m just doing my best at a job I love.”

TREATMENT TRAIN

The 6 mgd (design) Hargesheimer plant draws raw water into a 36-inch main using three vertical turbine pumps on Lake O.H. Ivie. Raw water travels 43 miles to a 6-million-gallon booster station, then to a 10-million-gallon feed tank at Ovalo.

As water gravity flows the remaining 9 miles to the plant, it receives injections of chlorine dioxide to oxidize iron and manganese. At the plant’s raw water vault, injectors feed 20 ppm of ferric sulfate coagulant to the static mixer.

Water entering the plant flows through three strainers with 40- by 40-inch stainless steel wire mesh cones, and then to six microfiltration racks (Pall Corporation) each holding 92 modules with 0.1-micron polyvinylidene fluoride hollow-fiber membranes. Feedwater enters the bottoms of the modules, passes through the membranes, and exits as permeate through the tops. Membranes are backflushed every 30

to 60 minutes, interrupting forward flow for 2.5 minutes.

Permeate flows to a concrete break tank. A portion of the water flows to one of two 1.5 mgd reverse osmosis trains (Advanced Environmental Water Technologies) to remove sodium, chloride and sulfate. The two-stage RO



Operator III Justin Brickey and Houston view the controls on the plant's microfiltration system (Pall Corporation).



Houston takes sample readings at the reverse osmosis trains (Advanced Environmental Water Technologies).

“Even after 14 years, I’m always learning something new. I love the challenge of treating water with very undesirable characteristics, and the water is always different.”

GARRY HOUSTON

Garry Houston, Hargesheimer Water Treatment Plant, Abilene, Texas



POSITION: | **Senior plant operator**

EXPERIENCE: | **14 years**

EDUCATION: | **Abilene High School**

CERTIFICATIONS: | **Texas Class A water operator**

MEMBERSHIPS: | **South Central Membrane Association, Texas Water Utility Association**

GOALS: | **Reach full potential as a water operator**

WEBSITE: | **www.abilenetx.com**

GPS COORDINATES: | **Latitude: 32°29'68.75"N; longitude: 99°76'71.06"W**

trains have 24 vessels in the first stage and 12 in the second. Each vessel holds seven energy-saving polyamide 2-LD filters (Hydranautics, a Nitto Group Company) set for 75 percent recovery. The resulting concentrate goes to a third-stage concentrator (H2O Innovation) set at 58 percent recovery.

The remaining permeate in the break tank is blended with microfiltrate, flows to the blended water vault, and is treated with free chlorine gas before the static mixer. After disinfection in a 100-foot-long 60-inch pipe, the water is finished with liquid ammonium sulfate, caustic and fluoride before flowing to a 5-million-gallon clearwell storage tank for distribution through 934 miles of mains to more than 40,000 customers.

An upgrade now in progress will increase plant capacity to 12 mgd. Besides replacing the third-stage concentrator (now operational) and adding two 7.5 mgd microfiltration racks, improvements include a cascade for aeration, two flocculation basins, and two sedimentation basins with incline plate settlers and automatic sludge collection rakes (both from Jim Myers & Sons). A belt press (BDP Industries) will dewater sludge before offsite disposal.

The plant is manned 10 hours per day. Houston works with Operator III Justin Brickey (Class A license), and Operators I Michael Ingram (Class C license), Chase Hoyt, Fay Couture and Will Thompson (D license). Kenny Hutchins is the utility system manager.

“Garry is a very important player in the success of our overall water treatment strategy. He’s self-motivated and a go-getter.”

RODNEY TAYLOR

NATURAL CHALLENGES

Drought and Abilene’s huge demand for water in summer complicated the plant upgrade. Houston and the construction contractor spoke daily to coordinate shutdowns, as the city’s conventional Grimes and Northeast water treatment plants needed time to increase production.

“Our plant has automatic shutdown, so it takes 30 minutes to close the raw water valves and empty the lines or start back up,” says Houston. “The on-again-off-again schedule was hard on everyone, so we switched to running the plant once a week.”

Lake Ivie has high natural concentrations of iron and manganese, making it necessary for operators to flush the raw water intake lines before starting the plant. They also change the water in the Ovalo feed tank. “Every so often we’d open the blow-off, drain half the tank, and fill it with freshwater to dilute what had been sitting,” says Houston. In early July 2015, operators shut the plant down to accelerate construction. It remained dormant until pretreatment startup in October 2016.

Lake Ivie’s natural characteristics are only half the equation. The reservoir, with 19,149 surface acres, holds 554,340 acre-feet. It was half full when Houston arrived 14 years ago. “Evaporation concentrates the iron and manganese, making them harder and harder to treat,” says Houston. “We’ve also had three freak rainstorms over the years that filled the lake to 25 or 30 percent. The massive runoff carried organic debris into the lake and churned up sediment.”

The Ovalo feed tank was the plant’s warning system. It takes a day and a half for water to flow from it to the plant. Both are sampled daily. “When Ovalo has a bad sample, we prepare for the dirty water by adjusting chemi-

(continued)



Garry Houston records process numbers on the plant’s third-stage concentrator (H2O Innovation).

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cal doses,” says Houston. “Once the lake calms down, treatment returns to normal.”

REPEAT PERFORMANCES

In 2007, with the Lake Ivie level at 11 percent, mineral concentrations were so high that they stopped up the membranes. Although operators cleaned them with citric acid, the plant was barely running. Wanting to know why, Houston pulled a membrane and sent it to Pall Corporation for an autopsy. “It showed the water was full of iron,” he says. “We needed a stronger cleaning solution, and Pall sent sulfuric acid.” Multiple applications finally cleaned the membranes, enabling operators to maintain them with citric acid.

In 2012, the lake level reached 30 percent, then headed back down again. “Sure enough, the membranes stopped up,” says Houston. “This time, the autopsy showed organics were at fault. We were using caustic and bleach to clean the membranes, but Pall said our solution needed to be much stronger. That worked.”

In 2015, clogged membranes almost brought the plant to its third standstill. To uncover which membranes in the six racks were at fault, Houston asked his operators to put their hands on them during the air scour cycle in the backwash. Those that didn’t shake were pulled and weighed. “New membranes weigh 65 pounds, but clogged ones weigh as much as 95 pounds,” says Houston. The autopsy revealed iron and organics as the culprits.

LONGER LIFE

The operators had learned they didn’t need sulfuric acid to clean clogged membranes if they used much stronger citric acid, caustic and bleach. They called it super-cleaning as opposed to maintenance cleaning. It took a week to super-clean a rack with 92 filters. Then they repeated the six-week process to fully restore the membranes. To be on the safe side, they super-cleaned a third time.

“I consider the award a great honor because it comes from my peers; but truthfully, I’m just doing my best at a job I love.”

GARRY HOUSTON

“We wanted to produce more water to take some pressure off the Grimes and Northeast plants, but doing so without pretreatment would simply stop up the membranes faster,” says Houston. “The upgrade with pretreatment will bring cleaner water into the plant and extend the life of the membranes.”

Hargesheimer was not the first water treatment plant using membrane technology in Texas, but it was an early entry. “Garry is a very important player in the success of our overall water treatment strategy,” says Taylor. “He’s self-motivated and a go-getter. Garry found answers to our early problems by establishing a network of peers from throughout the industry, and he regularly exchanges information on how to resolve technological issues.”

Houston, who turned 60 in January 2016, hopes to stay at his post another 10 years. “Even after 14 years, I’m always learning something new,” he says. “I love the challenge of treating water with very undesirable characteristics, and the water is always different.” **tpo**

The team at the Hargesheimer Water Treatment Plant includes, from left, Houston; Chase Hoyt, operator in training; Justin Brickey, Operator III; Will Thompson, operator in training; and Michael Ingram, Operator I.



FOOD FOR THOUGHT

Garry Houston had no idea what delights he was missing by sticking to chicken-fried steak and Texas-style barbecue. Then Houston, senior plant operator at the Hargesheimer Water Treatment Plant, found the Yelp website while searching for a Dallas restaurant. Yelp publishes crowd-sourced reviews about local businesses.

“My hobbies are playing golf and eating out,” says Houston. “I downloaded the free Yelp app and was hooked. Here was instant access to thousands of people’s opinions of different places, events, nightlife, bars. The list is extensive.”

Before long, Houston wrote his first restaurant review. Then he began reviewing everywhere he went and everything he did. Since February 2011, he has written 654 reviews and posted 817 photos. “There’s no remuneration and no freebies,” he says. “I just do it for fun.”

Averaging 130 reviews per year, he quickly exhausted most of the restaurants, business and home services in Abilene. So he headed toward Fort Worth and Dallas. Tired of ordering the same meals and eager to try something new, he ventured into dishes from different cultures. “German and Thai are my favorite cuisines,” he says. “Next on the list is Korean food.”

Yelp has community managers in all major cities who review applications to join its Elite Squad, a group of active members recognized for providing quality information. In 2015, Houston’s application was accepted. He has retained his Elite Squad status.

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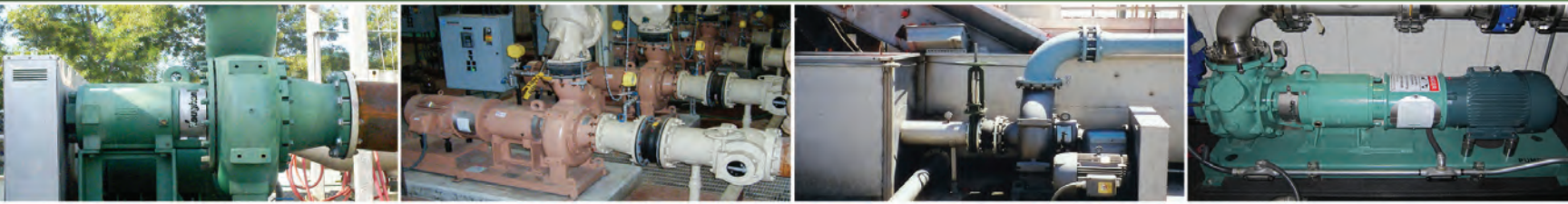
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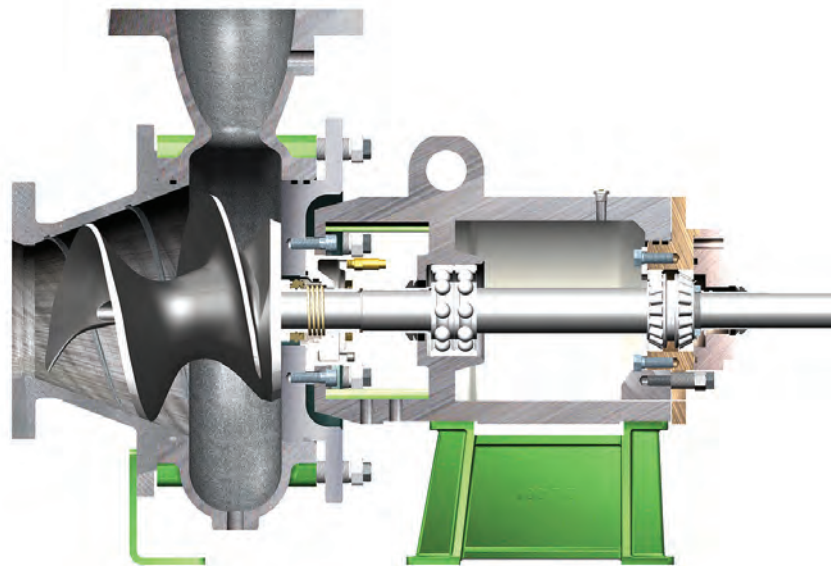
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Putting Heads Together

A PAIR OF ILLINOIS ASSOCIATIONS PLAN A JOINT CONFERENCE TO HELP FOSTER MORE CONNECTIONS BETWEEN THE ENGINEERING AND OPERATIONS SIDES OF THE CLEAN-WATER INDUSTRY

By Ted J. Rulseh

Many states have two (or more) associations for water and wastewater professionals. Typically there's an independent operators' group and a Water Environment Association (WEA) affiliated with the Water Environment Federation.

That's all fine. The groups aren't duplicative. They have somewhat different roles and serve different mixes of industry players. The typical WEA membership, for instance, tends to slant toward wastewater and the engineering and management sides, while the operator association members are the folks who make water and wastewater treatment plants run day to day.

Still, wouldn't it be a good idea if the two came together now and then and shared ideas and perspectives, instead of existing in silos? Leaders of two Illinois associations thought so. And therefore, April 24-26 in Springfield, the Illinois Association of Water Pollution Control Operators (IAWPCO) and the Illinois WEA will hold their first joint conference. The focus will be on the importance of wastewater, stormwater and plant operations.

Billed as the Illinois Wastewater Professionals Conference (IWPC), it will include about 80 vendors and other exhibits, and a technical program with presentations covering a wide range of topics. Clean-water organizations in other states may want to keep a close eye on how it works out, as this approach could easily be replicated (in fact, associations in some states already hold joint conferences).

As this issue went to press, the IWPC program was still being built, but the idea had generated lots of positive commentary among the state's professionals. Andy Warmus, utilities superintendent in Algonquin, a member of both organizations, and technical chair for the IAWPCO, talked about the conference in an interview with *Treatment Plant Operator*.

tpo: How would you describe the organizations putting on the IWPC?

Warmus: They're both professional organizations that go back to the early 1970s, each with celebrated histories of progressive conferences that aim to educate young professionals and foster environmental stewardship. Each brings a little something different to the table. IAWPCO is geared more toward the operators. The IWEA, while having operators as members, has a heavy presence with engineers and more focus on larger utilities and districts. Each group has about 900 members.

tpo: How did the idea for this conference come about?

Warmus: It came out of conversations between current and past presidents of both associations. Over the years, we've worked together on half-day

or day seminars. Our conferences were attracting much of the same memberships and exhibitors, and some of the same presentations and speakers. It made sense to try to combine both groups and reach out to a broader audience. My IWEA counterpart Mike Lutz and I, with the help of program committee members, have done a great deal of work to assemble a diverse, engaging conference program.



tpo: Do you see it as important to foster more interaction between operators and engineers?

Warmus: One of the big goals of the joint conference is to bridge the gap a little bit, to get those folks in the same room so they can understand each other's challenges and perspectives.

tpo: What kinds of conference activities might help accomplish that?

Warmus: One example would be to present a case study and have operators and engineers speak about it from their perspectives as the project moves from concept to construction. The engineer might present from the standpoint of design and how to draw upon operators for input and information. And then once you're in construction, what unforeseen problems do you come across? It's about understanding what's important to each side — why operators are looking for certain things and engineers are looking for certain things — and trying to create a better end result.

tpo: Were there any other major goals in planning the conference?

Warmus: Another goal was to get the Illinois EPA more involved in attendance and as an educational resource. The agency historically had a heavy presence at our conferences before the constraints of budgets. We want

“One of the big goals of the joint conference is to bridge the gap a little bit, to get those folks in the same room so they can understand each other's challenges and perspectives.”

ANDY WARMUS

agency staff to be more involved as speakers and in getting information out to the operators and to the engineers.

tpo: So far, how have your overtures to IEPA been received?

Warmus: They have been very receptive to every idea we've presented. That includes a one-stop shop — an information booth on the exhibit floor, where attendees can ask questions about anything, whether low-interest loans,

The planners

Here are the people from each of the two associations who helped plan the 2016 Illinois Wastewater Professionals Conference:

IWEA Executive Board

Mark Termini, president
Dan Collins, president-elect
Eric Berggren, first vice president and conference chairman
Kam Law, second vice president
Mary Johnson, corporate secretary
Debra Ness, treasurer/WEF delegate 2019
Mark Halm, WEF delegate 2017
Lou Storino, past president
Laurie Frieders, executive manager

IAWPCO Executive Board

Tom Glendenning, president
Josh Stevens, first vice president
Rick Lallish, second vice president
Mike Burnett, third vice president
Doug Armstrong, past president
David Miller, executive director
Ed Brown, secretary/treasurer

stormwater issues, nutrient removal, watersheds, CMOM. We have also secured several IEPA speakers for the technical program.

tpo: Will there be any separate events during the conference for members of the two associations?

Warmus: Each association will have its own awards banquet. Everything else will be shared, including an exhibitors' reception and several networking functions. It will be one show for everyone.

tpo: What are some of the conference highlights?

Warmus: We've invited the mayor of Springfield to open the conference and give a welcome. We're going to tour the Sangamon County Water Reclamation District's Spring Creek Wastewater Treatment Plant. It's a recently rebuilt, state-of-the-art facility. We'll have representatives from several engineering firms with presentations that appeal to both young and more seasoned professionals.

tpo: Given the more diverse audience, what will the technical program look like?

Warmus: We had 106 abstracts submitted for about 60 spots. In making our selections, we tried to look at everything in terms of: What would an operator take away from this presentation? What would an engineer take away? That same consideration applied to workshops on topics like BOD and emergency management.

tpo: What is your approach to the exhibits?

Warmus: We're looking for ways to make the exhibits more interactive. Vendors want to increase traffic and bring exposure to new products and technologies, but we want to make it as much of a learning experience as we can. We'd like the exhibitors to come up with a game, a presentation, something to grab attention and hold on to people while they're spending time on

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the floor. There are the younger professionals we're trying to bring along, and the more we can educate them and expose them to new things, the better off they'll be.

tpo: How would you characterize the value of conferences generally?

Warmus: The first conference I attended was in 1986, in my first year as an operator. I left that conference saying, "I want to come back every year." I met my peers. I talked to people who accepted my inexperience and took

“Each group does things in different ways, but everybody has been receptive to trying new things, mixing things up so we can have a better conference.”

ANDY WARMUS

the time to explain things. I had a good time, I learned things. I'd like to see if we can't restore that excitement and sense of community. How do we make it so the first-year operator comes to our conference in April and says, "I want to come back next year, and the year after that, and the year after that. I want to get involved." That's what we're trying to do.

tpo: Do you envision holding joint conferences from now on?

Warmus: I think we're just dipping our toe in the water for right now, but the response from both organizations has been very positive. Each group does things in different ways, but everybody has been receptive to trying new things, mixing things up so we can have a better conference. **tpo**



The mural by artist Pash Lima took more than three months to complete.

Extreme Makeover

A ONCE-UGLY WALL AT A GEORGIA WATER PLANT COMES TO LIFE WITH VIBRANT COLORS WITH A MURAL SHOWING THE WATER CYCLE

By Jeff Smith

The operators and staff of the Fayette County Water System are proud of their 2016 People's Choice: Best of the Best Tasting Tap Water Award from the Georgia Association of Water Professionals.

They are also proud of the 98-foot-long mural that graces the front walls of the highly visible settling basins at the 13.5 mgd Crosstown Water Treatment Plant in Peachtree City. "The mural covers what used to be just a nasty-looking concrete wall," says Lee Pope, system director. "Now it's something that lots of people want to stop and take a picture of."

PICTURES OF LIFE

The colorful 12-foot-high mural shows the cycle of water and is interspersed with images of wildlife such as turtles and fish, and of people drinking clear water. Highlights and the transition between scenes are created with a contrast of bold colors and soft shades.

Pope says county commissioner Steve Brown led the effort to create the mural. Two years ago, as chairman of the county's all-volunteer Public Arts Committee, Brown inspired a call for artists to submit their ideas and concepts for the nearly 1,200-square-foot mural.

From the six responses received, the 11-member arts committee chose the proposal from Atlanta resident Pash Lima. The Fayette County Buildings and Grounds Department prepared the concrete surfaces for painting by power washing, caulking cracks and applying a coat of Sherman Williams Loxon concrete sealer and primer.

Large timbers and a gravel walkway strategically placed in front of the settling basins buffer the mural from any ground maintenance work. "It's

just another way to protect the mural so that string trimmers and tractors don't get at it," Pope says.

LENGTHY PROJECT

It took Lima nearly three months to complete his original and unique painting. About a year after completion, any necessary touch-up painting will be done and the mural will be sealed with a coat of Sherman Williams Loxon XP.

The Fayette County Commission honored Lima during an arts committee meeting. The members also recognized the management of a local hotel for

“The best outcome, though, is the impact it has on the operators. They feel they are getting noticed in a positive way rather than just as having slapped on a little paint.”

LEE POPE

contributing a free room for Lima during his work on the mural. Funding for the \$20,000 project was shared by the arts committee and the water system.

Pope says the idea for the mural was an expansion of the desire to paint the concrete walls to project a better image to the public. The painting is part of a larger initiative to spruce up the county through art, such as by painting fire hydrants and holding sidewalk chalk-art contests.

The Crosstown Water Treatment Plant is on the main access road to the popular Lake McIntosh Park and recreational area. Completed in 2013, the 650-acre lake is only a mile from the Crosstown facility. The heavily used

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Share Your Ideas

The mural turned what had been an unsightly wall into a visual pleasure for passers-by and visitors.

14-acre park includes a boat launch, hiking trails, picnic pavilion, gazebo and restrooms. Lake McIntosh is one of four raw-water reservoirs for the county.

Pope says it's been good to hear the positive public feedback about the mural because it confirms that the project meets the arts committee's goal to enhance the county's reputation by using art to enrich citizens' lives. "The best outcome, though, is the impact it has on the operators," says Pope. "They feel they are getting noticed in a positive way rather than just as having slapped on a little paint. It's good to see." **tpo**

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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Aaron Reese, right, owner of Bald Eagle Pellet Co., describes the spill absorption qualities of premium wood pellets. INSET: The high-density pellets can absorb up to twice their weight in water.



Absorbing Wayward Wastewater

WOOD PELLETS FROM BALD EAGLE PELLET CO. CAN SUPPORT SPILL CLEANUP BY ABSORBING DOUBLE THEIR WEIGHT IN WATER

By Craig Mandli

Spill absorption materials include cellulose, cotton, synthetics and crushed fossilized shells. Another such material, Premium Wood Pellets from Bald Eagle Pellet Co., was on display at the 2016 Water & Wastewater Equipment, Treatment & Transport Show.

The pellets, with 6 percent moisture content, can absorb up to twice their weight in water; a ton of wood pellets can take up 482 gallons. According to company owner Aaron Reese, the pellets can be used in many wastewater applications.

“The pellets will absorb untreated wastewater, slurries, frac water, hydroexcavation waste and chemicals, essentially turning it into a solid,” he says. “They are made of sawdust, so they are completely biodegradable and environmentally friendly.”

COST REDUCTION

As hauling and disposal costs rise, especially for liquid waste, the pellets can save money. “The savings are calculated by how much it costs to dispose of the liquid compared to a solid,” says Reese. “You’d be surprised by the large difference in price in some areas.”

The pellets can be used for stabilizing hazardous and contaminated demolition material and site reclamation. They are compressed to half-size in a high-density pellet so that one ton fits into an easy-to-move sack that comes on a standard pallet.

The pellets are made from virgin-use wood fiber, ensuring their acceptance at any landfill. They are suited for water-based spill cleanup in the oil

“The pellets will absorb untreated wastewater, slurries, frac water, hydroexcavation waste and chemicals, essentially turning it into a solid.”

AARON REESE

and gas industry, but the downturn in that sector led him to seek other applications. WWETT Show attendees provided answers he hadn’t thought of.

“A landfill operator from the Bahamas saw the pellets as a potential solution to leaching issues,” says Reese. “Others said they could absorb liquids laced with phosphorus and nitrogen before it hits lakes and rivers. There are obvious uses in hauling wastewater from grease traps and car wash traps.”

NATURAL CONTENT

The pellets are manufactured daily from wood fiber product provided by Pennsylvania’s timber industry. “There is nothing in the pellets that can harm the environment in any way,” Reese says. The company also produces a fine sawdust called wood flour that can be used to clean oil-based spills.

Reese came to the WWETT Show to introduce himself and his product to the wastewater treatment market and to see where his pellets could fit. He’s excited to expand on the possibilities: “This show has given me a lot of ideas on what markets we can target going forward.” **814/329-2482; www.baldeaglepellet.com tpo**



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Dewatering Equipment

AQUA-ZYME DISPOSAL SYSTEMS ADS

The ADS 30-yard open-top roll-off dewatering unit from AQUA-Zyme Disposal Systems can be filled with 22,000 to 25,000 gallons of biosolids at 1 to 2 percent solids in about two hours. After draining 24 hours, the unit can be picked up using a standard-capacity roll-off truck and transported for solids disposal. Sludge volume can be reduced by 80 percent with reductions to 98 percent in BOD, COD, FOG and TSS. Effluent is clear, the unit has few moving parts, and the size of filter media can be selected according to job requirements. Standard equipment includes a roll-over tarp system; side, floor and center screens; 1/4-inch floor plate; 7-gauge side plates; four door binder ratchets; eight drain ports; two inlet ports; and a long-handle scraper. Units are also available in a 15-yard size. **979/245-5656; www.aqua-zyme.com**



ADS dewatering unit from AQUA-Zyme Disposal Systems



Dewatering system from In The Round Dewatering

IN THE ROUND DEWATERING HORIZONTAL DEWATERING DEVICE

The horizontal biosolids dewatering system from In The Round Dewatering has a stainless steel drum with perforated plastic

tile lining. The drum is mounted on a roll-off frame for easy transport and unloading. Water trays allow containment of discharge water. An 18,000- to 25,000-gallon batch is mixed with polymer before being filtered in the rotating drum, driven by a 1/2 hp variable-speed electric motor with a heavy-duty chain and sprocket. The turning eliminates crusting and wet pockets to produce uniform, consistent results. The dewatered material dumps easily and the drum is self-cleaning. **317/539-7304; www.itrdewatering.com**

OLD LINE ENVIRONMENTAL WWS MARK IV

The WWS Mark IV dewatering/screening unit from Old Line Environmental helps remove rags, wipes, grease and debris from septage receiving stations, wet well/pump station and vacuum waste, as well as digester debris from thickened biosolids. The unit can help reduce pump and sewer line maintenance costs and saves operational labor and cumbersome repairs. It is a complete skid-mounted unit that allows for both permanent and mobile applications. It is operator friendly with Allen Bradley touch-screen controls and automated features. All dewatered/screened debris passes paint filter testing and can be conveyed into conventional dumpsters for landfill disposal. **410/241-1654; www.oldlineenv.com**



WWS Mark IV dewatering/screening unit from Old Line Environmental



SludgeKing dewatering roll-off box from Park Process

PARK PROCESS SLUDGEKING

The SludgeKing dewatering roll-off box from Park Process has side-wall filters that form a radius at the bottom, leaving a rounded turn, not a 90-degree angle. The rounded shape helps prohibit cake from sticking while dumping. The filter media and support panels terminate horizontally on the floor, leaving the filter media and the tie-down bracket sticking up about a 1/2 inch from the floor. In this void between the center wall filters and the wall filters are installed UHMW plates that fill the volume with plastic, so no water can stand in the bottom. This material is used in dump trucks to help facilitate dumping and in the unit it performs the same function. It also incorporates two center wall filter panels to get even more surface area of filter per unit volume, equating to faster drainage rates and drier cake. The design is available in roll-off-type dewatering containers or permanently mounted on a tipping stand. **855/511-7275; www.parkprocess.com**

SEE WATER WS SERIES

WS Series duplex control panels from See Water are ideal for sewage pump chambers, grinder pumps, sump pump basins and lift stations. The duplex panels provide pump alternation, two-pump high demand and a high-liquid alarm. It has a NEMA-4X heavy-duty polycarbonate enclosure that allows pump status to be viewed without accessing the inside of the control panel. The control panels are UL listed and CSA certified. **888/733-9283; www.seewaterinc.com**



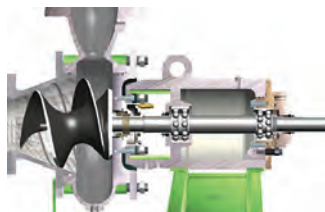
WS Series duplex control panels from See Water

(continued)

Grinder/Shredder

VAUGHAN COMPANY TRITON

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



Triton screw centrifugal pumps from Vaughan Company



Phantom Series from Anue Water Technologies

Headworks

ANUE WATER TECHNOLOGIES PHANTOM SERIES

The Phantom Series from Anue Water Technologies offers a cost-effective solution for wet well and force main FOG, odor and corrosion control problems, and for market applications where ozone and oxygen provide the best and environmentally proven answer for effective water treatment. It uses side-stream wastewater to draw in concentrated oxygen and ozone. The aerated/ozonated side stream is delivered back to the wastewater force main, or wet well/lift station through EP or HS well washing systems, uniformly transferring the oxygen and ozone for both FOG and odor/corrosion control. Installation generally takes a half day, and has adaptive power requirements (440/220 VAC single or three phase). **760/727-2683; www.anuewater.com**

The Phantom Series from Anue Water Technologies offers a cost-effective solution for wet well and force main FOG, odor and corrosion control problems, and for market applications where ozone and oxygen provide the best and environmentally proven answer for effective water treatment. It uses side-stream wastewater to draw in concentrated oxygen and ozone. The aerated/ozonated side stream is delivered back to the wastewater force main, or wet well/lift station through EP or HS well washing systems, uniformly transferring the oxygen and ozone for both FOG and odor/corrosion control. Installation generally takes a half day, and has adaptive power requirements (440/220 VAC single or three phase). **760/727-2683; www.anuewater.com**

Screw Conveyor

SCHREIBER TUBE-MOUNTED SCREW PUMP

The tube-mounted screw pump from Schreiber incorporates the Archimedean screw pump concept in a self-contained unit for ease of installation and construction. It transports liquid inside a stationary tube, simplifying design and eliminating grouting. Units are factory assembled and can be set at a fixed angle, or the lower end can be supported by a hoist to vary the pump angle and for maintenance access. The pump provides variable capacity at constant speed. It uses a single-row spherical roller and self-aligning combination radial/thrust lower support bearing. A flanged bearing provides radial support at the upper shaft. **205/655-7466; www.schreiberwater.com**



Tube-mounted screw pump from Schreiber



Raptor seepage plant systems from Lakeside Equipment Corporation

Septage Receiving Stations

LAKESIDE EQUIPMENT CORPORATION RAPTOR

Raptor septage acceptance plant and septage complete plant pretreatment systems from Lakeside Equip-

ment Corporation can help manage the unloading process and protect downstream equipment. The system's security access and hauler management and accounting software provide municipalities with the tools to maximize revenue generation and produce more energy with a minimum of maintenance. **630/837-5640; www.lakeside-equipment.com**

SCREENCO SYSTEMS MEGA SCREEN

The Mega Screen septic receiving station from ScreenCo Systems has 40.5 square feet of screening area, fed by a 6-inch inlet with dual fan spreaders. The front screens are virtually self-cleaning, processing up to 1,000 gpm. The dual screen design is non-mechanical and uses gravity to separate trash from the waste stream.



Mega Screen septic receiving station from ScreenCo Systems

The unit is constructed from aluminum with stainless steel 3/8-inch gapped bar screens on opposing angles, meeting the 503 regulations for septic screening. It can be set up with a single 6-inch inlet hose or two 4-inch inlet hoses capable of off-loading two trucks simultaneously. It will not plug with rags or hair, and simple raking to the trash draintray with the custom tools provided makes for a simple clean-out. Built-in forklift skids make it portable. An OSHA-compliant catwalk is included. **208/790-8770; www.screncosystems.com**



OVIVO DUET screen from Ovivo USA

Screening System

OVIVO USA DUET

The OVIVO DUET dual aperture screen from Ovivo USA is a comprehensive solution for screenings removal and handling. It offers coarse debris removal, fine fibrous

waste removal, washing and compacting of screens and coarse grit removal. PropaPanel technology in the primary screen eliminates hair pinning, preventing nuisance blinding and thus saving hours of operators' time. The straight-through flow design keeps headloss to a minimum. An integral washer compactor washes the organics and dewateres the screenings, reducing volume and odor costs. Due to lower flow velocities in the tank after primary screening, heavier grit settles and can be removed from the side or pumped out of the tank. With a simple rack-and-pinion arrangement and a single motor to drive the dual drum screen, it offers energy savings and reliability for the end user. The screening aperture can be changed to meet any future change in the influent screening characteristics. **512/834-6000; www.ovivowater.com**

Sludge Handling/Hauling/Disposal/Application

BOERGER BLUELINE ROTARY LOBE PUMP

The BLUEline Rotary Lobe Pump from Boerger is a self-priming, valveless, positive displacement pump used for the conveyance of viscous and abrasive materials. There are 21 pump models in six series with low shear and pulsation-free operation, fully reversible rotation, dry-run capabilities and flow rates up to 7,500 gpm. Pumps are stable and wear-resistant with a maintenance-in-place design that allows for all wetted parts to be easily replaced through the front cover without the removal of pipe or drive systems. **612/435-7300; www.boerger.com**



BLUEline Rotary Lobe Pump from Boerger

JDV EQUIPMENT CORPORATION LEVEL LODER

The LEVEL LODOR cover system from JDV Equipment Corporation helps contain odors by covering standard dump containers used for hauling processed material. The design allows for even distribution, increasing the fill percentage without having to manually even out material. Enclosing containers allows outdoor installation without exposing material to the environment or pests. **973/366-6556; www.jdvequipment.com**



LEVEL LODOR cover system from JDV Equipment Corporation

Sludge Heaters/Dryers/Thickeners

HUBER TECHNOLOGY BT BELT SLUDGE DRYER

Due to the use of lower temperature thresholds, the Huber Technology BT Belt Sludge Dryer provides the ability to reuse waste heat previously not possible in high-temperature dryers dependent on

fossil fuels. With minimal dust production and low-heat application, it provides a safe and efficient way to produce biosolids that can be used in applications such as soil amendments or sources of fuel. Thermal drying can help dramatically lower the volume of biosolids produced by a treatment plant. **704/949-1010; www.huber-technology.com**

JWC ENVIRONMENTAL IFT ROTARY DRUM SLUDGE THICKENER

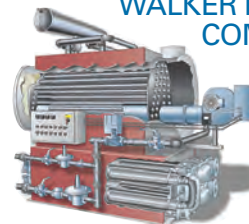
The IFT Rotary Drum Sludge Thickener from JWC Environmental can achieve 5 to 15 percent solids for municipal wastewater biosolids. It has capture rates in excess of 98 percent thanks to its almost

exclusive use of woven wire mesh screening panels. This also equates to a significantly lower polymer use. It needs only a short dwell time in the flocculation tank to achieve the required floc structure, and the entire system is fully enclosed to collect filtrate water and easily connect to odor control systems. It offers solid capture rates, easily replaceable screening panels, a fast-acting flocculation system and mixing tank, and a clean and less odorous process. **800/331-2277; www.jwce.com**



IFT Rotary Drum Sludge Thickener from JWC Environmental

WALKER PROCESS EQUIPMENT COMBINATION BOILER/HEAT EXCHANGER



Combination boiler/heat exchangers from Walker Process Equipment

Combination boiler/heat exchangers from Walker Process Equipment help operators minimize energy costs by generating hot water for anaerobic digester heating and other building/process heating needs. Advanced, built-in modulating burner PID temperature control saves energy, extends the useful life of the equipment, allows the

recycling of digester gas energy and provides backup fuel capability for critical plant heating. The boiler is a dry-back, double-pass design with efficient forced draft burner. It maintains water temperature at a typical 180 degrees F, ensuring optimal exhaust gas temperature to prevent flue condensation while providing an inventory of uniform hot water. The heat exchanger is an independent tube-in-tube design with sludge/water counter-flow arrangement providing maximum heat transfer. Both are built on a common base to minimize installation space and are supplied with integrated water piping, fuel lines, instrumentation and an electrical control system. **630/892-7921; www.walker-process.com tpo**

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- Kuhn North America Knight VT Vertical Maxx mixer
 Roto-Mix Staggered Industrial Compost Series

Dewatering Equipment

- AQUA-Zyme Disposal Systems ADS dewatering unit
 In The Round Dewatering horizontal dewatering system
 Old Line Environmental WWS Mark IV dewatering/screening unit
 Park Process SludgeKing dewatering roll-off box
 See Water WS Series duplex control panels

Grinder/Shredder

- Vaughan Company Triton screw centrifugal pumps

Headworks

- Anue Water Technologies Phantom Series

Screw Conveyor

- Schreiber tube-mounted screw pump

Septage Receiving Stations

- Lakeside Equipment Corporation Raptor septage pretreatment systems
 ScreenCo Systems Mega Screen septic receiving station

Screening System

- Ovivo USA DUET screen

Sludge Handling/Hauling/Disposal/Application

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Aeration and mixing unit helps plant keep up with increasing demand

Problem

The Big Park Domestic Wastewater Improvements District in Arizona built a 500,000 gpd wastewater treatment system in 1997. As it aged it could not keep up with increasing demand.

Solution

The district engaged Sunrise Engineering, which partnered with **Aeration Industries International** to upgrade the plant's equalization basin and the sludge digester and thickener. To upgrade without interrupting operations, **Aire-O2 equalization basin and digester systems** were installed. The Aire-O2 Triton units enable aeration and mixing with one device easily accessed from the surface. When oxygen demand is low, the control system turns the equipment off to save energy. Digestion and thickening occur in one basin. For decanting, the system is turned off and the solids settle to the bottom.



RESULT:

The equalization basin and digestion/thickening systems have made it possible to reduce maintenance and free up time to optimize treatment. 800/328-8287; www.aireo2.com

Bar screen helps reduce manpower and maintenance costs

Problem

Four years ago, Mendocino City (California) Community Services District administrators saw a need to improve the headworks at the 1 mgd wastewater treatment plant. "It would reduce some solids to a smaller size but would pass everything through," says representative Steve Acker. Non-biodegradable materials had to be manually removed to keep them from accumulating elsewhere in the facility.

Solution

A **Screenotec vertical screen** from **Aqualitec** matched the plant's technical requirements and footprint constraints, accommodating a 12-foot-deep headworks serviced by way of an 8-foot manhole.



RESULT:

Waste accumulation dropped to a fraction of its former level. Personnel no longer had to manually fish out solids, saving labor and reducing exposure to hazardous conditions. The unit has required no servicing. 855/650-2214; www.aqualitec.com

Composting agitator installed in odor-sensitive area

Problem

The town of Fairfield (Connecticut) Biosolids Compost Facility is next to the town's water pollution control facility and within 500 feet of dense residential areas on multiple sides. Odors need to be minimized.

Solution

The town selected an enclosed, agitated-bay **compost system** with agitators from **BDP Industries**. The technology is designed to contain and treat odors and produce a compost product after 21 days that is stable enough to store outdoors without significant odor.



RESULT:

The compost facility was started in 1989 and performed well for 15 years. In 2006, the facility underwent a major overhaul, including a new and more efficient compost agitator to replace the two original units. 518/695-6851; www.bdpindustries.com

Digester heater uses biogas, saving natural gas costs

Problem

The Washington/East Washington (Pennsylvania) Wastewater Treatment Plant used a hot-water boiler and heat exchanger to heat its anaerobic digester. In winter the boiler ran continuously; natural gas fuel cost up to \$3,000 per month. Although digester gas was available, the boiler required a minimum pressure that kept it from fully using that fuel.

Solution

An **Envirex Heater and Heat Exchanger** from **Evoqua Water Technologies** replaced the previous system. This integral unit with a boiler and tube-in bath heat exchanger is more efficient and has a smaller footprint that separate boiler and heat exchanger. The unit can operate at a pressure of 2 inches of water column, maximizing use of biogas.



RESULT:

Digester heating is now highly efficient and cost-effective. The unit runs almost exclusively on biogas, saving some \$20,000 a year. www.evoqua.com

Rotary press helps city save big on disposal

Problem

Canal Winchester, Ohio, operates a conventional activated sludge plant with aerobic digestion and once relied on liquid injection of biosolids. That was costly and time-consuming, and material had to be stored over winter.

Solution

The facility installed a **Fournier Industries rotary press** with four dewatering channels and capability to add two more channels later. The press typically runs unattended.

RESULT:

Biosolids are dewatered continuously in alternating weeks, Monday through Friday. The press receives material at 0.8 to 1.2 percent solids and discharges cake at 15 to 17 percent. Biosolids hauling costs have declined by 75 percent. “A quality piece of equipment you can trust makes all the difference in the world,” says Steve Smith, superintendent. **418/423-4241; www.rotary-press.com**



Large-bubble mixing works to suspend post-grit tank solids

Problem

An Indianapolis Southport Advanced Water Treatment Facility post-grit-removal junction structure needed mixing to move fine minerals and organic wastes to downstream treatment. The material had to be lifted 25 feet to pass over weirs and into distribution channels. Removing the structure from service for manual cleaning was not an option.

Solution

The design engineer selected a **Sequential Large-Bubble Vertical Mixer** from **Pulsed Hydraulics** to create the lift needed to keep material from accumulating in the post-grit tank. The 36-inch-diameter pulsed air masses each create over 900 pounds of buoyant force through each bubble-forming plate on the tank floor. Only two to four pulses per minute per plate are necessary. The mixing energy requires only a 20 hp rotary-vane compressor operating at two-hour intervals for 30 minutes per interval.

RESULT:

Solids no longer accumulate on the tank floor, and grease and other materials that could cause odors do not accumulate on the water's surface. The vertical mixing system minimizes maintenance and uses minimal energy. **800/641-1726; www.phewater.com**



Screw press helps create cleaner, more efficient dewatering

Problem

Seneca (South Carolina) Light & Water operates a 20 mgd water treatment facility that used alum as a coagulant. Waste alum was dewatered to 24 percent solids on plate-and-frame presses that ran batches; the process was labor-intensive and not clean.

Solution

The utility successfully piloted a **Schwing Bioset screw press** that yielded 28 to 32 percent solids.

RESULT:

A fully automated FSP 503 screw press was designed into a dewatering building. The dewatered sludge is hauled to the nearby wastewater treatment plant, mixed with dewatered biosolids and hauled to landfill. The press yields up to 34 percent and 30 percent on average. **715/247-3433; www.schwingbioset.com**



Plant optimizes grit system performance and maintenance

Problem

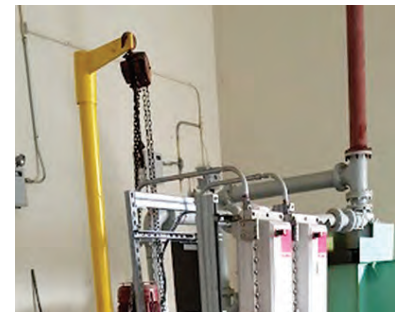
Grit removal was a problem at the Shamokin Coal Township (Pennsylvania) Joint Sewer Authority. An Archimedes screw device augered grit from two chamber wells. During wet weather, grit included sediment and other fine particles harmful to pumps and processes. The older system could not remove the large amount of grit entering during those events, requiring costly multiday clean-outs four times a year.

Solution

The authority chose the **PISTA 360 grit system** with **V-FORCE BAFFLE** from **Smith & Loveless** for its particle removal efficiency, ability to handle surge events, high turndown and low life-cycle cost. The hydraulic design with integral flow-control baffle maintains the ideal velocity during low-flow and surge events, ensuring consistent and efficient grit removal.

RESULT:

The upgraded plant was commissioned in 2015. The PISTA 360 has provided dependable grit removal with minimal maintenance. “It’s removing 99 percent of the grit pre-storm and during storm events,” says Paul Petrovich, general manager. “We don’t see any grit downstream, including in the motors, where grit can tear them up.” **800/898-9122; www.smithandloveless.com** tpo



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industry news

InnServices and Lystek execute agreement to implement biosolids management solution

InnServices Utilities and Lystek International have executed a formal agreement to implement biosolids management solutions at the Lakeshore Water Pollution Control Plant in Innisfil, Ontario, Canada. Currently, the plant has a design-rated capacity of 3.9 mgd. In 2011, the town completed the Innisfil Lakeshore WPCP Expansion Environmental Study that concluded the historical Class B biosolids storage and disposal program would not be suitable to keep pace with future growth. The Lystek Thermal Hydrolysis Process will not only meet all of the town's immediate needs, but by extending the operating hours of the fully automated system, it will meet peak demand in the future as well with no need for any additional storage tanks or buildings. It also moves the plant forward to producing a pathogen-free, federally registered, Class A-quality fertilizer product (LysteGro) that can be sold; not given away or treated as waste.

Legacy Building Solutions Top 600 Contractor for third consecutive year

Legacy Building Solutions has recently been ranked on the *Engineering News-Record* Top 600 Specialty Contractors list for the third year in a row. Legacy's 2016 ranking is 540, an increase from each of the previous two years. The article accompanying the Top 600 list highlights two growth trends that have helped fuel Legacy's growth: expansion of services, design-build and design-assist technology. While Legacy has always offered engineering, fabric manufacturing and installation services, a 2016 addition allowed the company to fabricate steel beams at their South Haven, Minnesota, office. In addition to the Top 600 Specialty Contractors designation, Legacy was named to the Inc. 5000 list this year, another sign of consistent growth.

Agru America expands East and West Coast manufacturing facilities

Agru America has extended its manufacturing capabilities with additional production lines at the company's Georgetown, South Carolina, and Fernley, Nevada, facilities. "Agru has added the increased manufacturing capacity to better service the U.S. East and West coasts for our geomembrane business," says Agru America President Robert L. Johnson. "The expanded production capability of our quality geosynthetics will allow us to keep pace with the ever-expanding demand and technological advances in plastic extrusion for years to come." The company also supplies geosynthetic clay liners, vertical barrier systems and large-diameter piping systems for the U.S. and international civil/environmental markets. **tpo**

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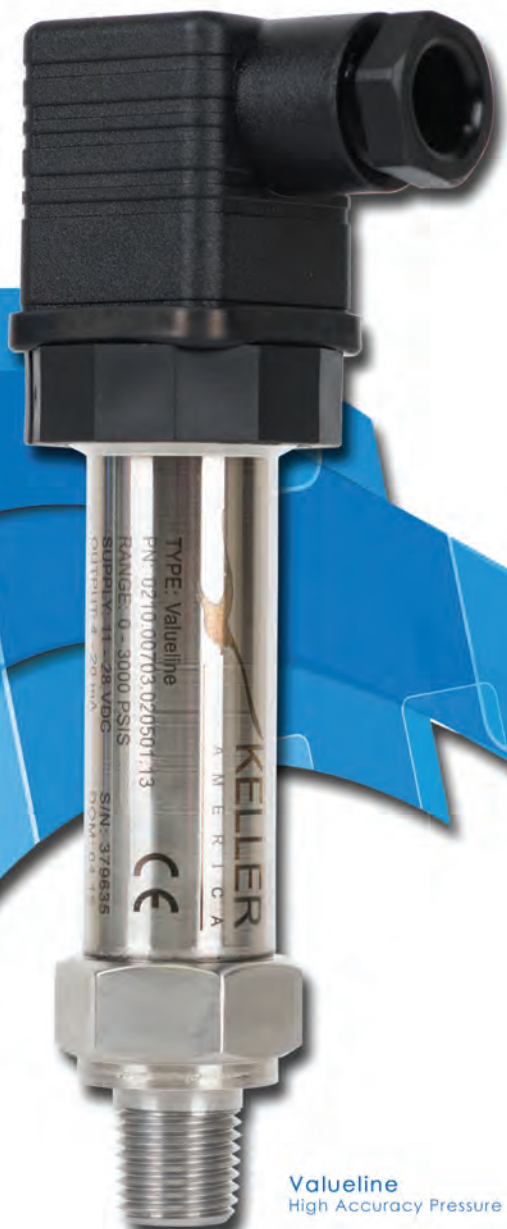
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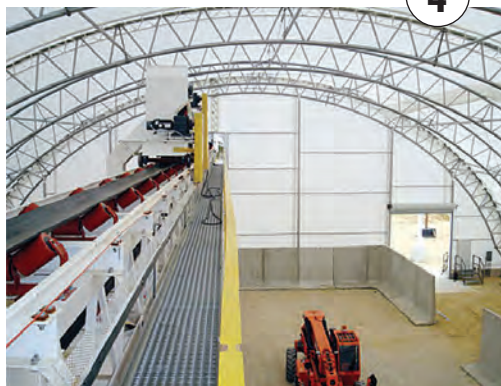


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Grundfos Pumps is extending its SL and SE range of wastewater pumps to include medium, high and super-high hydraulic offerings from 12 to 42 hp. Designed to handle raw, unscreened sewage, effluent and large volumes of surface and process water, the extended selection ensures high pump efficiencies over a wide range of demand and a large free passage of solids at low vibrations. The extended range enables free passage of solids up to 5 inches, which is ideal for large flows of raw sewage. Intelligent and self-adaptive controls allow the pump to adjust to changing operating conditions, while high-efficiency motors meet or exceed global standards. **800/921-7867; us.grundfos.com**

2. GREENER PLANET SYSTEMS BIOAUGMENTATION PRODUCT SERIES

The GPS Pro2 and the BioPro bioaugmentation product series from Greener Planet Systems help deliver fully dissolved, super-saturated oxygen, eliminating off-gassing and elevating contact time with the water body to intensify microbial consumption of organic waste. BioPro Ammo combined with the Pro2 increases the effectiveness of ammonia treatment. BioPro FRZ not only remains fully active in temperatures down to 34 degrees F, but also allows for below-ice treatment of wastewater in the colder months. **888/669-1787; www.greenerplanetsystems.com**

3. BLUE-WHITE POLYMER PUMP

The FLEXFLO A-100N polymer pump from Blue-White handles high-viscosity polymers. It is equipped with a built-in tube failure detection system that if senses tube failure, will automatically shut off and energize a relay or switch, permitting communication with external equipment, such as a backup pump or alarm. This eliminates polymer spills and cleanup. No false triggering is caused by condensation and washdown procedures. It is self-priming, and tube assemblies are stamped with clearly visible part numbers for simple reorder. It offers precise chemical feed to 124 gph, and a max working pressure of 100 psi. **714/893-8529; www.blue-white.com**

4. CLEARSPAN FABRIC STRUCTURES EXTRA-TALL BUILDING

The Round Super-Tall HD Building from ClearSpan Fabric Structures provides a structural solution for those in need of extra clearance

where equipment and machinery needs to be operated within the structure. It comes in three sizes that can be customized to meet any building requirements. The 25-foot-8-inch-tall building is 43 feet wide, the 30-foot-11-inch-tall building is 52 feet wide and the 34-foot-2-inch-tall building is 62 feet wide. Each size can be built as a freestanding structure or on pony walls. **866/643-1010; www.clearspan.com**

5. EZ RIG CRANE JIB BOOM ATTACHMENT

The Jib Boom attachment from EZ Rig Crane allows the user to reach up to 26 feet high and 12 feet out past the wheels while supporting weights up to 800 pounds. It can be used to lift motors, blowers, fans and mixers over pipes in tight places, eliminating needing to rig unsafe lifts to get into a difficult location. **805/643-4387; www.ezrigcrane.com tpo**

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- 2. Greener Planet Systems GPS Pro2 and BioPro bioaugmentation product series
- 3. Blue-White FLEXFLO A-100N polymer pump
- 4. ClearSpan Fabric Structures Round Super-Tall HD Building
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water: product spotlight



Radar level transmitters are cost-effective and easy to use

By Craig Mandli

FMR10 and FMR20
from Endress+Hauser

FMR10 and **FMR20 free space radar level transmitters** from **Endress+Hauser** can be used to measure liquid levels in storage tanks, open basins, open channels, weirs and canal systems. The FMR10 measures liquid levels at ranges up to 16 feet with 0.2-inch accuracy, while the FMR20 measures levels up to 66 feet with 0.08-inch accuracy.

“These transmitters are the best price/performance ratio for straightforward simple level measurement application,” says Gene Henry, Endress+Hauser’s level product manager. “Its radar technology can be used in situations where ultrasonic transmitters would have typically been used in the past.”

The FMR10 has a 4-20mA output and comes standard with Bluetooth for configuration. The SmartBlue App that runs on any Apple or Android smartphone or tablet will provide secure communications with the transmitter in order to configure or view envelope curves. The encrypted and password-protected Bluetooth wireless connection allows operators to monitor the sensor’s output and perform configurations in hazardous or unsafe locations without exposing personnel to dangerous conditions.

“Certainly the Bluetooth configuration feature is useful and is a timesaver for operators,” says Henry. “The ease of use and cost savings allows an operator to monitor levels in places they typically wouldn’t in the past. That gives them better control over their plant.”

Protection to IP66/68 and NEMA 4X/6P, hermetically sealed wiring, and fully potted electronics eliminate water ingress and allow operation under harsh environmental conditions. Both sensors are available with a flooding protection tube that prevents a loss of echo or signal, even if an overflow condition causes the sensor to be completely immersed.

“It’s a very compact, durable design with the entire inside encapsulated,” says Henry. “That way there is no internal condensation, increasing the unit’s overall life span.”

The level sensors work in process temperatures of -40 to 176 degrees F and process pressures of -14 to 43 psi, are vibration resistant, and have CSA/UL approvals. They are easy to set up, with just three main parameters and a remote indicator solution, resulting in time savings and enhanced safety. The feedback received from those using the transmitters in the field has been overwhelmingly positive.

“Operators love how easy they are to set up and configure, and the price point allows them to monitor tanks and other holding areas that they hadn’t been able to in the past,” says Henry. “The ability to see the envelope curve on a smartphone or iPad via Bluetooth greatly increases the diagnostic capabilities of the transmitters.”

888/363-7377; www.us.endress.com

wastewater: product spotlight

Versatile pump series added to Xylem’s rental offerings

By Craig Mandli

Flygt 3000 Series electric submersible pumps are now offered as a rental option, making them ideal for temporary bypass pumping projects at treatment plants and lift stations.

“Having rentals available makes them the perfect fit when work is being done on a treatment plant or lift station, or when a system is being upgraded,” says Stan Rockovich, Xylem’s submersible distribution manager. “The series is extremely versatile and can be used in a variety of applications.”

The Flygt 3000 Series of small and midsized pumps covers an extensive performance range and are classified as low-, medium- or high-head pumps. They are nonclog pumps, ideal for handling solids-bearing liquids in a variety of applications. The vast horsepower range enables the customer to meet the requirements of virtually any application.

“Flygt 3000 Series 240 hp pumps were recently used in a Philadelphia treatment plant to keep the flow intact while the screw pumps were being replaced,” says Rockovich. “They are available in a horsepower range from 2 to 470 hp, up to 16,000 gpm, with heads up to 400 feet.”

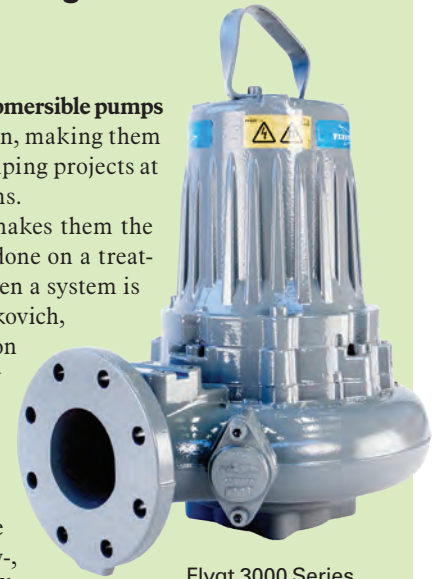
For municipalities that need to engage in lift station repairs or plant upgrades, Flygt 3000 Series submersible pumps are a cost-effective and environmentally friendly rental alternative that provides a quiet, efficient and easy-to-install bypass solution for many applications. They are available from rental locations around the U.S., along with hoses, HDPE piping, generators, as well as high-tech monitoring and control systems. The pumps’ N-technology impeller adds durability, making maintenance easy. It is designed to handle the stringy material that is prevalent in today’s influent streams.

“The pumps have a robust hard iron impeller that is self-cleaning, so there are no clogs or buildup,” says Rockovich. “It is corrosion and abrasion resistant, and offers a long life span, including several years of continuous use.”

Rockovich says that adding the versatile pump series to the company’s rental fleet makes sense on several levels. The durable units can be utilized during construction or upgrade work, are easy to maintain, have a small footprint, and are energy-efficient — a perfect temporary solution.

“The great thing is the small footprint allows the user to design his own bypass system,” he says. “Especially in areas that are tight on space, it makes a lot of sense.”

856/467-3636; www.xylem.com/dewatering/us/brands/flygt



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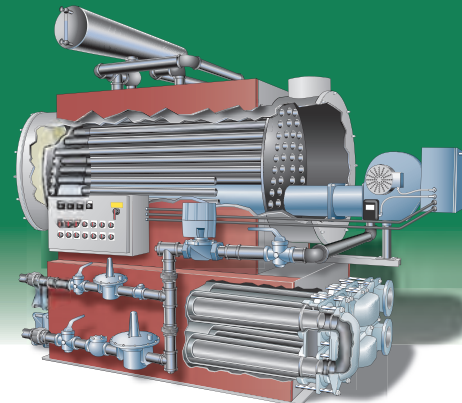
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people/awards

The city of Klamath Falls, Oregon, hired **Ray Busch** as wastewater division manager.

The village of **Breckenridge** received a \$521,063 grant from the Michigan Economic Development Corporation for improvements at its wastewater treatment facilities.

The city of **Jerome wastewater facility** received a 2016 Idaho Award for Leadership in Energy Efficiency. The most significant measure came after the wastewater department created its energy-saving team in 2012. The city installed timers on the blowers that aerate the mixed liquor to run them intermittently. The department also replaced motors with energy-efficient units and installed new heating and air conditioning systems.

The city of Jacksonville, Texas, hired **Randall Chandler** as utilities director, replacing David Brock, who retired.

The city of **Kiel wastewater treatment utility** received a \$500,000 grant from Wisconsin Focus on Energy to help pay for a biogas-fueled power generation system.

Jared Cummons of Bridgeport received the 2016 Glenn O. Fortney Operator of the Year Award from the West Virginia Water Environment Association. Cummons, a Class IV wastewater operator, has been the superintendent of utilities since 2010.

The city of Virginia Beach, Virginia, hired **Robert Montague** as director of public utilities.

The city of Norman (Oklahoma) Utilities Water Treatment Plant received four 2016 awards from the Oklahoma Water and Pollution Control Association: **Rachel Croft**, Laboratory Technician of the Year; **Greg Apperson**, Mechanic of the Year; **Scott Lewis**, Well Operator of the Year; **Neal Engleman**, Instrumentation Technician of the Year.

Geri Wellborn was promoted from laboratory manager to plant manager at the Norman (Oklahoma) Water Treatment Plant.

The city of **Murfreesboro (Tennessee) Water and Sewer Department** was designated as a Utility of the Future by water sector organizations including the National Association of Clean Water Agencies, the Water Environment Federation, the Water Environment Research Foundation and WaterReuse, with support from the U.S. EPA.

Adel Banoub, acting superintendent of the Woonsocket (Rhode Island) Wastewater Treatment Facility, received the 2016 New England Water Environment Association Alfred E. Peloquin Award for training initiatives and service to the association.

The city of **Jerome wastewater treatment facility** was recognized for excellence in energy efficiency at the 2016 Idaho Awards for Leadership in Energy Efficiency.

The city of **Glasgow** received the 2016 Montana Water Environment Association Small System Award.

The **Toppenwish Water System** was recognized for Best Tasting Water

events

Feb. 6-8

New York Water Environment Association Annual Meeting and Exhibition, New York Marriott Marquis. Visit www.nywea.org

Feb. 7-10

Water Environment Federation Utility Management Conference, Tampa (Florida) Marriott Waterside. Visit www.wef.org

Feb. 13-17

AMTA/AWWA Membrane Technology Conference and Exposition, Long Beach (California) Convention and Entertainment Center. Visit www.awwa.org

Feb. 15-16

Hawaii Section AWWA Annual Conference, Honolulu. Visit www.awwa-hi.org

Feb. 21-22

Michigan Water Environment Federation Borchardt Conference: Symposium on Advancements in Water and Wastewater, University of Michigan, Ann Arbor. Visit www.mi-wea.org

Feb. 22-25

Water & Wastewater Equipment, Treatment & Transport (WWETT) Show, Indiana Convention Center, Indianapolis. Visit www.wwettshow.com

in the state of Washington by the Evergreen Rural Water, the state's affiliate of the National Rural Water Association.

Travis Anderson, city of Clinton water production supervisor, received the A-Well Operator of the Year award from the North Carolina Water Operators Association.

The **Eastsound Water and Sewer District's Eastsound** and **Orcas Village Wastewater Treatment plants** and the **Rosario Resort Wastewater Treatment Plant** received Outstanding Wastewater Treatment Awards from the Washington Department of Ecology.

The **Broken Arrow** and **Muskogee Water Treatment plants** in Oklahoma received Water Fluoridation Quality Awards from the U.S. Centers for Disease Control and Prevention.

The **Muscle Shoals Water Department** received an Optimized Plant Award from the Alabama Department of Environmental Management and a Water Fluoridation Quality Award from the Alabama Department of Public Health.

The city of **El Dorado** was honored for the best-tasting water in the state by the AWWA Kansas section.

The city of **Akron Water Supply Plant** at Lake Rockwell Reservoir won the Ohio EPA Encouraging Environment Excellence Award for reducing waste, improving efficiency and continuously improving as an environmental steward.

Bob Green, city of Dubuque Water Department manager, received the Iowa Section AWWA Outstanding Service Award.

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