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MARCH 2015

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Chris Lambert
Public Utilities Senior Director,
Water/Wastewater Division
Clarksville, Tenn.



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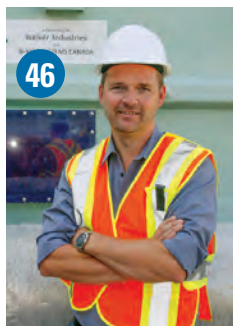
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on the cover

Chris Lambert and the team at the Clarksville (Tenn.) Wastewater Treatment Plant made a valiant recovery from a huge flood in May 2010. Days of heavy rain ultimately sent Cumberland River floodwaters over the top of a protective berm and into the plant's "bowl." More than four years later, the plant is still in recovery, though fully functional. (Photography by Sanford Myers)

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That Old Boy Scout Motto

Heroic efforts and long hours help treatment plants recover after storms and floods. But the really critical work — preparation — is done long before any storm is forecast.

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let's be clear

That Old Boy Scout Motto

HEROIC EFFORTS AND LONG HOURS HELP TREATMENT PLANTS RECOVER AFTER STORMS AND FLOODS. BUT THE REALLY CRITICAL WORK — PREPARATION — IS DONE LONG BEFORE ANY STORM IS FORECAST.

By Ted J. Rulseh, Editor



Were you a Boy Scout? If so, you know the motto: *Be prepared!*

If you went camping, you took along everything you needed. Clothing not just for today's weather but for anything that might reasonably come. Not just matches for starting fires — waterproof matches. Insect repellent in case of bugs. A first aid kit. Compass. Rope. An extra day's food rations. And more. You get the idea.

That Boy Scout motto is good to remember in many walks of life, including water and wastewater treatment. If you need proof, just look at some of the storms in recent years: Hurricane Katrina, Super-

storm Sandy. Plant teams affected by such storms worked heroically afterward to get back online. But the really critical work of recovery gets done before a storm ever shows up on the weather service radar.

CONSIDER CLARKSVILLE

Think about what happens in a severe flood. Your facility is underwater. You need emergency equipment like pumps and generators, but so does everyone else. The local supply can't come close to meeting the demand. If it's all committed by the time you call the dealers, you may be out of luck for a long time.

That's just one reason you need to prepare. The Clarksville (Tenn.) Wastewater Treatment Plant's experience (reported in this issue of TPO) illustrates others. The flood that hit Nashville and surroundings in spring of 2010 didn't get the notoriety of the huge hurricanes, but locally it was devastating. The Clarksville plant was under water for several days, and the recovery took years. In fact, it's still not complete.

It could have been much worse, though, if the plant's owner, Clarksville Gas & Water, hadn't heeded that Scout motto. The management and staff had a number of pieces in place that helped immensely in the crisis.

A QUICK CHECKLIST

How well prepared are you? Perhaps you're not in hurricane country and you're not especially vulnerable to flooding. Even then, what about an ice storm lasting days? How about a tornado or other freak windstorm? Any number of events can threaten serious damage and a long, painful process to restore service.

So, based on the experience of Clarksville and others that have "been there," here are a few questions to ask yourself while the weather is calm and dry.

- Are your critical computer records adequately backed up somewhere off site where a storm can't reach them?
- Are your critical electronic components in a basement or at ground level? Or somewhere above the flood line? Or flood-proofed in some other way?
- Do you have agreements with rental houses that let you stand first in line for pumps and generators in an emergency?

Perhaps you're not in hurricane country and you're not especially vulnerable to flooding. Even then, what about an ice storm lasting days? How about a tornado or other freak windstorm? Any number of events can threaten serious damage and a long, painful process to restore service.

- Do you have emergency policies that let you circumvent the usual slow, bureaucratic purchasing procedures at times when speed is of the essence? How long would it take you to generate a purchase order at crunch time?
- Do your team members know who to call, where to report and what to do as an emergency unfolds and in the hours and days just after?
- Do you have enough emergency power generation capacity? Are the generators in a high-and-dry location? How long could they run on the fuel you normally keep on hand? What if fallen trees and power lines across roads kept diesel fuel trucks from reaching you?

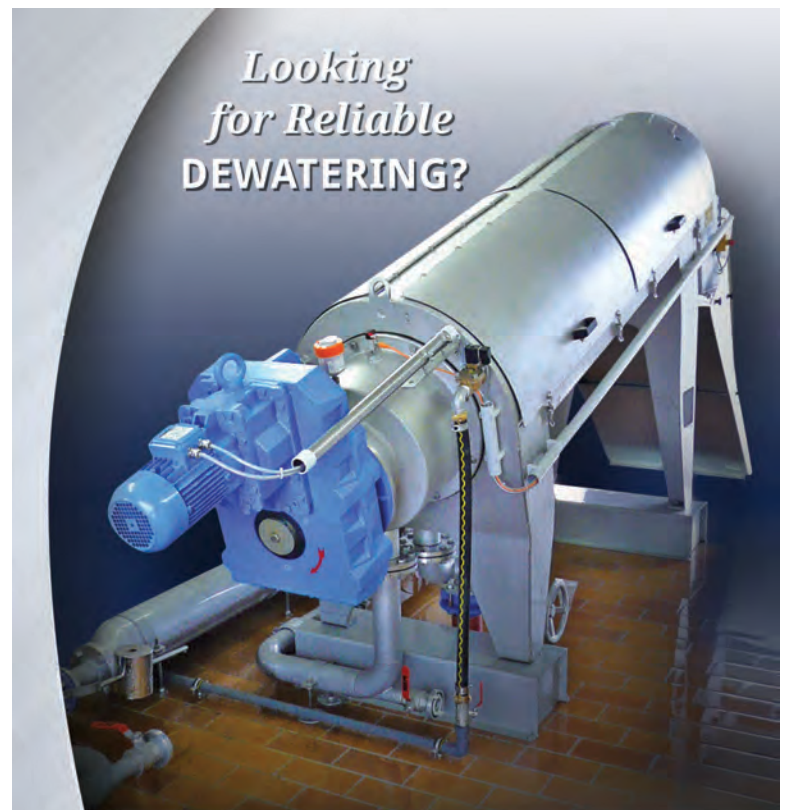
READY FOR THE WORST

That's just for starters. You'll need to ask and answer many more questions in putting together a sound emergency response plan. If you're inclined to say that's "not a priority right now," consider Clarksville's experience and think about the consequences of failure to plan.

Then remember: Those things that just can't happen? Sooner or later it seems they always do. Far better to have a plan and not need it than to need it and not have it. **tpo**

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FLIGHT PATH

5 Beautiful Wastewater Plant Aerials

What happens when a dedicated wastewater treatment plant operator earns his pilot's license? Answer: One of the most unique hobbies you can imagine. Learn more about this unusual mix of passions, and take a look at Marcel Tremblay's Top 5 treatment plants, as seen from his flying office.

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OVERHEARD ONLINE

"If we took a couple of people off the street ... most wouldn't know much about biosolids. Where's the disconnect? Why does everyone know that manure is a nutrient-rich supplement, but hardly anyone sees biosolids that way?"

Nathan Carr, Quasar account executive

Biosolids Battle: Quasar Talks Lessons Learned in New York
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COLOR ME CREATIVE

Paracord Bracelets Made Just for Operators

Operator ingenuity — or creativity — can come in so many shapes and forms. See how A. Taylor Musburger, a water treatment operator for the Town of Friday Harbor in San Juan Island, Wash., tells the story of water and wastewater treatment through colorful paracord bracelets. It's a hobby he wears proudly.

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TEXAS CONSERVATION

Where Brown is the New Green

In drought-conscious Texas, water conservation is front of mind. Find out how one community has managed to make brown the new envy of the neighborhood, and learn how "keeping up with the Joneses," no longer means lush grass and manicured lawns. With the help of a friendly neighborhood challenge, these residents are helping area aquifers and turning water conservation into a growing trend.

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Many hands have worked hard to make multiple improvements to the Biddeford facility. Plant team members have handled a great deal of the work in-house.

Taking It *Back*

A COASTAL MAINE COMMUNITY BUILDS
A MULTI-TALENTED TREATMENT PLANT TEAM
AND RESUMES CONTROL OF OPERATIONS
AFTER SEVERAL YEARS OF CONTRACTED SERVICE

STORY: **Ted J. Rulseh**
PHOTOGRAPHY: **Gabe Souza**

WHEN A CONTRACT OPERATOR TOOK CONTROL OF the City of Biddeford's clean-water plant, both sides knew the arrangement was temporary.

OMI, the operations arm of CH2M HILL, signed a contract to operate the city's treatment plants, collections system and lift stations in the early 1990s. In the years that followed, the city resumed operations, step by step.

The Biddeford Waste Water Treatment Facility came back under the city's charge in November 2009, and since then the plant team, led by Jeff Demers, assistant director of Public Works, Waste Water Division, has made numerous improvements that boost efficiency and performance.

The city didn't leap back in blindly. Demers, with Guy Casavant, director of Public Works, and Tom Milligan, P.E., city engineer and director of wastewater, first mapped out a strategy that began with building a team of professionals, each with essential skills, from plant and lab operation to trades like electrical, carpentry, plumbing and instrumentation.

The payoff is that the team has made substantial modifications and

upgrades largely in-house. "The city knew and OMI knew that they weren't here forever," Demers says. "They were here to get the city back in compliance, and they did that well. Once they got things situated, the city realized that with good staff we could run the plant again. The team we put together has saved the city a bunch of money. The work they've performed is just amazing."

GETTING PAST TROUBLE

Biddeford, a Maine beach community of about 20,000 half an hour south of Portland, has a 3.5 mgd (design) activated sludge treatment plant for the city proper and a 30,000 gpd rotating biological contactor plant that serves oceanfront properties in a tidal area known as Biddeford Pool, about six miles south of downtown. Demers and his team also operate and maintain nearly 40 miles of collections system and 24 pumping stations.

The city once was home to a large mill district with shoe, blanket and other clothing and textile manufacturing. Most of those industries have

City of Biddeford Waste Water Treatment Facility



“The team we put together has saved the city a bunch of money. The work they’ve performed is just amazing.”

JEFF DEMERS

The team at the Biddeford Waste Water Treatment Facility includes, from left, Mike Jones, John Sevigny, Ron Kinney, Steve Collomy, Alex Buechner, Jim Lewis, Jeff Demers, Tony Ellsworth, Jay Allen, Brian Phinney, Jon Koestner, Tom Milligan, Steve Demers, and Dan Laflamme.

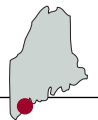
moved out and some mills have been converted to housing units, shops, restaurants and breweries. The sewer network has about 4,020 residential, 460 commercial and 12 significant industrial users.

The main treatment plant was built in 1962. By the early 1990s it had fallen out of repair and out of date and its effluent out of compliance. From 1996 to 1998, under OMI’s direction, Biddeford completed a major treatment plant upgrade, ordered by the U.S. EPA. The new plant included an activated biotower upstream of two aeration basins, followed by a pair of secondary clarifiers. “All the buildings were replaced except one,” says Demers. “The one that stayed was the dewatering building, which ended up with two belt filter presses.”

TUNING THE PROCESS

Engineers chose the biotower for its ability to treat industrial flows and resist toxic shock loadings. “BOD and TSS were in the low teens after the tower,” says Dan Laflamme, chief operator. “At that point the aeration basins

City of Biddeford (Maine) Waste Water Treatment Facility



BUILT: | 1962, upgrade 1998

POPULATION SERVED: | 20,000

FLOWS: | 3.5 mgd design, 2.6 mgd average

TREATMENT LEVEL: | Secondary

TREATMENT PROCESS: | Activated sludge

RECEIVING WATER: | Saco River

BIOSOLIDS: | Landfilled

ANNUAL BUDGET: | \$1.52 million (operations)

WEBSITE: | www.biddefordmaine.org

GPS COORDINATES: | Latitude: 43°30'11.30"N; longitude: 70°27'8.64"W



Steve Collomy (left) and Jon Koestner change out a motor on a water strainer (S.P. Kinney) — just one example of the tasks the plant team has handled without outside assistance.

**Biddeford Waste Water Treatment Facility
PERMIT AND PERFORMANCE**

	INFLUENT	PERMIT	EFFLUENT
BOD	100-150 mg/L	30 mg/L monthly average 45 mg/L weekly average 50 mg/L daily maximum	10 mg/L
TSS	100-150 mg/L	30 mg/L monthly average 45 mg/L weekly average 50 mg/L daily maximum	10 mg/L



Jon Koestner (left) and Steve Demers check the cake consistency in the Huber screw press during normal maintenance rounds.

were almost a polishing treatment before the clarifiers.”

In 2012, seeing greatly reduced industrial flows, the plant team took the biotower offline. “We get good treatment straight from the basins and we save a lot of energy,” says Laflamme. “We used to run two or three pumps under normal flow. We used a 75 hp pump just to lift influent to the top of the tower. Now we typically modulate one pump [to feed the aeration basins].”

Treatment starts with a pair of traveling bar screens with rakes (Lake-side Equipment), each designed for 10 mgd, the plant’s peak design flow. Next comes a two-channel PISTA Grit system (Smith & Loveless), also sized for 10 mgd. Water from that system enters a single channel leading to an influent pumping station with four 75 hp pumps (Flygt – a Xylem Brand).

A 125 hp centrifugal blower (Hoffman) and a 100 hp turbo blower (APG-Neuros) feed air to the aeration basins. The city has ordered two EE-pac high-efficiency screw blowers (Universal Blower Pac) with an operating range of 400 to 2,000 scfm at 8.3 psig to replace the Neuros blower; the Hoffman unit will remain as a backup unit.

The blowers feed air to the basins by way of fine-bubble diffusers (Sani-taire). The flow then proceeds to two 80-foot-diameter secondary clarifiers (Ovivo and FMC). Secondary effluent is disinfected with chlorine and dechlorinated with sodium bisulfite. Final effluent discharges to a tidal zone of the Saco River.

Two rotary lobe pumps (Boerger) alternately draw waste activated sludge from the clarifiers and deliver it to a pair of 20,000-gallon holding tanks, “small for a facility our size,” says Demers. That material is dewatered on a

pair of inclined screw presses (Huber Technology). The resulting cake at 24 percent solids (350 dry tons per year) is hauled to a landfill by Public Works staff. The plant team is exploring composting at a nearby contract facility.

RESUMING CONTROL

Demers came to Biddeford in 1995 as an OMI employee; the city hired him a year later as it took over responsibility for the collections system. “We worked on the system for a couple of years and made some nice improvements,” Demers recalls. “A few years later the city decided to take the pump stations back. During that process, we implemented a new SCADA system and did some pretty intensive vacuuming of the sewers. Our crew received a 2006 achievement award from the state Department of Environmental Protection [DEP].”

In 2002, the city resumed operations of the Biddeford Pool treatment plant. “In 2009, we decided to take on the big bear here at the main treatment facility,” says Demers. “The challenge was show-

“As a Biddeford taxpayer, I’m pleased to know the people working here have the best interests of the city and the plant at heart. I’ve seen a lot of plants, and I really like the attitude and the motivation I see here.”

DAN LAFLAMME

ing that we could do it, and do it cost-effectively. I can tell you we have done both. The DEP is very happy with what we have done here, and the city fathers are happy as well. In our five years running it, we have saved about \$850,000 in operating costs.”


A strong team made it happen. “Guy, Tom and I


sat down and figured out what we needed to run the plant,” says Demers. “We looked at our staff and the skills they had, looked at the budget, and came up with the positions and the skills we thought were necessary.”

Then came the hiring: “We knew, No. 1, that we needed a good person who could wrap arms around operations and compliance. That’s where Dan Laflamme came in.” At the time Laflamme was an electrician for the South Portland treatment plant. He had worked on a number of treatment plants and pump stations while with a construction company and while self-employed for several years as an electrical contractor.

Demers observes, “Dan is a great operator and his knowledge from working at several plants and seeing how they’re run has really helped us a lot. And if we have an electrical issue we need to iron out quickly, he will put his electrician’s belt on and help us.”

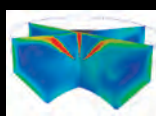
The city also brought on two OMI employees: Tony Ellsworth, lead operator who also keeps the plant’s safety program on track, and Alex Buechner,







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BEYOND THE PLANT

The collections crew has been integral to the success of Biddeford’s wastewater system since the city resumed control after a period of contract operation.

“The street crew is very important to us,” says Jeff Demers, assistant director of Public Works, Waste Water Division. “We have a combination unit out there for cleaning catch basins and scum pits and jetting lines. If we need something done here at the plant, they come with the boom truck and help us. We have a pump station team of two guys who do an excellent job.”

The collection system team includes Ron Kinney, supervisor; Jeremy Court, sewer system technician; Jason Buda, sewer system utility specialist; Jay Allen, sewer system operator; and Mike Jones and John Sevigny, pump station technicians.



Jeff Demers,
assistant director of
Public Works, Waste
Water Division

lab technician who has helped keep the facility in compliance through various upgrades while helping reorganize the maintenance program and the operations daily manual.

“We were also fortunate to hire Steve Collomy as a maintenance technician,” says Demers. “He had worked 17 years with the DPW and had spent two years in North Carolina working on a NASCAR team. He’s an excellent fabricator and welder, the kind of all-around guy you need in this environment.”

Jon Koestner came on board in a utility maintenance and press operator role. A plumber by training, he previously worked for a plumbing contractor. “We were doing a lot of plumbing work in this plant,” says Demers. “Jon has surprised Dan and me with some of the projects he has completed for us.”

Jim Lewis, plant operator and pump station technician, spends two hours a day at the Biddeford Pool plant and the balance at the main plant and in the field. He also helps with electrical issues, carpentry and handyman projects. Brian Phinney is the environmental code officer and industrial pretreatment coordinator. Steve Demers (no relation to Jeff) is an assistant press operator and groundskeeper.



Alex Buechner sets up a BOD test in the lab.

GETTING TO WORK

The team has made multiple and far-reaching improvements. The biggest was a dewatering upgrade that replaced two aging belt filter presses with the screw presses. “People had to watch the filter presses constantly and there were a lot of breakdowns. They were producing cake at about 15 to 16 percent. We wanted to improve that and save money in hauling.”

The new presses run largely unattended and dewater around the clock, spreading out the power consumption as opposed to operating during the day shift and driving up on-peak electric power demand. The two presses

“The challenge was showing that we could do it, and do it cost-effectively. I can tell you we have done both.”

JEFF DEMERS

provide redundancy to protect the plant’s 40,000-gallon total sludge storage capacity.

“We waste about 15,000 gallons per day, so we can’t be down for very long,” Laflamme says.

“In addition to the screw presses, we bought a rotary drum thickener (BDP Industries). If we ever get in trouble for sludge storage, we’ll be able to thicken 1 percent solids waste activated sludge to 5 percent and get five times the room.”

The team completed the installations in-house with some outside engineering support and with contractors’ help on the concrete and electrical work. “Our team did the rest — laying the electrical conduit, all the steel work, the piping, the setting of the presses, the conveyors,” Demers says.

MORE IMPROVEMENTS

That’s just one example of the team’s ingenuity. They also made changes that helped reduce combined sewer overflows (CSOs) to the river. “There was a float arm and a modulating gate valve that limited our flow so that the plant wouldn’t get washed out,” says Laflamme. “It limited the flow to between 9 and 10 mgd, above which there were times we would bypass.”

“We were comfortable that the plant could handle more flow. So we installed a gate valve with an actuator. Now, with remote access from our SCADA system, any of our operators can go online and modulate that valve. So we’re inclined to take flows of up to 14 mgd, while keeping an eye on our blankets. That has cut down drastically on our CSO events.” A 2-million-gallon CSO capture tank provides further assurance against bypassing. “We’ve had maybe two or three events in the past three years,” Demers says.

The team’s other plant improvements include:

- Adding automated valves in the two influent channels so that each channel can be closed for maintenance when required. Another valve

(continued)

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just before the influent screen allows the entire flow to be diverted to the CSO holding tank in case the plant receives a toxic shock load.

- Replacing a process water skid (for in-plant effluent reuse) that was an “energy hog” with three 30 hp pumps that ran regardless of water demand. The new skid has three 15 hp pumps with variable-frequency drives that provide pressure and flow only when needed.
- Building a new SCADA system with FactoryTalk software (Rockwell Automation) with help from a local contractor. “We walked him through what we wanted to see on the screens and how we wanted the ladder logic to work,” says Demers. “He made it happen for us.”
- Changing the waste activated sludge piping so that material for dewatering can be drawn from the holding tanks or directly from the clarifiers.
- Adding a Monashell system (Anua) that processes foul air from the sludge storage tanks and dump container area, reducing odor issues in the plant’s residential neighborhood.

KEEPING IT TOGETHER

With the plant on a sound footing, Demers concentrates on keeping his team in place. Friday meetings provide a place to review the next week’s tasks and to air out issues as a group.

“When we put this team together, we decided to offer competitive rates of pay,” says Demers. “Our people are paid well, they get a great benefit package and we treat them well. Everybody is a team player. We aim to keep these people around for the long term.”

Laflamme observes, “I wish I could put into words how happy I am with the team. As a Biddeford taxpayer, I’m pleased to know the people working here have the best interests of the city and the plant at heart. I’ve seen a lot of plants, and I really like the attitude and the motivation I see here.” **tpo**

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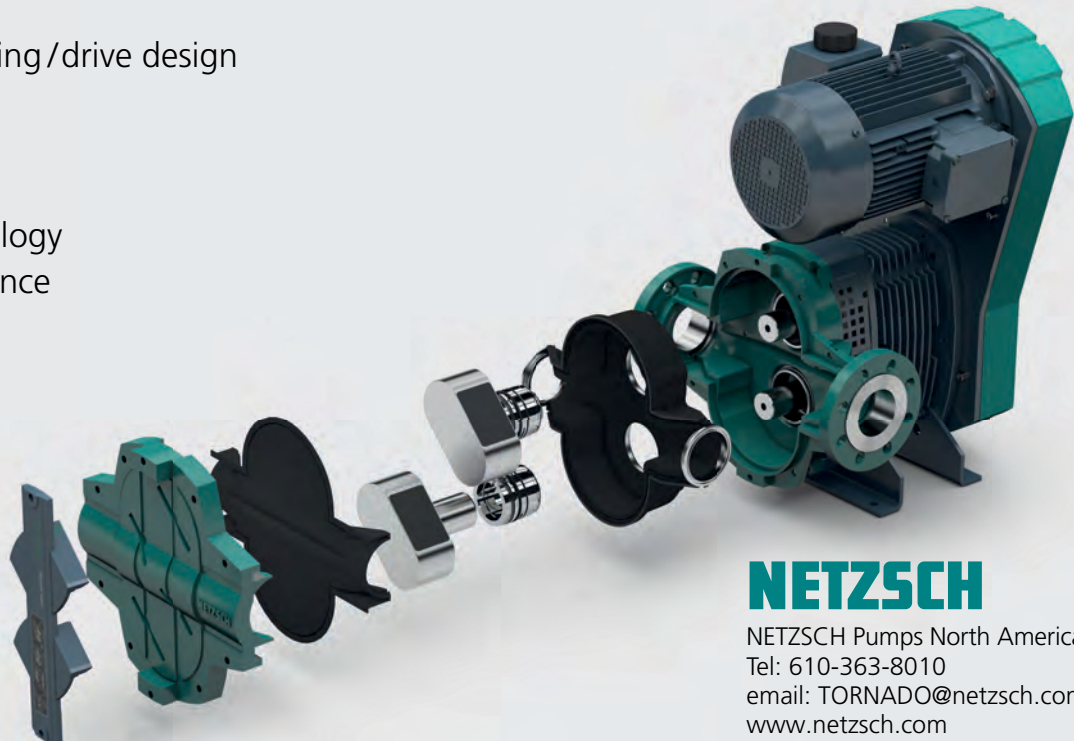
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PHOTOS COURTESY OF WEST VIRGINIA AMERICAN WATER

West Virginia American Water employees Richard Bishop, left, and Mike Staley help children repair a “leaky” pipe during WaterFest.

The Human Side of Water

A WATERFEST HELPS WEST VIRGINIA AMERICAN WATER HEAL WOUNDS AFTER A LEAK FROM A CHEMICAL COMPANY CONTAMINATED CHARLESTON’S WATER SUPPLY

By Craig Mandli

While dealing with the fallout from a large chemical leak near its source water intake, West Virginia American Water decided the best response was transparency.

That’s why last August, for the first time since 1986, the company opened its Kanawha Valley Water Treatment Plant in downtown Charleston to the public in a WaterFest event.

“There’s been a lot of interest from the public about what goes on inside the walls of our plants,” says Laura Jordan, the external affairs manager. “We thought that if people could see for themselves what happens in a plant and meet the people behind the process of treating their water, it may start to ease some of their concerns.”

FINDING THE POSITIVE

Those concerns arose after Jan. 9, 2014, when a tank owned by Freedom Industries sprung a leak, discharging more than 10,000 gallons of chemicals into the Elk River near the treatment plant’s only intake. The coal-cleaning chemical Crude MCHM got into the system and contaminated the tap water for 300,000 people.

One positive amid the negative was that citizens began asking questions about what truly comes out of their taps. “The feedback we received from customers over the six months after the spill is that they are increasingly interested in how water is treated and delivered,” says Jeff McIntyre, com-

pany president. “WaterFest was an excellent opportunity for anyone interested in learning more about our drinking water and experiencing the human side of water.”

FAMILY FRIENDLY

The free festival and open house offered water treatment plant tours, educational demonstrations, children’s activities, face painting and refreshments. A Splash Zone for children featured water games, an inflatable water slide and slip-and-slides.

Young attendees could help “fix” a water leak, climb on heavy equipment and vehicles, learn how a water meter works, and use a fire hose to help extinguish a “fire.” Community partners including the Charleston Fire Department, Clay Center for the Arts & Sciences, West Virginia Rivers Coalition and Dollar Energy Fund shared space in a Water Wise tent with more activities and information about how they work together in the world of water.

“We registered around 300 participants, which is right where we were aiming for attendance,” says Jordan. “All received a WaterFest passport and earned a sticker for each educational opportunity they participated in. When they received five stickers, they got a water bottle. (continued)

What’s Your Story?

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

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A tour group examines a clarifier at the Kanawha Valley Water Treatment Plant.



The West Virginia Rivers Coalition provided a fun, educational tool on watersheds.

“ We did have some tough questions, but we answered them as thoroughly as we could. The biggest take-away we tried to offer was an appreciation for the value of water — normally something people take for granted. You can turn on your tap and get it for a penny per gallon, but there’s a lot behind it.”

LAURA JORDAN

“The kids were all very excited, and most participated in everything. A lot of families with kids also took the plant tour, which we weren’t expecting. It was great to see so many people interested in learning.”

TOUGH QUESTIONS

Some attendees did have pointed questions for the plant staff, mostly about the safety of water seven months after the chemical leak. Even though Crude MCHM was no longer detectable in the water system, some still didn’t feel comfortable drinking tap water.

“We did have some tough questions, but we answered them as thoroughly as we could,” says Jordan. “The biggest take-away we tried to offer was an appreciation for the value of water — normally something people take for granted. You can turn on your tap and get it for a penny per gallon, but there’s a lot behind it.”

COMMUNITY SUPPORT

West Virginia American Water, a private company that operates nine plants in the state, works hand-in-hand with public entities and municipal

decision-makers to ensure clean potable water. Those partnerships were on display at WaterFest, as the Charleston Fire Department offered children the chance to extinguish a “fire” while the local sheriff’s department offered a lesson in fingerprinting.

“We want to be involved in the community and enjoy the opportunities to let people know what we do,” says Jordan. “We’ve been asked to talk with scout troops, give classroom presentations and set up educational displays at charitable functions like run/walks and outdoor festivals. We try to drive home the idea that water shouldn’t be taken for granted and should be conserved.”

FUTURE EVENTS

Encouraged by the attendance and positive feedback, the company is considering making WaterFest an annual event shared among its nine facilities. Jordan hopes other treatment facilities follow suit.

“For us, WaterFest was born out of a negative situation, but it turned into a terrific opportunity to interact with our customers and really give them the chance to meet the human side of their water,” she says. “I’d definitely encourage others to do it

often and would be happy to answer any questions or assist any plant that wants to do outreach. It’s certainly worth all the time and effort. People want to learn.” **tpo**

The Charleston Fire Department participates in WaterFest 2014.



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At the *Head of the Class*

THE VALDOSTA WATER TREATMENT PLANT SCORED HIGH ACROSS THE BOARD IN A DETAILED ASSESSMENT FOR A STATEWIDE PLANT OF THE YEAR AWARD COMPETITION

STORY: **Jim Force**

PHOTOGRAPHY: **Kaylinn Gilstrap**

OZONE IS ONLY ONE REASON THE VALDOSTA WATER Treatment Plant ranks as exceptional in Georgia. It won the 2013 Plant of the Year Award from the Georgia Association of Water Professionals (GAWP) for excellence across the board, including well field operations, chemical processes and documentation, scoring 90 percent or better in all areas.

“We were the first plant in the state to use ozone to oxidize organics in drinking-water treatment,” says Craig Dozier, plant superintendent. “Visitors from plants from the Atlanta area and others came to see ours in operation before considering ozone in their processes.”

During the visits, they might have noticed Valdosta’s other strengths: safety and training procedures, operations manuals, energy conservation and more. On all counts, Valdosta ranked at or near the top among Georgia groundwater systems pumping more than 10 mgd.

“The competition is tight,” says Pamela Burnett, GAWP executive director. “For groundwater treatment facilities, the checklist includes assessment of 43 items on documentation and paperwork, 23 on system monitoring, 22 on the laboratory and 85 for each well. No permitting violations are allowed.”

The honor brought praise from city officials. “Every day thousands of customers in our city turn on their faucets with little thought to the water



“The competition is tight. For groundwater treatment facilities, the checklist includes assessment of 43 items on documentation and paperwork, 23 on system monitoring, 22 on the laboratory and 85 for each well.”

PAMELA BURNETT

Rigorous operations and maintenance procedures help the Valdosta staff keep the water plant functioning smoothly and producing water at affordable rates.





NURTURING WELLS

Valdosta treats its groundwater wells with tender loving care, making sure of their integrity while planning for the area's future water needs.



Craig Dozier, water plant superintendent

The wells date to 1992 and improvements continue, making sure surface water does not contaminate the groundwater supply. Seven wells provide the raw water to the Valdosta treatment plant. Well 7 is being renovated and two new wells are on the drawing board, aimed at preparing the city for residential and commercial growth over the next 10 years.

"We have installed new steel casings and new pumps to make sure we keep surface water out of the wells," says Craig Dozier, water plant superintendent. "Our river disappears underground at places, and there's a danger of surface water getting down into the aquifer." The wells are near the treatment plant: The closest is just 150 yards away.

The wells were located after a geological study in an effort to limit the risk of surface water intrusion. "Surface water shouldn't get in," Dozier says. "But there's always a possibility."

The plant's air strippers remove hydrogen sulfide from the raw water (Indusco Environmental).



Valdosta (Ga.) Water Treatment Plant

BUILT: | 1992 (upgraded 2007)

SERVICE AREA: | City of Valdosta, water sales to Lowndes County

POPULATION SERVED: | 57,000

SOURCE WATER: | 7 groundwater wells

TREATMENT PROCESS: | Ozone

TREATMENT CAPACITY: | 22.5 mgd (10 mgd average)

INFRASTRUCTURE: | 300 miles of distribution lines, 3 elevated storage tanks

SYSTEM STORAGE: | 8.5 million gallons

ANNUAL BUDGET: | \$1.73 million

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that streams out and how it moves from its source through the treatment process and ultimately to their taps," says Henry Hicks, Valdosta director of utilities. He commends Dozier, along with Jason Barnes, assistant superintendent, and the "other skilled men and women responsible for bringing Valdosta water customers quality drinking water every day."

THE WINNING SYSTEM

Expanded and upgraded in 2007, the Valdosta water plant pumps about 10 mgd on average and has a capacity of 22.5 mgd. The water comes from a

well field near the treatment plant. Seven wells (two more are planned) each draw about 1,500 gpd from the porous limestone that forms the Upper Floridian Aquifer 200 to 400 feet below the surface.

Besides Dozier and Barnes, the staff includes Randy Jones, maintenance supervisor; Charlie Marsh, maintenance helper; Victor Durden, Russell McBride, Kenneth Hadley, Kathy Chavez, Brian Sunbom and Steve Patel-ski, operators; and Phillip Walker and Kenneth Hughes, lab analysts.

At the treatment plant, air strippers (Indusco Environmental) remove hydrogen sulfide, and then the water is treated with ozone produced on site. The ozone generators (WEDECO) combine oxygen and water to produce the gas. "There's lots of sulfur in the water and the smell is objectionable to people, so we strip it out," says Dozier. "That also reduces the ozone needed to eliminate the hydrogen sulfide. Without the strippers we'd use a lot more ozone."

Phosphate is added for corrosion control and chemicals are introduced to maintain the desired pH. Fluoride is also added. The finished water is disinfected with sodium hypochlorite, which replaced chlorine gas for safety reasons. Valdosta generates the hypochlorite on site but is evaluating a switch to purchasing the chemical.

The treatment plant site includes three 1.5-million-gallon inground reservoirs, and the city maintains three elevated storage tanks, one brand-new, that total 4 million gallons in capacity.

The distribution system consists of 300 miles of piping, including a 6-mile transmission line completed in 2012. An 11-member staff operates the system around the clock. All processes, including the distribution system and the water levels in all elevated tanks, are monitored and controlled by a SCADA system.

MEETING CHALLENGES

Running the system means facing daily challenges that include dealing with surface water intrusion and naturally occurring groundwater impurities. The Withlacoochee River flows south through the Valdosta area into Florida, and in some sections it "disappears" beneath the ground. In addition, the limestone aquifer has cracks, solution channels and caverns that can allow surface water to enter and affect the water supply.

The water in the aquifer moves slowly through the limestone: Travel time from the point where the river goes underground to the well field has been measured at up to 75 years. Nonetheless, the Valdosta team needs to guard against surface water influence in the wells. The groundwater itself contains sulfides, organics, iron and manganese.

"The water treatment plant was moved from downtown to the current site northeast of the city in 1992 to get away from surface water influence," says Dozier. In 2007 the plant was upgraded to sodium hypochlorite disinfection and two ozone generators were added, joining three older generators. The new setup includes a pair of contactors, one of which is normally in service. In summer when volume picks up, the flow is split and both contactors are used, producing a more effective ozone contact time.

For preventive maintenance, the Valdosta staff inspects each side of the ozone contact basin every six months, closely following confined-space safety practices. "We notify the fire department every time we go down," says Barnes.

The sodium hypochlorite is produced in a ClorTec system (Severn Trent Services). Brine is delivered by truck. Finished product is stored in three tanks at the plant. The staff uses muriatic acid to clean the electrodes in the hypochlorite generators. Water leaving the plant has a chlorine concentration of 1.8 parts per million. "We're evaluating the on-site process to see if it's still cost-effective to make our own sodium hypochlorite versus buying it," Barnes says.

“There's lots of sulfur in the water and the smell is objectionable to people, so we strip it out. That also reduces the ozone needed to eliminate the hydrogen sulfide. Without the strippers we'd use a lot more ozone.”

CRAIG DOZIER

(continued)

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Steve Patelski checks the Hankison nitrogen boost system (SPX) that operates in conjunction with the plant's ozone generation process.

LIMITING WATER LOSS

Valdosta protects its investment in clean water by monitoring the distribution system for leaks, breaks and excess usage. A regular water loss audit helps spot problems. "We monitor how much we're pumping versus how much we're selling," says Barnes. "We pump 3 billion gallons a year, and there's some water loss — up to 30 percent. We're working to get a handle on it."

Maintenance and monitoring are important. The team closely watches water used by the parks and fire departments as well as in the flushing of mains. "We train the fire department in how much water they're using during training exercises," says Barnes. "We put a monitor on it and measure how much is going down the storm drain."



The Valdosta plant team includes, from left, Charlie Marsh, maintenance helper; Craig Dozier, superintendent; Steve Patelski, operator; Jason Barnes, assistant superintendent; Victor Durden, operator; and Randy Jones, maintenance supervisor. Not pictured are Kathy Chavez, Russell McBride, Brian Sunbom and Kenneth Hadley, operators; and Kenneth Hughes and Phillip Walker, lab analysts.



Ozone generators, including this WEDECO Model PDO-3000Y, contribute to the plant's disinfection process.

Valdosta uses a computerized maintenance management system (Hyperweb). "We've had it for roughly four years," say Randy Jones, maintenance supervisor. "We generate all our work orders and preventive maintenance tasks with it, and it provides us with a historical data bank on all our equipment." The city still uses manual-read and touch-read water meters but is considering an automated system.

PURSuing QUALITY

The overriding goal is to provide the best quality water as cost-effectively as possible to Valdosta's 57,000 residents. The improvements and recent capital investment help: The city's water rates are lower than those of at least 100 other utilities of all sizes in the state.

The Valdosta plant deserves its award-winning status, GAWP's Burnett affirms. "The fact that the plant had no permit violations in 2013 and that it received a score of at least 90 percent on the inspection review made it exceptional," she says. "The award recognizes the exceptional quality water that is delivered to customers of the Valdosta system and also recognizes the water professionals at work in the city every day." **tpo**

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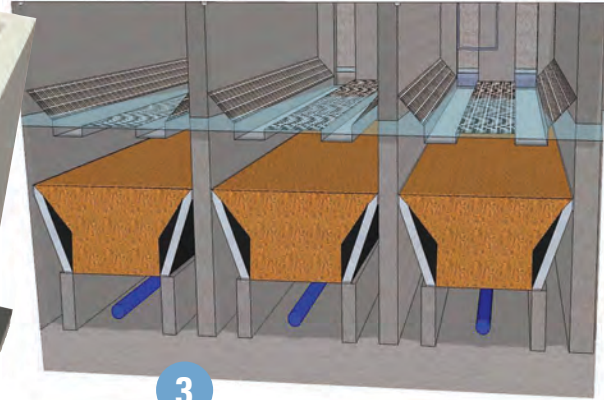
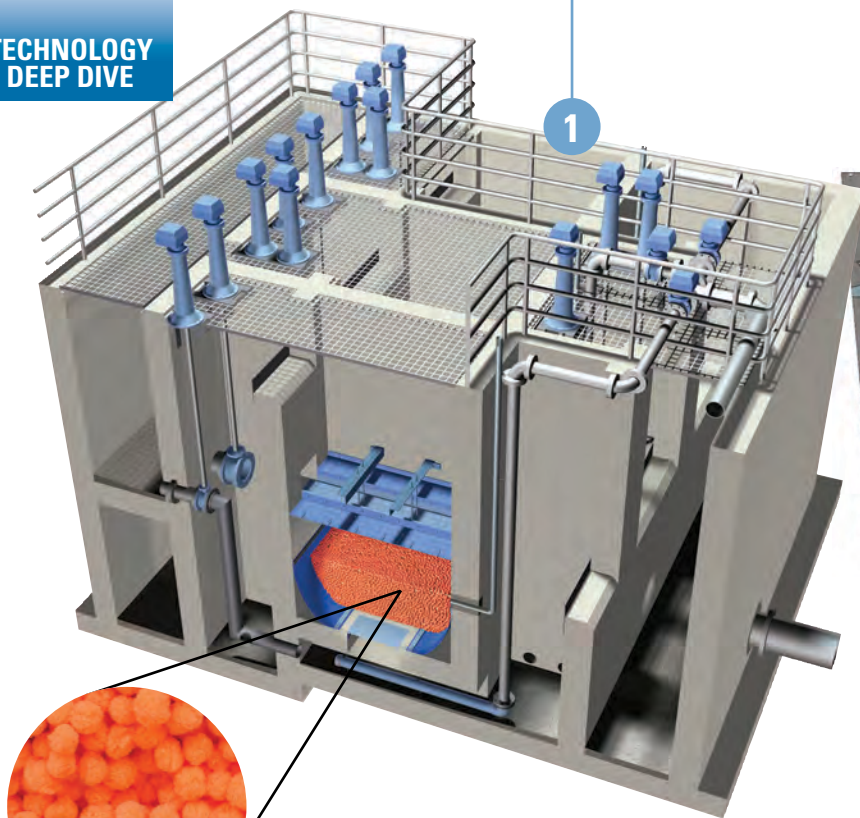
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- 1) The FlexFilter is a passive system that allows a plant to treat flows without requiring more operators or the addition of chemicals.
- 2) The compressible media consists of balls of a bicomponent fiber.
- 3) Cross-section diagram shows the overall system configuration.
- 4) A WWETCO FlexFilter system installed in the field.

Flexible Filtration

A HIGH-RATE COMPRESSIBLE-MEDIA FILTER FROM WESTECH CAN PROVIDE TERTIARY TREATMENT, THEN EASILY SWITCH TO TREAT PERIODIC WET-WEATHER CSO AND SSO FLOWS

By Ted J. Rulseh

Clean-water agencies charged with treating heavy flows from storm events face large capital investments for processes they may use only a few times per year.

Now, WesTech Engineering offers a filtration technology that can treat flows with a wide range of TSS content. It is flexible enough to provide continuous tertiary treatment during dry-weather flow conditions, yet switch over easily to handle weather-related flows such as combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs).

The WWETCO FlexFilter is a gravity-flow system that uses compressible media. The varied porosity of the filter bed allows the system to treat flows both high and low in solids. Its passive design requires no chemical additions and it functions with minimal operator attention.

WWETCO operates as a wholly owned subsidiary of WesTech. Jim Hanson, vice president and national sales manager for municipal products with WesTech and also president of WWETCO, talked about the technology in an interview with *Treatment Plant Operator*.

tpo: What need is this technology intended to fulfill?

Hanson: Municipalities are challenged with tighter regulations while their staffs often are decreasing through attrition. They are having to do

more with less. This is a passive system that allows a plant to treat flows without requiring more operators or the addition of chemicals.

tpo: How does this filtration technology function in a combined role in tertiary treatment and in treating higher flows like CSOs and SSOs?

Hanson: Municipalities dealing with CSOs and SSOs face large capital investments and major construction to treat flows that only occur a few times a year. The beauty of the FlexFilter is that it can be used for tertiary treatment and then flip to the CSO or SSO mode seamlessly and automatically. One day it functions as a tertiary filter producing reuse-quality water. Then when you have a storm event, it simply switches over. It's a way for plants to make use of that capital investment for wet-weather flows 365 days a year.

tpo: What other applications are appropriate for this technology?

Hanson: We can do primary treatment — the filter will handle a high solids loading and hold a large volume of solids before it requires a backwash. We can also handle stormwater treatment, raw water pretreatment for drinking water systems and industrial water pretreatment, either for incoming plant water or ahead of ultrafiltration or reverse osmosis membranes. In

essence, anything a traditional gravity media filter or a sand media pressure filter can accomplish.

tpo: What does the compressible filter media consist of?

Hanson: The media consists of balls of a bicomponent fiber. There are 15,000 individual fibers stapled together to create each single ball.

tpo: How does the filtration process work?

Hanson: Our process uses no mechanical actuators or other moving parts. We rely on incoming hydraulic forces. The water coming in onto a flexible membrane actually squeezes the media, causing the compression. Once the water overflows into the media, the filtration process begins. There is no ramp-up period after bringing the system online. It treats the flow in a natural and passive way. You get the desired level of treatment right out of the gate until you shut it down.

“Municipalities are challenged with tighter regulations while their staffs often are decreasing through attrition. They are having to do more with less. This is a passive system that allows a plant to treat flows without requiring more operators or the addition of chemicals.”

JIM HANSON

tpo: How exactly does the compressible media capture the solids?

Hanson: As the bladder compresses the media, it creates a compression gradient from the bottom of the media to the top. The bottom is compressed the most, and the top of the media bed is actually under no compression. The larger particles are captured by the loosely compressed or uncompressed media, and the finer particles are captured down deeper where the media bed is at its highest compression. It's the pressure gradient that allows the filter to capture a high volume of solids.

tpo: What happens during the backwash cycle?

Hanson: When the filter needs to be backwashed, it's simply drained down. The flexible membrane relaxes, the media bed becomes decompressed, a low-pressure blower is activated along with a little backwash water, and the solids are carried off through an airlift pumping action.

tpo: Do you have an example of how this filter has performed in field conditions?

Hanson: The City of Springfield, Ohio, ran a pilot test from October 2010 to June 2011 in which they treated 16 wet-weather CSO events. The influent TSS in those events ranged from as high as 500 mg/L to as low as 150 mg/L. The filter produced an average effluent TSS of 22 mg/L. During that pilot study, they did short-duration and long-duration tests. They even ran the filter through the winter with the media effectively frozen at the start of the wet-weather event.

tpo: Based on the test results, did the city install the technology in full scale?

Hanson: It has been installed, and it started up in late 2014. This was an evaluated bid process in which the city evaluated three competing technologies. Three members of the city staff and three representatives from the city's engineering consultants rated 14 weighted factors on a scale from one to five. Those that most differentiated our technology were the fact they would not have to increase plant staff, the simplicity of the process and the equipment's operation, the fact that the process uses no chemicals, the system's ability to passively ramp up and turn down, and the future capacity for tertiary filtration during dry weather, should they choose to operate the system for that purpose. **tpo**



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Money in the Bank

A CALIFORNIA DISTRICT'S \$4 MILLION UPGRADE PROJECT COMBINES LONG-TERM, GUARANTEED ENERGY SAVINGS WITH IMPROVED OPERATIONAL PERFORMANCE AND FLEXIBILITY

By Doug Day

The East Valley Water District can count on one thing for the next 10 years: significant guaranteed savings through an energy performance contract.

“One of the major costs we have to manage is electricity,” says John Mura, general manager and CEO of the district, in Highland, Calif. The performance contract with Honeywell, signed in February 2014, will help the district control its energy budget and improve performance. “We were able to do \$4 million in energy-efficiency projects that result in \$523,000 a year in guaranteed savings,” says Mura. “The bigger benefit for us is the operational flexibility we were looking for.”

East Valley provides water and sewer service to about 95,000 people in Highland, San Bernardino and nearby rural areas. As the district has grown since 1954, leadership made many decisions based solely on serving areas as they developed.

“We had some major system constraints that prevented us from doing things in the most efficient and reliable ways,” says Mura. “This really started out as a way to optimize our system and then morphed into both: We can optimize and have the benefits of efficiency and operational control, while also saving significantly on electrical costs. In less than a year from conception, we’ve completed the projects and are seeing the savings. The operators have controls we didn’t have in the past to better serve our community.”

LIMITED SOURCES

East Valley has three sources of water. About 83 percent comes from groundwater and the rest from the Santa Anna River (15 percent) or from imports through the California State Water Project (2 percent).

“All of our groundwater production is on the west side of our service territory, which is at the lowest elevation,” says Mura. “Most of our new home development is on the east side at a higher elevation. Trying to deliver 85 percent of your water across a 17-mile district and up 600 to 800 feet becomes expensive.”

Three pressure-reducing valves (Cla-Val) gave the district more options for deploying water sources to different geographic regions to reduce pumping costs. “It also provided us with more detailed information on what specific wells we can deploy based on demand and bring them into the system in a way that is much more efficient,” says Mura.



Four wells like this one pump to a newly constructed reservoir. This site received a downsized well designed to run more efficiently for longer durations.



To make the best use of an existing pipeline and site space, the facility team installed a new split-case pump and motor (Nidec Motor Corp.), designed to run 10 hours per day during the summer.



An electrical upgrade at the East Valley plant included a new vertical turbine motor, permanent generator, motor controls, and SCADA network connections.

The SCADA system (Rockwell Automation) helps by providing real-time data about demand, supply and delivery options. Automation of that process limited operators’ manual actions while keeping the system ahead of demand fluctuations. “Water is not a given out here, and you really have to think ahead,” Mura says. “We continue to grow as a state and a region, and they’re not making any new water. We have to use what we have in a lot smarter ways, so it’s a challenge for us.”

AUTOMATED DEMAND RESPONSE

Three of the water district’s 17 active groundwater wells were outfitted with high-efficiency, soft-start, single-speed motors and pumps, as were six booster stations. Models include Simflo, Flowserve and U.S. Motors. This along with the SCADA controls has reduced energy for pumping. Outdated switches and breakers were also replaced to improve efficiency.

“Our pumping strategy has totally changed to follow the time-of-use electric rate schedules,” notes Mike Maestas, assistant general manager. “We followed them the best we could in the past. Now with the automation and the ability to flow water into different zones we’ll be able to take full advantage of time-of-use rates.” The project reduced the district’s electrical usage by about 730,000 kWh in the first year alone.

Honeywell also helped East Valley join Southern California Edison’s Demand Response Programs in which the district makes money by agreeing to shed load during times of high demand on the utility grid.

Honeywell installed smart remote terminal units with programmable logic controllers. The utility provided \$50,000 to install the necessary equipment. “With some of our 16 sites, we can go in and manually shed load and get a certain amount of money,” says Maestas. “The rest of our sites are included in an automated Demand Response Program in which Southern California Edison can shed the load automatically.”

The SCADA system display shows all the locations, and district personnel can prevent automatic load shedding if needed, such as if a certain well is needed to meet water demand. While that would reduce the incentive payment, there is no penalty for opting out of load shedding when requested.

LEARNING OPPORTUNITY

The automated Demand Response Program actually led to the broader efficiency project. While seeking grant money and other funding for the SCADA, the district staff found that vendors offered much more.

“You hope and believe you are operating in the most efficient way,” says Maestas. “There were things that came out of this project where we were able to move up some of our capital improvements that we knew had to be done, and we realized the savings

much sooner. We’re talking \$4 million worth of projects, and it would have taken some time to put all that together.”

Mike Henderson, production superintendent, says the work has helped the team understand the system better. “We learned the weak spots, the inefficient points of pumping the different wells and the time-of-use electrical rates, so we can do a better job of that,” he says. “We’ve learned which wells are most efficient and are trying to use them more frequently.”

Because of the uniqueness of this project in the municipal water sector, Honeywell will follow the project closely, according to Kelly Malloy, public affairs and conservation manager for East Valley. “They will document results and post information online as we go along so that people interested in implementing the same kinds of efficiencies can see how it’s working out.” **tpo**

LOOKING AHEAD

With a new focus on efficiency, the East Valley Water District is looking for other savings, sustainability projects and alternative energy uses.

“We’re looking at all different options and seeing how we can implement them,” says Kelly Malloy, public affairs and conservation manager. “As a rate-based organization, we have an obligation to be stewards of our customers’ money and stewards of the resources, be they water or energy.”

Among the possibilities is in-line hydroelectric generation at the 8 mgd Philip A. Disch surface water membrane filtration plant. The generator would be in a pipe that imports water from the state water project under more than 100 psi.

“The project is designed to take that plant off the grid,” says Mike Maestas, the district’s assistant general manager. “The preliminary information shows the generator we would be installing would take care of that.”



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The completed mural on the new digester facility at the main entrance to the Bemidji plant.



Homegrown Talent

THE FIRST CLEAN-WATER PLANT ON THE MISSISSIPPI'S COURSE SOUTH GETS A COLORFUL MURAL CONVEYING HONOR AND RESPECT FOR WATER RESOURCES

By Jeff Smith

The City of Bemidji's activated sludge wastewater treatment plant sits between Lake Irving to the south and the larger Lake Bemidji to the north. It is also the northernmost effluent discharger to the Mississippi River.

Its phosphorus discharge limit of 0.3 mg/L is the strictest in Minnesota and among the lowest in the United States. A \$4.6 million upgrade to the 1.2 mgd (average) plant in 2011 included a gray architectural block on a new primary digester building that houses new equipment and controls. "It was just too big, too flat and too gray," says Mike Forbes, co-superintendent. "We really needed something to make it look nice."

“Our goal for the mural was to present something that reflected the importance of what we do here at the plant, to have some cultural content and to pay homage to cleaning up the environment.”

MIKE FORBES

PUTTING OUT THE CALL

Forbes took his idea for a colorful mural to the local Regional Arts Commission and with its help gained city council support. The city then issued a call for artists in northwestern Minnesota, including three Native American reservations.

“Our goal for the mural was to present something that reflected the importance of what we do here at the plant, to have some cultural content and to pay homage to cleaning up the environment,” says Forbes.

A committee including retired art teacher Gregg Wilimek, landscape architect Tom Cooper, city council member Reed Olson, deputy city clerk Michelle Miller, public arts commission chair Sandy Kaul, art teacher Lisa

Robinson and Forbes chose three finalists from nine respondents.

Marcia Larson, director of the Parks and Recreation Department, served on the committee because part of the 121-mile Paul Bunyan Trail, which the department helps maintain, passes in front of the plant where hikers and bikers would have a clear view of the mural.

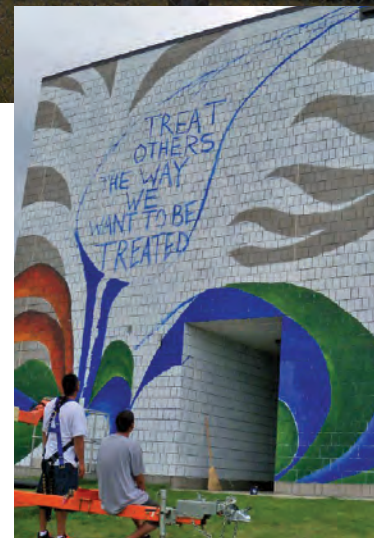
The finalists presented the committee with examples of their artwork and a plan and budget for the mural. The committee chose Native American artist Wesley May for his rendering, “Protect, Respect, Honor, Give Thanks for the Water.”

IN A DROPLET

The 30- by 50-foot painting shows a drop of water containing a serene lake guarded by eagles. May says the eagles and supporting scene represent protection of Mother Nature's filtration system and humans' respect for its preservation. “He did a great job and it really looks good,” says Al Gorick, co-superintendent.

May worked with one assistant and completed the painting in a little more than a month. He painted the mural over a white undercoating and sealed it with a clear finish. The \$25,000 cost came from the city's annual budget.

Forbes says the mural complements art projects in the downtown and other areas of the city: “It meets our goal to improve the appearance and image of our facility and expand the presence of art in our community.” **tpo**



The artist, Wesley May (left) and his cousin, Daniel May, who helped him throughout much of the project, view the temporary inspirational message Wesley put on the wall before finishing the mural.



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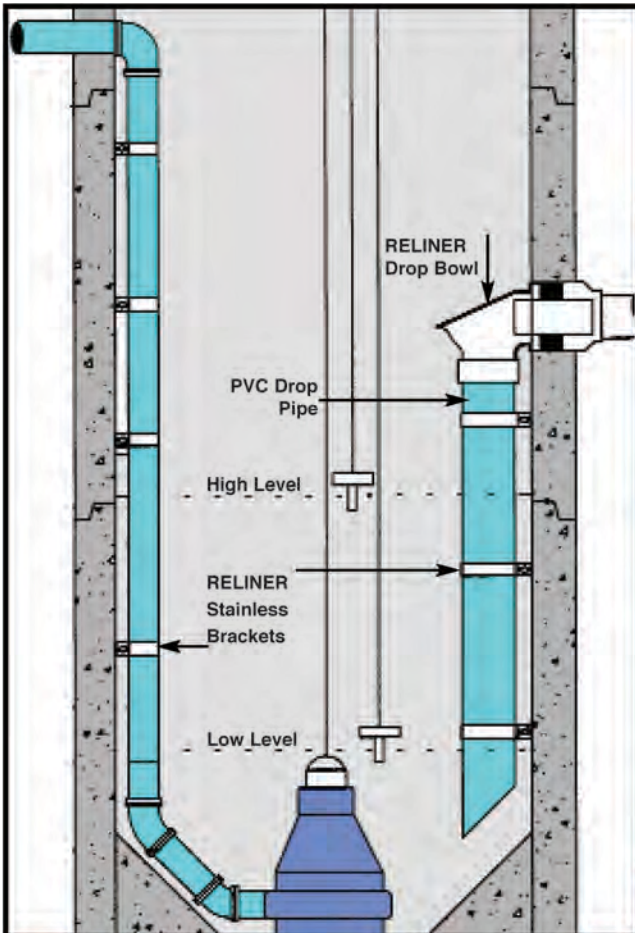


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Washed *Away*

AN EPIC FLOOD IN 2010 MEANT EXTENSIVE DESTRUCTION
AND A LONG BUT SUCCESSFUL RECOVERY PROCESS
FOR THE TREATMENT PLANT TEAM IN CLARKSVILLE, TENN.

STORY: **Ted J. Rulseh**
PHOTOGRAPHY: **Sanford Myers**





THIRTY FEET OF WATER AND SEWAGE COVERING THE TREATMENT PLANT grounds and structures. Building roofs lifted off. Clarifier vacuum units afloat and drifting free. Water inside every electrical wire and component. Major pumping stations out of commission.

If you can picture all that, you can begin to imagine the caliber of disaster caused by the flood of May 2010 at the Clarksville (Tenn.) Wastewater Treatment Plant.

Days of heavy rain ultimately sent Cumberland River floodwaters over the top of a protective berm and into the plant's "bowl." It took most of a week just to empty the site of water and three months to restore full secondary treatment. More than four years later the plant is still in recovery, though fully functional and in compliance with its effluent permit.

Through it all the plant team has performed heroically, according to Pat Hickey, general manager of Clarksville Gas & Water, the city department in charge of the facility. "The staff was exemplary in keeping the plant in operation," says Hickey.

"Initially, everybody had a deer-in-the-headlights look about them. We stressed that this was going to be an amazing experience — that not too many people in our profession have an opportunity to go through something like it. They worked safely with no accidents. Everyone knew what their jobs were and performed with very little supervision."

Construction crews work on the treatment plant's new secondary clarifiers.

Clarksville (Tenn.) Wastewater Treatment Plant

BUILT: | 1962, major upgrade in progress

POPULATION SERVED: | 150,000

FLOWS: | 25 mgd design, 10 mgd average

TREATMENT LEVEL: | Secondary

TREATMENT PROCESS: | Activated sludge

RECEIVING WATER: | Cumberland River

BIOSOLIDS: | Dewatered and landfilled

ANNUAL BUDGET: | \$5 million (operations)

WEBSITE: | www.cityofclarksville.com

GPS COORDINATES: | Latitude: 36°30'38.61"N;
Longitude: 87°16'39.80"W



During the May 2010 flood, the Cumberland River over-topped a berm and filled the bowl in which the Clarksville treatment plant lies.



Kevin Buchanan, left, public utilities director, Water/Wastewater Division, and Chris Lambert, public utilities senior director, Water/Wastewater Division.



A new headworks building is under construction at the Clarksville plant.

An upgrade now in progress will boost wet-weather design capacity from 45 mgd to 75 mgd and correct some pre-flood deficiencies in the existing plant.

“We stressed that this was going to be an amazing experience — that not too many people in our profession have an opportunity to go through something like it. They worked safely with no accidents.”

PAT HICKEY

SILVER LINING

Hickey notes that the Clarksville plant, designed for 25 mgd dry-weather flow, had constraints that limited performance. Average flow was 10 mgd, but when flow exceeded about 12.5 mgd there was a risk of solids escaping the secondary clarifiers and of other issues leading to potential permit violations. “We’re using the fact we have to rebuild the plant anyway to change some operations and procedures and upgrade the facility to make it more efficient, so we’ll have the true capability to treat 25 mgd within our permit parameters,” Hickey says.

Before the flood, the headworks consisted of four drum screens, two vortex grit removal units, three primary clarifiers, three aeration basins fed by turbo blowers and ceramic fine-bubble diffusers, nine rectangular secondary clarifiers with top-mounted vacuum units, and UV disinfection before discharge to the river. Primary and secondary sludges were mixed and dewatered on plate-and-frame presses, and the biosolids were lime stabilized and land-applied.

From late April into early May 2010, the area saw torrential rains. “We are downstream from the Old Hickory Dam, the Wolf Creek Dam and several other dams on the Cumberland River,” says Hickey. “Throughout the rainy period we had no flooding. We were getting regular estimates of where the river was going to crest and everything looked pretty good.

“Our plant sits at an elevation of 378 feet. It’s protected by a berm with an elevation of 392. As late as Monday morning [May 3] at 8 o’clock, reports from the U.S. Army Corps of Engineers and others said the river was going to crest below 392 feet, which meant we would be OK.”

Kevin Buchanan, public utilities director, Water/Wastewater Division, was at the plant relaying his observations to Hickey. Concerned that Corps of Engineers data might be understating the risk, Buchanan and his team began moving equipment, computers and documents out.

LONGTIME SUBMERGED

As it turned out, on Sunday afternoon the Corps had significantly increased

the rate of release from Old Hickory Dam, about 50 miles upstream. That meant a surge of water was heading for Clarksville. “Monday was a beautiful May morning — sunny, blue sky,” says Hickey. “Kevin and his group were taking a break and sitting on a bench on the berm when the water started to seep over the top. He called and told me they were evacuating.”

The water crested at 394.5 feet, putting all plant structures underwater except the headworks building and part of the primary clarifier pump building. While the major pump stations that feed the plant were inoperable, flow to the facility continued at 6 to 8 mgd. Meanwhile, the plant staff mobilized and began following emergency procurement procedures to arrange for pumps, lighting, generators and other emergency equipment needed to restore at least basic operations at the plant and lift stations.

The river crested on Tuesday, and the next day the water dropped below the level of the berm so that site dewatering could begin. By then the Clarksville team had engaged Allied Technical Services for recovery assistance; pumps were on site and were started immediately. All water pumped from the plant was disinfected with chlorine tablets and filtered through a 60- by 40-foot geosynthetic bag to provide primary treatment.

The entire bowl had been dewatered by Sunday, May 9, and restoration began. “We soon realized that we would be in some form of emergency operations for an extended time,” says Hickey. “We did have one motor for a primary clarifier that had been repaired and had been returned and was sitting on a hillside awaiting installation. That allowed us at least to get some primary treatment re-established.”

THE LONG ROAD BACK

By May 12, the screens, grit system and primary clarification were functioning and bulk sodium hypochlorite was providing disinfection. By week’s end, through emergency RFPs, the city had engaged the Hazen and Sawyer engineering firm for plant restoration and Shermco Industries to rebuild the electrical system.

“We found that while not all of our motor control centers had been totally flooded, wastewater had wicked up through the wires and into the equipment,” says Hickey. “Every electrical component and all the wiring had to be replaced.”

Shermco brought on the BELFOR disaster recovery firm for site cleaning and disinfection. “The 10-acre plant site inside the berm had been under 30 feet of sewage for five days and everything had to be disinfected and cleaned,” says Hickey. “That took several months.”

Restoring secondary treatment was critical: That took until August. The motors from the three 1,000 hp Turblex blowers (Evoqua) had to be removed and rebuilt by the manufacturer. The ceramic fine-bubble diffusers, destroyed by the flooding, were replaced with membrane fine-bubble units (Sanitaire). Then the secondary treatment process had to be reseeded. “That took time as well,” says Scott Woodard, P.E., a senior associate with Hazen and Sawyer. “It was just like starting up a new facility.”

Meanwhile, to restore final clarification, the Clari-Vac (Leopold) units had to be repaired. “Another

“Another contractor came in to gather up the Clari-Vacs, which were turned upside down, off track and bent up. They had to refabricate six out of the eight.”

CHRIS LAMBERT

contractor came in to gather up the Clari-Vacs, which were turned upside down, off track and bent up,” recalls Chris Lambert, public utilities senior director, Water/Wastewater Division. “They had to refabricate six out of the eight.” Solids dewatering was restored by way of a trailer-mounted belt press and centrifuge.

Through it all, the team had to relearn how to operate the plant manually — the flood had ruined the SCADA system. “We didn’t have VFDs where

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The Clarksville team includes, front row, from left, Brian Shelton, public utilities supervisor; Jimmy Davis, senior maintenance mechanic; Donald Luffman, public utilities supervisor; Dustin Owen, operations assistant; Tommy McClellan, public utilities supervisor; and Erin Clark, maintenance technician. Back row, Wesley Tierney, grade 3 operator; Victor Ward, operations assistant; Dewie Potts, maintenance mechanic; Jereme Oakes, grade 3 operator; Virgil Taylor, truck driver; and Kevin Buchanan, public utilities director.

LESSONS LEARNED

After a calamitous storm, normal life goes out the window and with it customary ways of doing business.

The Clarksville Gas & Water team had an emergency plan and had conducted tabletop disaster response exercises, but nothing could have prepared them for a disaster the size of the May 2010 flood. Still, lessons emerged that will help the team in the future and that can help other water and wastewater utility teams be ready.

One key lesson: “Make sure you have an emergency purchasing policy,” says Pat Hickey, general manager. “That enabled us to follow purchasing guidelines as required by FEMA [the Federal Emergency Management Agency] if you are going to seek reimbursement. We were able to follow our emergency guidelines, which allowed us to get some equipment and supplies that we probably could not have purchased or rented expeditiously without policies in place.

“We were writing up bid specifications and sending them out by fax, saying we were going to have a bid opening in two hours. We had to get equipment in quickly, and we had to get in line for it because we weren’t the only facility flooded.

“The trailer-mounted belt press we acquired was actually headed somewhere else, but the facility it was headed for had not issued a purchase order yet. Because we had an emergency

purchasing procedure in place, Hazen and Sawyer was able to talk to the manufacturer, who said the first party to issue a PO would get the press. We had a PO within a couple of minutes.”

Another lesson: Keep the regulatory agency in the loop. “We were in direct correspondence with the TDEC [the Tennessee Department of Environmental Conservation] during the whole time,” says Chris Lambert, public utilities director, Water/Wastewater Division. “Hazen and Sawyer sent them daily activity reports through the first month and a half of the recovery process, and weekly reports once things started to get back on track.” Sampling and testing had to continue even while the plant was violating its permit.

And finally, follow FEMA guidelines. “Anyone who has to go through a disaster like this and expects any funding from the federal government had better be sure to dot the I’s and cross the T’s,” says Hickey.

All in all, says Hickey, the team performed as well as it could have: “I think we did a good job and handled every aspect effectively, from dealing with FEMA all the way to the operators at the plant who were trying to produce water that met the regulations. After multiple discussions we’ve concluded that there aren’t many things we would do differently.”

we used to have VFDs,” says Hickey. “We didn’t have DO sensors where we used to have them. They had to go out and get a sample, run it, come back, make adjustments and see what the results were. The staff handled it extremely well. Even today during the new plant construction, we’re still running manually.” Many of the on-line analyzers have already been replaced since the flood in order to more efficiently operate the plant, but the SCADA system has not been restored at this point.

A FRESH START

During the recovery, the Clarksville team and Hazen and Sawyer moved straight into design of the new facility, to be complete in March 2016.

The upgrade includes improvements to the existing aeration basins, including a full-width effluent weir to eliminate short-circuiting and an anoxic zone at the front end. “The anoxic zone was added to limit filamentous bacteria and improve the settleability of activated sludge in the secondary clarifiers,” says Woodward. “That zone also provides a secondary benefit if nutrient limits are included in a future permit.”

Other upgrades will include:

- A headworks relocated for better hydraulics and equipped with dual-entry drum screens (Ovivo) and a Eutek Headcell grit removal system (Hydro International).
- Replacement of the rectangular secondary clarifiers with four 140-foot-diameter circular units (Walker Process Equipment).
- A centrifuge (Andritz) for dewatering; biosolids will be landfilled.
- Replacement of UV disinfection with chlorine contact.

A new administration and lab building was completed last September, and the berm around the plant has been raised to 398.5 feet elevation — 6 feet higher than before. The total cost of flood recovery and plant redesign and upgrades will be \$120 million.



Workers install a new Andritz centrifuge in the new dewatering building.

Clarksville Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	PERMIT	EFFLUENT
CBOD	267 mg/L	25 mg/L	8 mg/L
TSS	380 mg/L	30 mg/L	14 mg/L

For the Clarksville team, the memory of the flood won’t soon wash away. “This wasn’t your run-of-the-mill 100-year event,” says Hickey. “I don’t know if it has been finally classified, but this was either a 500- or 1,000-year storm.”

Afterward, the team’s first “office” was a 10-foot-square awning over a table. Through much of 2014, the staff still worked out of temporary office trailers and with a prefabricated laboratory (CPM Labfab). In the early stages, long days were spent scrambling for equipment and for diesel fuel to power generators. In some respects the plant is still in a recovery mode.

Says Hickey: “It’s been one heck of a ride.” **tpo**



Victor Ward works on the facility’s belt press (BDP Industries).

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For Those Who Follow

A SUCCESSION PLAN IN BLACKSBURG, VA., AIMS TO PRESERVE INSTITUTIONAL KNOWLEDGE AND PREPARE REPLACEMENTS FOR KEY PEOPLE LEAVING THROUGH RETIREMENT

By Ann Stawski

Developing employees takes time and effort, and Matt Stolte finds homegrown candidates are the most likely to be successful.

As assistant director of management in the Blacksburg (Va.) Department of Public Works, Stolte and the leadership team are focused on capturing and passing on the knowledge, experience and talents of employees soon to retire, including those in the water and wastewater areas.

Many organizations struggle with succession planning beyond making a static list of names slotted for a few top spots. When Stolte stepped into his role a year ago, he saw an opportunity to do something much more effective. He saw that without a succession plan, Blacksburg would be left with a significant knowledge gap that might never be filled.

With support from Kelly Mattingly, director of Public Works, Stolte set out to lay the groundwork for a succession plan. “Kelly understood the need to have career development opportunities within the department and organization,” says Stolte. “He’s the one who encouraged me to pursue avenues to develop the succession plan.”

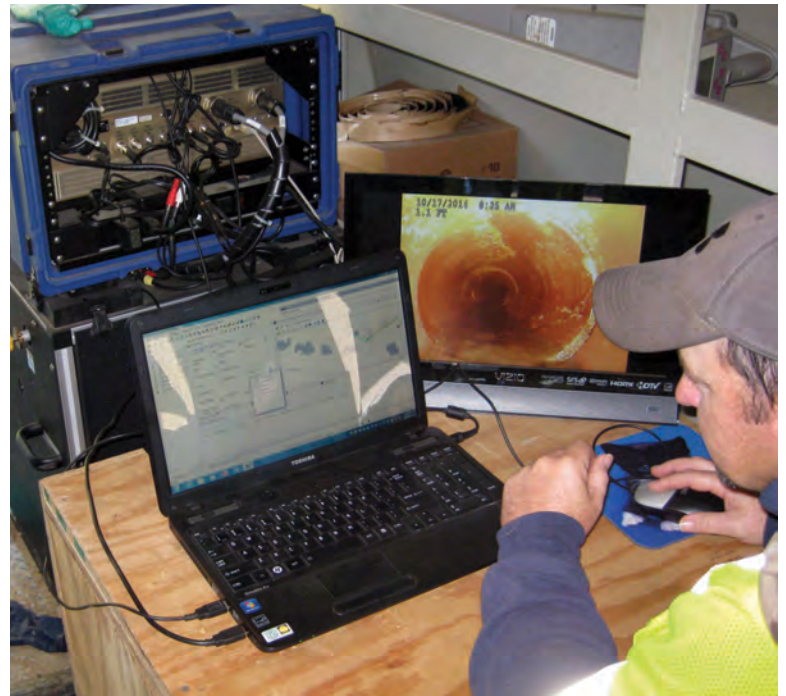
CREATING A ROAD MAP

In developing the concept, Stolte used his background in capital asset management to transition knowledge to the human element. The Human Resources Department helped him outline the succession plan. “Creating a succession plan with human resources specialists is key because they know how to hire and how to maintain the program,” says Stolte. “They could also help sell the idea across the departments so the municipality could create a robust program.”

A main component is a road map, providing a framework and advice on how to align talent management with the organization’s vision. The road map ensures that employees have opportunities to hone their skills and it guarantees that the organization has an employee development plan in place for the future.

SETTING PRIORITIES

Through the process, Stolte found opportunities to develop all levels of employees, not just those in the top spots. He notes that employees accumulate massive institutional knowledge and problem-solving know-how. “Succession planning isn’t just about acknowledging the time commitment or



CLOCKWISE, FROM TOP: A condition assessment crew works in the field to provide up-to-date data on collections system performance; a construction manager communicates to the department and design team on progress of new facility improvements; pump station mechanics use data-logging systems to monitor performance, a task that requires technical development of employees.

“Succession planning isn’t just about acknowledging the time commitment or tenure employees give to an organization, although that should be valued and evaluated. It’s the information we want to pass through to others in the organization.”

MATT STOLTE

tenure employees give to an organization, although that should be valued and evaluated,” he says. “It’s the information we want to pass through to others in the organization.”

The next step in succession planning was to assign priorities to the positions held by people slated for retirement and to see whether dual roles could be created for those positions. “First we focused on the important positions with a lot of institutional knowledge that needed to be shared,” says Stolte. “Next we had to figure out the skill sets we needed and whether a successor might need additional training or coursework.”

Blacksburg uses nearby Virginia Polytechnic Institute (Virginia Tech) for education and training. In addition, employees attend water and utility

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conferences. “Asset management revolves around performance and sustainability, and we need to take care of our employees,” Stolte says. “That comes through training and development.”

TRANSFERRING KNOWLEDGE

Blacksburg’s succession plan is not just about filling holes — it’s about career development. “The challenge isn’t in finding the employees or their willingness to step up and develop their skill sets,” says Stolte. “The challenge is how to reduce the knowledge gap. Since this program is just developing, we don’t have a lot of time.”

In developing the framework, Stolte and human resources identified three criteria employees would need to meet to begin career succession:

- Willingness to be part of the organization
- Willingness to expand technical skills
- Willingness to enhance skills in personal interactions

Once he identified the criteria, he held expanded conversations with human resources for guidance. “We talked about what the criteria meant in respect to coursework an employee will need to take,” he says. “We also asked: How many hours will an employee need to commit to training? And is additional compensation required to encourage someone to step up over a three-year period to work toward an end goal?”

Stolte found it important to estimate the amount of mentoring and apprenticeship an employee would need to fill a higher role. For example, among highly skilled electricians and pump operators who retire, “There is significant institutional knowledge that we need to capture and pass along to those who will transition into those positions,” says Stolte.

His proposed plan includes a mentoring/apprenticeship program in which upcoming retirees “hand off” information while on the job. “Apprenticeships

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allow more credence for what we’re trying to do,” he says. “Also, the experienced employee is able to share knowledge and information before retirement in hands-on situations.”

THE NEXT PHASE

As the process rolls into its second year, Stolte acknowledges there is plenty of ground to cover before Blacksburg’s succession planning is ready to launch. He is positive about the foundation work already done and excited for the future.

“If we can demonstrate a mechanism that’s flexible and taps into the right people who have the level of service and will commit, we’ll be able to move forward,” he says. “It’s been important to get these conversations started and begin developing our employees.

“The only way to reduce the effect of lost knowledge is through a strong succession-planning program that identifies and fosters the next generation of employees through mentoring, training and apprenticeships. Our people will be ready and knowledgeable to take the helm when the time comes.” **tpo**



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Nothing Left Over

A PUBLIC-PRIVATE PARTNERSHIP CREATES A BIOSOLIDS PROCESSING FACILITY THAT YIELDS A HIGH-QUALITY PRODUCT FOR APPLICATION TO ONTARIO FARMLAND

STORY: Erik Gunn

PHOTOGRAPHY: Bruce Bell

JUST 10 MILES FROM NIAGARA FALLS, A BIOSOLIDS treatment plant has managed to take waste and turn it — all of it — into something useful.

A private company operates the Niagara Biosolids Processing Facility in Thorold, Ontario, under contract with the regional government. Eight years after it began, the operation has exceeded its expected output and the operators are looking at more ways to use its product, says Geoff Boyd, general manager - organics for Walker Environmental Group, the plant's owner.

In spring 2014 the Water Environment Association of Ontario recognized the operation with an Exemplary Biosolids Management Award.

And it all started, Boyd says, when the region's communities realized they needed an alternative to applying all to farmland in liquid form. "If they didn't have us as an outlet, they could potentially get themselves into a serious compliance situation," Boyd says. Although they had "plenty of storage, sometimes it isn't enough."

A DOZEN COMMUNITIES

Ontario's Niagara Region is a regional municipality, a form of government that takes the place of counties in some parts of Canada. The 715-square-mile region straddles the isthmus between lakes Erie and Ontario. It is bordered on the east by the Niagara River (also the boundary between Canada and the United States at that point). West of the region is the City of Hamilton and Haldimand County.

The region (population 430,000) encompasses five cities, five towns and two townships. It was formed in 1970 in a series of government reforms to consolidate municipal services, one of which is managing the biosolids from municipal wastewater treatment plants.

A little more than a decade ago the Niagara Region undertook a biosolids master planning project. "At the time, 100 percent of biosolids generated



Geoff Boyd, general manager - organics for Walker Environmental Group, makes an adjustment to the mixer phase of a process that yields a high-quality commercial fertilizer product.

in the region were liquid land-applied,” Boyd says. “That can be affected greatly by weather and land availability.” Long winters and wet springs narrowed the opportunities.

Knowing it was time to diversify the use of biosolids, the regional government issued a request for proposals in 2004 for a centralized processing facility. The winning bidder was a 50-50 joint venture between Walker Environmental Group (a division of family-owned Walker Industries) and N-Viro Systems Canada.

The Walker firm came with a background operating landfills and limestone quarries and a product line that includes crushed stone and aggregates, road asphalt and waterproofing emulsions for building products and wall-board. N-Viro provided an alkaline-stabilization process that yields a dried product that in the United States would be considered Class A. The biosolids facility in Thorold became fully operational in 2007.

Niagara Biosolids Processing Facility, Thorold, Ontario



BUILT: | 2007

OPERATOR: | Walker Environmental Group

POPULATION SERVED: | 430,000

BIOSOLIDS PROCESS: | Proprietary alkaline treatment process

BIOSOLIDS VOLUME: | 33,000 wet tons/year; 8,800 dry tons/year

BIOSOLIDS USE: | Agricultural land application

WEBSITE: | www.walkerind.com/walker-environmental-group/biosolids-management

GPS COORDINATES: | Latitude: 43°6'22.16"N; longitude: 79°12'53.59"W





Kevin White lubricates the mixer (Cemen Tech CSP 30) as part of regular planned maintenance.

Since then Walker has acquired N-Viro, making it a wholly owned subsidiary of Walker Environmental. N-Viro also operates plants in Sarnia and Leamington, both about three hours west of the Thorold plant. Additional plants are in Halifax, Nova Scotia, and in Banff National Park in Alberta. A plant in Sudbury will open in 2015.

A composting operation on the Thorold site also takes in Niagara Region food waste and lawn and yard waste.

PUBLIC-PRIVATE PARTNERSHIP

In addition to Boyd, key personnel involved in the Thorold operation include Walker Environmental Group executives Mike Watt, executive vice president; Robert Crane, biosolids business development manager; and Mike Melinko, Niagara Biosolids plant supervisor. The team also includes Dan Grabell, Kevin White and Jamie Gale, operators, and John Vanderlee, equipment supervisor.

The Thorold biosolids facility is unusual in being operated by a private company rather than by the Niagara Region municipality, Boyd says. The company made the case to municipal officials that it could reduce the risk of liability and bring solid marketing experience. "They felt that we could also operate the plant more cost-effectively than they could," Boyd says.

The facility takes dewatered biosolids from wastewater treatment plants in Niagara Region and from the City of Toronto. Most of the liquid biosolids are trucked to a central dewatering site owned and operated by the region.

All the region's treatment plants use anaerobic digestion. Before dewatering,

TURNING ON THE GAS

The site of the biosolids treatment facility Walker Environmental Group operates under contract with the Niagara Region municipality is also the site of two landfills the company owns.

That has produced another valuable resource.

In 2000, Walker installed an advanced methane gas collection system in the east landfill. In 2009, a second landfill opened with an integrated gas collection system. From the gas, the operation generates 12.5 MW of electricity; some is sold back to the province's electrical grid, and some is sold to neighboring industries to reduce reliance on natural gas.

The landfill gas provides another benefit: "Because we're destroying methane, we're generating carbon offsets," says Geoff Boyd, general manager - organics. Walker has sold 8.5 million metric tons of carbon offsets across Canada to corporations that seek to reduce their carbon footprints. The carbon offsets and the use of green construction techniques "give us the ability to make our facilities carbon neutral," Boyd says.



The rotary dryer (Uzelac Industries) receives material at 45-50 percent solids, pulls some 15,000 cfm of air through the drying chamber, and evaporates about 10 tons of water an hour.

ting, the biosolids are about 3 percent solids. Centrifuges dewater it to about 30 percent solids. The dewatered material is then trucked to the Walker plant, which receives 100 to 165 tons every weekday.

At the Thorold facility, the dewatered biosolids are dumped into two live-bottom bins 15 feet below ground level. Each bin holds 45 tons. Screw augers move the material to a belt conveyer (Serpentix) with a sectional ribbed design that allows for runs that turn extreme corners and go up steep inclines without product falling off.

The conveyor carries material about 30 feet up to the plant's mixer (Cemen Tech CSP 30), which can process up to 27 wet tons per hour but typically handles about 11 tons per hour.

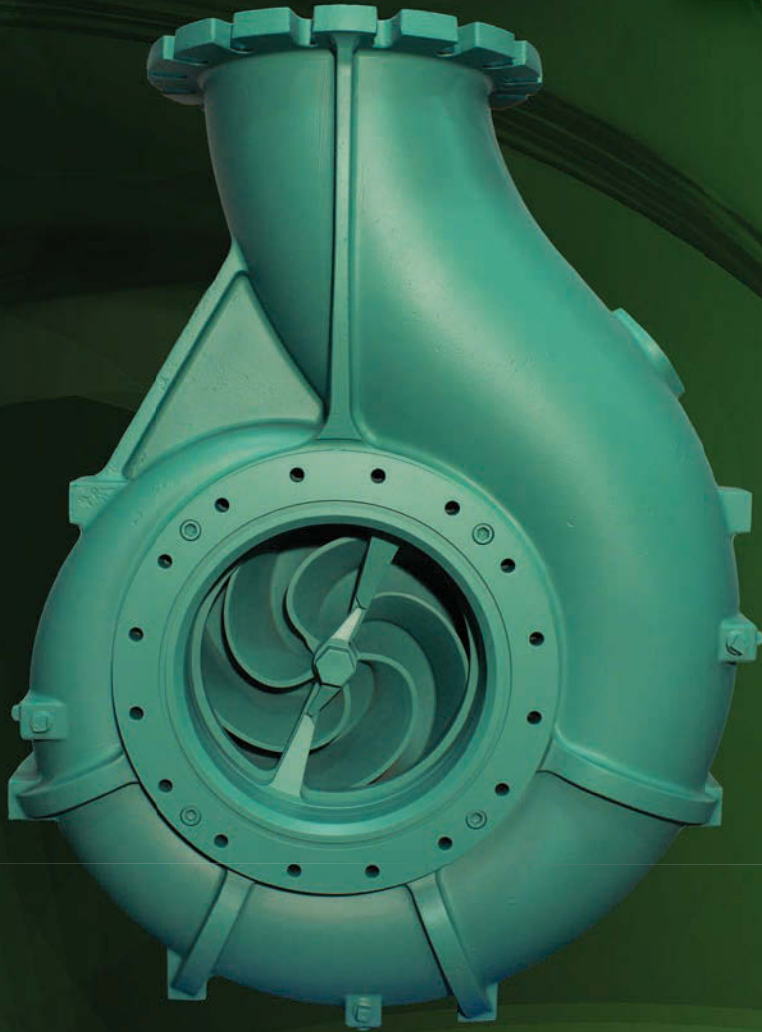
The kiln dust is transported from the cement plant in trucks with pneumatic blowers used to fill storage silos. During the mixing process, a screw conveyor carries the dust from the storage silos into the plant and to a hopper on the mixer; a second small screw conveyor moves material from the hopper to the mixing box. In the mixing box, a 12-foot-long toothed auger combines the biosolids with highly alkaline (pH13) cement kiln dust.

KILN DUST TREATMENT

The kiln dust, primarily calcium oxide, is added at a ratio of about 30 percent kiln dust to 70 percent wet biosolids. The dust is highly reactive and

(continued)

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the resulting alkaline admixture generates heat. The process also raises the pH from neutral pH to about 12.

The kiln dust is a byproduct of a cement plant about three hours away. It previously was landfilled, but N-Viro saw its value and began reclaiming it. Besides 35 percent calcium, it contains about 8 percent potash, a valuable agricultural nutrient.

The biosolids/kiln dust mixture is about 45-50 percent solids, says Boyd. It looks granular and earthy, much as it does when processing is complete. It is discharged onto another conveyer belt that carries it nearly 25 feet and feeds it into a model CSD-6000 direct-fired rotary dryer system (Uzelac Industries).

The dryer pulls about 15,000 cfm of air through the drying chamber and evaporates about 10 tons of water an hour. A tumbling process breaks down clumps of material, reducing particles to about the size of a grain

“We’re looking for our final product to have a percent total solids of 60 to 62. Anything greater than 64 percent tends to make it a little too dusty; between 60 and 64 percent is ideal for field application.”

GEOFF BOYD

of sand. The retention time in the dryer varies with the solids content of incoming material. The biosolids characteristics can vary with the source. For instance, Toronto biosolids are typically “a lot more pasty” than material from other plants, Boyd says.

What goes into the dryer is “typically about 45 to 50 percent solids,” he says. “After about 10 minutes in the dryer, it comes out at about 58 percent.”

CLEARING THE AIR

Dried material is light enough to pass through the center of the dryer drum and through the unit’s cyclone separator, which sends it through an airlock and onto a screw conveyer, which deposits it in one of four 88-ton-capacity concrete cells. Air and fine particulates are drawn off into a baghouse.

The baghouse removes particulate, leaving air high in ammonia. A scrubber (Verantis) then uses a sulfuric acid process to remove the ammonia, producing ammonium sulfate that is collected and sold as liquid fertilizer for its high nitrogen and sulfur content.

The air is then forced through a biofilter (Ambio Biofiltration) that uses shredded wood media for odor removal. The air comes out smelling like damp wood.

TAKING THE CURE

Back in the concrete bunkers the solids cure, typically for 12 to 16 hours. Samples are collected hourly to check the temperature and pH of the batch to make sure pathogen-reduction requirements are met. Solids content is also measured. “If it’s too dry or too wet, we make adjustments to the dryer or mixer,” says Boyd. “If the pH is too high or too low, we make adjustments to the alkaline dosing.”

The facility takes in and treats biosolids during daytime hours; curing takes place overnight and into the next day. The plant typically does not operate on weekends. During the cure the solids dry further. “We’re looking for our final product to have a percent total solids of 60 to 62,” says Boyd. “Anything greater than 64 percent tends to make it a little too dusty; between 60 and 64 percent is ideal for field application.”

To ensure against hazardous substances, municipalities are required to take biweekly samples of their biosolids, checking for all restricted heavy metals and for pathogens. Pretreatment regulations keep heavy metals out and anaerobic digestion keeps the pathogen count low to begin with, Boyd observes.

“Any material coming to us has to meet the guidelines for liquid land application,” he says. “It’s already approved to be spread on land as it is, even before it goes through our process.”



Biosolids safety is regulated under the country’s Fertilizers Act by the Canadian Food Inspection Agency; regulators conduct random spot checks to verify that the material meets or exceeds a minimum guaranteed nutrient level and that it is safe for use.

SOLD-OUT PRODUCT

Walker sells the biosolids straight from its storage building. “It goes out the same way it comes in — in large dump trailers,” says Boyd. “We load it into the customers’ trucks with a front-end loader and off they go.”

The direct customers are large farm fertilizer distributors who sell the material and the direct application service to farmers in Ontario, most of them two hours or farther west of the plant outside the Niagara Region where most of the province’s large cash-crop farms are found.

Total production of the product, branded N-Rich, amounts to about 110 tons per day, or about 33,000 tons per year. Walker has been fetching about \$10 (Canadian) per ton. The material has required very little marketing in Ontario, Boyd says.

“We could probably sell three to four times what we’re making,” Boyd says. “We turn people away all the time. The plant was built on the basis that we would do 50 percent of the region’s biosolids. In the past four or five years we’ve been doing closer to 65 percent.”

A CLOSED LOOP

For now, the operation’s future looks bright. “Our existing customers could take quite a bit more than we’re producing so far,” Boyd says.



Mike Melinko at the rotary dryer controls.

At the same time, in anticipation of the Sudbury plant’s opening, the company is looking for more uses for the product, such as mine reclamation. The company is working with a contractor, a mining company and university researchers to apply materials to areas where mine tailings have been deposited. “They will plant vegetation that can be harvested and used as biofuel,” Boyd says. A similar approach is being considered to test usage for reforestation.

Boyd points out that the Thorold operation has achieved the environmental Holy Grail: a closed-loop system. “We’re bringing in biosolids, which are typically a waste to many municipalities, and the alkaline kiln dust, and the plant generates absolutely no waste at all,” he says. “There’s no residual left over — everything that comes in is turned into product.” tpo

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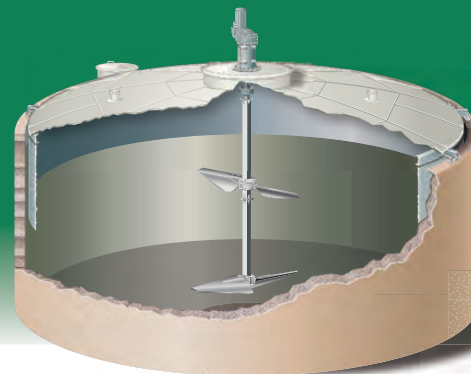
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Pittsburgh Water & Sewer Authority extends partnership with Veolia

The Pittsburgh Water & Sewer Authority Board of Directors voted to continue a nearly three-year partnership with Veolia North America. Since 2012, the partnership has secured more than \$5 million annually in financial benefit, delivered operational efficiencies and made PWSA a leader in green infrastructure, according to Veolia. The one-year contract extension to December 2015 allows PWSA and Veolia to continue a long-term strategy to improve customer service, reduce spending, increase efficiency, overcome financial challenges, and protect water quality and the environment. The partnership is part of Veolia's Peer Performance Solutions model, enabling utilities to benchmark against other leading utilities while preserving public governance and a public workforce.

East Orange County Water District selects Sedaru software

IDModeling has been selected by California's East Orange County Water District to deploy Sedaru software to connect various systems. The software helps industry professionals anticipate water operations, understand impacts and solve problems for energy, quality, water resource and asset management initiatives. The software will allow district personnel to call up current customer data and historical maintenance data in the field on a tablet, eliminating paperwork. The district will also be able to leverage hydraulic modeling data and run scenarios before performing actions, such as which valve to close in an emergency.

South San Francisco trash trucks operate on biogas

South San Francisco trash trucks now operate on compressed natural gas made from anaerobic digester biogas. South San Francisco Scavenger Company, which serves San Francisco International Airport along with the cities of South San Francisco, Brisbane and Millbrae, has partnered with a facility that converts food scraps to fuel. The digester processes 11,200 tons of compostable materials a year, producing the equivalent of up to 55 gpd of diesel fuel daily. The process also yields digestate that can be converted into compost.

United Water signs 20-year agreement with Nassau County, N.Y.

United Water signed an agreement with officials of Nassau County for a 20-year contract to operate, manage and maintain the county's wastewater treatment plants, pumping stations and sewers. The system handles and treats wastewater from 1.2 million people on Long Island. It is the largest water-related public-private partnership in the United States with a value of more than \$1.2 billion, according to the company. Nassau County will invest more than \$830 million in its sewer system over the next several years. United Water will aim to improve the system's operating efficiency and performance on environmental standards; clean discharges to meet state regulatory standards; and eliminate odors from three treatment plants. United Water will guarantee cost savings of more than \$230 million during the contract.

Palmdale Water District awards 10-year contract to Calgon Carbon

Calgon Carbon Corporation and Palmdale Water District (Calif.) signed a 10-year contract under which Calgon Carbon will provide reactivation services to treat the district's drinking water. The district uses granular-activated carbon to meet the U.S. EPA Stage 2 Disinfectants and Disinfection Byproducts Rule. The district will convert to Calgon's high-performance Filtrasorb400 GAC, which when spent will be taken to the company's facility in Gila Bend, Ariz., for custom reactivation.

Arizona's Pima County signs contract with Anaergia

Anaergia and project partner Grannus Biogas contracted with the Pima County (Ariz.) Regional Wastewater Reclamation Department to design, build, finance, own and operate a biomethane upgrading facility. Solids from the department's nine wastewater treatment plants are handled in a central site at the Tres Rios Water Reclamation Facility in Marana. Anaerobic digestion of biosolids yields biomethane that the new upgrading facility will treat and compress for use in place of nonrenewable fossil fuels.

Neptune Benson ETS-UV added to drinking-water facility in Berea, Ohio

Neptune Benson installed a UV drinking-water disinfection system in Berea, Ohio, enabling the city to seek a *Cryptosporidium* credit. The city uses surface water drawn from the East Branch of the Rocky River but can also draw from Coe Lake and Baldwin Creek. These open-water sources are vulnerable to runoff and other contamination. The city chose the Neptune Benson ETS-UV systems after an evaluation of UV suppliers.

American Water wins new contract for Picatinny Arsenal

American Water Works Company won a contract for ownership, operation and maintenance of water and the wastewater systems at Picatinny Arsenal, N.J., worth an estimated \$297 million over 50 years. Located about 35 miles west of New York City, Picatinny employs about 3,900 civilians, 100 military personnel and 1,000 contractors, about half of them engineers and scientists. The installation specializes in the research, development, acquisition and life-cycle management of advanced conventional weapon systems and advanced ammunition.

CDM Smith to implement biosolids improvements at Trinity River Authority

The Trinity River Authority in Texas selected CDM Smith to design comprehensive biosolids improvements at its 162 mgd Central Regional Wastewater System in Dallas. In addition to new anaerobic digestion and ancillary processes, the project will incorporate thermal hydrolysis to produce Class A biosolids for safe, flexible land application at multiple outlets. The company will also provide the authority with owner's advisory services for construction management.

DC Water to receive world's largest deammonification system and thermal hydrolysis process

World Water Works will supply its DEMON deammonification process technology to DC Water's Blue Plains treatment facility. It will be the world's largest anammox-based treatment system. The DEMON biological process removes high amounts of nitrogen from water, using 60 percent less energy and producing 90 percent less sludge than traditional nitrogen-removal processes, according to the company, and does not use methanol. The technology has a small carbon footprint and sequesters carbon dioxide. A biomass separation device maintains appropriate levels of ammonia oxidizing bacteria and anaerobic ammonium oxidizing (anammox) bacteria, both key to the low-energy, no-chemical process. The installation is part of a new solids processing facility at Blue Plains.

A Cambi thermal hydrolysis process (THP) designed and built by CDM Smith and PC Construction Company in a joint venture is now operating at DC Water's Blue Plains advanced wastewater treatment plant. The system is the first of its kind in the United States and the largest Cambi system in the world. The THP system is part of Blue Plains' updated biosolids main process train, which includes new facilities for biosolids blending and screen-

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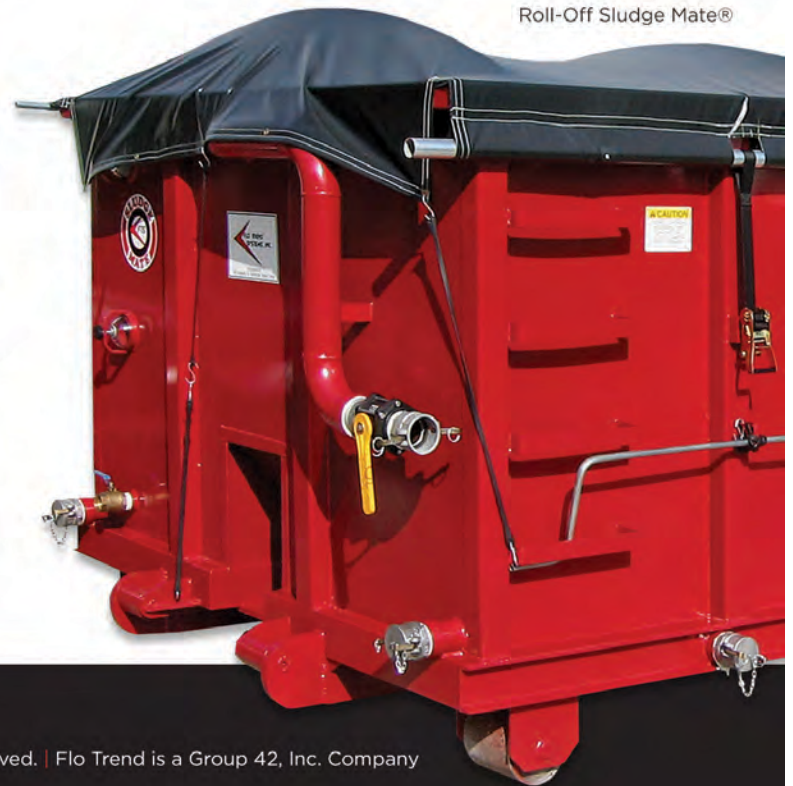
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ing, pre-dewatering and four 3.8-million-gallon anaerobic digesters. The process yields Class A biosolids and allows generation of power from biogas while significantly reducing the volume of biosolids hauled away. The project is projected to reduce costs by \$10 million for electricity and \$10 million for solids handling.

Titusville awards contract for disc filter system

Veolia Water Technologies won a contract with the City of Titusville, Fla., to furnish a Hydrotech Discfilter system as part of the Osprey Water Reclamation Facility Headworks and Filter Improvements project. Veolia will supply two filter units with PLC controls designed to provide an average effluent TSS concentration of less than 5 mg/L and capable of filtering a peak flow of 4.125 mgd per filter unit.

Ottawa cleantech firm wins two wastewater deals worth \$2 million

BluMetric Environmental won two contracts worth a combined \$2 million for wastewater treatment installations in Ontario and Kentucky. The company's water division won a contract to supply an onsite wastewater treatment system for a new housing development near the Greater Toronto Area. The system includes ROTORDISK rotating biological contactors technology with denitrification and phosphorus-removal capability. Under the second contract, the company will supply specialized wastewater treatment equipment for a multinational firm in Carrollton, Ky. **tpo**

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Reliably Pure

A CALIFORNIA WATER DISTRICT DOCUMENTS LONG-STANDING SUCCESS WITH INDIRECT REUSE OF RECYCLED WASTEWATER TO BOLSTER THE DRINKING-WATER SUPPLY

By Doug Day

While not accurate, the term “toilet to tap” makes great headlines. The use of recycled wastewater to supplement drinking-water supplies is in the news, especially in drought-prone states like California, which has invested \$1 billion in the technology.

In reality, the concept is not new. The \$481 million Groundwater Replenishment System (GWRS) in Fountain Valley went online in January 2008 as a jointly funded project of the Orange County Water District and the Orange County Sanitation District. It replaced the original Water Factory 21 that went online in 1976 and pumped treated wastewater into injection wells to prevent saltwater intrusion into the aquifer.

The GWRS water purification plant uses microfiltration, reverse osmosis (RO) and advanced oxidation with UV light and hydrogen peroxide to treat wastewater from the Orange County Sanitation District, says Bill Dunivin, director of water production for the water district. The plant converts 70 mgd of treated wastewater into drinking water. A \$142 million expansion will increase capacity by 30 mgd by 2015.

“We analyze the water far beyond what our permit requires. ... What we’re doing is very reliable. The parameters we meet every day exceed drinking-water standards by several times.”

BILL DUNIVIN



Energy-efficient pumps with variable-frequency drives help hold down operating costs so the Groundwater Replenishment System can produce an affordable alternative to imported water.



BETTER THAN THE STANDARDS

In a traditional scenario, water would flow from the wastewater treatment plant to the ocean and be lost to the system. Instead, after treatment in the GWRS, about half recharges the groundwater supply by percolating through sand and gravel basins. The rest is sent to injection wells for the Talbert Gap seawater barrier, some of which migrates to the groundwater.

Orange County receives about 10 inches of annual rainfall. “We are a desert and in a drought, so water management is a big part of everyone’s day,” says Dunivin. “All the greenery we have is because of water pumped from the groundwater basin or imported from the Colorado River or from northern California through the Metropolitan Water District of Southern California.”

RELIABLE PROCESS

At the GWRS, microfiltration with 0.2 micron hollow fibers removes suspended solids, protozoa, bacteria and some viruses. RO. Through semipermeable polyamide, polymer membranes filter out dissolved chemicals, viruses and pharmaceuticals. Disinfection with UV light and hydrogen peroxide destroys any trace organic compounds.

The treatment results in water that is nearly distilled, requiring the addition of lime to replace calcium, magnesium and other minerals. “We do the same thing as a bottled water company — add minerals to give the water a better taste and make it less corrosive,” Dunivin says.

“We analyze the water far beyond what our permit requires. We like to show the world that we are putting all the latest technology to use to make this a safe alternative. What we’re doing is very reliable. The parameters we meet every day exceed drinking-water standards by several times.”

BUILDING SUPPORT

Even though it has been doing indirect potable reuse for more than 30 years, the water district spent 10 years building support for the new plant. “We had a very proactive campaign,” says Dunivin. “We went out into the community speaking to city councils, civic clubs, business groups, churches and any place where people would listen.”

The Orange County Water District public outreach program includes tours of the Groundwater Replenishment System facility, after which participants receive a glass of the plant’s finished product for a taste test.



Students from San Bernardino Valley College gather for a photo after a facility tour. The district also offers a speaker bureau for community presentations.

SPREADING THE WORD

Since the Groundwater Replenishment System in Orange County went online in January 2008, the site has hosted more than 20,000 tours for local residents and representatives of national and international groups interested in water reuse.

Surveys of those who have taken tours show general support for reusing wastewater. While pre-tour surveys show some people doubt the water is safe or have no opinion, there are fewer skeptics in post-tour surveys.

To further inform and involve the public, the Orange County Water District hosts a Children's Water Education Festival for students in grades three-five. About 7,000 students and teachers take part in more than 60 hands-on activities covering drought, the water cycle, groundwater and surface water protection, wetlands preservation, recycling, pollution prevention, water treatment, distribution, conservation and other topics. Lead sponsors besides the water district and its Groundwater Guardian Team are Disneyland Resort and the National Water Research Institute.

"The kids learn and go home and tell the parents," says Bill Dunivin, director of water production for the water district. "Teachers who may not know a lot about how we manage the water basin or everything involved in drinking water and wastewater are also learning something."



UV and hydrogen peroxide disinfection are used in the Groundwater Replenishment System. Its end product supplements the drinking-water supply of semi-arid Orange County.

Focus groups revealed that the public was well aware of RO because many people have small RO systems in their homes. As they learned about the plant's technology, the public became comfortable. Dunivin sees proof of that during hundreds of tours the plant provides every month, ending with samples of finished product.

"They say, 'Wow, this really tastes good,'" says Dunivin. "Because of our outreach, the public has a sense of confidence in what we're doing — not only management of the groundwater basin, but doing our part to supplement the drinking-water supply."

STAYING EFFICIENT

Dunivin acknowledges that indirect potable reuse may not be economical in areas with abundant drinking water: "Our other source is imported water. The Metropolitan Water District charges about \$920 an acre-foot, roughly equivalent to a football field covered with 1 foot of water. The water we produce costs about \$435, and the price of imported water is expected to go up over the next several years."

The GWRS product would still be cheaper than imported water if the water district had to pay for the entire plant instead of receiving \$196 million from the sanitation district and \$89 million in state grants. "If we paid for everything, the water we produce would cost about \$825 an acre-foot," Dunivin says.

Efficient energy use is one way of controlling production costs at the GWRS plant. "We used the most efficient motors and pumps and connected those to variable-frequency drives," Dunivin says. The pumps automatically adjust with increasing pressure as fibers and RO membranes become fouled during use.

"When we started Water Factory 21, we ran at about 600 psi and the RO membranes had to be cleaned monthly," says Dunivin. "Our new units run at about 125 psi and may have to be cleaned every six months to a year. Membrane chemistry is changing to allow us to be even more efficient and eventually our membranes may not need cleaning for two or three years."

EYEING DIRECT REUSE

The technology is already cleaning wastewater to levels better than drinking-water standards, which means there is no technical reason why water from the GWRS plant couldn't go directly into the drinking-water supply.

Dunivin says public confidence in that approach would be bolstered by more data. "What level of instrumentation do you need to give us and the public the complete satisfaction that there is nothing getting through?" Dunivin asks. "We need direct online analytical methods for getting that data immediately instead of taking it to the lab."

Dunivin expects such instrumentation to be available within about five years. He observes, "Even though we'll still be doing indirect potable reuse, we're going to be one of the first to use those instruments to demonstrate the reliability for direct reuse." **tpo**

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try@epicintl.com www.epicintl.com

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704-409-9700 Fax: 704-295-9080
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217-222-5400 Fax: 217-228-8243
pd.blowers@gardnerdenver.com www.gardnerdenver.com

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419-755-1011 Fax: 419-755-1251
grsales@gormanrupp.com www.GRpumps.com

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866-325-4210 315-255-3378 Fax: 315-253-7408
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800-328-5460 612-331-6910 Fax: 612-331-5304
customer.service@hawkinsinc.com www.hawkinsinc.com

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		YES	YES											
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			YES	YES			YES	YES	YES					
							YES	YES				YES	YES	
	YES		YES				YES					YES	YES	
		YES												

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 sheinly@ksbusa.com www.ksbusa.com

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Lutz-JESCO America Corp.

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 mail@jescoamerica.com www.jescoamerica.com

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 info@mp-gps.com www.mp-gps.com

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 610-363-8010 Fax: 610-363-8426
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 info@pennvalleypump.com www.pennvalleypump.com

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 enewsreplies@pentair.com www.pentair.com

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YES

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 sales@prominent.us www.prominent.us

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	YES			YES			YES	YES	YES		YES			
	YES							YES	YES			YES	YES	
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	YES	YES	YES		YES		YES	YES	YES					
							YES	YES				YES	YES	Dry Pit
		YES		YES										
	YES	YES			YES		YES	YES	YES	YES	YES	YES	YES	
				YES							YES			
	YES			YES			YES	YES	YES		YES	YES	YES	
							YES							
		YES												

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ft.amer.info@spx.com www.spxft.com

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USABlueBook
PO Box 9006, Gurnee, IL 60031
800-548-1234 847-689-3000 Fax: 847-689-3030
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Pumps

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YES

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	YES				YES					YES	YES		YES	
		YES			YES		YES				YES		YES	
														Remote Monitoring Systems
							YES	YES	YES		YES		YES	Grit
	YES	YES		YES			YES	YES	YES	YES	YES	YES		Positive Displacement
			YES									YES		
											YES	YES	YES	
				YES	YES	YES	YES	YES	YES	YES	YES		YES	
		YES	YES								YES			
					YES					YES				Positive Displacement
								YES						
								YES	YES		YES	YES	YES	Self-Priming

Troubleshooting pH Analyses

A SERIES OF SIMPLE PROCEDURAL AND MAINTENANCE STEPS CAN HELP ENSURE RELIABLE AND CONSISTENT PH READINGS IN WATER AND WASTEWATER APPLICATIONS

By Peter Strimple

Water and wastewater operators and laboratory technicians who measure pH for compliance and process control may encounter occasional problems that require troubleshooting. A few simple guidelines can help in resolving these problems quickly and in performing pH analyses with reliable results.

Troubleshooting a pH problem means looking at various aspects of the procedure to identify the cause. First and foremost, make sure the calibration buffers have not expired and replace them if they have.

Second, it is best to calibrate with buffers poured fresh daily or at least weekly; buffers that are reused for extended periods, especially if kept uncovered, can become contaminated and adversely affect calibration. Keep in mind that the buffers should bracket your sample values and that a three-point calibration will ensure the best results.

Third, be sure to rinse the electrode thoroughly with deionized or distilled water and blot it dry between buffers used for calibration. This will prevent small drops of one buffer from contaminating the next buffer.

Finally, you may want to consider the possibility that one or more of your buffers, though not expired, could be bad. This happens from time to time; here are a few guidelines to identify such a problem:

- Calibrate your meter with your regular buffers.
- Analyze a check standard, preferably from a different manufacturer (do not use one of the calibration buffers).
- Assess the accuracy of the check standard to see if it meets the acceptance criteria (e.g., ± 0.1 pH units, from *Standard Methods* #4500-H⁺ B).

Since pH is temperature dependent, you need to use either an automatic temperature compensation (ATC) probe or measure the temperature with a thermometer and adjust the meter accordingly.

- If this fails, obtain buffers from a different manufacturer.
- Switch one of your original buffers with the new buffer, calibrate the meter and analyze the check standard.
- If it passes, measure the original buffer you switched out as a sample — if it fails the same acceptance criteria, that indicates a problem with it.
- If the check standard passes, repeat the procedure with the other buffers one by one and determine which if any of them is bad.
- Keep in mind that if you are not analyzing check standards from a separate source or if you rerun a calibration buffer as a check standard, you may not encounter this problem.

CALIBRATION

Troubleshooting a pH calibration entails evaluating the slope (if displayed on your meter) to assess the efficacy of the electrode. Manufacturers

should provide an acceptable slope range (as a percent or in millivolts) for their specific electrodes, so be sure to follow those criteria. If your slope is outside that range after a calibration, you can pour fresh buffer, clean the electrode (if needed) and recalibrate to get a good slope.

If your meter does not display slope, you should at least follow the manufacturer's recommendations about assessing a calibration. Either way, unacceptable calibrations can result in unstable or unreliable sample results.

A good troubleshooting step after calibration is to verify it using a check standard, preferably from a second source or at least a different lot number. If this standard fails to meet the acceptance criteria, that could be a sign the calibration did not hold and you may need to recalibrate the meter.

PH METERS

Today's pH meters are rarely at fault when troubleshooting a pH problem. Essentially, they are glorified voltmeters that use an algorithm to convert millivolts to pH readings on a scale from 1 to 14. Short of a manufacturing defect or damaged from dropping or misuse, they are dependable and work for many years with no problems.

If you do suspect your meter is at fault, consult the user manual or the manufacturer's technical support department for help. One tip that can determine a problem with your meter is to unplug the electrode and plug in the shorting cap (if so equipped). This will enable you to check the millivolt reading to ensure that it meets the manufacturer's requirements. Another useful tip is to remove your electrode and replace it with another suitable, working probe. If both probes fail to work, then your meter may need repair.

TEMPERATURE PROBES

Since pH is temperature dependent, you need to use either an automatic temperature compensation (ATC) probe or measure the temperature with a thermometer and adjust the meter accordingly. Whether you use a separate ATC probe or a triode with built-in temperature probe, be sure it is undamaged and plugged in tightly (if applicable), and that the meter is not displaying a default temperature that indicates a possible problem with the ATC probe.

PH ELECTRODES

As for electrodes, first be sure you are using the correct type of electrode for your application. Second, make sure the measuring electrode is not damaged (cracked or scratched). If using a new electrode, remember that they can be faulty from manufacturing defects or damaged in shipment.

Also be sure to follow the guidelines in the user manual for properly conditioning a new electrode. Remember, too, that a pH electrode has a limited lifespan of six to 18 months, depending on the application (water or waste-

water) and the quality of care and maintenance. Two crucial maintenance tips are to rinse the electrode with deionized or distilled water between uses and to store it in an appropriate solution, such as storage solution or pH 4 or 7 buffer.

If you see sluggish or erratic pH readings, you should clean the junctions and the rest of the electrode following the manufacturer's guideline. Most electrodes can be cleaned with a lab detergent or with a very dilute hydrochloric acid solution (such as 0.1 N). Allow the electrode to equilibrate in a buffer or storage solution after cleaning. A clogged junction may take a little more effort to clean, but cleaning is necessary for proper electrode operation.

For any type of electrode, begin by inspecting it and the cable for signs of damage and replace it if any are found. Depending upon the type of electrode, a few troubleshooting tips will help.

For gel-filled electrodes:

- Look for air bubbles, and if you find them shake the probe downward as in shaking a thermometer to reset the liquid level. This will force the bubble back up to the top of the probe. Rinse and dry off the electrode tip.
- Look at the round disk (often made of Teflon) that serves as a seal to retain the gel inside the electrode body.
- If there are signs of leakage you will need to replace the electrode.

For refillable electrodes:

- Make sure the electrode is kept filled with the proper solution or gel.
- If the wrong filling solution is used (such as deionized or distilled water), the electrode may be permanently damaged.
- If the electrode has been dry for an extended period, it may be permanently damaged.
- The small opening near the top (for refilling) should usually be left open for measuring and closed during storage. Check your user manual.

SAMPLES

Although you should be using temperature compensation, this process is not always foolproof. If you are measuring a cold sample, you may find its temperature changing too quickly to allow the meter to

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stabilize. In that event you may want to let it equilibrate for a few minutes — but remember the 15-minute holding time. In addition, readings will stabilize faster if you swirl or stir samples. Keep in mind that SM #4500-H+ B states, “...bring sample and buffer to same temperature...” Some state regulators may want you to follow this, even if you are using ATC.

For more information, consult manufacturers' user manuals. Another recommended resource is *Standard Methods for the Examination of Water and Wastewater*, Method 4500-H+ B (Electrometric Method), latest method revision: 2000.

ABOUT THE AUTHOR

Peter Strimple is a process specialist with Severn Trent Services. He can be reached at 321/229-7747 or peter.strimple@stservices.com. **tpo**

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A New Pathway for Innovation

A CONSORTIUM IN SOUTHERN ONTARIO AIMS TO HELP COMPANIES TEST AND PROVE WASTEWATER TREATMENT TECHNOLOGIES AND BRING THEM TO MARKET FASTER

By Ted J. Rulseh

Manufacturers constantly develop new and improved wastewater treatment technologies. A key question is how and where to test and prove them before going to market.

Traditionally, the process includes bench scale and pilot testing, the latter phase often requiring cooperation from a municipal wastewater treatment plant. Now, the Southern Ontario Water Consortium (SOWC) and partners have developed a more effective and streamlined avenue for technology testing and demonstration.

The partnership involves the SOWC, Western University and the cities of London and Guelph. At London, an \$8 million center of excellence has been created within the Greenway Wastewater Treatment Plant that enables research and testing with real-world, full-scale flows. At Guelph, a facility is outfitted to perform bench scale and pilot tests.

The concept makes it easier for companies to arrange for and complete pre-market testing and demonstration. In particular, it frees them from establishing their own partnerships with cities or utilities to establish test sites and it removes the need for permitting of tests from regulators.

Evelyn Allen, manager of industry partnership development for the SOWC, and Geordie Gauld, division manager of wastewater treatment operations with the City of London, talked about the new centers of excellence in an interview with *Treatment Plant Operator*.

tpo: How did this project develop?

Allen: The SOWC was officially announced in August 2011 and was supported with funding through the Federal Economic Development Agency for Southern Ontario and the provincial Ministry of Research and Innovation. The first two years were spent building the consortium and all

“We observe that a lot of companies are trying to develop new technologies but have a hard time gaining access to the real-life flows and the concentrations they need to test them.”

GEORDIE GAULD

the infrastructure that went along with it. During that time we engaged with our industry partners to help them get involved in the process and ensure that what we were building would fit their needs.

Now we've moved into an operational mode. All our facilities, including London and Guelph, were operational as of March 2014. In the operational mode, we engage with industries to help them develop and scope projects — research and development in particular — that would take place at London and Guelph and at facilities across our eight partnering universities. Across the board, we've built facilities that allow real demonstrations of technology.



Evelyn Allen



Geordie Gauld

tpo: What is the nature of the facilities SOWC has created?

Allen: The London facility is dedicated to full-scale wastewater technology demonstration and development. The site in Guelph is also for wastewater, but it's designed for pilot or bench scale activities and so has lower flow rates. We also have mobile trailers that can accommodate ecotoxicology work. They can be placed in situ, such as downstream of a treatment plant or an area of concern. We also have facilities dedicated to technology testing and development for drinking water — membranes and advanced oxidation processes and technologies.

Another big part of what we've done is build real-world demonstration capability for watershed management. We have three highly instrumented sub-watersheds within the Grand River Watershed and have made them available to companies and researchers to do technology development or do research on the watersheds in new ways.

tpo: How are full-scale demonstrations run at the London treatment facility?

Gauld: In designing the facility, we picked the main treatment process flows within the plant. We have the ability to direct those flows back to the water treatment center. We can have 1 mgd worth of different process flows that can be directed back to four test bays. A client can take that total flow or a portion of it and run tests on it. The flow then gets returned to the point in the process from which it was drawn.

tpo: What is a practical example of how this kind of testing would work?

Gauld: TrojanUV, a company right here in London, has worked with us to test a new UV disinfection system. We took final effluent from the plant and ran it back to their test bay. They ran the flow through their UV system, after which it was returned to the plant. So they were able to use a real flow with concentrations as in a real plant to test their system.

tpo: What does the research section of the plant look like?

Gauld: It's a retrofitted section of the plant that has been divided into test bays so that clients can access a bay dedicated to their own independent use. We can draw wastewater that has been screened but not degrittied, primary influent or primary effluent. We can also take mixed liquor and final effluent flows back to the test bays. Those are the 1 mgd flows. If a client wants to do testing with waste activated sludge or primary sludge, they can do that, as well.

tpo: What is different at the Guelph facility?

Allen: The concept is similar in that wastewater from the plant is pumped to our test facility. Clients can access the same types of waters, but at much smaller flows, up to a maximum of 72,000 gpd. Ultimately, we could see a company come to Guelph to do pilot or bench scale testing, and then when they want to scale up moving to London for that part of the development work or demonstration.

tpo: Why is it important to have facilities like these?

Gauld: We observe that a lot of companies are trying to develop new technologies but have a hard time gaining access to the real-life flows and the concentrations they need to test them. Many municipalities are not willing to allow companies to come in for pilot testing. And some companies need larger flows — 1 mgd wouldn't even be available at a smaller municipality.

Allen: Besides needing a utility willing to allow pilot testing, in Ontario a company would also need approval from the Ministry of Environment. That takes time and resources. At both of our facilities those approvals are already in place. So access to facilities like ours makes it much easier for companies to do their tests and demonstrations.

tpo: How did the relationship between SOWC, Western University and these two cities come about?

Allen: Western University and London have been an integral part of SOWC throughout the process. They were early supporters. London has a long history of supporting innovation, working with local companies to develop technologies. This is an opportunity to do that on a larger scale.

Gauld: London was originally trying to establish a water-technology center in another facility the city operates. So this initiative grew from that. We had the basis on an idea, and the funding from the federal and provincial governments helped it come together.

tpo: How are plant employees involved with the test facility?

Gauld: At London, the staff is involved in scoping out the flows and routing them to the test facility. They are not involved in the actual testing.

tpo: How do you see these facilities contributing to the betterment of wastewater treatment?

Allen: This provides a huge step in reducing barriers to bringing new technologies to market. The water market is quite risk-averse, and this is one

About the SOWC

The **Southern Ontario Water Consortium** is a platform that creates capacity for research, development, testing and demonstration of water and wastewater technologies and services for local, national and global markets.

The platform includes state-of-the-art facilities, instrumentation and technical support for research and development in watershed management, wastewater treatment, ecotoxicology, drinking-water treatment and sensor development, along with development of analytical techniques for detecting emerging contaminants. It enables collaborations between the private and public sectors with leading academic researchers from eight partner universities. It also promotes integration across the research areas.

SOWC provides a single point of contact for users, recognizing that some need access to single facilities while others need access to multiple facilities over time. It offers a large computational and data environment for processing, analyzing, storing and distributing water data. **For more information, visit www.sowc.ca.**

more step in helping mitigate that risk for companies trying to break into the market. It's another way for them to provide proof of concept before they get into an actual plant installation.

Gauld: Another roadblock for new technologies is getting the consultants and engineers on board, making them feel at ease. In a setup like this, consultants can come in and actually see the technologies working. Anything that helps make them more comfortable pays big dividends.

tpo: How long do these tests typically last?

Allen: The time frames vary. Some companies want to be there for three years. Others just want to test a pump and they are in for a week. Some companies have a technology that is already established and they want to use our facility as a demonstration site for their clients.

tpo: What role do the SOWC partner universities play in this process?

Allen: We're here to help support research and development, whether through the universities or from private-sector businesses, or helping to fos-

“The water market is quite risk-averse, and this is one more step in helping mitigate that risk for companies trying to break into the market. It's another way for them to provide proof of concept before they get into an actual plant installation.”

EVELYN ALLEN

ter the cooperation of both. Our goal is to help connect all the players in the water sector. With the involvement of Western University and our seven other university partners, we have a critical mass of academic resources available. The most likely scenario is an academic-private sector partnership where a company works with a university to develop a research or development project with a technology.

tpo: When did the first actual clients begin their testing at the SOWC facilities?

Allen: The first clients have signed their agreements and began their projects in late 2014. **tpo**



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By Craig Mandli

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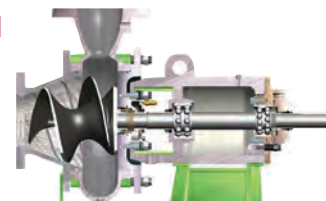


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The Chopper Pump from Landia needs no axial adjustment of the impeller to provide continuous efficient cutting of solids. Its knife system chops all debris before it enters the pump, eliminating health and safety risks for maintenance crews. The pump casing and impeller protect against impurities. The stainless steel unit with nitrile seals withstands severe applications such as dewatering hazardous waste acids and alkalis. **919/466-0603; www.landiainc.com.**

VOGELSANG XRIPPER XRS-QG

The high-torque XRipper XRS-QG twin-shaft in-line grinder from Vogelsang reduces solids, preventing clogging and equipment damage. It has easy-maintenance one-piece cutters that need no factory reconditioning. Numerous cutter width and material options are available. It comes with high-wear cartridge mechanical seals. Flanges from 4 to 12 inches and in-channel units are available with electric, submersible or hydraulic drive options. Auto-reversing controls prevent clogging. **330/389-9145; www.vogelsangusa.com.**



XRipper XRS-QG grinder from Vogelsang

Dewatering/Bypass Pumps

BOERGER MOBILE ROTARY LOBE PUMP



Mobile Rotary Lobe Pumps from Boerger

Mobile Rotary Lobe Pumps from Boerger are self-priming, valveless, reversible and compact positive displacement pumps with flow capacities up to 5,000 gpm. The units are for rapid deployment of sewer bypass, municipal waste and stormwater pumping, industrial effluent and sludge pumping, digester and lagoon cleanup, flood disasters and spill emergencies. The rotor tip enables cost-effective operation. They are manufactured



Dri-Prime NC350 pump from Godwin, a Xylem brand

GODWIN DRI-PRIME NC350

The Dri-Prime NC350 pump from Godwin, a Xylem brand, offers flows to 6,530 gpm and discharge heads to 160 feet. It has Flygt N-technology with a non-clogging self-cleaning impeller. Its Dri-Prime automatic system self-primers and re-primers

from dry to 28 feet without operator assistance. The unit has a hard-iron (60 HRC) impeller and insert ring. It includes a dry-running high-pressure oil bath mechanical seal with abrasion-resistant silicon carbide faces. The close-coupled centrifugal pump allows for easy pump end or engine/motor changeover in the field. It can be customized with a diesel engine or electric motor. It can be highway trailer or skid-mounted or housed in a quiet enclosure. **800/247-8674; www.godwinpumps.com.**

MTH PUMPS C SERIES

C Series stainless steel centrifugal pumps from MTH Pumps have a cast stainless steel semiopen impeller with a trimmed face to provide varying performance curves. This enables a specific pump size to have varying design flow rates while preserving high head at low flow. The casing's impeller clearance allows slight adjustment of flow without installing a valve in the discharge line. This adjustment can also be used to restore loss of performance due to wear without dismantling the pump. It operates in the 10 to 20 gpm range at 130 feet total dynamic head (TDH), while delivering up to 100 gpm maximum flow and 140 feet maximum TDH. **630/552-4115; www.mthpumps.com.**



C Series centrifugal pumps from MTH Pumps

SUBARU INDUSTRIAL POWER PRODUCTS PKX SERIES

The 4-inch PKX401 centrifugal pump from Subaru Industrial Power Products has a maximum delivery volume of 356 gpm and is powered by a 9 hp EX27 engine. An abrasion-resistant cast-iron three-blade impeller extends life, while a hardened cast-iron volute withstands debris sucked through the strainer. The volute pumps water straight into the

with Maintenance In Place, allowing quick access to the pump casing and all wetted parts through a quick-release cover. The suction and pressure hoses can be installed in minutes. **612/435-7300; www.boerger.com.**

DRAGON PRODUCTS MOBILE WATER-TRANSFER PUMP

Mobile water-transfer pumps from Dragon Products have Redi-Prime vacuum-assisted priming, with a run-dry mechanical seal, powered by a John Deere 6090 Tier III 325 hp engine with 160-gallon-capacity integral fuel tanks. They have a maximum flow of 4,900 gpm with a 368-foot total dynamic head. The units have DOT lights and tandem torsion-ride axles, stabilizer jacks and electric brakes. **866/914-8198; www.dragonproductsltd.com.**



Mobile water-transfer pumps from Dragon Products

Metering Pumps

FLUID METERING CERAMPUMP



CeramPump valveless piston metering pumps from Fluid Metering

CeramPump valveless piston metering pumps from Fluid Metering provide precision fluid control for environmental monitoring, sampling and treatment. The low-current DC motor can be used for extended 12/24-volt battery operation in remote locations. It uses one moving part, a rotating and reciprocating ceramic piston, for pumping and valving functions. The piston and mated liner are made of dimensionally stable, sapphire-hard ceramics that provide long-term, drift-free accuracy of 1 percent or better. The inert fluid path of ceramic and fluorocarbon is suitable for injection of concentrated tracer dyes and water treatment chemicals. **800/223-3388; www.fmipump.com.**

LMI PUMPS ROYTRONIC EXCEL SERIES AD

ROYTRONIC EXCEL Series AD chemical metering pumps from LMI Pumps have a design-fitting system for secure, leak-proof tubing connections. Every pump with a standard FASTPRIME or optional AUTOPRIME (degassing) liquid end includes 1/2-inch NPT connections for ease of configuration. High-viscosity liquid ends are available. They are capable of pressures to 250 psi and flows up to 2 gph and include an LCD user interface. Models can include external pacing, alarms and pulse/4-20 mA input and output capability. **215/293-0401; www.lmipumps.com.**



ROYTRONIC EXCEL Series AD chemical metering pumps from LMI Pumps

MILTON ROY MACROY SERIES



MACROY Series metering pumps from Milton Roy

MACROY Series metering pumps from Milton Roy are designed for applications up to 175 psi, including water-treatment chemicals, process additives, acids, outgassing fluids and slurries. The drive incorporates a variable eccentric design that enables smooth output and reduces system shock. The mechanically actuated diaphragm reduces the risk of hydraulic oil contamination of process liquid. DC variable-speed drives are available for external control and automation. The pumps have flow rates up to 310 gph; a dura-

ble, metallic powder-coated housing; high-performance check valves with machined seats; precision stroke adjustment while the pump is running or stopped; and increased turndown ratios available with variable-speed options. **800/693-4295; www.miltonroy.com.**

MOYNO DOSING PUMP

Dosing pumps from Moyno provide a smooth pumping action with no pulsation and low shear. They are suited for intermittent or continuous dosing duty in high-pressure, low-flow applications, transferring at pressures of 1,044 psi. With no valve components, blockages are eliminated and the working pump life is extended. Stators are available in a variety of materials. **877/486-6966; www.moyno.com.**



Dosing pumps from Moyno

PROMINENT FLUID CONTROLS SIGMA/1



Sigma/1 metering pump from ProMinent Fluid Controls

The Sigma/1 mechanically actuated diaphragm metering pump from ProMinent Fluid Controls is capable of flow rates from 5.3 to 38 gph and pressures up to 174 psig. The product range, control type S1Cb/S2Cb/S3Cb, comes with a removable HMI operating unit for complete system integration. It is available in a basic (non-microprocessor based) version and in explosion-proof models. **412/787-2484; www.prominent.us.**

UGSI CHEMICAL FEED ENCORE 700

The Encore 700 mechanical diaphragm metering pump from UGSI Chemical Feed is available with six diaphragm sizes in simplex, duplex and double-simplex configurations. It combines hydraulic diaphragm drives with mechanical diaphragm liquid ends. Capacities to 634 gph are available with backpressures up to 175 psi. It has a nonloss-motion (amplitude modulation) stroke adjust mechanism with a choice of direct or pulley-coupled drives. Clear PVC cartridge valves allow service with no piping disturbances and provide built-in visual indication of operation. **855/669-3845; www.ugsichemicalfeed.com.**



Encore 700 metering pump from UGSI Chemical Feed

Peristaltic Pumps

BLUE-WHITE INDUSTRIES PROSERIES-M M-4



ProSeries-M M-4 peristaltic metering pump from Blue-White Industries

The ProSeries-M M-4 peristaltic metering pump from Blue-White Industries has feed rates from 0.002 to 158.5 gph. Smooth, quiet, low-velocity injection eliminates destructive forces, and there is no need for pulsation dampeners or piping system repairs. It has CNC-machined squeeze rollers and two alignment rollers for optimum squeeze and tube life. The single-piece, heavy-duty rotor means no flexing and increased accuracy with no metal springs or hinges.

It has a 10,000-1 turndown ratio with high-resolution motor speed adjustment. **714/893-8529; www.blue-white.com.**

(continued)

FLOWROX PERISTALTIC PUMP

Peristaltic pumps from Flowrox can pump diverse slurries and dose a range of abrasive, corrosive, viscous or crystallizing media. As the cylindrical rotor rotates along the hose, the process medium gets pushed forward through the hose. At the same time the hose behind the compression point reverts to its original circular shape, creating a suction effect at the pump inlet port. As a result the hose bore gets filled with the medium. No backward flow can occur as the hose is squeezed tight by the roller. The pump eliminates friction, maximizes hose life and lowers energy consumption. **410/636-2250; www.flowrox.us.**



Peristaltic pumps from Flowrox



Chem-Tech Series XP peristaltic dosing pumps from Pulsafeeder

PULSAFEEDER CHEM-TECH SERIES XP

Chem-Tech Series XP peristaltic dosing pumps from Pulsafeeder have an electronic timing circuit that provides reliable pump control without relying on mechanical adjustment components that may wear over time. The interface and controls provide easy operation, and the peristaltic design is virtually maintenance-

free. They have a heavy-duty gear train and computer-aided peristaltic design and are available in fixed-rate, adjustable, pulse-input, flow switch-activated, dry-contact input and timer models. A variable model with control electronics that allow a variety of choices of input signal types and onboard-timer programs to customize to any application is available. **800/333-6677; www.pulsatron.com.**

Progressive Cavity Pumps

NETZSCH PUMPS NORTH AMERICA MULTIPHASE PUMP

Multiphase Pumps from NETZSCH Pumps North America can handle various mixtures of oil, gas, solids and water. Mixtures with a sand content, with low emulsification of oil/water or with highly viscous products are effectively transferred. The progressing cavity pump is designed for untreated well flow applications and can provide flow rates up to 2,600 gpm and handle pressures up to 900 psi. They provide almost pulsation-free pumping, low shear rates, high overall efficiencies, and low operating and maintenance costs. **610/363-8010; www.netzschusa.com.**



Multiphase Pumps from NETZSCH Pumps North America



Alpha skimmer from Megator

Solids/Sludge Pumps

MEGATOR CORP. ALPHA

The Alpha skimmer from Megator removes wastewater scum from aeration tanks. Made of stainless steel, it handles aggressive liquids at varying depths and concentrations. It has a lightweight design with one-man operation, an adjustable

intake weir, a tri-float design for stability and a shallow draft that enables it to operate in as little as 12 inches of water. The skimmer can be arranged for gravity flow in new construction. **800/245-6211; www.megator.com.**

PENN VALLEY PUMP CO. DOUBLE DISC PUMP

The Double Disc Pump from Penn Valley Pump Co. does not rely on close tolerances within the pump chamber to generate flow, eliminating friction. It can run dry indefinitely without damage and the short stroke allows the pump to incorporate a non-leak sealing trunnion that requires no maintenance, seal water, packing or lubrication. It is self-priming and can pass up to 2-inch solids and line-size semisolids. **215/343-8750; www.pennvalleypump.com.**



Double Disc Pump from Penn Valley Pump Co.



SKG Series submersible pumps from BJM Pumps

Submersible Pumps

BJM PUMPS SKG

SKG Series submersible pumps from BJM Pumps have a dual shredding system with radial and axial shredding elements for difficult/heavy solids, including flushable wipes. They come with high-torque, four-pole motor pumps in 2, 3 and 5 hp. **877/256-7867; www.bjmpumps.com.**

GRIFFIN PUMP HYDRAULIC SUBMERSIBLE PUMP

Hydraulic submersible pumps from Griffin Pump & Equipment are available in axial flow and trash-handling models. They range from 4 to 24 inches and are designed to handle water volumes up to 20,000 gpm and heads up to 140 feet. The impellers can handle solids up to 3 inches. They fit in standard manholes for sewer bypass and for moving liquids with heavy trash and solids content, such as sludge, trash, raw sewage, clear liquid and industrial effluent. **866/770-8100; www.griffinpump.com.**



Hydraulic submersible pumps from Griffin Pump & Equipment



S4CSL pump from Hydra-Tech Pumps

HYDRA-TECH PUMPS S4CSL

The S4CSL submersible 4-inch hydraulic-driven sand slurry pump from Hydra-Tech Pumps includes a built-in agitator for stirring up solids. It has hardened alloy wear parts and can be used in applications where settled solids must be put into suspension and pumped away with the discharge water. It requires hydraulic inputs of up to 17 gpm at 2,800 psi. When combined with the company's open and sound-attenuated power units, it is capable of output flows to 750 gpm. **570/645-3779; www.hydra-tech.com.**

VERTIFLO PUMP COMPANY SERIES 800

The Series 800 industrial vertical immersion sump pump from Vertiflo Pump Company can be used for sump drainage, flood control and process drainage to meet U.S. EPA and OSHA requirements. It's used for severe service at heads to 230 feet and temperatures to 350 degrees F. It operates in pit depths to 26 feet and delivers up to 3,000 gpm. It includes carbon line shaft bearings, a semiopen impeller with external adjustment, a high-thrust angular contact ball bearing, 416 stainless steel shafts to 1 15/16 inches and a standard NEMA C face motor. Construction materials available are cast iron, 316 stainless steel or alloy 20. **513/530-0888; www.vertiflopump.com.**



Series 800 sump pump from Vertiflo Pump Company

Vertical/Lift Station Pumps



FLYGT EXPERIOR

The Experior wastewater pumping system from Flygt – a Xylem Brand has self-cleaning Flygt N-technology that enables efficient pumping. Its Adaptive N-hydraulics allow the impeller to move axially upward when necessary to permit bulky or tough debris to pass through, reducing stress on the shaft, seals and bearings. It has a preprogrammed SmartRun pump control unit that provides variable-speed pumping. Its premium-efficiency motor is small and light, yet durable, with a long bearing and motor life. 704/409-9700; www.flygtus.com.

Experior wastewater pumping system from Flygt – a Xylem Brand

GOULDS WATER TECHNOLOGY SERIES E-SV

The Series e-SV stainless steel vertical multistage pump by Goulds Water Technology – a Xylem brand is offered in 11 models with flow rates up to 800 gpm and heads up to 1,150 feet. It has standard NEMA motors that support 0.5 to 75 hp and have a temperature range of -20 to 250 degrees F. Easy to maintain, the design enables the removal of the mechanical seal without detaching the motor. 866/325-4210; www.goulds.com.



Series e-SV multistage pump by Goulds Water Technology – a Xylem brand

JWC ENVIRONMENTAL VERTICAL AUGER MONSTER

The Vertical Auger Monster all-in-one grinder, screening basket and spiral lifting screw from JWC Environmental eliminates pump clogs and sewer backups caused by sewage debris, particularly wipes. It combines five systems into one compact footprint to shred, capture, extract, wash and discard waste materials. The result is cleaned, compact discharge that keeps odors to a minimum and lowers disposal costs. The unit is quickly installed to the pump station wall, and operators can bring the screening trough, auger brush and auger conveyor to deck levels for inspection or maintenance. Automated monitoring protects the system from overloading. 800/331-2277; www.jwce.com.



Vertical Auger Monster from JWC Environmental

KSB KRT JACKET-COOLED WASTE WATER PUMP

The KRT Jacket-Cooled Waste Water Pump from KSB has a fully sealed, closed-loop cooling system to keep the pump free of debris. The cooling liquid inside the jacket is an environmentally safe propylene glycol/water mix that enables the cooling system to protect the pump in temperatures as low as -4 degrees F. An impeller inside the closed loop circulates the propylene glycol/water mixture so it constantly flows around the motor gathering heat, then over a heat exchanger, which dissipates the heat into the pumped liquid. The system is designed for continuous duty completely dry or fully submerged. 804/222-1818; www.ksbusa.com.



KRT Pump from KSB

Pump Controls



ACQ550 drive from ABB

ABB INC. ACQ550

The ACQ550 drive from ABB is designed for quick and easy setup and is available in ratings from 1 to 550 hp. It integrates as a NEMA-1, NEMA-12 or outdoor-rated NEMA-3R solution. A library of preprogrammed startup assistants provides commissioning for submersible, centrifugal or positive-displacement pumps. Application macros simplify configuration of inputs, outputs and parameters. 800/752-0696; www.abb.com.

BAKER WATER SYSTEMS DIVISION MONITOR BOOSTER STATION

Monitor Booster Stations from Baker Water Systems Division are buried and house a submersible pump and motor in the low-pressure suction tank reservoir. This eliminates motor noise and the requirement of a traditional-style pump house and the attendant confined-space entry. Monitor Municipal Controls provide a variable-frequency drive control that eliminates water hammer and the need for pump control valves. The system includes emergency pump shutdown, low-suction pressure protection, SCADA integration and a UL-approved control panel. 800/356-5130; www.bakermonitor.com.



Monitor Booster Stations from Baker Water Systems Division



T15BR operator panel from Beijer Electronics

BEIJER ELECTRONICS T15BR

The T15BR operator panel from Beijer Electronics withstands inclement weather. It is certified by UL, ATEX and IECEx for hazardous environments and is designed to NEMA 4X, IP66 and UL 50E Type 4X (outdoor) standards. It has a 15.4-inch high-resolution, 1280 x 800 pixel, TFT color LCD, high-bright display and resistive touch screen. It supports an Intel Atom 1.0 or 1.6 GHz CPU, 1 or 2 GB RAM, 4 or 16 GB flash, two Ethernet ports, two galvanically isolated serial ports, three USB ports, an SD slot and an optional two-port CAN module. It can be operated in temperatures from -22 to 158 degrees F and stored in temperatures from -40 to 185 degrees F. 801/466-8770; www.beijerinc.com.

DATA FLOW SYSTEMS TCU

The TCU pump controller from Data Flow Systems combines automated pump control functions with SCADA communications for fixed-speed and VFD applications. It automates up to three pumps or can be linked in series to accommodate any number of pumps. It has an intuitive operator interface and expandable I/O interface; no PLC knowledge is required. The HOA switches are fail-safe and remain functional even with loss of power. The unit is SCADA-ready with open Modbus RTU and ASCII protocols and is available with integrated radio, networking, auto dialer or Verizon cellular communications. It comes with a backup battery and charger and configuration software. 321/259-5009; www.dataflowsys.com.



TCU pump controller from Data Flow Systems

(continued)

ENVIRONMENT ONE CORPORATION IOTA ONEBOX

The Iota OneBox telemetry system from Environment One Corporation enables control of a fleet of pressure sewer grinder pumps from an office desktop or a smartphone. It integrates into a SCADA network to provide information on tank-storage capacities, power failures, blockages and faults. Diagnostics for individual properties, streets or whole networks are available in real time. It enables remote control and monitoring of individual grinder pumps; alerts before the customer becomes aware of any faults; trend analysis, report generation and peak flow demand determinations; and flow smoothing and maximized efficiency of downstream infrastructure. **518/579-3068; www.eone.com.**



iota OneBox telemetry system from Environment One Corporation



Integrinex line of lift station controls from Gorman-Rupp Company

GORMAN-RUPP INTEGRINEX

The Integrinex line of lift station controls from Gorman-Rupp Company enables system performance through precise matching of controls to pumps and motors. The four choices include Basic for simple and reliable plug-and-play performance, and accurate start/stop operation in a duplex alternation pump system; Standard with duplex and triplex alternation, level sensors, pump delay and alarms; Advanced including Soft Starters

and VFDs to manage electric inrush, hydraulic shock and matching starting and stopping torque-based management and monitoring; and Remote View, which includes the functionality of the Advanced system with remote tablet-based management and monitoring. **419/755-1011; www.grpumps.com.**

HOFFMAN & LAMSON VARIABLE-FREQUENCY DRIVE

Next-generation controls and variable-frequency drives from Hoffman & Lamson, Gardner Denver Products, optimize the efficiency of new or existing blowers. The controls include SCADA-ready panels, meterless flow control, pre-engineered design packages that reduce electrical installation costs and automated monitoring. Horsepower consumption is low as the blower output decreases while the optimal efficiency remains the same as at full speed. **724/239-1500; www.hoffmanandlamson.com.**



Controls and variable-frequency drives from Hoffman & Lamson, Gardner Denver Products



OLS Series control panels from Orenco Controls

ORENCO CONTROLS OLS SERIES

Corrosion-resistant OLS Series control panels from Orenco Controls contain integrated variable-frequency drives to optimize system operation, reduce energy usage and decrease hard starts and water hammer. Panels are customized to the application and setup needs. Multiple drives can be configured through one interface. Engineers preprogram the user interfaces to site-

specific needs. Maintenance staff can easily adjust settings and monitor the system remotely. Panels come in a corrosion-resistant, weatherproof enclosure that offers circuit protection, heat dissipation systems (fan or A/C), phase and voltage protection, and level controls. **877/257-8712; www.orencocontrols.com.**

PRIMEX LEVEL VIEW

The Level View controller from PRIMEX controls two or three constant- or variable-speed pumps for pump up (water) and pump down (wastewater) applications. Its color touch screen can be easily read in direct sunlight and provides on/off level control, speed control, pump alternation, flow monitoring, data logging, alarm logging and historical trending. An SD card provides data storage and download capability. Connectivity options provide flexibility for SCADA/BAC integration, as well as a plug-and-play interface to the Pump Watch Web-based monitoring system. **844/477-4639; www.primexcontrols.com.**



Level View controller from PRIMEX

Pump Parts/Supplies/Service

EATON MODEL 2596



Model 2596 strainer from Eaton

The Model 2596 automatic self-cleaning strainer from Eaton continuously removes entrained solids from liquid in pipeline systems. It is suited for applications that demand uninterrupted flow and is used for straining cooling water from ponds, lakes or rivers, cooling towers, plant service water, boiler feed water, secondary effluent, irrigation and municipal water intake. The determining factors are the level of solids content and the ability to handle the backwash discharge flow. It can be used when loading is high or upset conditions occur. Continuous

flow is ensured even while the system is being backwashed, providing uninterrupted protection for pumps, valves and other process equipment. **877/386-2273; www.eaton.com.**

FLOWSERVE CORP. PLEUGER PMM6

Designed for electrical submersible pumps, the Pleuger PMM6 submersible electric motor from Flowserve Corp. uses an efficient permanent magnet synchronous motor to boost power output at full and partial loads. Testing has shown that thermal losses are reduced, extending motor life. When operated in conjunction with a variable-frequency drive, the motor allows the pump to run at the best efficiency point under variable-flow conditions. It is available in a 6-inch motor size with power output of 7 to 60 hp. **410/756-2602; www.flowserve.com.**



Pleuger PMM6 submersible electric motor from Flowserve Corp.



Merlin Chemical Dilution Systems from Force Flow

FORCE FLOW MERLIN CHEMICAL DILUTION SYSTEM

Merlin Chemical Dilution Systems from Force Flow enable automatic adjustment of chemical strength on site to keep a metering pump operating in the ideal speed range, regardless of changes in seasonal chemical demand. Operators can save money by purchasing standard high-strength chemical, then diluting on site as needed. **925/686-6700; www.forceflow.com.**

LUDECA EDDYTHERM

EDDYTHERM induction bearing heaters from LUDECA allow precise setting of time and temperature to prevent premature bearing failures due to improper installation or overheating. A magnetic temperature

probe continuously measures and displays actual temperature while a standby function permits holding of the temperature at a preset level indefinitely. They automatically demagnetize bearings after heating, and a visual and audible signal announces termination of the heating/demagnetizing cycle. **305/591-8935; www.ludeca.com.**



EDDYTHERM heaters from LUDECA



Online calculator from Met-Pro Global Pump Solutions, a CECO Environmental Company

MET-PRO GLOBAL PUMP SOLUTIONS ONLINE CALCULATOR

The online calculator from Met-Pro Global Pump Solutions, a CECO Environmental Company, lets operators quickly estimate total life-cycle cost for pumps. Users input data including initial pump costs, installation costs and annual recurring costs. The calculator accounts for energy costs and generates an analysis. **215/723-8155; www.mp-gps.com.**

RED VALVE CO. PUMP-PROTECTION VALVES

Pump-protection valves from Red Valve Co. can be used throughout a plant to isolate pumps and equipment and control fluid pressure and flow as it is processed. They are designed for various pressures, temperatures and chemicals for any equipment application and to manage

the corrosive and abrasive nature of numerous fluids. Gate valves section off the pump when service is required. Tideflex check valves ensure that fluid in the system flows in one direction to prevent pump backflow contamination. Automatic recirculation valves protect pumps during low-load operation and startup. **412/279-0044; www.redvalve.com.**



Pump-protection valves from Red Valve Co.



Inside Drops from RELINER/Duran

RELINER/DURAN INSIDE DROP

Inside Drops from RELINER/Duran extend pump life in lift stations by preventing aerated influent from being directly drawn into the pumps and causing cavitation. The drop pipe should always be extended below the low limit level and cut to follow the slope of the base fillet. If there is no fillet, users cut the pipe at 45 degrees and maintain a distance from the floor or fillet of one pipe diameter. This creates a diffuser by directing the flow back against the structure, de-aerating the influent. **800/508-6001; www.reliner.com. tpo**

FREE INFO ON THESE PRODUCTS – RETURN FOLLOWING FORM

For FREE information on these products, check the box(es) below:

Centrifugal Pumps

- Franklin Electric FPS NC Series
- Godwin Dri-Prime NC350
- MTH Pumps C Series
- Subaru Industrial Power Products PKX Series
- Vaughan Company Triton

Chopper/Grinder Pumps

- Landia Chopper Pump
- Vogelsang XRipper XRS-QG

Dewatering/Bypass Pumps

- Boerger Mobile Rotary Lobe Pump
- Dragon Products mobile water-transfer pump

Metering Pumps

- Fluid Metering CeramPump
- LMI Pumps ROYTRONIC EXCEL Series AD
- Milton Roy MACROY Series
- Moyno dosing pump
- ProMinent Fluid Controls Sigma/ 1
- UGSI Chemical Feed Encore 700

Peristaltic Pumps

- Blue-White Industries Proseries-M M-4
- Flowrox peristaltic pump
- Pulsafeeder Chem-Tech Series XP

Progressive Cavity Pumps

- NETZSCH Pumps North America Multiphase Pump

Solids/Sludge Pumps

- Megator Corp. Alpha
- Penn Valley Pump Co. Double Disc Pump

Submersible Pumps

- BJM Pumps SKG
- Griffin Pump hydraulic submersible pump
- Hydra-Tech Pumps S4CSL
- Vertiflo Pump Company Series 800

Vertical/Lift Station Pumps

- Flygt Exporior
- Goulds Water Technology Series e-SV
- JWC Environmental Vertical Auger Monster
- KSB KRT Jacket-Cooled Waste Water Pump

Pump Controls

- ABB Inc. ACQ550
- Baker Water Systems Division Monitor Booster Station
- Beijer Electronics T15BR
- Data Flow Systems TCU
- Environment One Corporation iota OneBox

- Gorman-Rupp Integrinex
- Hoffman & Lamson variable-frequency drive
- Orenco Controls OLS Series
- PRIMEX Level View

Pump Parts/Supplies/Service

- Eaton Model 2596
- Flowserve Corp. Pleuger PMM6
- Force Flow Merlin Chemical Dilution System
- LUDECA EDDYTHERM
- Met-Pro Global Pump Solutions online calculator
- Red Valve Co. pump-protection valves
- RELINER/Duran Inside Drop

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European plants use pumps to reduce foam

Problem

Two wastewater treatment plants in Brussels, Belgium, faced issues with sludge circulation in the decanting basins. Previously installed pumps were creating too much foam, leading to sludge particles floating near and on the surface. Because the sludge was not settling into the basins as expected, the extraction process was not effective and the pumps were using more energy than anticipated.

Solution

Six **Cornell 18NHFL self-priming pumps** were installed to pump sludge from lower to higher tanks. They are driven by 90 kW electric motors and are controlled by variable-frequency drives that operate between 400 and 600 rpm. The maximum hydraulic efficiency of the pumps is 87.3 percent.



RESULT

The pumps helped remove excess air from the sludge before it was pumped into the upper tanks and came in contact with surface mixers. The dry/vacuum-priming pumps with Redi-Prime system helped remove air bubbles trapped in the water. They have worked effectively since 2011. **503/653-0330; www.cornellpump.com.**

Ultrasound flow monitor deployed in pump station

Problem

In a two-pump station, Thames Water wanted to monitor station performance and check the condition and efficiency of each pump. The usual approach would be to install a magflow-type meter. However, that would have required groundwork, including the building of a separate chamber next to the existing pumping station to house extra piping and the meter.

Solution

The company used a **Flow Pulse** unit from **Pulsar Process Measurement**. Completely noninvasive, it is installed using a simple band and silicon pad to make close contact with the pipe; it can be positioned close to pipe bends or flanges. It fires an ultrasound pulse from a high-output ceramic crystal through the pipe wall and analyzes the flow using Refracted Spread Spectrum Analysis (RSSA), which consolidates the real-flow information from the mass of signals coming from the particles, bubbles, turbulence, vortices and eddies within the flowing liquid.



RESULT

Thames Water benefited from the unit's rapid deployment at cost savings over the magflow meter. **850/279-4882; www.pulsar-pm.com.**

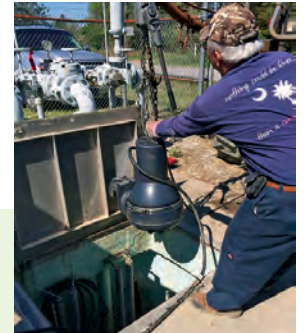
Town increases efficiency with retrofit wastewater pumps

Problem

The Town of Harleyville, S.C., was looking to upgrade its aging lift stations to increase efficiency, lower utility costs and reduce pump maintenance. The town's six 25-year-old lift stations each suffered from frequent clogging, expensive maintenance and repair, and large monthly utility bills related to extended pump runtimes.

Solution

Working with global engineering consultant URS Corporation and Carolina Pumpworks, the town began by retrofitting one lift station with **Grundfos SLV wastewater pumps**. The improvement was dramatic and led to upgrades at two additional lift stations. The three duplex lift stations each have two 5.5 hp, 1,750 rpm three-phase pumps that alternate operation according to the station's level control system, which offers system redundancy and added capacity during high-flow events. SuperVortex impellers ensure that solids up to 3 inches in diameter pass freely.



RESULT

The additional pump capacity combined with the pumps' reliability saved the town 35 percent in utility costs and \$25,000 in maintenance costs per year. The stations cut runtime by roughly 80 percent and peak pump operation fell from an average of 18 to 3.5 hours per day. **800/921-7867; http://us.grundfos.com.**

Alternative power runs remote pump station

Problem

The City of Princeton, Ill., undertook an excess flow storage project to alleviate system surcharging and sewer backups by providing extended combined sewer overflow storage and controlled influent flow to the wastewater treatment plant. The site selected to construct the lagoon was remote. While it was desirable for its ample acreage and hydraulic profile, it created significant financial challenges in extending three-phase electrical power and generator fuel to the site.

Solution

Precision Systems and **Smith & Loveless** jointly developed a **solar/propane-powered hybrid pump station** with SCADA monitoring and control, eliminating the need for utility-based

three-phase power and natural gas. The solar component, which powers the system controls and SCADA, is always in standby and ready to engage the propane-fueled generator to power the pumps for as long as necessary to drain the lagoon back to the collections system. The SCADA system provides real-time indication monitoring of lagoon level, pump operation and battery conditions for the control system and standby generator. It maintains itself in a charged state for operation during overflow events.



RESULT

The solution has reduced system surcharging while providing ample storage and a creative means to control and transport the lagoon contents without using utility power. **Precision Systems: 708/891-4300; www.precision-systems.com / Smith & Loveless Inc.: 800/898-9122; www.smithandloveless.com.**

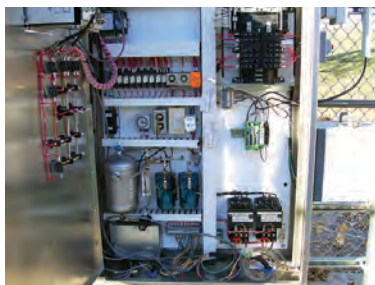
New system simplifies pumping system communication

Problem

HTM Sales implements SCADA systems to interconnect pumping stations. Initially the company used radio pairs that required multiple antennas. Due to the configuration of these radio pairs, sometimes it was necessary to install more than one system. A second iteration used multi-point-to-point radios that eliminated multiple antennas, but the solution was complicated by the use of hop-keys. HTM wanted a simpler solution.

Solution

For an installation in McCook, Neb., HTM used **power supplies, surge protection and Radioline modules** from **Phoenix Contact**. Radioline can function as a master, slave or repeater, avoiding the need to stock additional modules. It can download the network settings to all spokes from the master and can communicate point-to-point and point-to-multipoint.



RESULT

The Type 3 surge protection for power supplies and proper coaxial surge protection for antennas increased uptime. By properly protecting the system, HTM stopped losing wireless modules to transient strikes. HTM no longer has to keep track of the hop-keys necessary for programming each site/radio. This solution increased uptime, simplified inventory and eased implementation. **800/888-7388; www.phoenixcontact.com.**

High-capacity screw pumps used to convey mixed liquor to clarifiers

Problem

CH2M HILL/Ambiotec Civil Engineering Group won a contract to design and construct an expansion for the Robindale Wastewater Treatment Plant in Brownsville, Texas. The facility needed to integrate the existing plant with the additions, including final clarifiers to be installed at grade to reduce cost and address groundwater issues. This meant mixed liquor had to be pumped from the aeration tanks to the clarifiers. Centrifugal pumps were not suitable because they would cause breakup of mixed liquor biological floc from the aeration tanks, hindering settling in the clarifiers.

Solution

Pro-Equipment supplied **open screw pumps** to handle mixed-liquor transport to the clarifiers. The pumps have gentle hydraulics, limiting floc



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degradation. Four high-capacity pumps provide a lift of 18 feet at a maximum flow of 15,000 gpm per pump. Each is driven by a 100 hp motor through a high-reduction gear reducer to rotate at 40 rpm.

RESULT

The four screw pumps have been operating successfully to convey mixed liquor to the clarifiers since the fall of 2013. **262/513-8801; www.proequipment.com.**

Variable-frequency drive and rigid-shaft motor reduce maintenance, energy costs

Problem

The well system in Osceola, Ark., experienced frequent motor, drive and pump failures, resulting in \$85,000 per year in maintenance costs. The system, installed in May 1975, was composed of two vertical, six-stage turbine-style pumps coupled to 250 hp hollow-shaft motors through an eddy-current drive.

Solution

Technicians replaced the eddy-current drive and hollow-shaft motors with a **variable-frequency drive and rigid-shaft motor** from **WEG Electric Corp.** The system reduces vibration and slippage and is controlled with pump speed rather than a control valve. The solid-shaft motor has two points of efficiency and precision-alignment capability. The variable-frequency drive eliminates the component between motor and pump, reducing the overall height of installation.



RESULT

The system saves the utility an average of 390,540 kWh which, combined with a decrease of \$30,000 in annual maintenance costs, saves \$61,000 per year. **800/275-4934; www.weg.net.**

Hydraulic trash pumps meet grit-processing demands

Problem

The Carpinteria (Calif.) Sanitary District was using a towable 4-inch self-priming trash pump to dewater its water-and-grit slurry in a half-full 290,000-gallon wastewater tank. One day when the dewatering was scheduled, the pump stopped working as it could not handle the high concentration of grit.

Solution

A representative from **Stanley Hydraulic Tools** demonstrated the **TPO8 4-inch hydraulic trash pump** with a HP28 twin-power unit. The pump can move 800 gpm and up to 4-inch solids. During the demonstration, the unit pumped the slurry to a conveyer belt, which then pressed the last water from the grit. The grit was then placed in a separate storage compartment for processing to be sold as fertilizer.



RESULT

The HP28 was run from 7 a.m. to noon with few breaks in operation. To remove the grit, the power unit was turned off to add more water to the mixture. Otherwise it ran for a majority of the five-hour period. The slurry mixture was pumped with ease. **503/659-5660; www.stanleyhydraulic.com. tpo**



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“I approach each day as a gift, a new beginning so to speak, with the knowledge that no matter what happens to me, the sun will rise again tomorrow. This work has great variety and plenty of challenges. It offers me the opportunity to be a real environmentalist. I’m serving on the front line of environmental protection.”

Phil Webster
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 MANAGER, WATER POLLUTION CONTROL DEPARTMENT
 Alliance Water Resources, Sedalia, Mo.

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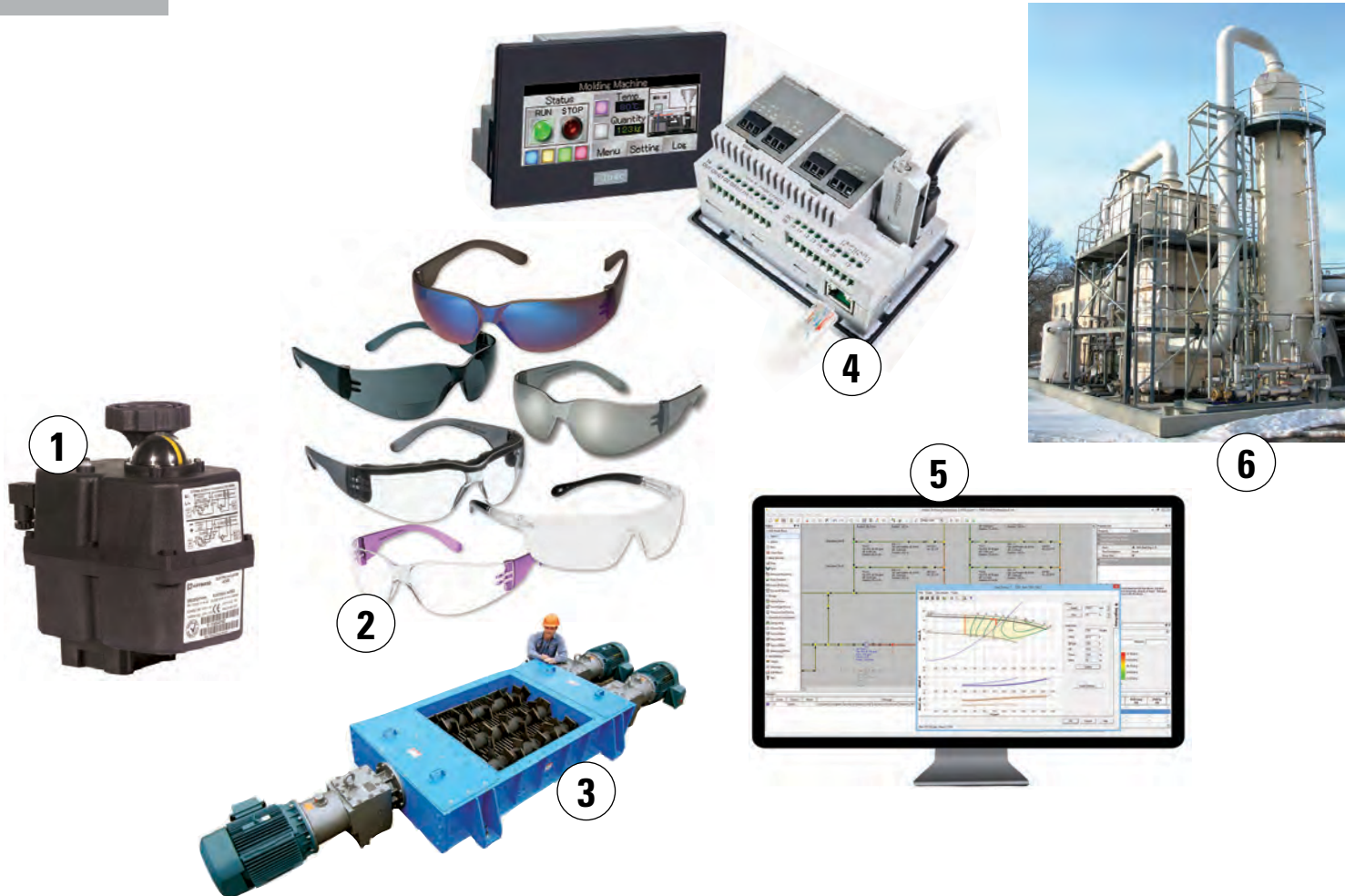
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ECP Series thermoplastic quarter-turn electric actuators from Hayward Flow Control have glass-filled polypropylene housing for corrosion resistance and performance in environments where most metal actuators cannot. Features include multivoltage sensing, LED status light, manual override external position indicator, stainless steel fasteners and anti-condensation heater. **888/429-4635; www.haywardflowcontrol.com.**

2. GATEWAY STARLITE SAFETY GLASSES

StarLite safety eyewear from Gateway Safety is available in 16 lens options, including antifog and IR filter shades. The StarLite SM is 10 percent smaller than the original glasses for smaller facial profiles. StarLite Gumballs come with 10 temple hues. StarLite Foam bridges the gap between glasses and goggles with an added foam ledge. StarLite Mag has a dual-purpose lens in five dioptic strengths. StarLite Squared features squared lenses and a clear frame for a modern look. **800/822-5347; www.gatewayssafety.com.**

3. FRANKLIN MILLER TRIPLE LP CRUSHER

The Delumper Triple LP crusher from Franklin Miller is designed to reduce large quantities of plastics, minerals, chemicals, lumps, chunks and agglomerates to controlled output sizes. The crusher can handle sticky, wet, moist substances as well as dry, caked solids. LP crushers are designed for high capacity on light- to medium-weight materials; HD units are designed for continuous, high-load operation with heavy materials at a rate of 38,000 cubic feet per hour. **800/932-0599; www.franklinmiller.com.**

4. IDEC MICROPROGRAMMABLE CONTROLLER

The FT1A Touch 14 I/O microprogrammable controller from IDEC Corp. allows for advanced analog monitoring and control, enabling users to perform both operator interface and control. The unit has a built-in 3.8-inch touch-screen HMI and provides up to 158 discrete and analog inputs and outputs (using FT1A controllers as remote I/O slaves), PID control and Ethernet communications. **800/262-4332; www.idec.com.**

5. ENGINEERED SOFTWARE PIPE MODELING

The Pipe-Flo Professional v14.0 pipe-modeling program from Engineered Software is designed for engineering, commissioning and operations projects. The piping-simulation model, once created, continually updates as the system evolves, incorporating new information as it becomes available. Inlet and outlet static pressure, hydraulic grade and energy grade are calculated and reported for pipes. Percent deviation is calculated for all devices for greater accuracy. License messaging aids in troubleshooting. Gradient color allows for clear diagnostics and model troubleshooting. **800/786-8545; www.eng-software.com.**

6. BIONOMIC PACKED TOWER SCRUBBERS

Series 5000 counter-current packed tower scrubbers from Bionomic Industries feature maximum throughput Hi-Flow random or structured packing, high-efficiency mist eliminator designs and clog-resistant liquid-distribution systems. An optional dual-packed bed enables the removal of multiple contaminants using different scrubbing reagents within the same unit. The scrubbers provide up to 99 percent removal efficiency and are available for flow rates from 30 through 300,000 cfm. **800/311-6767; www.bionomicind.com.**

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7. DEZURIK COMBINATION AIR VALVE

The APCO ASU combination air valve from DeZURIK/APCO/Hilton features an air release and air/vacuum mechanism designed for media containing grit, solids and grease. Available in 1- to 4-inch sizes, the stainless steel valve meets the performance requirements of AWWA C512 standard. **320/259-2000; www.dezurik.com.**

8. WALCHEM W600 SERIES CONTROLLER

The W600 Series controller from Walchem features icon-based programming on the touch-screen display. The unit can control up to six functions, including chemical metering pumps and valves in water treatment applications. The universal sensor input provides flexibility to utilize most sensors, including pH/ORP, conductivity, disinfection, fluorescence and flowmeter input. Internet connectivity allows for remote access. **508/429-1110; www.walchem.com.**

9. FESTO ALL-IN-ONE SERVO MOTOR AND DRIVE

The MTR-ECI all-in-one servo motor and drive unit from Festo Corp. is designed for automating manual changeovers. Features include stainless steel shaft, IP65 protection class rating and food grade lubrication. It has a brushless motor, integrated gearbox, power electronics, controller, absolute encoder and Ethernet/IP interface. **800/993-3786; www.festo.com.**

(continued)



water: product spotlight

UV disinfection system designed for smaller water treatment facilities

By Ed Wodalski

The **TrojanUVTelos ultraviolet disinfection system** from TrojanUV combines Solo Lamp and Flow Integration (FIN) hydraulic-optimization technology in a low-lamp-count, low-energy and easy-to-maintain unit. Made to protect against bacteria, viruses and chlorine-resistant protozoa such as *Cryptosporidium* and *Giardia*, the closed-vessel system uses flow modifiers throughout to ensure the highest possible UV disinfection while reducing lamp count and energy requirements.

“FIN technology matches areas of high velocity with higher intensity UV light and low velocity with lower intensity UV light,” says Adam Festger, drinking-water market manager at TrojanUV. “That enables us to accomplish a very uniform dose distribution and high disinfection performance.”

The low-pressure output system is about 74 inches long, 15 inches wide and can be installed both vertically and horizontally. The UV chamber is made from 316L stainless steel and rated to 150 psi (232 psi available). A 1/2-inch drain port is included.

Designed for small communities, the system can treat up to approximately 1,000 gpm. The largest model has two UV lamps, while the smaller models have one UV lamp. The high-efficiency, high-output, low-pressure amalgam lamps have a lifespan of 15,000 hours.

“We believe there are a lot of small drinking-water systems that struggle with disinfection,” Festger says. “They may default to using the simplest disinfection methodology, which is typically chlorine. While effective for a disinfection residual, chlorination does not address *Cryptosporidium*, *Giardia* and other chlorine-resistant organisms. UV offers a chemical-free



TrojanUVTelos from TrojanUV

means to disinfect water, and it does so in a superior manner.

“Many small drinking-water facilities in the U.S. and Europe don’t disinfect at all,” he says. “The Telos is meant to provide a cost-effective, low-maintenance solution for those utilities.”

The disinfection system includes SCADA connection, remote online monitoring and enhanced regulatory reporting, as well as color touch-screen human machine interface. NEMA 4X (IP66) lamp drivers and controls are preassembled and mounted on the UV chamber, eliminating the need for a separate wall- or stand-mounted cabinet.

The optional sleeve- and sensor-wiping system helps reduce maintenance and optimize UV output by automatically cleaning the quartz sleeves and UV intensity sensor window. The cleaning system operates while online without interrupting disinfection and allows for cleaning at preset intervals using a motor-driven wiper assembly.

The system can be included in new construction or retrofit to existing plants. **888/220-6118; www.trojanuv.com.**



10



11



12

10. HEMCO EMERGENCY SHOWER/ DECONTAMINATION BOOTH

Emergency shower/decontamination booths from HEMCO Corp. are fully assembled and ready for installation to water supply and waste systems. The one-piece molded shower is made of chemical-resistant fiberglass and equipped with a pull-rod activated shower and push-handle eye/face wash. The ANSI- and OSHA-compliant shower has frost-front strip curtains, interior grab bars, raised deck grating and bottom or rear drain outlet. **800/779-4362; www.hemcocorp.com.**

11. ROCKWELL PROCESS-AUTOMATION SYSTEM

The PlantPax process-automation system from Rockwell Automation features virtualization, batch management and integrated motor control capabilities. **414/382-2000; www.rockwellautomation.com/industries/water.**

12. PEPPERL+FUCHS ROTARY ENCODERS

ENA58IL and ENA36IL magnetic absolute rotary encoders from Pepperl+Fuchs combine precision and high-speed resolution in a compact design. The encoders are based on a magnetic-detection principle and use a two-axis Hall sensor that measures changes in the magnetic field, allowing the angular measurement to be generated by the encoder electronics. **330/486-0002; www.pepperl-fuchs.us. tpo**

wastewater: product spotlight



SiteMax from PowerPrime Pumps

Quiet, non-clog centrifugal pump primes and re-primed

By Ed Wodalski

The skid- or trailer-mounted **SiteMax centrifugal pump** from **PowerPrime Pumps** has a venturi or vacuum priming system that enables it to prime and re-prime in less than 20 seconds and on section lengths of 100 feet or longer.

"We've spent over two years designing this product," says JP Lake, president of PowerPrime Pumps. "It's the first product from PowerPrime that has been designed 100 percent from the ground up. We had about 20 prototype units in the field for over a year making sure it performed to our expectations."

The pump has an alloy steel screw-type centrifugal, non-clog impeller with push/pull function for greater suction lifts and less downtime when pumping stringy or incompressible solids.

"It also comes with a rotationally-molded, high-density polyethylene canopy, which makes it very quiet," he says. "With our largest 74 hp engine it's under 70 dBA at 23 feet."

Applications include digester cleaning, pumping down clarifiers or transporting sewage to another part of the plant.

"Guys responsible for the collections side of their system can use it as a bypass pump," Lake says. "You can even use it as a dewatering pump."

Available for rent or purchase, the pump comes in four models (1500, 2000, 2500 and 3000), based on the maximum gpm required. All models come with Kubota diesel engines. The 4-inch SiteMax2000 and 8-inch SiteMax3000 are available for rent from Rain for Rent.

"Everything is built to be Final Tier IV compliant," Lake says. "We're producing Interim Tier IV compliant engine units and we will be able to transition to Final Tier IV in the summer of 2015."

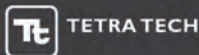
Other engine options include natural gas, propane and gasoline (available in mid- to late 2015).

The pumps have a maximum flow of 1,500, 2,000, 2,500 and 3,000 gpm and a maximum head of 130 to 205 feet. Pump sizes are customizable with 4-, 6- and 8-inch models.

The SiteMax is 152 inches long, 79.1 inches wide and 71.2 inches tall. Models 1500, 2000 and 2500 weigh 3,685 pounds. Model 3000 weighs 4,252 pounds. All units have an 88.5-gallon fuel tank for up to 65 hours of continuous runtime.

The pumps handle up to 3-inch solids and feature interchangeable parts to reduce maintenance cost and downtime. "We have one common volute across all the different sizes; it makes it easy to swap things out if you have a problem or just to keep your inventory level down," Lake says.

Environmental features include a built-in fluid containment basin that can capture 150 percent of onboard liquids, minimizing the risk of leaks or spills. **661/399-9058; www.powerprime.com.**



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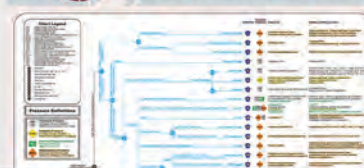
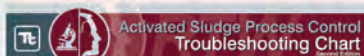
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industry news

Aqua-Aerobic Systems receives export award

Aqua-Aerobic Systems received the Exporter Continuing Excellence Award from former Illinois Gov. Pat Quinn. Aqua-Aerobic Systems was among 15 companies recognized for outstanding accomplishments in the export of Illinois goods and services. The company's primary international markets include Asia, Latin America, Africa, the Middle East, Canada and Europe.



Bill Decker (center), vice president and general manager, Equipment & Services Group, accepted the Exporter Continuing Excellence Award for Aqua-Aerobic.

ITT's Goulds Pumps hosts World of Pumps Quiz

ITT Corp.'s Goulds Pumps brand's fourth annual World of Pumps Quiz runs until midnight, March 29, on www.worldofpumpsquiz.com. The quiz offers new sets of basic and expert level questions on a biweekly basis. The quiz features interactive elements, including videos, infographics and product simulations. Topics range from pump history and operational facts to pump design and best maintenance practices. The quiz is a kickoff to the annual Pump Appreciation Day, observed the second Tuesday of April.

Cornell Pump names municipal market manager

Cornell Pump promoted Ron Aceto to municipal market manager. Based in New Jersey, he will be responsible for technical selling and regional support in the United States and internationally for all municipal applications.

Detcon gas detectors receive ATEX approval

Detcon's wired CX and wireless CXT Series gas detectors received ATEX approval for Zone 1 potentially explosive atmospheres. The sensors are available in infrared for monitoring hydrocarbons and electrochemical for monitoring toxic gases and oxygen.

BinMaster SmartBob receives hazardous location certification

The BinMaster SmartBob AO level sensor with integrated 4-20 mA analog output received hazardous location certification for use in locations where combustible dust might be present. It is listed for Class II, Groups E, F, G and enclosure types NEMA 4X, 5 and 12.

Clearford Water Systems acquires interest in UV Pure

Clearford Water Systems of Ottawa, Ontario, purchased a 91 percent interest in UV Pure, manufacturer of ultraviolet purification systems. The leadership team will remain shareholders of UV Pure Technologies. **tpo**



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people/awards

The **Attleboro (Mass.) Wastewater Treatment Plant** received an Industrial Pretreatment Program Excellence Award from the U.S. EPA.

David A. Simmons was hired as the wastewater treatment plant superintendent for the City of Nashua, N.H.

The **Muskegon County (Mich.) Wastewater Management System** received the Rookie of the Year Award from the Wildlife Habitat Council, given annually to one newly certified Wildlife at Work program.

The **City of Gresham Wastewater Treatment Plant** and Energy Trust of Oregon received a 2014 State Leadership in Clean Energy Award from the Clean Energy States Alliance, a coalition of public agencies and organizations working to advance the adoption of clean-energy technologies. The award recognizes the nonprofit organization Energy Trust of Oregon for its technical assistance, project development support and more than \$1 million in cash incentives to the City of Gresham for renewable energy production and energy-efficiency investments.

April Conatser was hired as the wastewater treatment facility operator for the Town of Century, Fla.

The **Hopewell (Va.) Regional Wastewater Treatment Facility** received a Silver Peak Performance Award from the National Association of Clean Water Agencies.

Ryan Jefferson, who assisted with an innovative rural wastewater project in Lincoln County, W.Va., was presented with a plaque from the Lincoln County Commission.

Josh Mohan was named the collections system foreman for the wastewater department in Lansing, Kan.

Andrew Denham, who previously supervised wastewater treatment in Mount Vernon, was hired as the public works director for the Town of Twisp, Wash.

Steve Woodworth, wastewater treatment plant operator-in-charge in Oconto, Wis., received an Operator of the Year Award from the Wisconsin Wastewater Operators Association.

Martha Graham, public works director, and **Glabra Skipp**, environmental compliance analyst, both with the City of St. Augustine, Fla., won the Gascoigne Wastewater Treatment Plant Operational Improvement Medal from the Water Environment Federation for a paper that documented the problems, procedures and findings related to using the disinfectant peracetic acid as an alternative to chlorine.

The **Anderson County Wastewater Department** was recognized as the 2014 Wastewater System of the Year by the South Carolina Rural Water Association.

The **Clayton County (Ga.) Water Authority** received the 2014 Collection System Gold Award, GWEF Safety Award for the W.B. Casey Water Reclamation Facility, Master Planning Spotlight Award, and the Ira C. Kelley Award for achievements in the environmental laboratory field at the Georgia Association of Water Professionals.

John Kalinczuk, water resource manager in Dawson Creek, Alaska, won the 2014 Operator of the Year award from the Environmental Operators Certification Program.

Spartanburg Water in South Carolina was presented with a Sustainable Water Utility Management Award by the Association of Metropolitan Water Agencies.

Pennsylvania American Water's **Philipsburg Water Treatment Plant** earned the Phase IV Presidents Award from the Partnership for Safe Water.

U.S. Water Services received the California Game Changer Company of the Year Award for helping California companies and organizations reduce their water use.

education

AWWA

The American Water Works Association is offering these online courses:

- March 9-12 – High-Tech Operator Course 2
 - March 11 – Specify Sustainable Products for Water Treatment Webinar
 - March 25 – Naegleria fowleri: A New Drinking Water Pathogen? Webinar
 - March 30-April 2 – High-Tech Operator Course 3
- Visit www.awwa.org.

Alabama

The Alabama Rural Water Association is offering a Competent Person/Confined Space Entry course March 4 in Valley. Visit www.alruralwater.com.

Alaska

The Alaska Department of Environmental Conservation Division of Water is offering an Introduction to Small Water Systems course March 2-6 in Anchorage. Visit www.dec.alaska.gov.

Arkansas

The Arkansas Environmental Training Academy is offering the following courses:

- March 3-5 – Basic Water Distribution, Rogers
 - March 3-5 – Backflow Advanced Assembly Repair, Texarkana
 - March 9-12 – Basic Water Math (night class), Fort Smith
 - March 9-13 – Water Supply Protection Specialist, Lafayette
 - March 10 – Water Treatment Exam Prep, Camden
 - March 10 – WSPS Refresher, Lafayette
 - March 11 – Water Math Exam Prep, Camden
 - March 12 – Water Distribution Exam Prep, Camden
 - March 16-20 – Backflow Assembly Tester, Camden
 - March 17 – Backflow Assembly Tester Recertification, Camden
 - March 17-19 – Basic Water Distribution, Russellville
 - March 23-26 – Applied Water Math (night class), Fort Smith
 - March 24 – Basic Water Math, North Little Rock
 - March 25 – Applied Water Math, North Little Rock
 - March 26 – PWS Compliance, North Little Rock
 - March 30-April 1 – Advanced Water Distribution, North Little Rock
- Visit www.sautech.edu/aeta.

The Arkansas Rural Water Association is offering these courses:

- March 4-5 – Exam review, Lonoke
 - March 11-12 – Water License Renewal Training, Ashdown
 - March 17 – Basic Math, Mt. Home
 - March 17-19 – Backflow Repair, Lonoke
 - March 18 – ADH Compliance, Mt. Home
 - March 19 – Applied Math, Mt. Home
 - March 24-26 – Intermediate Treatment, Lonoke
- Visit www.arkansasruralwater.org.

California

The California-Nevada Section of the America Water Works Association is offering the following courses:

- March 2 – Backflow Tester Course, Rancho Cucamonga
 - March 16 – D2-D3 Review, Riverside
 - March 16 – Leadership and Regulations Working Together, West Sacramento
 - March 17 – D2-D3 Math Review, Riverside
 - March 17 – D4-D5 Math Review, Riverside
 - March 17 – Operator Symposium 2015, Ontario
 - March 18 – D4-D5 Review, Rancho Cucamonga
 - March 23 – Backflow Tester, West Sacramento
- Visit www.ca-nv-awwa.org.

Colorado

The Rocky Mountain Water Environment Association is offering a Supervisor Certificate Program course on March 12 in Parker. Visit www.rmwea.org.

Florida

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

- March 2-6 – Water Class A Certification Review, Gainesville
 - March 3-6 – Water Class B Certification Review, Gainesville
 - March 9-11 – Water Distribution Systems Operator Level 1 Training, Kissimmee
 - March 12 – Basic Water and Wastewater Pump Maintenance, Tampa
 - March 13 – Water Distribution System Pipes and Valves, Tampa
 - March 23-27 – Wastewater Class A Certification Review, Gainesville
 - March 24-27 – Wastewater Class B Certification Review, Gainesville
 - March 30 – Lift Station Maintenance, Boca Raton
 - March 31-April 1 – Pumping Systems Operations and Maintenance, Boca Raton
 - April 2 – Unidirectional Flushing Techniques, Boca Raton
- Visit <http://www.treoo.ufl.edu/waterwastewater-training.aspx>.

Illinois

The Illinois Section AWWA is offering these courses:

- March 3 – Telemetry: A Detailed Look at Telemetry, O'Fallon
 - March 3 – Automatic Control Valves – Protection Against Surge Potential, Carpentersville
 - March 3 – Automatic Control Valves – Protection Against Surge Potential, Rockford
 - March 10 – Pumps and Pump Maintenance, Pittsfield
 - March 12 – WATERCON Exhibitors Webinar
 - March 17 – Confined Space Training, St. Charles
- Visit www.isawwa.org.

The Environmental Resources Training Center at Southern Illinois University - Edwardsville is offering these following courses:

- March 3-6 – Cross Connection Control, Moline
 - March 11-12 – Class 3 and 4 Water Operations, Champaign
 - March 30 – Class B Water Operations 1, Geneva
 - March 31 – Class B Water Operations 2, Geneva
- Visit www.siu.edu.

Kansas

The Kansas Water Environment Association is offering these courses:

- March 4 – Wastewater Certification Preparation, Phillipsburg
 - March 6 – Wastewater Collection Systems, Wichita
 - March 10 – Wastewater Stabilization Lagoons, Dodge City
 - March 11-12 – Wastewater Stabilization Ponds and Lagoons, Parsons
 - March 13 – Small Wastewater Systems, Syracuse
 - March 19-20 – Wastewater Certification Preparation, Garden City
 - March 25-26 – Utility Management Skills, Independence
 - March 30 – Asset Management, Topeka
- Visit www.kwea.net.

Michigan

The Michigan Section AWWA is offering a Short Course in Water Chemistry March 10-12 in East Lansing. Visit www.mi-water.org.

New Jersey

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

- March 10 – Effective Emergency Communications
 - March 11-13 – Operation and Maintenance of Pumps
 - March 25-26 – Management Skills for Supervisors
- Visit www.cpe.rutgers.edu.

events

March 2-3

Michigan Water Environment Association Biosolids Conference, Kellogg Hotel and Conference Center, East Lansing. Call 517/641-7377 or visit www.mi-wea.org.

March 2-6

2015 Membrane Technology Conference, Rosen Shingle Creek, Orlando, Fla. Visit www.awwa.org.

March 8-19

2015 Water and Wastewater Leadership Center, University of North Carolina-Chapel Hill. Call 202/833-1449 or visit www.wef.org. (Sponsored by the National Assoc. of Clean Water Agencies, the Assoc. of Metropolitan Water Agencies, the American Water Works Assoc., the Water Environment Federation, the National Assoc. of Water Companies and the American Public Works Assoc.)

March 10-12

2015 CGA Excavation Safety Conference and Expo, Rosen Shingle Creek, Orlando, Fla. Visit www.cgaconference.com.

March 11-13

WEF/AWWA 2015 Design-Build for Water/Wastewater, Grand Hyatt San Antonio, Texas. Call 202/682-0110 or visit www.dbia.org.

March 15-17

AWWA South Carolina Section 2015 Annual Conference, Myrtle Beach Convention Center. Visit www.scwaters.org.

March 15-18

AWWA Sustainable Water Management Conference, Portland (Ore.) Marriott Downtown Waterfront. Visit www.awwa.org.

March 15-18

Alabama Rural Water Association Annual Technical Training Conference, Renaissance Montgomery Hotel & Spa at the Convention Center. Visit www.alruralwater.com.

March 17-20

AWWA New Jersey Section 2015 Annual Conference, The Borgata, Atlantic City. Visit www.njawwa.org.

March 23-26

AWWA Illinois Section WATERCON 2015, Crowne Plaza Hotel, Springfield. Call 866/521-3595 or visit www.isawwa.org.

March 24-26

Kansas Rural Water Association Annual Conference and Exhibition, Century II Convention Center, Wichita. Visit www.krwa.net.

March 25-27

Minnesota Pollution Control Agency, 78th Annual Wastewater Operations Conference, Brooklyn Park at Marriott Northwest, Brooklyn Park. Visit www.pca.state.mn.us.

March 28-April 1

Missouri Water Environment Association Annual Conference, Osage Beach. Visit www.mwea.org.

Ohio

The Ohio Water Environment Association is offering a Government Affairs Workshop March 5. Visit www.ohiowea.org.

Oklahoma

The Oklahoma Environmental Training Center is offering a D Water Operator course March 9-10 in El Reno. Visit www.rose.edu. *(continued)*

EDUCATION

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Accurate Environmental is offering the following courses:

- March 3-5 – D Water and Wastewater Operator, Stillwater
 - March 6 – Open Exam Session, Tulsa
 - March 11 – General Refresher for Water Operators, Tulsa
 - March 11-12 – C Water Operator, Tulsa
 - March 13 – Open Exam Session, Stillwater
 - March 16-19 – B Water Operator, Tulsa
 - March 23-26 – A/B Water Laboratory, Stillwater
 - March 24-26 – D Water and Wastewater Operator, Tulsa
- Visit www.accuratelabs.com/classschedule.php.

Texas

The Texas Water Utilities Association is offering the following courses:

- March 1-4 – 97th Annual School, Corpus Christi
 - March 17-19 – Surface Water Production I, Longview
 - March 17-19 – Distribution, Victoria
 - March 31-April 2 – Surface Water Production II, Longview
- Visit www.twua.org.

Wisconsin

The Wisconsin Department of Natural Resources is offering these courses:

- March 10 – Surface Water Certification, Fond du Lac
 - March 18 – Disinfection: Introduction and Advanced, Chippewa Falls
 - March 23 – General Wastewater Treatment, Green Bay
 - March 31 – Trickling Filters and RBCs: Introduction and Advanced, Madison
- Visit www.dnr.wi.gov.

The University of Wisconsin is offering a Wastewater Pumping Systems and Lift Stations seminar March 25-27 in Madison. Visit www.epdweb.engr.wisc.edu.

The Univeristy of Wisconsin Department of Engineering Professional Development is offering these courses:

- March 2-3 – Understanding Water Chemistry for Practical Application, Madison
 - March 11 – Citizen, Customer Service, Fond du Lac
 - March 23-27 – Cross-Connection Control and Backflow Prevention, Madison
 - March 27 – ASSE Backflow Prevention Assembly Tester Exam, Madison
 - March 28 – Wisconsin Refresher Course: Cross-Connection Control and Backflow Prevention, Madison
- Visit www.epdweb.engr.wisc.edu.

The Wisconsin Rural Water Association is offering the following courses:

- March 5 – Small Water System Operator Certification Exam Review, West Salem
- March 5 – Cross-Connection Control Assembly Tester Refresher, Plover
- March 9-13 – Cross-Connection Control Assembly Tester Certification, Plover
- March 10-12 – Small Water System Operator Certification Exam Review, Sturtevant
- March 11 – Small Water System Operator Certification Exam Review, Appleton
- March 12 – Small Water System Operator Certification Exam Review, Spooner
- March 17 – Small Water System Operator Certification Exam Review, Cottage Grove
- March 19 – Small Water System Operator Certification Exam Review, Plover

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At the City of Justin's Wastewater Treatment Facility, Superintendent Carl Naumann is helping his team by sharing his immense knowledge of the treatment process. "I've never been one to say, 'If it's not broke, don't fix it.' By making small adjustments throughout the plant, you'll understand the effects, and know how to fix things in the future," he said.

Carl's dedication to helping his up-and-coming operators hone their craft is invaluable to the City of Justin. "It starts with understanding, and then really getting into it. I'm always asking the guys to name different process levels from around the plant. When they know the answers off the tops of their heads, I say, 'Bingo! You just learned how to be an operator.'"

Another way Carl is helping to improve the plant is by performing select laboratory testing in house. "When I came here [to Justin], we were outsourcing our TSS (total suspended solids) testing, something I knew we could be doing ourselves. When I priced out the ovens, paper and analytical balance from you guys [USABlueBook], it was a no brainer. Once we brought everything in-house, my TSS testing costs were reduced by \$11,000 annually, and it was all thanks to USABlueBook!"

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