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DEDICATED TO WASTEWATER & WATER TREATMENT PROFESSIONALS
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Ben Carver
Operator/Maintenance Technician
Fairfield, Calif.

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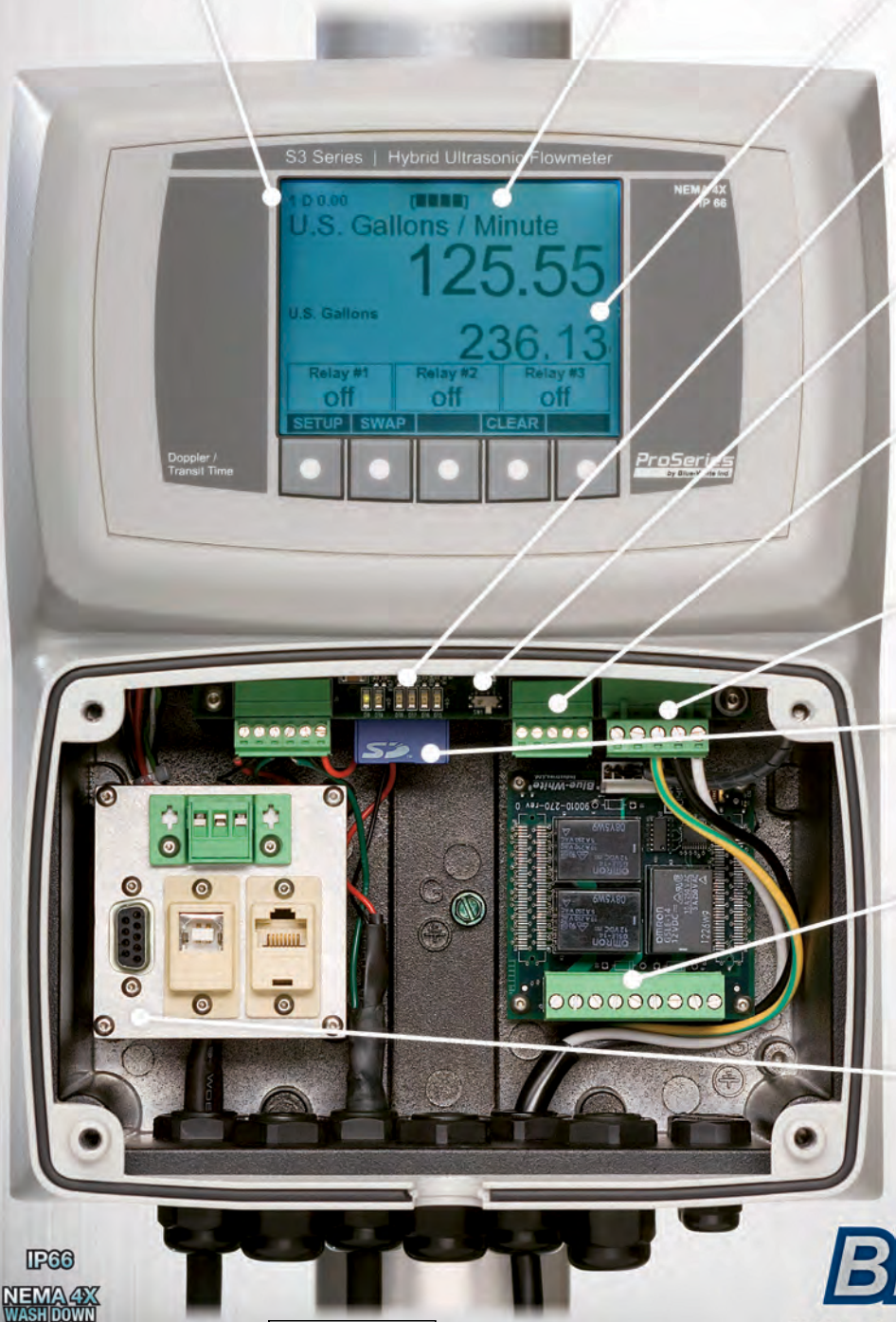

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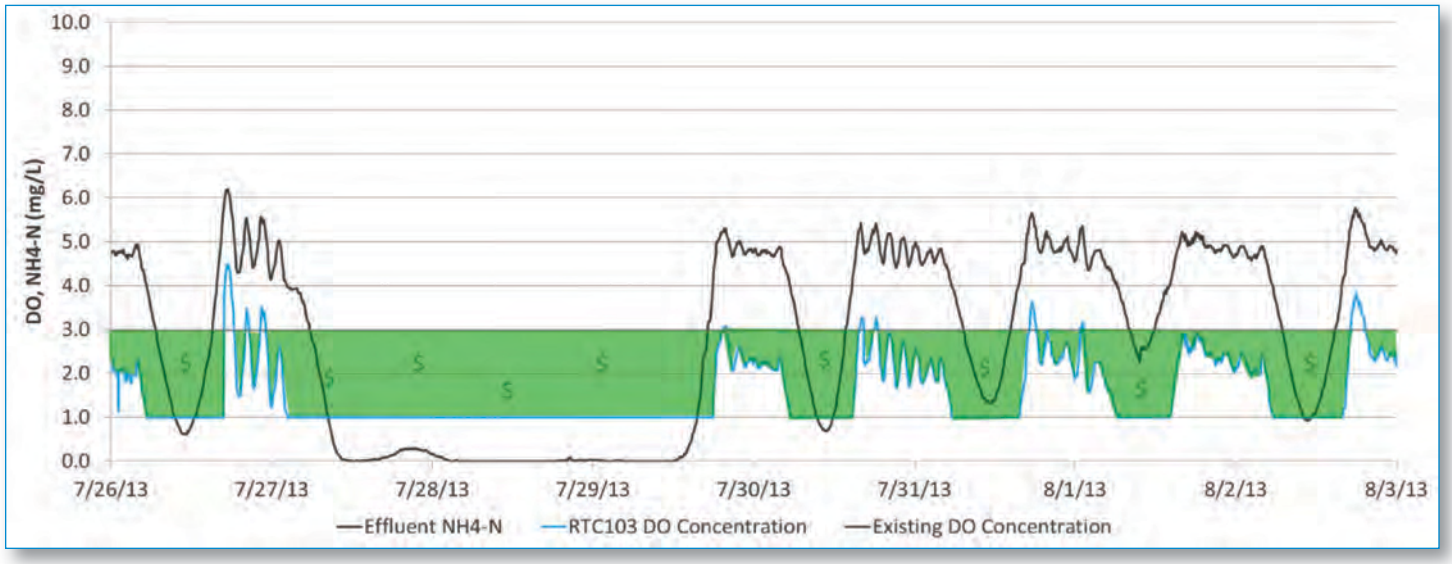

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September 2015

on the cover

Ben Carver loves the wastewater industry. As an operator/maintenance technician 5 with California's Fairfield-Suisun Sewer District, he focuses on expanding his knowledge while helping fellow operators advance their careers. (Photography by Lezlie Sterling)

top performers:

coming next month: October 2015

FOCUS: **Tanks, Structures and Components; WEFTEC Show Issue**

- Let's Be Clear: Considering the sources of biosolids "information"
- Top Performers:
  - Wastewater Plant: Raising the bar in Athens, Alabama
  - Water Plant: Shades Mountain WTP, Birmingham, Alabama
  - Operator: Karen Hawkins, Fairborn, Ohio
  - Wastewater Operator: Mike Welke, Warren, Ohio
- Tech Talk: New technology for older blowers
- How We Do It: Killing *Microthrix parvicella* blooms in Pueblo, Colorado
- How We Do It: Process automation in Springfield, Illinois
- Hearts and Minds: Trout in the classroom in Keene, New Hampshire
- Sustainable Operations: Community solar in Pocomoke City, Maryland
- In My Words: Perspectives on elevating the operations profession
- PlantScapes: Tree plantings in Chattanooga, Tennessee
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The Resume or the Person?

WHEN LOOKING TO HIRE NEW MEMBERS OF YOUR TEAM, ARE YOU FOCUSED ON TECHNICAL COMPETENCY? OR ON ATTITUDE, PERSONALITY AND GROWTH POTENTIAL?

By Ted J. Rulseh, Editor

HELP WANTED

Wastewater operator. We need a qualified operator to join the team at our wastewater treatment plant. We require an associate's degree in water or wastewater technology, five years of experience in an activated sludge facility larger than 5 mgd, and thorough knowledge of SCADA systems, maintenance software and laboratory information systems. Apply to Mary Smith, Director of Human Resources, Anycity Water, 1234 Main Street, Anycity, Yourstate.

HELP WANTED

Wastewater operator. We need a smart, energetic operator to help take our award-winning clean-water plant to a new level. We seek a team-oriented self-starter with a passion for water quality and environment and an appetite for constant learning. A license in wastewater treatment is a plus, as is knowledge of process automation and software. Apply to Kelly Jones, Director of Human Resources, Anycity Water, 1234 Main Street, Anycity, Yourstate.

Back in my journalism days, I applied for a job at a daily newspaper after several years working on weeklies. The editor just brushed me off because I had "no daily experience." He wasn't interested in the quality of my writing and reporting, only in whether I could step seamlessly into the rhythm of a daily newsroom.

Seriously, how long would it have taken me to adapt? For all he knew, I could have been, within months, the best reporter on his staff. But alas, to him, "no daily experience" was a deal breaker.

I won't insist it was a mistake for him not to hire me. I will argue strongly, though, that his approach to hiring was badly flawed and also very common. It's the mistake of hiring the experience — the resume — and not the person.

Consider the two want ads above. One is looking for an employee to come in and essentially be able to push all the right buttons without much training. The other seeks a go-getter with the right attitude and character, maybe not as qualified immediately, but with a huge upside. Who's going to get the better operator? I know which way I'm betting.

HIRING FOR ATTRIBUTES

The traditional way to hire is to screen for job-specific skills and experience, and maybe for a certain education pedigree. More recent thinking holds that hiring for those qualities alone can be a recipe for mediocrity. Organizations have found that it's certain traits — not specific job experience — that can separate star performers from the average. These traits go by various names: soft skills, emotional IQ and others. They can't be taught; they are part of the employee's personality.

It's fairly easy, for example, to teach a new operator how to run a belt press or monitor an aeration process. But trying to turn an introvert into an extrovert, a lone wolf into a team player, or an order-taker into a self-starter can be an exercise in futility. Evidence increasingly suggests that organizations able to hire people with sound technical skills and the right personal attributes have the best chance to excel.

The traditional way to hire is to screen for job-specific skills and experience, and maybe for a certain education pedigree. More recent thinking holds that hiring for those qualities alone can be a recipe for mediocrity.

It's not really accurate to label these attributes as "intangibles." For one thing, the label tends to relegate them to second-class status. For another, these attributes can in fact be measured, screened for, discussed with references and elicited in interviews.

For example, an interviewer looking to evaluate a prospect's team orientation might say, "Tell me about a time when you contributed to solving a problem as a member of a team. How did you fit within the team concept and how did you facilitate the team's success?"

HIRING THE HUNGRY

If you want an example of how hiring for passion, attitude and personality can bring success, look at coaching in professional sports. The ranks are full of head coaches who move from team to team without ever distinguishing themselves. They have experience. They know the X's and O's. They know the mechanics of running a team. They just don't know how to win.

Often — certainly not always — the best candidates for a vacant head coaching job come from the ranks of excellent assistants. To cite an example, none of the three coaches who took my Green Bay Packers to Super Bowl victories came with professional head coaching experience. Vince Lombardi, Mike Holmgren and Mike McCarthy were all assistant coaches before coming to Green Bay. They had the right stuff, and someone clearly had the wisdom to see it.

Now, what kind of person will you be looking for next time you hire an operator or other member of your team? What will your next want ad say? **tpo**

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letters

From the Inside

I am presently incarcerated at Walton Work Camp in the Florida Department of Corrections. I want to express my thanks to your magazine for informing the public of the select few of us in the wastewater industry.

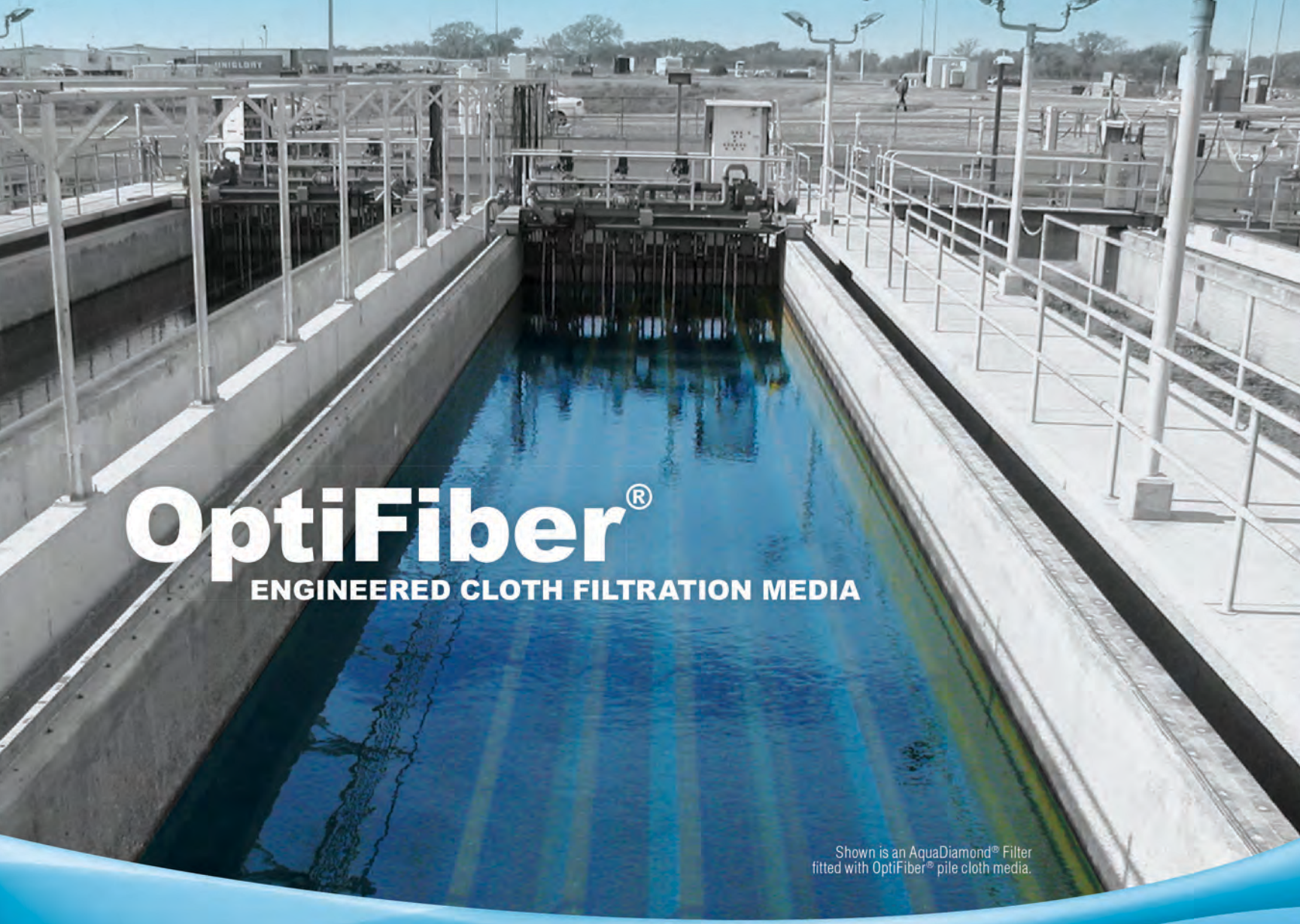
My story is different from the inmates in Virginia you wrote about in *TPO* ("A Fresh Start in Life," June 2015). In my case, I took it upon myself to get my GED by asking to take the exam. I then successfully completed Volumes 1 and 2 of the correspondence courses for the operations of wastewater treatment plants from California State University - Sacramento.

I was pretty much told I was on my own when I asked for financial help for my courses. Luckily, my family paid for them. I then sent my application for the Class C Wastewater Treatment Plant Operator state exam and successfully passed (just barely).

After passing the exam, I sent my application for my state license with all my hours of experience working in our wastewater plant (at the time about 3,200 hours) and was granted a Class C license. It feels really good to know that all my hard work paid off.

I'm presently working on an advanced wastewater operator course for my Class B license, which I should have by April 2016. I have been subscribing to *TPO* for more than a year and read it all the time; I did so even before I had a subscription. Thank you again, and spread the word that if I can do it, anybody can if they put their mind to it.

Ronald Witt
State of Florida Inmate 314235 (temporarily)
State of Florida Wastewater Operator 22833 (permanently)



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MASCOT MAGIC

What's Blue, Round and Popular at Water Events?

Standing a little over 7 feet from the bottom of his aqua-colored Chucks to the tip of his dewdrop cowlick, the American Water Works Association's newest mascot is a tall drink of water. In this interview, get the 411 on Eddy, a blue-eyed whirlpool of energy who made his debut at ACE15 in Anaheim, California. Hint: Find out how he can make an appearance at your utility.

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OVERHEARD ONLINE

"Some of the farmers … formed their own companies to distribute biosolids to their neighbors. They are local spokespeople for biosolids reuse."

10 Expert Ways to Market Your Biosolids Program

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GOOD-BYE, GEESE

Shelter Dog Solves Plant Problem

Some might call the Richmond (Virginia) Water Treatment Plant a halfway home for rescue dogs. There, a spoiled pup named Duck Dynasty has become the first canine in a unique program that uses shelter dogs to control waterfowl problems at the water treatment plant. Learn more about this interdepartmental brainstorm and find out how Duck Dynasty has become a favorite among water plant staff.

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TAP ON!

Operator Creates Tapping Competition

One might say it's competitive spirit or maybe just a bit of old-fashioned hometown pride. Whatever name it goes by, one thing is sure: Water department teams love going head-to-head during state and regional conventions. In this online exclusive, read how an Illinois operator embraced that competitive spirit and started a new tapping competition.

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Right Place, *Right Time*

JOHN DONOVAN HAS DEVOTED A LONG CAREER TO HELPING COMMUNITIES MAKE THE MOST OF BIOSOLIDS — WITH AMPLE ASSISTANCE FROM PLANT OPERATORS

STORY: **Ted J. Rulseh**
PHOTOGRAPHY: **Ed Collier**

JOHN DONOVAN, P.E., STARTED ON THE GROUND FLOOR IN A LONG career as a biosolids consultant.

Graduating from college just as the environmental movement began, he put his civil engineering degrees to work with CDM Smith (then known as Camp Dresser McKee). Forty years later, he can look back on numerous biosolids management projects across the country that he helped conceive and design.

Along the way, he had an inside track to explore emerging technologies, traveling widely to tour treatment plants where new processes were deployed. He counts operators of those and other plants as some of his best teachers. "I have a wealth of experience, and a lot of it is what I have learned from operators over the years," he says. "Every time I walk onto a treatment plant site, I want the operators to tell me everything they can about their situation. By listening, I can get a strong sense of what the real issues are."

Operators return the respect: Last year, Donovan received the New England Water Environment Association's first-ever Biosolids Management Award. It recognized his work on trend-setting projects for the Massachusetts Water Resources Authority (MWRA), the Lewiston-Auburn (Maine) Water Pollution Control Authority and others.

"Every time I walk onto a treatment plant site, I want the operators to tell me everything they can about their situation. By listening, I can get a strong sense of what the real issues are."
JOHN DONOVAN, P.E.

John Donovan, left, senior vice president for Biosolids and Energy Recovery with CDM Smith, and Richard Weare, capital projects manager at the Greater Lawrence Sanitary District, discuss plant operations.

John Donovan has helped multiple cities across the country improve management of wastewater residuals.

STARTING YOUNG

Going to high school in the Boston area, Donovan took an interest in math and life sciences, and teachers and guidance counselors steered him toward engineering. He earned a bachelor's degree in civil engineering from Northeastern University in Boston, along the way gaining work experience through the school's extensive cooperative programs.

"I had varied experiences working for a municipal government, an environmental consulting firm and a land surveyor, where I learned that working outside in winter perhaps was not what I wanted to do," Donovan recalls.

By the time he finished undergraduate studies in 1972, he was a U.S. Army Reserve second lieutenant. The Vietnam War was winding down,

"In biosolids management, there are no cookie cutters ... You see a lot of wastewater treatment technologies repeated, but you hardly ever see a solids processing train repeated. The solids side is very much site- and region-specific." **JOHN DONOVAN, P.E.**

John Donovan entered the engineering profession just as new U.S. EPA regulations were expanding the need for environmental consultants.

and the U.S. EPA had just been created. "I had an opportunity to get a graduate degree because the EPA saw a big need to train environmental engineers. I was in the right place at the right time."

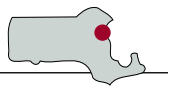
With a newly minted master's degree in civil engineering, he joined CDM, then a firm with a strong international reputation and about 1,000 people on board. Today the company is five times that size.

"Like a lot of engineers, I didn't know much coming out of school," he says. "The firm had taken a number of large assignments involving what at the time we called sludge management. Some of our people were very well respected in that field. Assignments in Boston and New York City and in Florida, Texas and elsewhere were putting stress on the firm's resources. So as a young graduate, I was assigned to some really challenging projects."

OUT OF THE OCEAN

In the late 1970s and early 1980s, cities in the Northeast were under EPA orders to end the long-standing practice of dumping biosolids in the ocean. The orders affected more than 80 cities, many in New York and New Jersey but also Philadelphia, Washington, D.C., and Boston.

John Donovan, P.E., CDM Smith, Cambridge, Massachusetts



POSITION:	**Senior vice president**
EXPERIENCE:	**40 years in wastewater industry**
DUTIES:	**Consulting on municipal and private-sector biosolids projects**
EDUCATION:	**Bachelor's degree and master's degree, civil engineering, Northeastern University**
CERTIFICATIONS:	**Registered professional engineer, board certified environmental engineer (American Academy of Environmental Engineers)**
MEMBERSHIPS:	**WEF, New England Water Environment Association**
GPS COORDINATES:	**Latitude: 42°21'31.18"N; longitude: 71°3'18.23"W**

"Boston had anaerobic digesters and discharged the digested material to the ocean twice a day on the outgoing tide," Donovan says. "That practice continued until the 1990s. When I was in school, my master's work was to study water-quality conditions in the Boston harbor. I was pleased in the 1980s to get involved in the Boston harbor cleanup, which turned out to be one of the most successful environmental programs in the country."

The demand for better management of residuals opened numerous opportunities for CDM and Donovan to work with municipalities to improve thickening, dewatering and other biosolids processes. The federal construction grants program was in full swing, ensuring that funds were available for major projects.

EYE ON INNOVATION

The EPA was also active in research, largely through its Municipal Environmental Research Laboratory in Cincinnati, Ohio. Thanks to mentors in his firm, Donovan won an assignment to work on an EPA contract to monitor and assess emerging biosolids technologies.

"During the construction grants program, the EPA was putting a fair amount of money into analysis of emerging technologies," says Donovan. "CDM, because of our stature in the industry, got several assignments in that area that I worked on through the 1980s and 1990s. We looked at everything from anaerobic thermophilic digestion to autogenous incineration to vermicomposting, which is making compost using earthworms.

"I gained a lot of insight into what was coming out, and of course there was a lot of interest within our industry because managing solids was so expensive. It was a great opportunity. I got to tour a lot of treatment facilities around the country. There were about two dozen European in-vessel composting facilities built in the 1980s, and I did a study for EPA on that. And CDM Smith had about 40 offices around the country, so I assisted them as part of a team of experts brought in to solve local problems. I have been to most of the states as a result."

BIG TOWNS AND SMALL

As the century turned, Donovan's focus shifted to deep involvement with major projects. He's especially proud of work for the MWRA at Boston's Deer Island Sewage Treatment Plant, a 350 mgd (average) facility with 12 large egg-shaped anaerobic digesters. The digested material is pumped 7 miles under the harbor to another facility, where it is centrifuge dewatered and thermally dried to make a pellet product (Bay State Fertilizer). "I had the opportunity to work on the planning for the treatment plant and biosolids facilities and to help design the digesters," Donovan says.

More recently, the MWRA hired CDM Smith to evaluate the biosolids facilities and recommend improvements. One outcome is a plan to replace the existing combined heat and power (CHP) system with a new gas turbine CHP system that will allow the authority to generate up to one-half of its power needs.

On a smaller scale, Donovan has worked extensively with the Lewiston-Auburn Water Pollution Control Authority and its 14 mgd (design) treatment plant. In the 1990s, CDM Smith helped the authority establish a highly successful composting facility and end landfilling of biosolids.

Several years ago, with CDM Smith's help, the authority became the first of Maine's roughly 120 treatment plants to use anaerobic digestion. Previously, the authority lime-stabilized a portion of its primary and waste activated sludges for application to pasture land as belt-pressed cake. Two mesophilic digesters now yield a higher-quality product that does not require liming and so is more compatible with local soils.

Digestion also produces biogas that fuels a CHP system with two engine-generators rated at a combined 500 kW. The electric output can exceed the plant's needs during low-flow night hours, and surplus power is sold to the utility grid under a net metering program.

SPOTTING TRENDS

Diverse experience on biosolids projects gives Donovan good insight to trends in the industry. One of the most important is an emphasis on energy: "There's a lot of momentum and public sentiment toward ways to reduce

From left, Cheri Cousens, P.E., executive director of the Greater Lawrence Sanitary District; John Donovan of CDM Smith; and Richard Weare, the district's capital projects manager.

energy consumption or produce more energy, especially at facilities that have digesters. I believe we're going to see a lot more co-digestion, digestion pretreatment, advanced digestion and CHP.

"Every plant would like to be off the grid, but at present only about a quarter of the plants that have digesters use the biogas for anything besides heating their digesters and buildings. So there is a long way to go.

"There's a lot of talk about bringing in different digester feedstocks. That's fine, but of course there's a need to make sure such materials don't carry contaminants that will affect the plant's basic mission, which is to clean the wastewater. It's also important to be mindful of proper equipment selection and proper gas treatment, because certain methods of converting gas to power require higher or lower gas quality."

Donovan also sees a trend toward producing higher-quality biosolids, despite the added expense, to address public concerns that go with beneficial use. "The biggest complaint from the public is odor," he says. "Many in the public are dumbfounded when they learn that there is no odor standard per se in federal regulations. There are vector attraction reduction requirements, but you can meet those and still have an odorous product.

"In rural areas, particularly for small generators, if farmers are willing and the sites are well buffered, there is nothing wrong with land application. But across the country we're seeing people moving to rural and semirural areas who want nothing to do with the odor, or the trucks, or even the thought of biosolids. I don't see that ever turning around, and so I think the industry needs to move toward more publicly acceptable products.

"Another thing we're seeing is more regional cooperation. In New Jersey, for example, Hurricane Sandy caused significant long-term outages for some major biosolids processing facilities, and there was a mad scramble to find other outlets, whether dewatering facilities or landfills. We're starting to see more cooperation at the utility level and even among private-sector service providers. For example, two large companies at a regional level might have a contractual arrangement to use each other's facilities in the event of some major problem. There isn't a lot of that yet, but it's a good trend."

AMPLE REWARDS

These trends unfold as Donovan winds down his career. He now works part time from CDM Smith's main office in Boston and continues his long involvement with the Water Environment Federation's Residuals Committee.

"Biosolids management is a key part of our industry, and there has been insufficient investment in that area," he says. "In biosolids management, there are no cookie cutters. There are about 16,000 wastewater treatment plants in this country. You see a lot of wastewater treatment technologies repeated, but you hardly ever see a solids processing train repeated. The solids side is very much site- and region-specific.

"In working on many biosolids projects over the years and trying to come up with solutions that are reasonable in cost and sustainable, I've come to believe that, in taking the long view, you usually make the right choice. As I look back on my career, I have strong sense of accomplishment for helping craft the solutions that CDM Smith has brought to our clients. I greatly appreciate the opportunities I've been given to contribute to this industry." **tpo**

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GETTING CREATIVE

Communities willing to look beyond their borders can find innovative, cost-effective and beneficial ways to manage biosolids, says John Donovan, P.E., a senior vice president with the CDM Smith consulting firm.

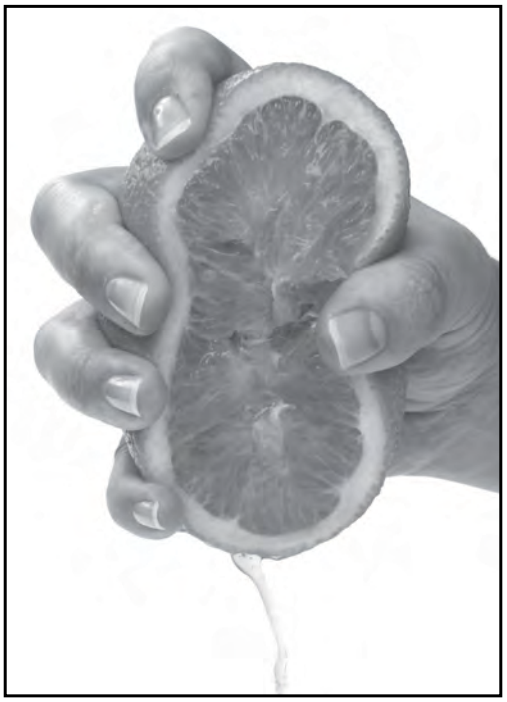
A good example is a partnership in Florida between a new company and an established biosolids service provider that serves some 50 communities.

Donovan and his firm have helped VitAG Corporation (short for Vitamins for Agriculture) develop a process to create a high-grade, slow-release fertilizer made from dewatered biosolids. The company has a 20-year agreement with Shelly's Environmental Services, which performs land application under contract with central Florida. That firm will divert about 200 wet tons of biosolids per day to the VitAG process.

"Florida is a good example of the deficiencies of traditional land-application approaches," says Donovan. "The state has shallow water tables and large volumes of Class B biosolids produced and land-applied. New state regulations there include more stringent environmental monitoring, greater setback distances and other provisions. There's a big problem in agriculture with overuse of nutrients, notably nitrogen but phosphorus as well."

The VitAG product will be an ammonium sulfate fertilizer with 16 percent organic content and an NPK analysis of 16-0-2. The organic material from biosolids will make it a slow-release fertilizer, a type in demand from fertilizer manufacturers and distributors. It will be suited for production of food crops, turf grass and bioenergy crops, according to the company.

"VitAG is just building its first plant," says Donovan. "They have done enough research with the product on a small scale to know that it will be in demand. This is one example of where the private sector has a solution and the public sector has an opportunity to put an emerging technology to use."



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Learning Afloat

CANOEMOBILE HELPS MICHIGAN CITY AND OTHER COMMUNITIES TEACH KIDS ABOUT WATER RESOURCES BY SENDING THEM ONTO THEIR LOCAL STREAMS, PADDLES IN HAND

By Craig Mandli

PHOTOS COURTESY OF THE TRAIL CREEK WATERSHED PARTNERSHIP

The stained waters of Trail Creek are typically still and often unnoticed. That stillness was broken last September as several handmade cedar canoes filled with students navigated its waters in Michigan City, Indiana.

The children — elementary, middle and high schoolers — paddled awkwardly at first but soon found their rhythm as they explored their city and learned to appreciate the water flowing through it in a brand-new way.

The canoes came from Wilderness Inquiry, a Minneapolis-based nonprofit that travels the country with its Canoemobile, bringing environmental education and outdoor learning experiences to underserved urban youth. Michigan City was among 26 stops across the U.S. in 2014.

"These kids don't realize that the water coming out of the tap is ultimately the same water that they pass by every day," says Nicole Messacar, an education coordinator with the LaPorte County Soil and Water Conservation District. "Most of Michigan City's drinking water comes from Lake Michigan. Canoemobile gives these students a productive opportunity to experience the resource and be out on the water."

SPREADING THE WATER WORD

Wilderness Inquiry aims to expose as many children as possible to the wilderness within their city boundaries. For more than three decades it has partnered with Minnesota school districts to get kids out on their waterways, tying what they learn in the classroom about history, ecology and chemistry to real, hands-on experiences. The ultimate idea is to link youngsters' internships with jobs in the water sector.

> "Once we started talking about the program around the community, many organizations were excited to jump on board, either through donations or helping run a portion of the outreach."
> **NICOLE MESSACAR**

"There is a great need for candidates to fill jobs in water and wastewater treatment, and also with watershed management and water biology," says Ashley Pethan, a program coordinator for Canoemobile. "We are trying to teach kids not only where their water comes from, but also that they are a major part of it. We teach them what they can do to leave a positive impact on the water supply."

This is Canoemobile's fourth full season traveling the country to educate kids growing up near urban waters. "We want it to be that catalyst," Pethan says. "If what we do gets these kids talking and thinking about the water that's all around them, then we've accomplished something."

Elementary students prepare for their paddle of Trail Creek.

(continued)

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Michigan City High School students perform water-quality tests with Michigan City Sanitary District staff members (above) and learn proper paddling technique from the Northwest Indiana Paddling Association (right).

UTILITY PARTNERS

Pethan says urban waterways can become sources of legend and mystery for children. Many streams have histories of pollution from industrial, manufacturing and farming practices that have earned them a poor reputation, despite local attempts to clean them. Wilderness Inquiry means to dispel the past and get the kids out on the water to learn about their streams' rich history and the abundant wildlife habitat they provide.

"We typically partner with local utilities and organizations," says Pethan. "The program is catered to each community, and we work with the partners to provide other educational outreach around the paddling excursions."

In Michigan City, program partners included the Indiana Department of Natural Resources, the LaPorte County Soil and Water Conservation District, Urban Waters, the Izaak Walton League, the Shirley Heinze Land Trust, Dunes Learning Center, the National Park Service, Michigan City Parks, and the Northwest Indiana Paddling Association.

Activities included Adopt a Beach and river cleanups, learning about Lake Michigan's food web, seeing into the history of the fur trade era, and practicing kayak technique and safety. Operators from the Michigan City Sanitary District showed students how to perform water-quality tests like those done on the city's drinking water and wastewater.

IMMEDIATE FEEDBACK

"We wanted to get them to think," says Messacar. "We wanted the students to know that there are parameters used to assess water quality and give them an idea of how you look at a river or stream when trying to keep it healthy."

District personnel used a portable "hydro lab" to test the water samples taken by the students, interpreting the findings almost immediately.

"I work with children all the time, and one of the first questions I always ask is 'Where does your water come from?'" says Messacar. "For the most part, the answer I get from the kids before activities such as Canoemobile is 'I don't know' or 'From the faucet.' Afterwards, the answers are typically much more detailed. That's what we're looking for."

SPRINGBOARD TO EDUCATION

Many of the Michigan City kids had never been on the river before. "This is their backyard," Messacar says. "We want to teach them that what they are doing on land is running into the water." She says that partnering with programs like Canoemobile can help municipalities that lack the budget or personnel for educational outreach.

For the past several years, Michigan City has used crowdfunding programs such as www.indiegogo.com and www.kickstarter.com to help raise funds to bring the program to town. The partner organizations then filled in the gaps, creating a week's worth of activities for anyone from grade-schoolers to senior citizens.

"Once we started talking about the program around the community, many organizations were excited to jump on board, either through donations or helping run a portion of the outreach," says Messacar. "Really all it takes sometimes is that first push to get the ball rolling."

THE RIGHT PARTNERS

Pethan says that while Canoemobile began as an urban program, it can be molded to fit any size municipality. "We view Canoemobile as a supplement to other water outreach a municipality offers," she says. "Our goal is to communicate extensively with each community we visit beforehand and collaborate with all our partners to reach toward a collective goal."

Besides hosting Canoemobile, Messacar leads student field trips to watershed areas and water and wastewater treatment facilities, sends out monthly newsletters about water conservation and watershed education, and leads other events such as canoe and kayak activities framed around Coastal Awareness Month in June.

The key to Michigan City's outreach has been finding the right partners who believe in the overall mission. "Obviously bringing in quality outside programming can be costly, and with a limited budget for outreach, the key is finding willing partners that appreciate the cause and leveraging the funds you have available as efficiently as possible," she says.

"You have to be passionate, though. You have to let people know first, that the water is there, and second, how important it really is."

To learn about the Canoemobile outreach program, visit www.wildernessinquiry.org. **tpo**

What's Your Story?

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

UPWARD BOUND

BEN CARVER BUILDS AN AWARD-WINNING CAREER AT FAIRFIELD-SUISUN SEWER DISTRICT BY LEARNING THE BUSINESS, ENHANCING HIS SKILLS AND TRAINING OTHER OPERATORS AND TECHNICIANS

STORY: **Jack Powell** | PHOTOGRAPHY: **Lezlie Sterling**

BEN CARVER LOVES THE WASTEWATER INDUSTRY. AS AN OPERATOR/maintenance technician 5 at the Fairfield-Suisun Sewer District in California, Carver is focused on expanding his knowledge while helping fellow operators develop the skills they need to advance their careers.

After just nine years in the business, Carver has parlayed his passion for wastewater into a senior role at the district's 23.7 mgd (design) advanced secondary wastewater treatment plant. Sited on 300 acres, the facility operates under reduced flow (14 mgd) due to California's five-year drought, water conservation measures and the San Francisco Bay Area's economic doldrums.

Carver, a Fairfield native, is serious about his role in producing clean water for the 41-square-mile area of Solano County that comprises the sewer district. It includes the cities of Fairfield (population 108,000) and Suisun City (28,000) as well as Travis Air Force Base.

Ben Carver, operator/maintenance technician 5 with the Fairfield-Suisun Sewer District.

RECOGNIZING PASSION

Beyond kudos from colleagues and supervisors for his dedication to training new and mid-level operations and maintenance technicians, Carver has gained broader recognition. In 2014, he received the Plant Operator of the Year award from the 9,000-member California Water Environment Association (CWEA). Earlier in the year, he won the same award for the CWEA's Redwood Empire Section.

"It's nice to have a career filled with accomplishments," says Carver. "But I can't take all the credit because it's really a team effort. Much of the success I've had is based on the great people I work with. All 58 sewer district employees, including our 14 treatment plant operators, function as a team to achieve great results for the community, so it's everybody's award."

That assessment draws some pushback from Brian Hawley, operations manager and Carver's boss for the past six-plus years: "Ben is the new model of an operator. He's passionate about the wastewater field and our commitment to protect the public and the environment. He's technically savvy and eager to learn new technologies."

EARLY INTEREST

Carver's interest in wastewater began when he was 15 and trying to figure out what to do with his life. A family friend who worked for the City of Fairfield Water Department described life at the water plant, leading Carver to look at classes at Solano Community College. The first one he found happened to be about wastewater, so he enrolled and decided to make it his career.

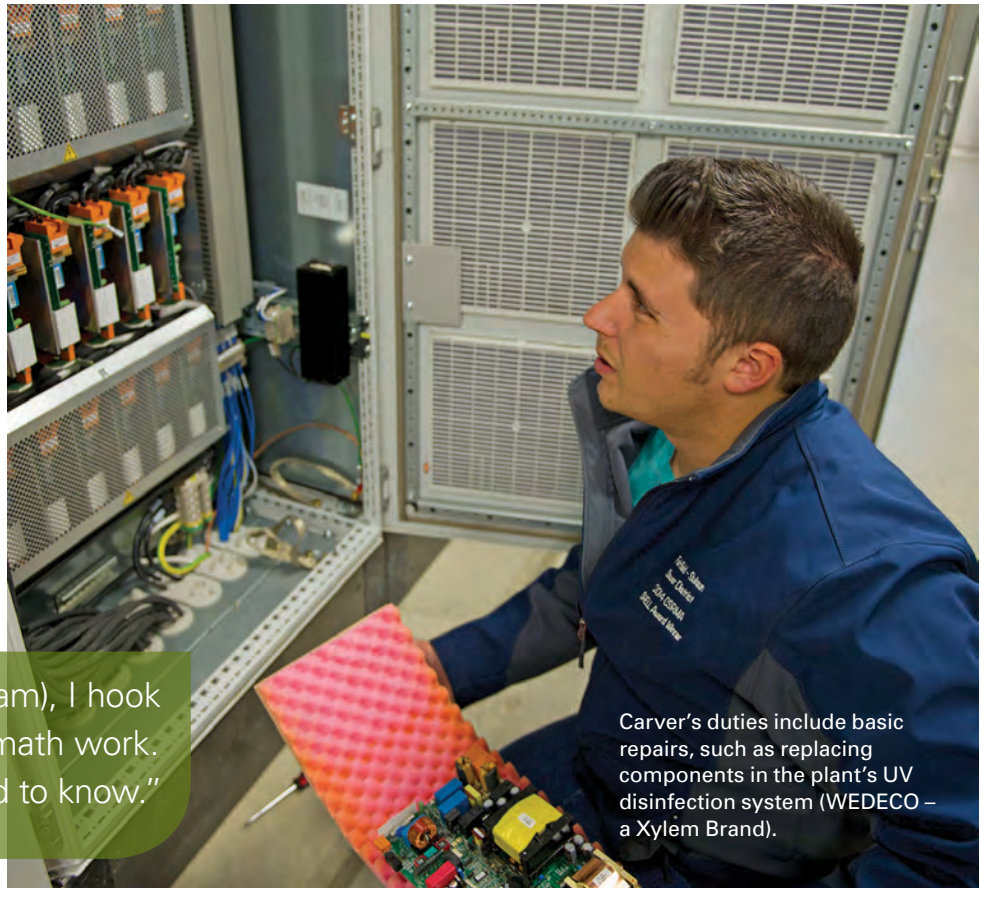
At 18, he volunteered at the Fairfield-Suisun Treatment Plant. After graduating from Vacaville High School in 2005, he landed a job at the plant with contractor United Water. In July 2008 he joined the sewer district, where he has made professional development a priority. From then on, every year, he has advanced his state certification, starting with an operator in training certificate and culminating with Grade V in 2011.

Microbiological examination is one way in which Carver and his team monitor the treatment process.

Benjamin Carver, Fairfield-Suisun Sewer District, Fairfield, California

POSITION:	**Operator/Maintenance Technician 5**
EXPERIENCE:	**9 years in the clean-water industry**
DUTIES:	**Operate the treatment plant, train employees, produce standard operating procedures, analyze lab data**
EDUCATION:	**Vacaville (California) High School, Solano Community College**
CERTIFICATIONS:	**Grade V Wastewater**
MEMBERSHIPS:	**California Water Environment Association, WEF, AWWA**
GOALS:	**Continue to enhance skills and seek out new wastewater technologies**
GPS COORDINATES:	**Latitude: 38°13'26.62"N; Longitude: 122°4'47.27"W**

"Every time I've had to take (an exam), I hook up with Ben and we go over the math work. Then he walks me through what I need to know."
GARY CRAWFORD



Carver's duties include basic repairs, such as replacing components in the plant's UV disinfection system (WEDECO – a Xylem Brand).

Ben Carver checks on the dewatering process at the plant (screw press by FKC).

TRAINING FOR A CAREER

Ben Carver's commitment to training doesn't stop with Fairfield-Suisun Wastewater Treatment Plant employees. He also encourages high school and college students to pursue clean-water careers.

For several years the plant has taken part in the Regional Occupational Program (ROP) with Solano Community College, in which prospective interns take wastewater courses and try to break into the field. Classes are full and demand for internships high — the Fairfield-Suisun district receives at least 10 to 15 applications each semester. Typically, the plant takes on one or two interns per semester.

"Students volunteer, and we give them hands-on experience toward their initial state certification," says Carver. "We train them on how to operate the plant, wastewater as an industry, the theory and science behind wastewater treatment, and other areas that might come up in their careers."

With Carver's help, interns learn the biological, chemical and physical treatment processes. During the semester-long program, students attend class and work at the plant 10 to 30 hours a week. Graduates are equipped to seek water/wastewater operator trainee jobs and to take certification exams administered by the State Water Resources Control Board.

When hiring, Brian Hawley, operations manager, looks at the person and the team fit: "Someone who is eager to learn and try to do the best they can. That's how I felt when I first met Ben. He'll go the extra mile to help us succeed."

"Wastewater is a wonderful career," Carver says. "It's rewarding and something that keeps me constantly motivated. The fact that I always learn something new is one of the big blessings of this profession. I'm never bored, because my job changes all the time. Plus, I'm able to support my family, and there are plenty of opportunities for advancement, so yes, I like what I'm doing a lot."

EXPANSION CHALLENGES

Almost from the day Carver arrived, the 40-year-old treatment plant has undergone expansions. In 2007-08, a secondary treatment expansion added a biological nutrient removal (BNR) system. The plant converted its old aerobic digesters to aeration basins with anoxic zones, built two new circular clarifiers, and converted a flow equalization tank to an intermediate clarifier.

Another project was a dewatering upgrade in which Carver and his colleagues replaced old filter presses with a screw press (FKC Co.), replaced two dissolved air flotation thickening tanks with gravity belt thickeners, and built a circular primary clarifier to add capacity to four existing rectangular clarifiers. In 2011, the plant switched from chlorine to UV disinfection (WEDECO – a Xylem Brand).

Crews also built a new alternate discharge pump station for discharging effluent to the Suisun Marsh, the largest contiguous brackish-water marsh remaining on the west coast of North America and a critical component of the 116,000-acre San Francisco Bay Delta estuary ecosystem.

Throughout the projects, Carver kept his cool demeanor and his laser

Overview of the Fairfield-Suisun Sewer District treatment plant.

focus on getting the job done right. "Ben is a great colleague — easygoing and super cooperative," says Dave Harrold, a Grade V operator and one of Carver's closest friends. "We've worked together for the last nine years and feed off each other's energy. We take a lead role in the plant, which means troubleshooting process upsets and handling any special projects."

SUPERVISING, TRAINING

A typical day for Carver runs from 6 a.m. to 4:30 p.m. Each day is different, but he usually supervises the morning meetings and briefings from graveyard shift operators, checks the duties for the day, and assigns tasks. Carver supervises the lower-level technicians and provides training when needed.

Training covers wastewater treatment processes, equipment handling, plant maintenance and other aspects of the job, such as maintaining the district's four main pump stations that deliver wastewater into the plant, nine lift stations and eight stormwater stations throughout the area.

> "Wastewater is a wonderful career. It's rewarding and something that keeps me constantly motivated ... Plus, I'm able to support my family, and there are plenty of opportunities for advancement, so yes, I like what I'm doing a lot."
>
> **BEN CARVER**

Gary Crawford, a Grade III operator, can attest to Carver's training expertise. A five-year plant veteran, Crawford came from an academic background and pursued a career at the university level. "The money wasn't that good and the jobs just weren't that plentiful, so I made a financial decision not to spend time trying to get published and get tenure for a small salary. I have a wife and wanted to earn a decent living."

Crawford didn't know much about wastewater, so Carver trained him, starting with basic treatment procedures and eventually preparing him for certification exams. "Every time I've had to take one, I hook up with Ben and we go over the math work," Crawford says. "Then he walks me through what I need to know. He's been an enormous help, for the tests and in becoming a skilled operator."

Hawley praises Carver for making sure the other operators are moving up in their certifications: "Of the 14 operators we have, all but one are Grade III and above. There are five of us with Grade V certification, so we have a highly certified staff."

PROUD TO PROTECT

Carver has little time for accolades. He's too busy doing his job: leading the operations team members as they work on the oxidation towers and dual-media tertiary filtration system, and making sure the sol-

> "Ben is the new model of an operator. He's passionate about the wastewater field and our commitment to protect the public and the environment. He's technically savvy and eager to learn new technologies."
> **BRIAN HAWLEY**

ids dewatering processes — screw press and asphalt-lined drying beds — function properly to generate 7 to 8 dry tons of biosolids daily.

He also helps conduct plant tours for elementary, high school and college students, promoting the satisfaction he feels from protecting the area's fragile ecosystems. That includes reclaiming 10 percent of plant effluent to irrigate turf farms or livestock feed and to replenish ponds for local duck clubs.

Looking ahead, the treatment plant faces stricter nutrient limits from the Regional Water Quality Control Board and the U.S. EPA. Carver relishes the challenge as he continues to improve his skills and look for ways to improve plant operations and efficiency.

EXCELLENCE IN ACTION

Ben Carver's Operator of the Year award from the California WEA is only the most recent honor for the Fairfield-Suisun Sewer District. The plant started life supporting a brewery.

In the early 1970s, Anheuser-Busch was looking to build a brewery and liked the Fairfield-Suisun area for its location near San Francisco and Sacramento, as well as the area's high-quality drinking water. The City of Fairfield wanted the brewery to come but wasn't equipped to handle the high-strength wastewater. So, with the help of Suisun City, Fairfield got the wastewater plant built, and it has been cited often for excellence. Honors include:

- Statewide Collection System of the Year award in 2013 and statewide Plant of the Year award in 2011 from the CWEA.
- Platinum Award in 2012 and Gold Awards from 2008-11 from the National Association of Clean Water Agencies.
- Plant of the Year awards in 2011, 2013 and 2014; Public Education Award in 2011; Safety Award in 2009, 2011 and 2013; Collection System of the Year award in 2009 and 2013; and Engineering Achievement Award in 2014, all from the CWEA Redwood Empire Section.

Today the plant maintains three oxidation towers that remove high-strength BOD from the brewery. The district operates an industrial pretreatment department that regulates, inspects and issues permits to local industries.

Ben Carver always looks for ways to improve his skills and improve plant operations and efficiency.

"There's no question that all the plants, including ours, are going to see much stricter limits on nutrients," he says. "We're already doing full nitrification and partial nitrogen removal, so we're a little bit ahead of some plants. As for me, I enjoy my work enough that I'll keep doing it. In this industry there are so many different avenues to pursue. I'll stick with it for the rest of my career." **tpo**

Farewell to Paper

MOBILE TECHNOLOGIES MAKE DATA MANAGEMENT MORE EFFICIENT AND ACCURATE, STREAMLINING EVERY STEP OF COLLECTION, ANALYSIS AND REPORTING

By Alan Fabiano

Every day the team that operates and maintains the 330 mgd Union Park pump station in South Boston, Massachusetts, uses mobile technology in the form of hand-held tablets to enter data on checklist forms. This allows them to store runtimes and retrieve data for monthly reports.

The team members, who service nine other sanitary, stormwater and water pumping stations in the area ranging from 1.5 to 6.5 mgd, also enter corrective maintenance work orders through a mobile application on tablets or smartphones; the information is automatically loaded to a computerized maintenance management system (CMMS).

This team's experience offers just one example of the efficiency and other benefits that go with using mobile data collection and management technology instead of manual, paper-based methods.

Utilities that use paper forms to collect data face a number of issues. Notes coming from the field are often hard to read, and data entry can be inconsistent. Manual entry errors are common.

These same utilities probably enter data into spreadsheets for calculations and reporting, introducing another source of errors and uncertainty. For example, has the data been entered or copied and pasted correctly? Is the formula accurate? What happens when there are discrepancies between manual and digital reports?

Furthermore, utilities often deal with file integrity issues. What happens when copies of the same spreadsheet are on multiple computers with several people updating them? How is data compared among multiple spreadsheets? What happens when permit levels change or when the spreadsheet expert leaves the organization? When utilities do not have good answers to these questions, issues accumulate and the agency has a data problem.

The tools available for data collection in the field and analysis in the office have improved significantly in recent years. Smartphones and tablets along with simple, flexible and affordable applications developed specifically for them make it possible to streamline every step of the collection, analysis and reporting of data.

Mark Wippler and his staff use mobile technology at their facility for daily plant checks, general-purpose checklists, calibrations, inspection forms, and health and safety checks.

THE MOBILE ADVANTAGE

Generally, utilities find that mobile technology and a data collection application solve the problems presented by paper forms and manual data entry. Mobile technology programs are simple and easy to learn and, because they bring efficiencies that save time and money, the initial startup costs are quickly paid back. Furthermore, when staff members spend less time collecting and entering data, they can devote more time to process repairs and improvements.

Because the cost of entry is low, small-scale operations can take advantage of mobile technology. For example, the team at the 0.6 mgd Wolfeboro (New Hampshire) Wastewater Treatment Facility, serving a community of 7,000, uses mobile technology.

"We have two tablets in use on a daily basis," says Russ Howe, plant manager. "The paper method we previously used needed the same data written on multiple forms: bench sheets, logbook, operational forms and others. The effort needed to find the required data and manually type it into a monthly report was time-consuming and prone to errors. Plus, document storage was always a challenge. Now, the tablet is carried with the person and data is entered once into the application."

> "We have two tablets in use on a daily basis. The paper method we previously used needed the same data written on multiple forms ... The effort needed to find the required data and manually type it into a monthly report was time-consuming and prone to errors."
>
> **RUSS HOWE**

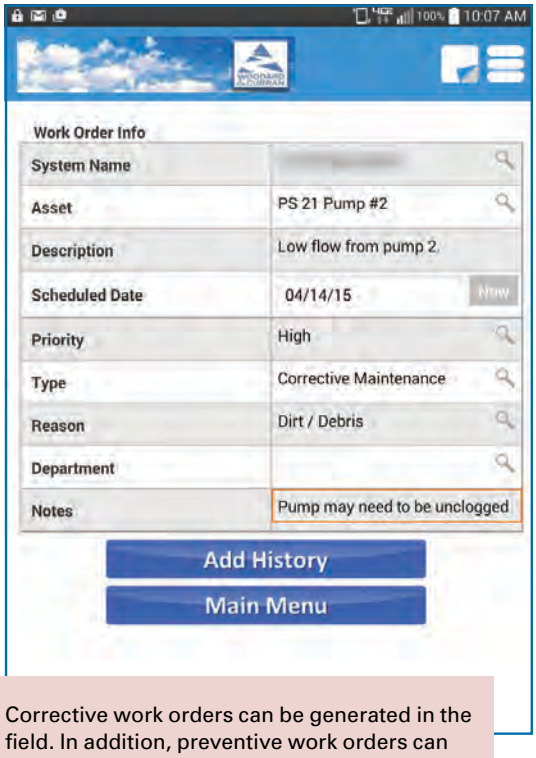
The Wolfeboro staff uses Hach Water Information Management Solution (Hach WIMS) software, which includes a database that receives and stores data where it is available at any time by way of a computer with an Internet connection. "The WIMS software generates plant reports using this data," notes Howe. "This saves the staff hours we used to consume developing reports."

Mobile technology users find that errors are significantly reduced. They can immediately validate data in the field, receiving notifications if an entry falls outside the normal or expected range. Richer data can be collected, including photos, video, GPS coordinates, and automatic date and time stamping. In addition, since real-time data is instantly uploaded, managers can be alerted when new information is available or action needs to be taken.

Greater security can be employed on a tablet or a mobile application: User authentication and password protection means forms and data can only be viewed and edited by those authorized. With electronic storage and automatic backup, there are fewer lost forms.

A VERSATILE APPLICATION

Among strong believers in mobile platforms is Woodard & Curran, a firm based in Portland, Maine, that operates more than 45 treatment facilities and remediation sites. After deciding to use mobile technology, the firm selected the doForms application for creating forms and collecting data. This simple but customizable application lets the company create purpose-built forms for different needs and provide direct upload of data from a wide range of mobile devices.



Corrective work orders can be generated in the field. In addition, preventive work orders can be dispatched to an operator's tablet directly.

The offering includes a website portal for creating forms and reporting on the data, as well as a mobile application for completing and submitting the forms. The form-building engine includes multiple options, including skip and relevance logic, lookup tables, and dropdowns to simplify data entry. A created form can be copied or updated easily. Deploying forms to a mobile device simply requires hitting a publish button.

The doForms system comes with pre-built report templates that can be modified for a specific need. Data and reports can be viewed through the application website or exported to PDF, Excel, CSV, HTML or KML. The system also integrates with CMMS and the Hach WIMS systems.

SIMPLICITY IN PRACTICE

At the 2.5 mgd wastewater treatment plant at the Southern California Logistics Airport in Victorville, plant manager Mark Wippler and his staff use doForms for daily plant checks, general-purpose checklists, calibrations, inspection forms, and health and safety checks.

The team works with three distinct databases: doForms, Hach WIMS (lab data) and SEMS (from SEMS Technologies, for maintenance data). "DoForms is the glue that sticks to our lab data and maintenance data," says Wippler. "Some effort is needed to ensure all three databases are set up correctly, but once that is done, we need only minor attention to software upgrades or modifying forms to meet changing requirements."

All the forms are stored in the doForms online database, so if they ever need a form printed for their records, it is available. When data is requested, Wippler and staff just download or email it. The doForms data is interfaced with Hach WIMS and updated hourly. Data collected on the tablets popu-

lates the reports automatically, making end-of-month reporting easier.

The doForms application is linked to Victorville's SEMS program so that corrective work orders can be generated in the field and preventive work orders can be dispatched to an operator's tablet directly. Work orders can be created and received in the field as long as a data connection is available. This allows managers to communicate tasks to staff wherever they are, along with specific work orders relevant to that task.

Process data can be collected in the field and immediately sent to the operation's database, alerting managers to potential issues. This combination multiplies the efficiency gains of a mobile data collection system alone.

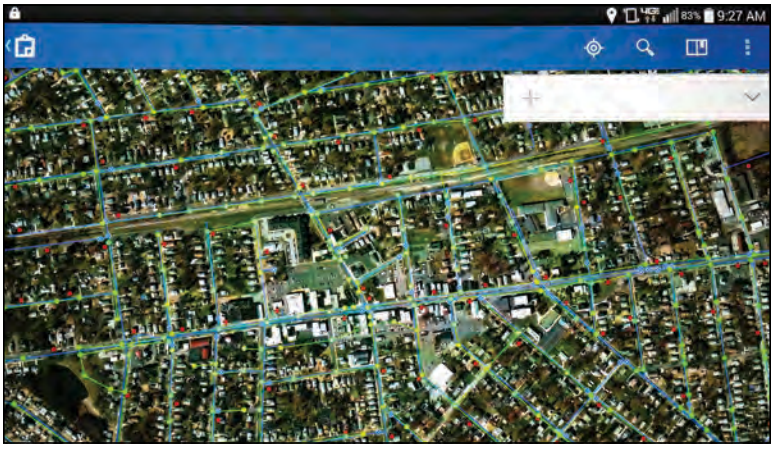
GIS ON THE FLY

Utility staff can use GIS applications for data collection or map viewing while in the field. GIS data on mobile devices enables staff members to see their utility system instantly in relation to their current location. Project managers find that a GIS-enabled map makes it easier to locate utility assets, versus searching through a pile of paper maps. Further, as more experienced utility workers retire and take institutional knowledge with them, it will be important to map assets electronically using GIS technology.

GIS applications are used both for viewing and collecting data. Today's smartphones and tablets generally have GPS capability, but it is imprecise. It is better to use a Bluetooth GPS receiver that delivers submeter locations to the mobile application. Both doForms and collector applications can collect GIS information and gather it over time. For example, staff members can collect accurate GIS data while inspecting manholes, flushing hydrants or exercising valves, and then use that data to help manage those projects more efficiently in the future.

GREATER EFFICIENCY

Using the right mobile devices and applications can eliminate not only paper but also cameras, GPS devices, calculators, pens, clipboards and more.



GIS data on mobile devices in the field enables staff members to see their utility system instantly in relation to their current location.

Transcribing paper notes to spreadsheets and deciphering illegible handwriting are all obstacles of an old technology.

"Errors are still made, but they are mostly fat finger errors caused by hitting the wrong button," says Victorville's Wippler. "They are easy to spot in the Hach WIMS database before creating the monthly reports. My estimate is that we are about 99 percent or greater error-free each month."

ABOUT THE AUTHOR

Alan Fabiano is a technology manager with Woodard & Curran responsible for operations and maintenance technology implementations for operations data management (OPS) databases, maintenance data management, mobile applications, GIS and other hardware or software support. He can be reached at afabiano@woodardcurran.com. **tpo**

TEACHER AND MENTOR

MICHAEL RAMSEY'S OPERATOR DEVELOPMENT EFFORTS EXTEND BEYOND HIS OWN ILLINOIS VILLAGE TO INCLUDE SEMINARS FOR MEMBERS OF HIS STATE AWWA SECTION

STORY: **Scottie Dayton** | PHOTOGRAPHY: **Rob Hart**

OPERATIONS CHANGED DRAMATICALLY THE DAY HIGH-PRESSURE water flowed into the lives of Michael Ramsey and his seven operators at the Water Division in Westmont, Illinois.

In 1992, the village abandoned seven underground wells and began receiving drinking water at 90 psi from the Jardine Water Purification Plant in Chicago. When distributed to Westmont's 25,000 customers and other villages, the pressure was too high for the remaining original 1920s iron mains.

Those pipes were cast in sand, producing wide variances in wall thickness and enabling pinhole leaks and rust pimples to develop, recalls Ramsey, former Water Division superintendent and now the director of Public Works. The old mains failed at an average of 150 breaks per year, some catastrophically. Ramsey adjusted the water pressure to 65 and 54 psi (to compensate for elevation), then began rehabilitating the distribution system with his team and the unwavering support of the village board.

Michael Ramsey, director of Public Works for the Village of Westmont, Illinois.

Ramsey's leadership in replacing those mains is just one example of the performance that helped him earn the 2014 Water Professional of the Year award from the Illinois Section AWWA. He also received the 2014 Educating the Drinking Water Utility Commendation award for in-person seminars from the ISAWWA Education Committee. The award recognizes excellence in teaching, mentoring or developing educational programs.

EARLY INTRODUCTION

Working summers while attending Illinois State University for a business administration degree, Ramsey met many of Westmont's 91 miles of water mains, 1,290 valves and more than 1,300 fire hydrants. When he graduated in 1986, the village board offered him a full-time position, and Ramsey discovered that water was his life's passion.

"It's a small community, like one gigantic family, and our working conditions are always attuned to safety," says Ramsey. (The village won the ISAWWA 2009 Wendell LaDue Safety Award.)

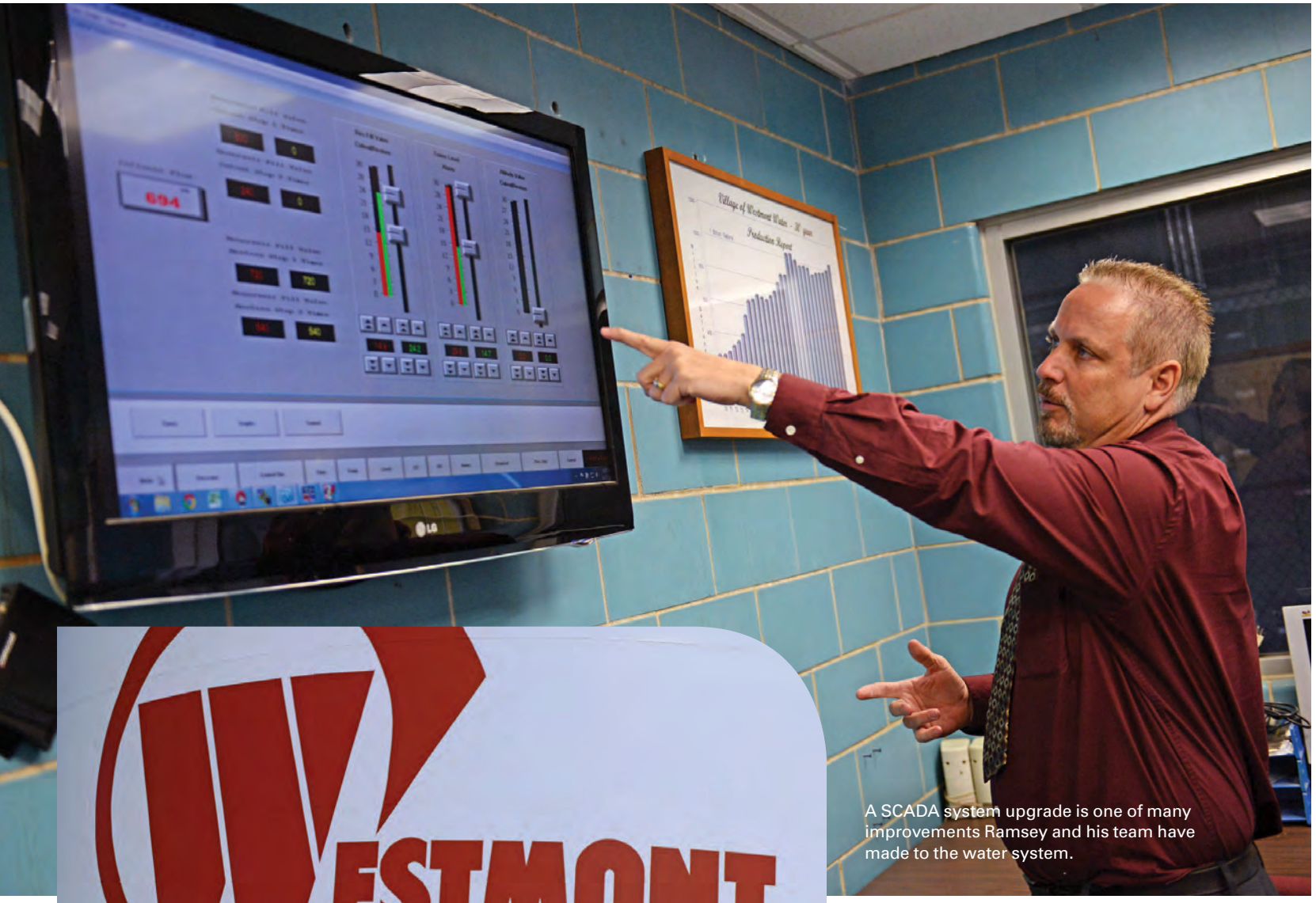
Attractive benefit packages encourage employee retention: Ramsey's team has a combined 129 years of experience. Besides his 29 years in the division, foreman Jim Cates has 15 years. Both are Class A (highest) operators. Class C operators include lead operator Brian Beusse (10 years), Kirk Nix (26 years), Frank Kulas and George Harrison (15 years), John Buschman (12 years), and Eric Borys (seven years).

TOWARD BETTER MAINS

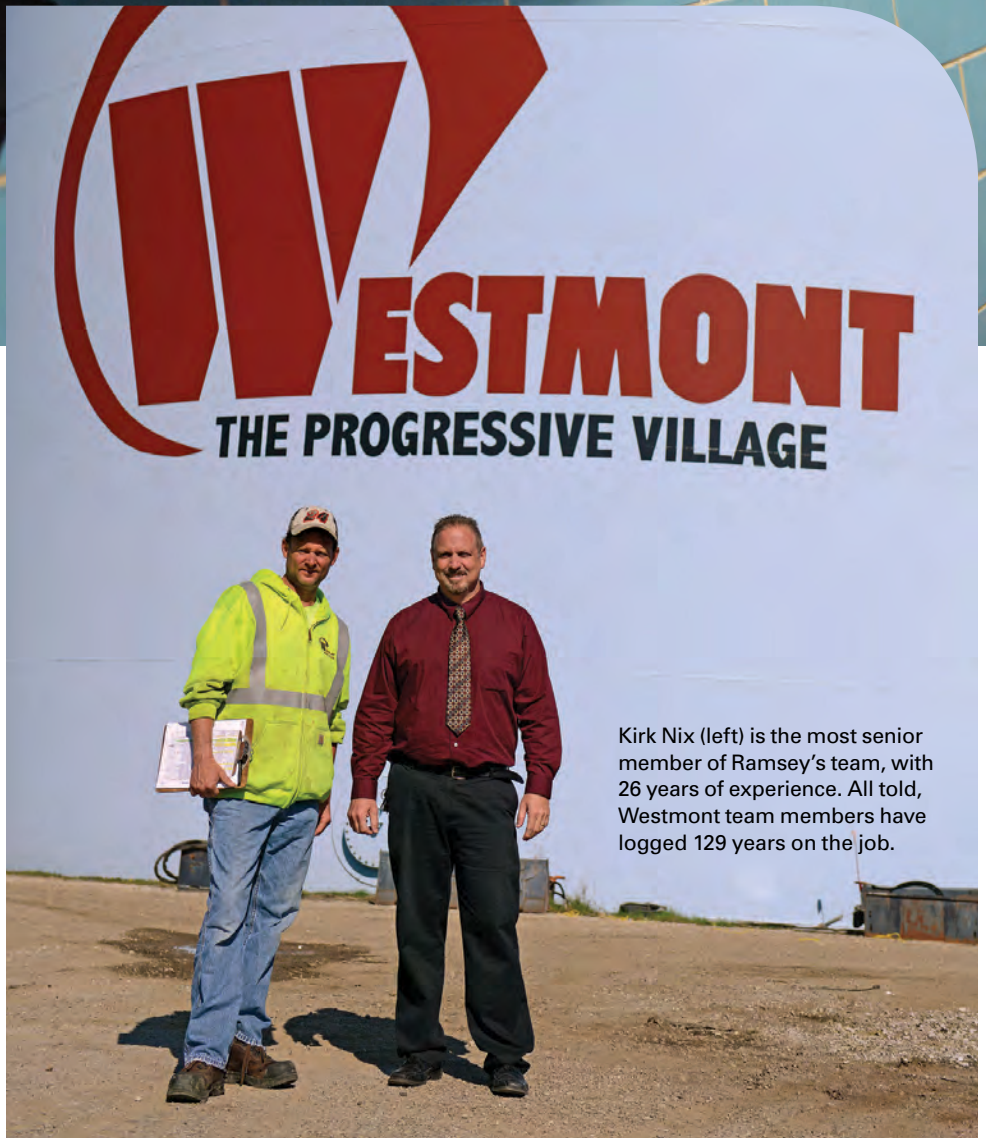
One of the team's biggest challenges was the replacement of old sand-cast iron mains. Westmont's board recognized the need for such a program as soon as purchased water began flowing. Since 1992, contractors have replaced more than 25 miles of old pipe, and village crews have repaired more than 1,000 water main breaks. Ramsey continued the restoration program when he became Water Division superintendent in 2006. By 2025, the oldest mains in the village will date to 1975.

"Saving the village lost water revenue, overtime and material costs has been a real positive, and the board willingly gives us money to continue the work," says Ramsey. "We also have minimized customer complaints about the frequency with which we tear up their streets."

The replacement program paid huge dividends during the last two frigid winters. Westmont had seven mains break in January and February 2015, while similar communities had 40 to 60. "We average 25 breaks per



A SCADA system upgrade is one of many improvements Ramsey and his team have made to the water system.



Kirk Nix (left) is the most senior member of Ramsey's team, with 26 years of experience. All told, Westmont team members have logged 129 years on the job.

Michael Ramsey, Westmont (Ill.) Water Treatment Plant

POSITION:	**Director of Public Works**
EXPERIENCE:	**29 years**
EDUCATION:	**Bachelor's degree, business administration, Illinois State University**
CERTIFICATIONS:	**Class A water operator**
MEMBERSHIPS:	**Illinois Section AWWA, American Public Works Assoc. Chicago Metro Chapter, Mid Central Water Works Assoc., South Suburban Water Works Assoc.**
GOAL:	**Act as mentor to young operators**
GPS COORDINATES:	**Latitude: 41°47'41.87"N; Longitude: 87°58'37.61"W**

"It's a small community, like one gigantic family, and our working conditions are always attuned to safety."
MICHAEL RAMSEY

> "It's a good feeling when they say later that I made a difference in their lives by enabling them to find work as water operators."
> **MICHAEL RAMSEY**

A meter replacement project paid big dividends for the village. Michael Ramsey and operator Kirk Nix are shown with an assortment of old meters removed from homes in Westmont.

DOUBLE THE FUN

Michael Ramsey, former superintendent of the Westmont Water Division, never allows moss to grow under his feet. He's involved in numerous water associations and sits on or chairs various committees, including the Illinois Section AWWA Host Committee.

One duty involves organizing the competitions at water conventions. "It dawned on me that we had an event for individuals — Meter Madness — and three-member teams had water main tapping, but there was nothing between them," he says.

Together with Jim Cates, foreman, and John Buschman, operator, Ramsey developed the rules and objective of Hydrant Hysteria. Two-member teams assemble a fire hydrant, and the fastest time determines the winner. The contest debuted at the 2012 ISAWWA Conference.

"Competitors and spectators really enjoy it," says Ramsey, who chairs the ISAWWA Hydrant Hysteria Committee. "Teams usually assemble the hydrant in around two minutes, and anyone can do it. Even a pregnant lady competed this year. I was a little nervous about that."

Hydrant Hysteria has spread to Michigan, Wisconsin and Minnesota. Ramsey's team introduced it at the national level with a demonstration at the AWWA's ACE15 show in Anaheim, California. The competition debuts officially as part of ACE16 in Chicago.

"We'll draw attention to the new contest by demonstrating it in the park across the street from Water Tower Place," says Ramsey. "Next year's state winners will receive a trophy and an all-expense-paid trip to ACE16."

year now and repair most with the main under pressure," says Ramsey. "It's brutal work in single-digit temperatures, but we avoid disrupting service."

Despite the division's best efforts, two catastrophic failures have occurred since 2010. One eruption washed away a section of a four-lane avenue. In 2014, the village's largest main, a 16-inch transmission line, ruptured, causing crews to valve down three blocks in the area.

A valve exercise program ensured that crews could respond quickly to stop flooding in those instances, but Ramsey wanted the entire distribution system emergency ready. When he noticed that only one of three 2,400 hp high-service pumps (Pentair - Aurora Pump) was working, he budgeted for a contractor to rebuild all of the 35-year-old units.

Ramsey also bought a Cummins diesel generator to power the water pumps during electrical failures. The pumps draw water from a 500,000-gallon standpipe, a million-gallon tower and two 1.5-million-gallon inground tanks.

The village maintains a deep well as its emergency water source. Laboratory technicians Cates, Beusse, Tim Staffeldt and Nix sample it 40 times per year using Hach instruments. They also perform 60 daily tests on the stored water, 30 lead and copper tests every three years, and four disinfectant byproduct tests annually. Suburban Laboratories does the 28 monthly Bac-T tests that require a certified laboratory.

VALUE DRIVEN

While distribution upgrades have paid off handsomely, the village has also updated its meter reading system for efficiency. The village had a TouchRead water meter system (Sensus), but Ramsey budgeted for and received a RadioRead system (also Sensus). In 2012, the village began upgrading to a fixed-based water meter system using Sensus iPERL and OMNI meters.

"The board understands the value of pushing a button and reading the meters without leaving the building," says Ramsey. "We've changed out 4,500

of our 6,900 meters and should complete the work next year." His crews also replaced more than 300 fire hydrants in the last 10 years, leaving only 30 units older than 1975.

Last January, electricians replaced the high-service pumps' solenoid valves with Kinetrol actuators to improve efficiency. The project is expected to save $3,000 to $4,000 a year in electricity and pump depreciation. "We also brought in Tri-R Systems, our IT specialist, to adjust the on-off timing on the pumps and modify our SCADA system," says Ramsey.

Once Ramsey was comfortable with the progress, he focused on how to pay for future infrastructure repairs and restorations. He asked area communities what they charged for water, then did a cost analysis to replace fire hydrants and water mains and build a water tower. "A rate increase of $1.60 per 1,000 gallons over the next 17 years would provide the necessary $28 million," he says. In 2009, Westmont became one of the first communities in the region to raise water rates to reflect the true cost of consumption.

TEACHER AND GAMER

Of all Ramsey's accomplishments, he's proudest of teaching night classes on water distribution system operation and maintenance to help operators prepare for their Class C and D certification exams. He also teaches utility management for water and wastewater leaders.

Since January 2012, Ramsey has had more than 100 students, and 73 of the 75 who took the certification exams passed. "It's a good feeling when they say later that I made a difference in their lives by enabling them to find work as water operators," says Ramsey. He also represents the Water Division at high school career days and mentors high school students through the village's summer work program.

The board fully supports, appreciates and encourages Ramsey's involvement in the water industry, including the time he spends traveling to help other AWWA sections. In 2015, he helped run conferences or annual events in Lansing, Michigan; Denver, Colorado; and Wisconsin Dells, Wisconsin. Ramsey also was a panelist at the 2014 Plumbing Manufacturers International Fall Conference, discussing "The Future of Water Revisited."

Ramsey served as host for the 2013 AWWA Distribution Systems Symposium/Emergency Preparedness and Security Conference in Itasca, Illinois, and is on the ISAWWA Host Committee for ACE16. His duties include soliciting vendors, handling registrations and overseeing the water main tapping, Top Ops, Hydrant Hysteria and Meter Madness competitions by finding teams and vendors.

Westmont Water Division teams compete annually in all four competitions during the ISAWWA's WATERCON event in Springfield. Ramsey was a member of the winning state 2012 tapping team that placed 10th at the nationals during the AWWA's ACE12 show.

"The board was so proud that they made a big deal out of the trophy presentation ceremony," says Ramsey. From 2012 to 2014, his team also competed in Top Ops, and Ramsey has been a contestant in and judge of Hydrant Hysteria, in which the winning two-member team assembles a fire hydrant in the fastest time.

With his advancement to Public Works director, Ramsey realized one of his goals. "I'm excited about becoming more involved with engineering and working with all our divisions," he says. "I have the background, and most people here have known me all my life. I'll still be involved with water, only in a different capacity. It'll be challenging but fun." tpo

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AMBITIOUS EFFORTS IN BIOGAS-TO-ENERGY AND SOLAR POWER HELP A CALIFORNIA CLEAN-WATER PLANT ACHIEVE ITS GOAL OF GENERATING ALL ITS ELECTRICITY ON SITE

By Doug Day

Since mid-September 2014, all electricity at the Hill Canyon Wastewater Treatment Plant has come from on-site sources. With about 1 MW of biogas cogeneration capacity and a 584 kW solar array, the 14 mgd (design) plant saves money while achieving its goal of electric power self-sufficiency.

Chuck Rogers, superintendent of the plant in Thousand Oaks, California, thanks his staff members who have embraced sustainability, power purchase agreements (PPAs) that make renewable energy feasible, and a city council that set a challenging goal.

The 54-year-old advanced tertiary plant has an average flow of 8.5 mgd. Serving a population of 120,000 people, it earns $700,000 in revenue annually by selling 90 percent of its effluent for farm, golf course and landscape irrigation. The rest supports natural habitat for plants and animals at a nearby lagoon.

PHOTOS COURTESY OF THE HILL CANYON WASTEWATER TREATMENT PLANT

ABOVE: The Hill Canyon Wastewater Treatment Plant's 2,783 solar panels utilize a motorized system to track the sun as it travels across the sky in order to maximize electrical generation. BELOW: Hill Canyon now generates all of its own electricity. Biogas cogeneration and solar photovoltaic projects help the plant save money and provide for long-term planning based on known electricity costs for years to come.

RENEWABLE ENERGY

In 2007, Thousand Oaks pursued two renewable energy projects that led to many years of guaranteed electric rates with zero capital investment. The developers funded construction and operate the generating facilities.

CHP Clean Energy owns the cogeneration system and consumes biogas that used to be flared. The facility includes two engine-generators and a gas treatment system. In 2014, one of the original 250 kW Mann engines was replaced with a 700 kW Ingersoll Rand unit. Actual outputs average 240 kW and 600 kW.

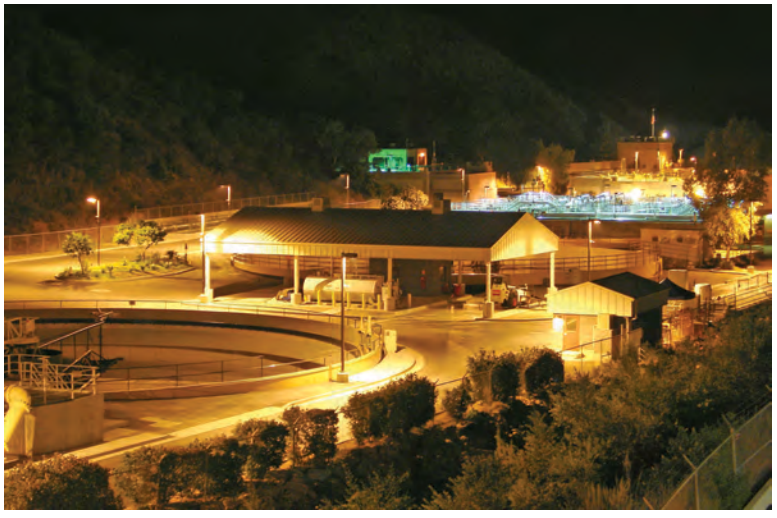
Under a 15-year PPA, the plant provides the biogas and pays 7.2 cents per kWh for the electricity, with an annual 2 percent escalation clause. The arrangement saves about $200,000 a year over rates from Southern California Edison (SCE). "As electrical costs continue to go up, the spread between what we buy it for compared to increases at SCE will be very favorable to the city," says Rogers.

The solar plant is owned by MMA Renewable Ventures and operated by SunPower Corporation through a 20-year PPA. The 2,783 panels are motorized to follow the sun, maximizing their output. "The solar is more expensive than the cogeneration, but it serves us well," Rogers says. The solar electricity is priced at 16.8 cents per kWh with no escalation clause.

Funding assistance for the developers came from California Public Utility Self Generation Incentive Program (SGIP) grants totaling $2 million. Another $1.5 million SGIP grant was issued for the new cogeneration engine.

PUTTING FOG TO WORK

Hill Canyon's average electric demand has dropped from 1.2 MW 15 years ago to just 680 kW, largely through use of modern equipment such as variable-frequency drives, energy-efficient motors and LED lighting. "Our goal is to get down to 600 kW," says Rogers. "Everywhere I turn, I can say we optimized that. We looked at the textbook digester mixing and decided we didn't have to mix them as frequently and vigorously. We turned it way down and it works fine. We try to run things off-peak, and we have a new SCADA system coming on that will give us more opportunity for automation."



To make sure the cogeneration system has enough fuel, Hill Canyon increased its FOG (fats, oil and grease) program over the years and recruited sources of other high BOD waste. The plant generates 450,000 to 600,000 cubic feet of gas daily.

In 2014, the plant took in about $400,000 from local haulers delivering between 15,000 to 30,000 gallons of waste per day. "We take FOG, coffee waste and beer waste," says Rogers. "We've taken yogurt and biodiesel waste in the past, and are currently taking a Russian dressing waste.

"FOG is nasty stuff, so we had to learn about controlling the digesters, which are being fed like a buffet every day. We had to increase our level of understanding so we weren't just foaming out of them. We've overfed them and overmixed them. It's understanding holistically everything that happens at the treatment plant. We just didn't know until we knew. We're trying to optimize this all the time."

One thing that has helped is software a local company developed to automate the feeding of variable Btu waste into the digesters. "It sets a target and then looks at how much gas a certain volume of material creates," says Rogers. "It's constantly balancing up and down from that target."

There was skepticism at first, but the software has been effective. "That's something a lot of people struggle with," says Rogers. "This stuff has wild variability. Some FOG loads are great, some are OK, and some are worthless for gas production." Next up is exploring options with locally generated food waste.

INFRASTRUCTURE MATTERS

Rogers has worked at Hill Canyon for 18 years and says Thousand Oaks is an example of what happens when a community pays attention to public works. "Affluence and wealth follow," he says. "We have beautiful streets and sidewalks, great water and wastewater systems. When you add them up, we have a community attractive to people and companies like Amgen (a global biopharmaceutical company) and Baxter International (a global biotechnology and health care company)."

He credits leadership for the plant achieving self-sufficiency in its electricity supply. "Our city council really drove it," says Rogers. "It was very challenging. If it hadn't been for our city council making a big deal about it, it probably wouldn't have happened. God bless difficult goals and objectives."

tpo

LIGHTS, CAMERA, ACTION

The Hill Canyon treatment plant tries to operate as a business. The plant rents some land to a farmer who grows peppers for sriracha sauce, and some to California's film industry. It also hosts numerous bee colonies and aims to turn that into a revenue stream.

"We've opened the door to public-private partnerships," says Chuck Rogers, plant superintendent. "We're constantly looking for good partners — ways to keep our costs down and make things a little bit better for everybody."

Just an hour from Los Angeles and Hollywood, the plant has hosted many commercial and video shoots. The Speed Channel shot a program about the Toyota Prius featuring Adam Carolla, and Intel used the plant as a setting for a training video. The first feature-length production was a 2014 low-budget movie, *The Big One that Went Direct to DVD*. "We got a call from HBO recently, but nothing has happened yet," says Rogers.

Thousand Oaks lies in the heart of Conejo Valley, site for dozens of popular movies and TV shows since the 1940s, from *Tarzan* and *Old Yeller* to *Friday Night Lights* and *Sleepless in Seattle*. The *Bonanza* opening credits scene showing the Cartwrights riding down a dirt road was shot at a farm near the plant.

Working with artists can be a bit challenging but also fun: "Hollywood people are just like they are portrayed in the media. There's never enough time in the day to not ask for another favor."

The back of the Petersburg Wastewater Treatment Facility, seen from the muskeg with Frederick Sound and the Mainland Mountains as a backdrop.

'Work Hard, Work Now'

COMMERCIAL FISHING HERITAGE GIVES THE TEAM IN A REMOTE ALASKAN VILLAGE THE WORK ETHIC NEEDED TO KEEP AN OLDER CLEAN-WATER PLANT OPERATING SMOOTHLY

STORY: **Jim Force** | PHOTOGRAPHY: **Tanya Somerville/Seaprints Photography**

COMMERCIAL FISHING PLAYED A BIG ROLE IN THE development of Petersburg, Alaska. It also has a lot to do with successful operation of the community's primary wastewater treatment plant.

"If you're a fisherman, you have to work hard, and you have to work now," says Justin Haley, wastewater supervisor. "People are depending on you." The same ethic applies to wastewater treatment.

Haley has worked as a commercial fisherman and so have all the members of his staff. "We're all from here and we've all commercially fished, so we know what it's like to have to work with baling wire and duct tape to keep things going," he says. "We've all grown up figuring out how to make things work."

Petersburg's remote location, on Mitkof Island along Alaska's Inside Passage, makes operator ingenuity necessary. It can take weeks to get parts for plant equipment, so staff members are jacks-of-all-trades. Since the new plant was started up in the late 1980s, they've fixed and improved nearly all the process equipment, while also servicing the lift stations and the 17-mile collections system.

Petersburg (Alaska) Wastewater Treatment Facility

BUILT: | **1977 (redesign and rebuild 1988-89)**
POPULATION SERVED: | **3,000**
SERVICE AREA: | **Petersburg, northern tip of Mitkof Island**
FLOWS: | **2.1 mgd design, 0.3 mgd average**
TREATMENT LEVEL: | **Primary**
TREATMENT PROCESS: | **Primary sedimentation**
RECEIVING WATER: | **Frederick Sound**
BIOSOLIDS: | **Dewatered, landfilled**
ANNUAL BUDGET: | **$1 million**
WEBSITE: | **www.ci.petersburg.ak.us**
GPS COORDINATES: | **Latitude: 56°48'36.85"N; longitude: 132°57'16.36"W**

The Petersburg plant team includes, from left, Blake Buotte, plant operator 3; Mike Bell, water operations supervisor; Aaron Greinier, water and wastewater operator 1; Justin Haley, wastewater operations supervisor; and Dennis Jones, wastewater plant operator 1.

> “We’re all from here and we’ve all commercially fished, so we know what it’s like to have to work with baling wire and duct tape to keep things going.”
>
> **JUSTIN HALEY**

Aaron Greinier cleans the rotary screens (Parkson Corp.).

A FISHING TRADITION

It's no surprise that all team members at the Petersburg Wastewater Treatment Facility have experience in commercial fishing. Most likely everyone in this small community on Alaska's Inside Passage has had some involvement with the industry.

Known as Alaska's "Little Norway," the town was founded more than 100 years ago by Norwegian fishermen. The community is named for Peter Buschmann, a Norwegian immigrant who arrived in the late 1890s and built a cannery and a dock. A cannery has operated there ever since and has been joined by two other fish processing installations.

All three plants have their own waste treatment facilities, so the municipal treatment plant doesn't have to deal with their discharges. Still, the canneries bring hundreds of workers to the community during the summer processing months. That, plus tourists in town for sport fishing, sightseeing and whale watching, nearly doubles the population.

"There are a lot of fishing charters here," says Justin Haley, wastewater supervisor. The mainstays are salmon and halibut, but the commercial operations also harvest crab, shrimp, herring, cod and several other species of fish and shellfish.

Haley had firsthand experience commercial fishing but now spends a lot of his spare time sport fishing. His biggest catch? "It was with my dad," he recalls. "I was 12 or 13, and we hooked a 300-pound halibut. We're all outdoors kind of people. We have gray skies 300 days a year, and we get 110 inches of rain annually. I couldn't imagine living here without loving the outdoors — the hunting and fishing. It takes a special kind of person."

Petersburg Wastewater Treatment Facility PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	161 mg/L	84.7 mg/L	140 mg/L winter 175 mg/L summer
TSS	192 mg/L	39.7 mg/L	140 mg/L
Dissolved oxygen	N/A	5.6 mg/L	2-17 mg/L

That self-reliance, along with excellent performance, earned Petersburg the 2014 Plant of the Year award from the Alaska Rural Water Association.

A PRIMARY PLANT

The plant's treatment process is unsophisticated but effective in compliance with its permit, which requires only preliminary and primary treatment.

At present, the plant has an exemption from secondary treatment. "The original plant built in the 1970s was a secondary plant using a bio-tower," says Haley. "The engineers who designed it grossly underestimated the flows, mostly because they ignored I&I, which was huge. The plant never worked, and so the decision was made to bypass until they could get a functional facility."

The U.S. EPA agreed with the decision and granted the exemption. The facility is still regulated by the EPA even though Alaska now has its own permit, because only the federal government can authorize the exemption.

Meanwhile, reducing I&I is a top priority. "Our dry-weather flows are around 0.3 mgd, and our peaks have dropped from 2.5 mgd a decade ago to about 1.7, but we still have a long ways to go," says Haley. "We have two smaller projects coming up in the next year, and we are starting plans for two more. My hope is that by the end of the decade, an upgrade to secondary treatment will be viable in the eyes of the people who sign the checks."

(continued)

> "We're at a lift station every week cleaning out flushables. With our small crew, our time would be better spent elsewhere. It could be avoided if people would pay closer attention to what they flush."
> **JUSTIN HALEY**

Justin Haley counts fecal coliform colonies. Chlorine dosing in summer helps control fecal coliform in plant effluent, although the plant's permit does not require chlorination.

SEASONAL FLOWS

Wastewater enters through a headworks with two Hycor rotary fine screens (Parkson Corp.) that operate alternately. Screenings are dewatered on a press, placed into a hopper and taken once a week to a landfill 2 miles away. After screening, wastewater passes through a Eutek TeaCup centrifuge grit removal process (Hydro International).

In summer, when tourists and employees of the town's fish processing plants boost the population from 3,000 to about 5,000, a dose of chlorine is added before the wastewater enters the primary sedimentation basins. While chlorine is not required by the plant's permit and is removed before the treated water is discharged, the dose helps the plant control fecal coliform.

The rectangular primary basins (12 by 60 feet and 10 feet deep) are equipped with chain and flight mechanisms. After treatment, the effluent is discharged through an outfall pipe that runs 1,000 feet into Frederick Sound, to a depth of about 100 feet.

Solids are stabilized in an aerobic digester equipped with Flexair fine-bubble diffusers (Environmental Dynamics). A belt press (Parkson Corp.) dewaters the material, which is then landfilled.

Petersburg easily meets its discharge permit, producing water with an average BOD of 84.7 mg/L (46.3 percent removal) and TSS of 39.7 mg/L (76.3 percent removal). Fecals are about 550,000 per 100 mL, versus the permit of 1 million. Dissolved oxygen averages 5.6; pH is 7.0.

Portions of the plant are controlled by a small SCADA system supplied by Rockwell Automation/Allen-Bradley. "We're phasing out an old system," says Haley. "The new one has been online only a year and right now controls just one of our lift stations."

SELF-SERVICE

When equipment needs modification or repairs, Haley and operators Dennis Jones, Blake Buotte, Mike Bell and Aaron Greinier do it themselves. All the plant's process equipment has required attention at some point.

The staff has made minor modifications to the rotary fine screens. "We made changes to reduce wear and tear on the bearings," Haley says. "We basically removed the automatic cleaning mechanism. It simplified their operation."

The staff also replaced the original grit-removal centrifuge. The original was made of carbon steel, which rotted out and leaked from the bottom. The team ordered a new stainless steel model and installed it, even though it was a hassle. "The screenings screw conveyor runs over the top of the centrifuges, and we couldn't take that out, so we had to squeeze the new TeaCup unit in beneath it," says Haley. "We cut the old one up into pieces. It took us about a week; it was quite an operation."

Haley's team wasn't satisfied with the sludge removal process in the primary basins, so they reworked that process, as well. "There was just a single pump pulling from the bottom of the sumps in both clarifiers, and it tended to pull one side, but not both," Haley says. "We re-piped the system so we could control where the sludge was coming from. Before, we had no way of directing the flow." Now one pump can pull from collection points in each clarifier.

Staff members also added a transparent section of PVC piping on the sludge line so they can observe sludge consistency.

VERSATILE TEAM

The Petersburg team's ingenuity extends to operating the water plant and caring for the distribution and collections systems. "Mike is the water operations supervisor, Blake is our water system operator, and Dennis is our wastewater operator," says Haley. "We share Aaron Greinier. But we all rotate and go where we are needed."

In other words, everyone is involved in everything: "It's a very full plate with a very small crew." The village's location on the rocky northern tip of Mitkof Island presents unique challenges to collections. "It's fairly hilly

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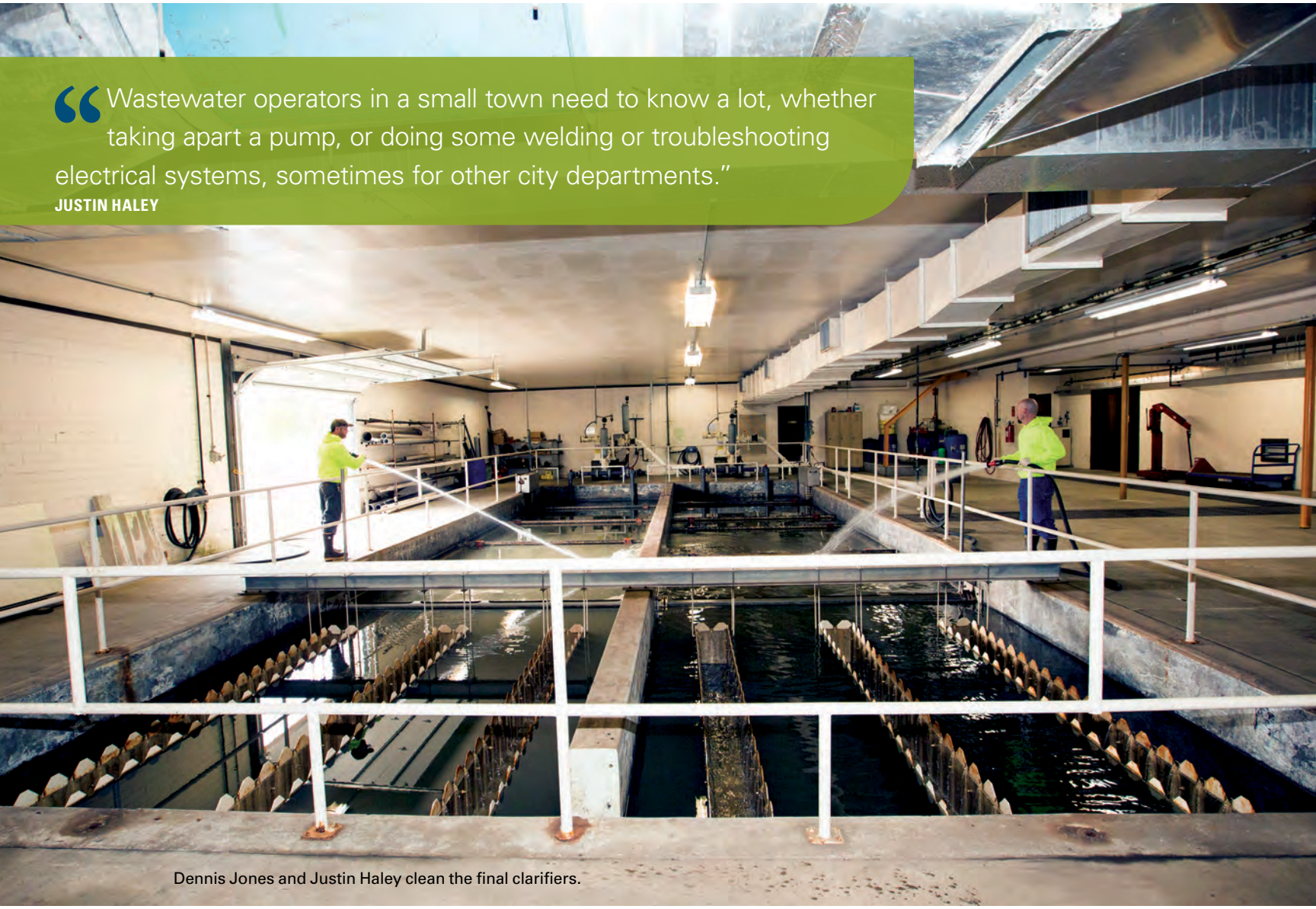

> "Wastewater operators in a small town need to know a lot, whether taking apart a pump, or doing some welding or troubleshooting electrical systems, sometimes for other city departments."
> **JUSTIN HALEY**

Dennis Jones and Justin Haley clean the final clarifiers.

ground, so we operate and service 20 lift stations." The rocky ground makes it too costly to blast to obtain grade. Some lines are 5 feet deep, and the deepest is only 20 feet.

The geology and remote location also make trenchless boring and lining infeasible. "It takes contractors and equipment too long to get here," Haley says. As a result, his crew handles it. In one recent project, they relocated about 2,000 feet of ductile iron force main that ran along the harbor and was getting exposed because of the low tides on the island. The pipe was corroding and in danger of rupturing. Crews are relocating it beneath a newly paved road and using HDPE pipe.

Most of the sewers date to the 1970s and consist of ductile iron, PVC, asbestos-cement or straight cement construction. "We actually spend most of our time on collections, cleaning, inspecting and dealing with grease," says Haley. "We use a Vactor unit for cleaning and jetting. We have the only septic pumping vehicle in town. We're constantly working on improvement projects."

To protect the sewers and receiving waters, the town has started a household hazardous waste collection program. "It's a two-day weekend drop-off," says Haley. "We do it in conjunction with the sanitation department, and it has gone over well."

Flushable wipes can be a challenge. "Like everybody else, it's a problem for us," Haley says. "We're at a lift station every week cleaning out flushables. With our small crew, our time would be better spent elsewhere. It could be avoided if people would pay closer attention to what they flush."

VARIED BACKGROUNDS

While fishing is in the background of all Petersburg operators, they've carried over other skills from previous jobs that prove invaluable. "Dennis was an iron worker before coming here," says Haley. "He's a certified welder. Mike worked in the logging industry and is a whiz with construction equipment.

"Wastewater operators in a small town need to know a lot, whether taking apart a pump, or doing some welding or troubleshooting electrical systems, sometimes for other city departments. Most of the time there are only two of us here at the wastewater plant. The work involves a lot of variety. We're not afraid to get dirty." **tpo**

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A SPECIALIZED EDGE-RETENTIVE COATING PROMISES LONG LIFE ON A NEW CLARIFIER AT A WATER PURIFICATION PLANT IN SPRINGFIELD, ILLINOIS

By Kevin Morris

Clarifier renovations had been challenging for City Water, Light and Power (CWLP) in Springfield, Illinois.

The conversion of two existing clarifiers to a new design involved installing new steel components to which coatings were applied to resist corrosion. The initial epoxy coatings began to fail within a few years after application.

In 2013, the utility faced converting a third clarifier. This time, utility leaders wanted a longer-lasting coating. They found it in an edge-retentive ultra-high-solids epoxy engineered for immersion service. The clarifier with the new coating was commissioned in April 2014.

City Water, Light and Power's clarifier upgrade was completed in time for the City of Springfield's high-flow season.

PROUD HISTORY

In 1930, Springfield voters passed a $2.5 million bond issue to construct Lake Springfield, a dam, a power plant and a water purification plant, all completed under the Depression-era Works Progress Administration.

In 1936, the water purification plant began operations with four filters and three clarifying basins called Spaulding Precipitators, invented by Charles Spaulding, at the time CWLP water superintendent and chief chemist. The plant soon became the model upon which other water treatment plants nationwide based their designs.

In 1999, the clarifiers needed renovation. The first project, a $1.2 million conversion from the original clarifier to a ClariCone helical upflow solids contact clarifier, aimed to increase the unit's capacity from 6 mgd to 10 mgd. The converted unit would produce softer, lower-turbidity water at less cost, use significantly less electricity, and treat more water with the same chemical dosage. Dave Wyness, former CWLP superintendent, invented the ClariCone, now a product of CB&I.

"Typically, ClariCone units are above-ground steel structures with only a few steel internals," says William Peffley, senior project manager at Crawford, Murphy and Tilly (CMT), engineer and consultant for the project. "The Springfield ClariCone units were the first to be below-grade concrete tank structures.

"The steel internals are there to remove sludge, support the bridge and direct the hydraulic, helical upflow pattern of the water through the mixing, flocculation and sedimentation zones. Finally, the water flows into the radial collection troughs and on to the next step in the treatment process."

The clarifier project required a coating system with strong edge retention on submerged and wetted surfaces to help extend service life.

SECOND CONVERSION

In the treatment process, water is pumped from Lake Springfield to the lime-softening water treatment plant into a dosing well, where most of the chemicals are added. Then, it flows into the clarifiers to remove suspended solids and precipitate hardness, calcium and magnesium, making the water softer. The water then flows to recarbonation and filtration to a clearwell and into the distribution system.

In 2002, CWLP commissioned a second converted unit at a cost of $2.1 million. To install the new ClariCone unit, the old precipitators were gutted of their steel parts. The original clarifier footprint remained the same, while the depth increased about 30 feet to match the ClariCone design. Then new internal steel parts were installed.

The first two ClariCone units' steel surfaces were protected with a traditional epoxy system. Each of these coating systems failed within a decade of service. "Each unit has steel internals, and any time you have steel and water, you need a protective coating," says Peffley. "In the first two conversions, we specified a traditional epoxy three-coat, 4 mil system for a total of 12 mils. Over time, we observed premature rust along edges and in corner areas."

A BETTER SOLUTION

In 2013, CWLP decided to renovate the third precipitator into a ClariCone, bringing total treatment capacity to 30 mgd. Leaders considered it imperative to choose a coatings system that would last more than 10 years.

"During the first two conversions, we used standard epoxy coatings systems from a couple different manufacturers, which began failing within the first three years of operation," says Todd LaFountain, CWLP general superintendent of water treatment. "This time we chose different specialty coatings. We needed a coating to last more than 20 years."

CWLP and CMT specified edge-retentive high-performance coatings and in a competitive process selected Sherwin-Williams' Dura-Plate UHS epoxy, valuing its edge-retentive qualities. "The edge-retentive aspect meant the failure point was less likely to occur, because there is more paint there to protect the edges before failure," says Peffley. The coating chemistry ensures that a single coat retains nearly the same degree of coverage on an edge or corner as on flat steel.

NAVAL ORIGINS

This characteristic of Dura-Plate UHS results from its ability to overcome surface tension, which causes other coatings to shrink from edges. The capability of such coatings was first demanded by the U.S. Navy and is now a key requirement of the Navy's MIL-PRF-23236 standard. The use of Dura-Plate UHS has expanded from the marine market to public works. It contains about 98 percent paint and 2 percent solvent.

"The U.S. Navy has been using this product since the 1990s," says Tony Ippoliti, project development manager of Sherwin-Williams Protective & Marine Coatings. "It provides protection on the edges of steel — corrosion begins there and then moves elsewhere, compromising the remainder of the asset. The Navy had been using it on ballast tanks and chemical holding tanks. In about 2000, it became NSF approved for use in the water and wastewater industry."

The product's one-coat protection, edge-retentive qualities and NSF approval to Standard 61 for potable water tanks of 1,000 gallons or greater made it a good fit for Springfield's project.

"In coatings, all paint that comes in contact with drinking water must be NSF certified," says Peffley. "All of the steel inside the ClariCone unit was for immersion service and received the Dura-Plate UHS epoxy coat, prepared at a steel fabrication shop."

EXTENDED LIFE

At the fabrication shop, the steel was first primed using Sherwin-Williams Copoxy Shop Prime to keep it from rusting after sandblasting. Then the Dura-Plate UHS was spray-applied. The rest of the ClariCone components not immersed in water were painted with a traditional epoxy system: Sherwin-Williams Zinc Clad IV, Macropoxy 646-100 PW, and a topcoat of Acrolon 218 HS Acrylic Polyurethane, a high-solids urethane that provides strong color and gloss retention against UV exposure.

"High-build qualities more than justified using this premium coatings system," says Peffley. "The original two conversions have a total of 12 mils of protective coatings on the submerged and wetted surfaces, whereas this edge-retentive system was applied at 28 to 34 mils. It is thicker and anticipated to last nearly twice as long, and therefore is an excellent value."

The third clarifier conversion began in September 2013 and was complete in time for the start of the city's high-flow season, running from May through mid-September.

ABOUT THE AUTHOR

Kevin Morris is water and wastewater market segment director for Sherwin-Williams, a major coating manufacturer. He can be reached at kevin.l.morris@sherwin.com. **tpo**

The biofilter at the treatment plant in Wenatchee is adorned with art sculptures of typical treatment microbes.

'Is That a Resort?'

SCULPTURES, MULTIPLE PLANTINGS AND DECORATIVE FENCING TRANSFORM A WASHINGTON TREATMENT PLANT AND MAKE IT A PUBLIC ATTRACTION

By Jeff Smith

The 5.5 mgd (design) activated sludge treatment facility in Wenatchee, Washington, has been transformed from an ordinary-looking plant into an eye-catching curiosity that attracts favorable comments from citizens and visitors alike.

"Some people have even asked whether there is some kind of a resort in here," says Pete Moser, plant superintendent. An attractive fencing system contributes to the illusion, but so do nearly 1,500 strategically placed trees, shrubs and vines, 10 public art sculptures and two elevated platforms with glass walls that serve as viewing stations.

The 10-foot-high ornamental metal fence and posts replaced a chain link fence around the 4-acre site. Built with vertically louvered steel panels joined by self-supporting posts, the fence sections are separated by 12-foot-high masonry block columns. Plant access gates are made of screen-like wire mesh panels of similar dimensions.

The elevated viewing platforms are poured concrete, one nearly 90 feet long. Sections of 1/2-inch-thick laminated safety glass form walls that allow a complete view of the decorative media cover of the biofilter, the sculptures, and some of the facility buildings and components. A cantilevered glass roof forms a canopy over one platform, while the other is uncovered and provides a view of the aeration basins. Each platform has lighted concrete stairs and ramps with handrails and benches. Access is from a roadway in front of the facility.

The sculptures are mounted on the biofilter's decorative media surface. Each 6-foot-high sculpture represents microbes common to the treatment process. Several of the viewing panels have a water feature etched into the glass, representing different images of water.

Transformation of the plant (2.6 mgd average flow) started in 2012 as part of an odor and visual mitigation project in which a BOHN BIOFILTER was installed. Red and brown lava rock and crushed stone of a contrasting color form the top layer of the media portion of the biofilter. The rocks and stone are arranged in grids of 8-foot squares and 4- by 8-foot rectangles, each cordoned off with 3/8-inch black steel plates embedded in the surface.

CLOCKWISE FROM TOP LEFT: A planter bed decorates the main entrance; an etched-glass waterfall adds eye appeal; picnic tables on lawn near the secondary clarifiers provide a pleasant spot for breaks.

Landscaping in and around the plant completes the picture. Nearly 250 red maple, cypress, ash, pine and pear trees were planted, along with more than 1,200 shrubs and ground cover such as burning bush, dwarf daylily, juniper, lavender and Adam's needle. Forty trumpet vine and winter creeper vines were planted before re-sodding.

"The original bones of the plant are still here, but the overall look is completely different," Moser says. "To someone not knowing what we were before, they honestly would wonder whether this is something other than a treatment plant."

Funding for the visual portion of the project was through the state's mandate that 1 percent of public project costs be set aside for public art. The treatment plant is in an industrial area that is fast becoming a commercial and residential hotspot. Hotels, shops and restaurants are opening nearby

> "The original bones of the plant are still here, but the overall look is completely different. To someone not knowing what we were before, they honestly would wonder whether this is something other than a treatment plant."
> **PETE MOSER**

to take advantage of county-owned Riverfront Park, bordered by the plant on one side and the Columbia River on the other.

The park has picnic areas, ball fields and boat launches, as well as a popular hiking and biking trail loop that follows the river and joins other parks in the county's system.

Says Moser, "It was our responsibility to upgrade the plant, and we did it to be a good neighbor to the surrounding developments." **tpo**

Share Your Ideas

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

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Climate Change: Time to 'Start the Conversation'

THE EAST BAY MUNICIPAL UTILITY DISTRICT IS A PIONEER IN PLANNING FOR THE IMPACTS OF A WARMING PLANET. ITS INITIATIVES CAN SET AN EXAMPLE FOR OTHER WATER AGENCIES.

By Ted J. Rulseh

Clifford Chan

Where will most people first feel the effects of climate change? In the supply and quality of water. That's according to Clifford Chan, operations and maintenance manager with the East Bay Municipal Utility District (EBMUD).

Chan draws that belief from the work of the Intergovernmental Panel on Climate Change (IPCC), the United Nations body devoted to climate science. EBMUD is a leader in climate change planning and action. The district supplies drinking water to 1.3 million customers in California's Alameda and Contra Costa counties and operates wastewater treatment facilities that serve 650,000 customers and protect San Francisco Bay.

Its mission includes managing natural resources in its care, providing reliable, high-quality water and wastewater services at reasonable rates, and preserving and protecting the environment for future generations. As part of that mission, the district incorporates climate change in its strategic planning. Its Climate Change Monitoring and Response Plan (http://www.ebmud.com/about-us/sustainability/climate-change/) informs decisions about water supply, water quality and infrastructure planning and guides mitigation of greenhouse gas emissions.

Chan shared insights on the district's approach to climate change and suggestions to other water and wastewater agencies in an interview with *Treatment Plant Operator.*

tpo: Why is it important for water and wastewater agencies to take note of climate change and prepare for it?

Chan: We believe the first impact society will feel as a result of climate change is the impact on water. If the global temperature increases by two or three degrees, people may not notice. But if they have to reduce water consumption due to droughts, or if their water has a different taste and odor because of algal blooms in the raw water reservoirs, those are things people will notice. One thing the water industry has to maintain is the public trust that a supply of high-quality water will be there. If we don't protect the environment and we don't address climate change, we will begin to lose that trust.

> "One thing the water industry has to maintain is the public trust that a supply of high-quality water will be there. If we don't protect the environment and we don't address climate change, we will begin to lose that trust."
> **CLIFFORD CHAN**

tpo: How did the EBMUD climate change plan evolve?

Chan: Back in 2006 we put out our first strategic plan, which didn't include plans to explicitly address climate change. Two years later, when we updated that plan, we put in specific goals to address climate change. We evolved from a discussion of what we could do to reduce energy usage, to what we could do to understand climate change, to how we could include it in our strategic planning and become actively involved in addressing it.

tpo: Why does climate change fall under the operations and maintenance umbrella at your agency?

Chan: Before my current position, I was in charge of the operations of our water treatment and distribution facilities. We knew we needed to involve all departments in climate change planning, but some group had to lead it. The most obvious choice was the operations and maintenance department, which is the largest group at the district and the department responsible for the most energy.

tpo: Climate change affects your agency because you are in a drought-prone area and are on the ocean. Does climate change matter to agencies not in similar locations?

Chan: Yes. On the East Coast, we saw Hurricane Sandy damage treatment facilities and impact their ability to produce clean water. Elsewhere we've seen outbreaks of algal blooms and toxins that treatment plants weren't equipped to manage. Some of these incidents required the utilities to send boil water notices. We see over-drafting of groundwater in California and the Midwest. Water supply is going to affect everyone. Customers will feel impacts on the water supply, quality and on what they spend for water.

tpo: What would you recommend that agencies do now, at a minimum, to address climate change?

Chan: We feel the first step is to start a discussion. Get your staff and

elected officials talking about climate change and understanding the impacts. Then share that discussion with your customers so they start asking questions: How should we respond? What should we do? There is a nexus between water and energy. Most people, when they look at a water main leak in the street, see water being wasted. But anytime there is a leak, that's also energy being lost, because we use energy to treat and distribute water.

tpo: Why should climate change be part of a utility's strategic plan?

Chan: Climate change is just one of many uncertainties utilities need to address. Why would you not plan for climate change when you're planning, for example, to replace aging infrastructure and for changes in your demographics and demand? Climate change isn't something you treat as the one and only problem you have to solve. If you address climate change, you'll likely also address other uncertainties you're facing.

tpo: How does planning for climate change help address other uncertainties?

Chan: When we talk about climate change and its risks, one thing we consider is that we may see an increase in water demand. For example, a warming climate will increase evapotranspiration, and water demand may go up. So, for example, if you're going to design and build a reservoir, once you build it, you're not going to revisit that reservoir for 50 or 100 years. If you were planning a 1-million-gallon reservoir, you might look at your climate change analysis and say, "Maybe we should build it for 1.1 million gallons." That is more cost-effective than finding out years later that the reservoir is too small. You're making the best use of public funds by investing wisely today for future uncertainties.

tpo: What would you say to a utility where the leadership is skeptical of or does not believe in climate change or that people are the cause?

Chan: You don't have to debate who is causing the problem. Just look at the data. Even the lowest projection of where carbon dioxide levels will be in our atmosphere is higher than at any time in the last 800,000 years. If you look at the planet as a whole, the 10 warmest years on record, except for one back in the 1990s, have all occurred in the current century. We've seen sea level rise by more than a foot. We see portions of the Antarctic glaciers collapsing. These are not things that are projected to happen in the future. This is happening now. So when we build facilities, we have to start thinking about sea level rise and how that might affect those facilities and our customers. Let's plan for these changes we see in the climate so we can be better prepared.

> "You don't have to debate who is causing the problem. Just look at the data ... If you look at the planet as a whole, the 10 warmest years on record, except for one back in the 1990s, have all occurred in the current century."
> **CLIFFORD CHAN**

tpo: What would you say is your agency's signature achievement related to climate change?

Chan: Our biggest achievement on the wastewater and water sides is that we produce more renewable energy than all the energy we consume in a year. We were the first wastewater facility to achieve the goal of being energy self-sufficient through our biogas cogeneration facilities. On the water side, we've been producing more hydropower than we consume for many years. We continue to build solar. We have about 1.2 MW of photovoltaics, and we're looking to add another 1 MW. If you look at the price of solar panels, that is an easy thing for many utilities to do too. One advantage utilities have is that we own a lot of land. We can take advantage of that land to generate solar power.

tpo: Where is EBMUD going in the next couple of years with respect to climate change actions?

Chan: We will continue to monitor climate science — not just the global data but the data very specific to our area. We'll also continue to look at how we can use energy more efficiently. A large portion of the energy we use is the fuel we burn. We're looking at more hybrid and electric vehicles and at hybrid construction equipment as well. We're also exploring more ways to purchase green power to further minimize our impact on climate change.

tpo: What resources would you recommend for utility leaders or operators who want to know more about this subject?

Chan: First, look to the U.S. EPA website on Climate Ready Water Utilities (http://water.epa.gov/infrastructure/watersecurity/climate/index.cfm). We've been part of that program for about six years. Its mission is to provide tools for utilities to assess the impact of climate change on their operations and to educate their staffs, elected officials and the public.

Next, review the National Climate Assessment (http://nca2014.globalchange.gov/). It includes summaries that talk about the impacts of climate change to all sectors. Finally, for a global perspective, look to the Intergovernmental Panel on Climate Change (http://ipcc.ch/). They released their fifth assessment report last year. It includes volumes on the science, mitigation, and impacts and adaptations.

tpo: What are the key points you would like leaders of other utilities to remember about addressing climate change?

Chan: Get a conversation going about climate change. Understand the risks and the impacts of climate change to your utility. And when you start planning for facilities and infrastructure, consider the impacts of climate change in your planning. It will make you more resilient in the future, for climate change and for other uncertainties. **tpo**

PHOTO BY CRAIG MANDLI

Pat Polston, left, co-founder and chief technical officer of Polston Applied Technologies, explains the process behind the new PAT 1249 combination truck, which combines vacuum and jetting with a downhole wastewater cleaning system.

Three Tools in One

COMBINATION TRUCK FROM POLSTON APPLIED TECHNOLOGIES PROVIDES COMPLETE CLEANING FOR A VARIETY OF WASTEWATER APPLICATIONS

By Craig Mandli

The PAT 1249 medium-sized combination truck from Polston Applied Technologies provides a stand-alone cleaning system for large pipes, digesters, grit and frac tanks, lift stations, wastewater treatment plants, ponds, lagoons and other environments.

The new model made its debut at the 2015 Water & Wastewater Equipment, Treatment & Transport (WWETT) Show. "The people in the wastewater industry know us, but it's always exciting to talk about a new product with them," says Pat Polston, company co-founder and chief technical officer. "This product takes what we've proven works and improves it even more."

The Combination3 technology on the truck breaks down to three components – a vacuum system, a water jetter and a downhole system that allows equipment to clean in deep or submerged environments and remove high-viscosity material. The service can be performed while a wastewater treatment plant remains fully online.

"The process filters the water, leaving sand and grit dry for normal disposal," he says. "It's basically separating sand from water as it runs through our unit, allowing machinery to remain in operation the whole time. It's a fit for anyone dealing with sludge cleaning, from municipalities to industrial wastewater treatment operators."

Debris dumps into the truck's pressurized 12-cubic-yard steel tank or a roll-off container. After treatment, water is pumped out of the unit. The debris tank has a full-opening rear door (power up/down) and a 45-degree dump angle with manual door locks, level indicator and internal float shut-off.

A fully baffled tank provides water for the fully automated multi-directional jetting system. The jetter reel holds up to 1,000 feet of hose. "This truck can pump to 25-cubic-yard debris boxes for quick disposal, allowing it to remain in constant operation," says Polston. "There's never a need to shut anything down."

A hydrostatic-drive, boom-mounted 6-inch submersible pump with six-blade impeller sits in the water, grabbing material and pushing it into the truck. Powered by a 400 hp engine, the unit can pump and separate grit from water at depths to 27 feet or more.

> "This is an efficient, safe process. Once people learn about it, they're hooked."
> **PAT POLSTON**

The truck has a 49-foot hydraulic articulating knuckle-boom crane with telescoping tubes for hard-to-reach places, wireless remote control and 180-degree rotation. Its hydrostatic-drive vacuum system delivers 16 inches Hg at 3,600 cfm, and the jetter nozzle produces 180 gpm at 2,000 psi.

The complete process can be performed remotely by one operator, saving time and manpower and eliminating confined space entry. "This is an efficient, safe process," says Polston. "Once people learn about it, they're hooked."

Polston calls the WWETT Show a big success for his company and plans a bigger display in 2016. The PAT 1249 is a medium-sized version of the company's smaller PAT 949 and the larger PAT 360HD Combination3 trucks. Polston wants to introduce another truck geared toward municipalities and a training program to increase the reach of the Polston Process. He sees WWETT as the opportunity to do that.

"I've been coming here to this show since 1986 and have built a lot of trucks," says Polston. "This has always been the best place to get the product in front of customers." **844/765-7866; www.polstonprocess.com.** tpo

New Technology Slated for WEFTEC 2015

By Craig Mandli

WEFTEC, the Water Environment Federation's annual technical exhibition and conference, annually offers water and wastewater professionals from around the world exposure to the newest products, along with water quality education and training. This year's event, slated for Sept. 26 to 30 in Chicago, promises to show off some of the finest new products on the market for municipal water and wastewater professionals. Below is a smattering of some of the newest products that will be highlighted at this year's show.

Aerzen USA Gm Series

Gm Series biogas blowers from **Aerzen USA** are specially designed for the biogas market, ensuring reliability and efficiency. They are available in a variety of different sizes with intake volume flows of 35 to 1,500 icfm and positive pressure up to 15 psig. They are used for the compression of biomethane and biogas, landfill gas, and natural gas.

610/380-0244; www.aerzenusa.com; Booth #441

AllMax Software

AllMax Software combines software and service offerings to provide operations and maintenance solutions that make data management and reporting tasks easier and less time-consuming. Operator10 and Antero have been developed according to client requests and the requirements of the industry. Software setup, data conversions and training are available, as well as custom report development. Annual technical support contracts offer users the ability to get help with troubleshooting and usage questions. Technical specialists are trained in water and wastewater concepts.

800/670-1867; www.allmaxsoftware.com; Booth #1021

Analytical Technology Q46N

The **Q46N Free Ammonia Monitor** from **Analytical Technology** is designed for the continuous measurement of free ammonia, total ammonia, and monochloramine in potable water. It is intended for monitoring chloraminated water to minimize the amount of excess ammonia in the system. It has a fast response time for real-time ammonia measurement, providing continuous, real-time updates for better process control. It uses a simple chemical system with inexpensive reagents. Three separate reagents are required for operation, and can be purchased directly or mixed on site using readily available chemicals. Each system is supplied complete with monitor, chemistry module, sensor membranes and electrolyte, reagent bottle brackets, reagent pickup tubing assemblies, a spare parts kit, and a copy of the manual.

800/959-0299; www.analyticaltechnology.com; Booth #1271

Aqua-Aerobic Systems AquaDisk

The **AquaDisk** cloth media filter from **Aqua-Aerobic Systems** can be used to filter stormwater at wastewater treatment plants or at remote locations. The OptiFiber cloth filtration media is engineered to accommodate varying flows and characteristics of stormwater. The filter media provides low effluent TSS without the use of chemicals. The unit itself has a small footprint and is mechanically designed to handle grit and scum. It enables effective TSS removal in a low-energy backwash system with no complicated startup. It can be enclosed in a building at the plant or at remote sites. The filter can be used for tertiary treatment between rain events.

815/654-2501; www.aqua-aerobic.com; Booth #612

Blue-White Industries ProSeries-M M-2 Peristaltic Metering Injector Pump

ProSeries-M M-2 Peristaltic Metering Pumps from **Blue-White Industries** are designed for small to mid-size municipal water and wastewater treatment systems. Standard control features include intelligent control design that permits connection to SCADA systems and other remote controllers for chemical dosing control via either a 4-20mA signal or high-speed digital pulse input, or slow pulse for batching type applications. Optional advanced SCADA communications command and status capabilities include start, stop, prime, and setpoint speed, touch pad locking/unlocking, motor status, pump head cover status, tube failure detection status, alarm reset, and running hours reset. The firmware is field upgradable.

714/893-8529; www.blue-white.com; Booth #3405

Carylon Corporation Main-to-House Lining

Main-to-House (MTH) lateral lining from **Carylon Corporation** is an effective solution for problem laterals. From within the mainline sewer, a specialized lateral packed unit, used in conjunction with a CCTV camera, is moved into position at the lateral connection. An epoxy-impregnated CIPP liner is then inverted into the lateral and is inflated using high-pressure air inversion. The curing process, using steam, takes approximately two hours to complete. Once cured, the liner provides a new jointless, tight-fitting, and infiltration-free lateral pipe. The lining process can rehabilitate up to 80 feet of lateral pipe without the need of a clean-out.

800/621-4342; www.caryloncorp.com; Booth #1170

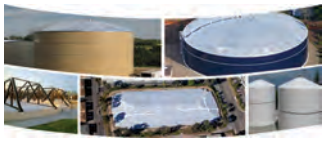
Centrisys THK Hybrid Thickening Centrifuge

The **THK Hybrid Thickening Centrifuge** from **Centrisys** helps decrease polymer consumption and increase capacity. Little to no polymer is required, meaning facilities can expect to save $140,000 per dry ton of solids in the WAS thickening process, equaling a return on investment in 2.5 years with polymer savings. Its hydraulic assist technology allows for control of cake solids. It has a small footprint, and its airtight, enclosed packaging leads to less odors. It has low maintenance and labor requirements.

877/339-5496; www.centrisys.us; Booth #2674

CST Industries

Aluminum domes, flat panel covers and **reservoir covers** from **CST Industries** are versatile enough to permit a wide range of accessories important to the water and wastewater industry. They provide strength, durability, odor control and protection characteristics. Tanks are available in bolted and welded designs, capacities of 4,000 to more than 6 million gallons, and in-ground, standpipe and elevated configurations. Tanks and covers are manufactured in U.S. ISO certified manufacturing facilities and are supported around the world by service and support teams. Brands include Aquastore, Hydro-Tec, Columbian TecTank, Temcor, Conservatek and OptiDome.



913/621-3700; www.cstcovers.com; Booth #2408

CUES Digital Universal Camera (DUC)

The **CUES Digital Universal Camera (DUC)** is a high-resolution, digital CCTV, side-scanning camera designed for rapid and detailed condition assessment of a wastewater system, increasing revenue while reducing expenses. It produces a high-resolution digital video scan of internal pipe conditions in 6- to 60-inch pipe, and a flat unfolded view of the pipe to facilitate rapid assignment of observations. An expanded flat unfolded view of the pipe is provided for measurement purposes. This low-maintenance camera has no moving parts and is driven through the pipe without the need to stop or pan and tilt. Drive the unit on cruise control to the remote manhole or through multiple manholes for maximum efficiency.

800/327-7791; www.cuesinc.com; Booth #2816

Eagle Microsystems VF-100 Dry Chemical Feeder

The **VF-100 Dry Chemical Feeder** from **Eagle Microsystems** is constructed of stainless steel and uses a direct drive to ensure optimum performance and durability in harsh chemical feed environments. It can be optimized for any dry-feed application with options like dust collectors, flex-wall agitation, wetting cones, solution tanks, 4-20 control, extension hoppers, and multiple screw and motor ranges to accommodate any required feed rate. With no external gears, pulleys, chains, belts, or lubrications required, it is user-friendly and low-maintenance. It is accurate and completely customizable to fit any process need.

800/780-8636; www.eaglemicrosystems.com; Booth #2337

Envirosight ROVVER X Quick-Change Wheels

Quick-Change Wheels for the ROVVER X pipe inspection crawler from **Envirosight** can be changed quickly, without requiring bolts, washers, or tools. To attach, each wheel is simply pressed onto a locking hub. To detach, the center of the hub is pressed, releasing the wheel. The design streamlines crawler setup and cleaning, and eliminates the risk of loose bolts. Ten wheel options are available: rubber wheels in four sizes, each with a tread pattern that enhances traction and smooth rolling; abrasive wheels in three sizes; and carbide wheels in three sizes. All have optimized geometry for improved clearance centering.

866/936-8476; www.envirosight.com; Booth #1206

FlowWorks

FlowWorks allows an organization to add Internet-based private rainfall stations to a network without a large investment, saving in equipment costs, installation, and telemetry charges. Once the data is in the network, the organization can use the stations with the suite of FlowWorks tools. This can be helpful for comparative analysis, reporting, or to enhance Isohyetal mapping results by increasing the resolution and granularity with the added rainfall stations.

888/400-3288; www.flowworks.com; Booth #4619

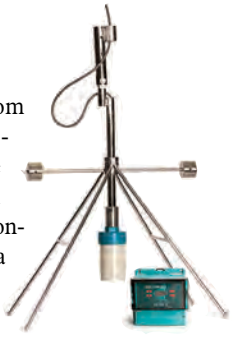
Hach Company PROGNOSYS

The **PROGNOSYS** predictive diagnostic system from **Hach Company** enhances the critical decision-making process with real-time data on instrument condition and visibility of upcoming maintenance tasks. It allows the user to be proactive in maintenance by alerting the user to upcoming instrument issues. Know with confidence whether changes in measurements are due to changes in the instrument or the water. It can help ensure the best maintenance decisions are made so your plant will keep running.

800/227-4224; www.hach.com; Booth #3626

Hawk Measurement Sultan Sonar

The **Sultan Sonar** from **Hawk Measurement** provides reliable and accurate sludge level measurement on various clarifier processes. Conditions vary greatly among a sedimentation tank, secondary/final clarifier, and flocculent blankets. The 150 kHz transducer can measure down to the sludge bed layer or up to the light flocculent layer. It propagates a high-frequency sound pulse from a submerged transducer to the interface or bed level. Using time of flight calculations, the sound signal is reflected, interpreted by the transducer and sent to the transmitter. User-friendly configuration and easy calibration allow tracking of specific densities dependent on the process. The maintenance-free impact plate scum cleaner uses the surface sweeper mechanism to keep the sensor face clean without interrupting the measurement. A wide range of communication options and 3G remote support capabilities are available.



978/304-3000; www.hawkmeasure.com; Booth #5274

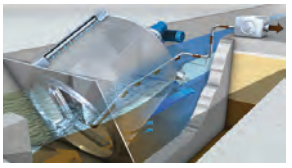
Hoffman & Lamson Centrifugal Blower System

Centrifugal blower systems from **Hoffman & Lamson, Gardner Denver Products** are designed to meet specific needs. Reliable and durable centrifugal products, and energy-saving controls and VFDs create custom-engineered solutions that are smart, safe and sustainable. Technology upgrades can recover an investment through energy savings in as little as one year.

724/239-1500; www.hoffmanandlamson.com; Booth #2044

Huber Technology Rotamat RPPS STAR

The **Rotamat RPPS STAR** from **Huber Technology** addresses increased equipment protection requirements with a 1 or 2 mm pleated perforated plate geometry that significantly increases throughput and allows for



a smaller footprint. This results in a reduced capital expenditure for the screen and structure. The fold provides additional stiffness critical to larger drum designs.

704/949-1010; www.huberforum.net; Booth #1467

JDV Equipment Corporation Nozzle Mix System

The **JDV Nozzle Mix System** from **JDV Equipment Corporation** is a dual zone mixing system that provides uniform mixing patterns that produce even distribution and a stable environment. The system is designed with pumps installed outside the tanks to facilitate maintenance. The pumps are typically chopper pumps or pumps incorporating in-line grinders that prevent fibrous materials from accumulating and causing plugging problems. The application dictates which type(s) of the many varied pump options that can be used. High-velocity nozzles are mounted inside the tank and oriented to discharge in a flow pattern that completely mixes the tank contents.

973/366-6556; www.jdvequipment.com; Booth #3840

Keller America Levelgage

The **Levelgage** general-purpose level transmitter for wastewater level measurement from **Keller America** is a low-cost alternative for applications for which traditional instruments are too much. It is constructed of durable 316L stainless steel to resist corrosion, provides industry-standard analog output signals for easy integration into existing systems, and is built to order in three business days or less to keep downtime to a minimum. It is built with a 4-20mA output, and includes lightning protection at no additional cost.

877/253-5537; www.kelleramerica.com; Booth #508

Komline-Sanderson Drying Products

Biosolids, sludge, and byproducts **drying products** from **Komline-Sanderson** are available for biosolids and industrial clients. The company offers laboratory and on-site pilot testing services. The Wastewater Treatment Products Group provides quality wastewater treatment and sludge processing equipment and systems for water and wastewater treatment plants. A line of plunger pumps facilitate the transfer of sludge through various stages of the waste treatment system, feed belt filter presses, and pump thickened sludge.

800/225-5457; www.komline.com; Booth #3927

Lakeside Equipment Corporation Raptor

Raptor septage acceptance plants and septage complete plants from **Lakeside Equipment Corporation** are ideal for hauled liquid waste receiving. A successful hauled waste handling facility is dependent upon the type and quality of the upfront screening and grit removal system. Hauled waste receiving generates consistent revenue, but only if the system is designed effectively. Properly screening the hauled waste allows it to be utilized more successfully in energy production or processed through the facility.

630/837-5640; www.lakeside-equipment.com; Booth #3431

Lovibond Tintometer MD 100 COD Set

The **MD 100 COD Set** from **Lovibond Tintometer** supplies the user with everything required to perform the COD test. This single-parameter colorimeter is capable of measuring three ranges of COD. When purchased as a set, the instrument includes reagents for testing two ranges, the RD 125 Reactor for sample digestion, and a tube test rack. COD vials are offered in packs of 25 or 150 tubes and meet U.S. EPA testing requirements.

941/756-6410; www.lovibond.com; Booth #2487

Neptune Chemical Pump Company MP7000

Series MP7000 mechanically actuated diaphragm metering pumps from **Neptune Chemical Pump Company** eliminates the use of contour plates on the liquid side of the diaphragm while the simple, straight-through valve and head design allows for improved flow characteristics. It is self-priming, and has a maximum capacity range up to 275 gph at 235 psi.

215/699-8700; www.neptune1.com; Booth #4656

PRIMEX Arc Armor

PRIMEX Arc Armor control systems act as a shield in the field by reducing municipal operator arc flash exposure. The 304L stainless steel multiple-compartment design isolates control and power circuitry and offers single wall construction. Electrostatically precipitated white polyester powder coating reduces heat buildup. Door stays, interior LED lighting and a voltage-sensing indicator offer additional safety features to municipal operators. Freestanding, wall-mount and pole-mount enclosures are available.

844/477-4639; www.primexcontrols.com; Booth #639

R.S. Technical Services TranSTAR II and TrakSTAR II

The combination of the **TranSTAR II** and **TrakSTAR II** from **R.S. Technical Services** delivers a high-power tractor and a compact pan-and-tilt zoom camera for inspection capability in lines 6 inches and larger in diameter and up to 3,000 feet in length. Dual 90-watt motors achieve speeds up to 70 feet per minute, with rapid freewheel retrieval, a tilt connection, rear view camera, adjustable LED lighting, and 10x optical/4x digital zoom. Optional elevator systems and multiple tire configurations are available.

800/767-1974; www.rstechserv.com; Booth #1821

SEEPEX Two-Stage Smart Conveying Technology

Two-stage **Smart Conveying Technology (SCT)** progressive cavity pumps (PCP) from **SEEPEX** can be used in applications with high pressure requirements. They handle the same applications and offer all the same benefits as one-stage SCT PCPs, but have higher pressure capabilities up to 120 psi. They use an improved adjustment mechanism to reach higher pressures. Due to stator and rotor innovations, PCPs with the SCT design allow for reduced maintenance costs, prolonged stator life, and reduced energy consumption.

937/864-7150; www.seepex.com; Booth #2437

Singer Valve Single-Process Controller

The **Single-Process Controller (SCP-TP)** from **Singer Valve** is designed to complement a dual solenoid control valve. It is easily configured for level control, upstream and downstream pres-

sure management, flow control or position control. This controller makes automation of water distribution systems quick and easy. The color touch-screen interface makes it simple for anyone to use, and is also complete with a built-in data logging function.

604/594-5404; www.singervalve.com; Booth #4267

Smith & Loveless PISTA Vio Grit Removal System

The **PISTA Vio Grit Removal System** from **Smith & Loveless** provides design flexibility to go with removal efficiencies. It can be designed with the inlet and outlet channels at any variable angle up to the full 360 degrees of the chamber, offering simple installation into existing sites or an efficient footprint for new sites. With the use of a hydraulically forced ring and tunnel system, it creates the vortex flow path necessary to provide 95 percent grit removal down to 140 mesh/105 microns.

800/898-9122; www.smithandloveless.com; Booth #3648

Suez North America Dehydris Twist

The **Dehydris Twist** from **Suez North America** is an advanced sludge dewatering process employing Bucher Unipektin hydraulic piston press technology. The automated process consists of a rotating cylinder and moving piston that continuously squeezes the sludge, allowing water to pass through flexible drainage elements. Up to 30 percent reduction in sludge bulk volume can be achieved over conventional dewatering, and digested sludge can be dewatered to autothermal conditions before incineration. The versatile process accepts both drinking water and wastewater sludge.

804/756-7696; www.degremont-technologies.com; Booth #931

Tank Connection Affiliate Group

Tank Connection designs, manufactures and installs all four types of **steel storage tanks,** including bolted RTP, field-weld, shop-weld and hybrid tank designs. The tanks have an effective LIQ Fusion 7000 FBE coating system. Aluminum geodesic domes are available for liquid storage tank applications. Dome covers are all aluminum, maintenance-free, corrosion-resistant and provide superior field performance compared to competitor designs.

620/423-3010; www.tankconnection.com; Booth #4023

Tideflex Technologies TF-1

The **TF-1** curved-bill check valve from **Tideflex Technologies** has a bill that returns to a closed position every time, achieving a tight seal for backflow operations. The valve's strong spine provides long-term performance, while handling water weight. It helps ensure maintenance-free backflow prevention.

800/756-0044; www.tideflex.com; Booth #1436

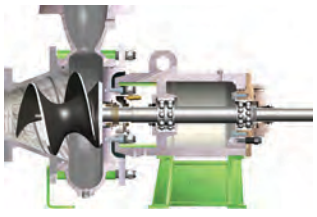
USP Technologies

USP Technologies, formerly known as US Peroxide, provides cost-effective, **peroxygen-based technologies** and full-service **chemical treatment programs** for municipal and industrial wastewater treatment. Cloevis is a long-lasting force-main biofilm removal service to control sulfate-reducing bacteria. Biosolids Odor Control includes customized solutions to treat hydrogen sulfide, reduced sulfur compounds and other odorants generated in plant operations. Peracetic Acid is provided for wastewater disinfection when disinfection byproducts, effluent toxicity and chlorine residual limits are of concern.

404/352-6070; www.usptechnologies.com; Booth #3621

Vaughan Company Triton

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



888/249-2467; www.chopperpumps.com; Booth #2362

Watson-Marlow Fluid Technology Group Bredel APEX

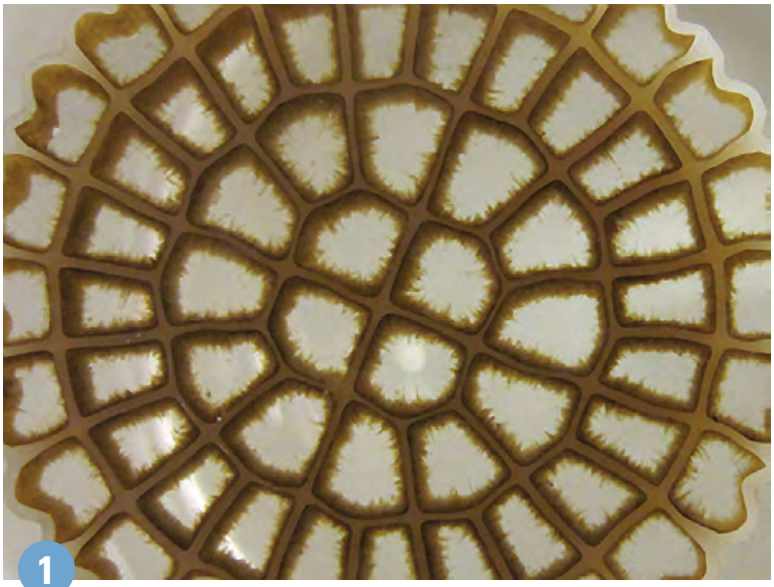
The **APEX** hose pump from Bredel of the **Watson-Marlow Fluid Technology Group** lowers acquisition, operating and maintenance costs for low- to medium-pressure applications. The pumps are designed for dosing, metering and transfer duties from 0.012 to 27.3 gpm and are suited for aggressive and abrasive applications up to 116 psi. The higher flow per revolution means the pumps can be run at lower speeds, increasing hose life and reducing wear. There are no wear components such as seals, valves, membranes or rotors to maintain.

800/282-8823; www.wmftg.com; Booth #4062

YSI, a xylem brand UltraClean

YSI, a xylem brand, includes **UltraClean** ultrasonic cleaning technology in its portable, optical-based turbidity, TSS, and UV/VIS sensors designed to measure accurately in harsh applications. The technology prevents biofouling by generating high-frequency vibrations of the optical windows. The result is improved data, reduced maintenance, and time saved. UltraClean keeps sensors clean even after a 30-day deployment.

937/767-7241; www.ysi.com; Booth #1041 tpo



1) Plastic "wheels" form the substrate for growth of a biofilm of nitrifying bacteria.

2) More than 50 municipal AnoxKaldnes systems have been installed in the United States and about 600 worldwide. Sequencing batch reactors are another treatment mode in which the media can be retrofitted.

Uprating SBRs

A PROVEN PROCESS ENABLES TREATMENT AGENCIES TO BOOST THE CAPACITY OF SEQUENCING BATCH REACTORS TO REMOVE AMMONIA AND TOTAL NITROGEN AND MEET TIGHTENING PERMIT LIMITS

By Ted J. Rulseh

Clean-water facilities face increasingly strict permit requirements, most notably for nitrogen and phosphorus. The cost to comply can be substantial.

Now Kruger, a Veolia business unit, offers the AnoxKaldnes Hybas process for sequencing batch reactors (SBRs). The company says the retrofit technology can enhance ammonia and total nitrogen removal in existing SBRs within the original system footprint.

The process is an innovative application of the company's proven AnoxKaldnes fixed-film technology. It uses engineered moving bed media to grow and foster nitrifying bacteria, even at low solids retention times and low reactor temperatures. The process enhances nitrification capacity for ammonia removal.

With the addition of a recirculation process, the technology allows for both nitrification and denitrification to meet total nitrogen effluent limits, according to the manufacturer. Chris Thomson, product manager, talked about the process in an interview with *Treatment Plant Operator*.

tpo: What was the key reason behind bringing this offering to market?

Thomson: The real market driver was knowing that, given the current age of many SBR installations and the continuing evolution of nutrient regulations, a time would come when communities would face the need to upgrade their systems for ammonia or total nitrogen removal. For us, the question was how to apply our existing AnoxKaldnes technology to existing SBR systems to meet that need.

> "We have installed a number of MBBR and what we call IFAS (integrated fixed-film activated sludge) systems where we add media to achieve nitrification. What is new is the application of this technology to SBRs, where it has never been used before."
>
> **CHRIS THOMSON**

tpo: In simple terms, what is the AnoxKaldnes process?

Thomson: AnoxKaldnes has been around since the late 1980s and early 1990s. Anox based in Sweden was one company; Kaldnes based in Norway was another. Those two companies are now one and are part of the Veolia family. The technology takes the fixed-film biological treatment process and deploys it in a moving bed bioreactor (MBBR).

We add polyethylene media to a reactor, and instead of being fixed, the media is constantly moving. That allows nitrifying bacteria to grow on the media. The media has a very highly protected surface area, so the nitrifiers can grow without being washed out hydraulically. With this process we can achieve nitrification, and with some additional separation of tankage we can achieve denitrification, all in a very small footprint.

tpo: What is new and different about this latest offering?

Thomson: We have installed a number of MBBR and what we call IFAS (integrated fixed-film activated sludge) systems where we add media to achieve nitrification. What is new is the application of this technology to SBRs, where it has never been used before. In essence, we are applying a tried and true technology to the SBR process.

tpo: What if the facility's need is for total nitrogen removal, as opposed to ammonia?

Thomson: If the need is for nitrification and denitrification, we can install a partition to segment off a non-media free anoxic zone where they can denitrify. That zone is constructed inside the existing tank, so it does not add to the footprint of the system.

> "For agencies thinking about expanding their facility by adding tankage to meet more stringent ammonia or total nitrogen limits, this process can be an appealing alternative."
> **CHRIS THOMSON**

tpo: How would you describe the fixed-film media used in this process?

Thomson: We use 100 percent virgin polyethylene for its durability. The media looks almost like pasta wheels, about the size of a quarter. It has a very high surface area. For example, K5 media, which we use most often, has 800 square meters of surface area for every cubic meter of media we supply. There are multiple ridges and surfaces where the biofilm can grow. That's where the nitrifiers develop and reside. They are protected almost like snails in their shells. With constant agitation and movement, the biomass does slough off, so that prevents clumping and the development of septic conditions.

tpo: How does the technology work in the SBR environment?

Thomson: Our typical polyethylene media has a specific gravity less than 1, so it floats. For SBRs, we developed a new media that uses our existing geometry but has a specific gravity greater than 1. That allows the media, instead of floating, to sink with the biomass during the SBR's settle cycle. We added a stainless steel screen to retain the media in the SBR tank.

tpo: Does the process require upgrade or replacement of existing SBR controls?

Thomson: Yes. We have instrumentation and controls specialists on staff who would be involved in any SBR retrofit. We provide a complete solution in which we do the design and install the capital equipment, instrumentation and controls. We provide a performance guarantee on the process.

tpo: How would you summarize the benefits of this process for an existing SBR?

Thomson: This process is designed for retrofitting SBR systems that have reached or are nearing their capacity for ammonia or total nitrogen removal. We can increase that capacity by up to 30 percent and do it in the same footprint. So for agencies thinking about expanding their facility by adding tankage to meet more stringent ammonia or total nitrogen limits, this process can be an appealing alternative.

tpo: Can this process enable facilities to increase absolute treatment capacity in the event nitrogen or ammonia removal is not a critical need?

Thomson: The chief driver of this process is nitrification/denitrification. It is not tailored for additional BOD removal.

tpo: What has been done to demonstrate the viability of the process in SBRs?

Thomson: We have completed pilot testing at the North Durham Water Reclamation Facility in Durham, North Carolina. We proved the concept there and also developed the proper loading rates and parameters for treatment. We have also validated the basic treatment concept on municipal wastewater. We've installed more than 50 municipal AnoxKaldnes systems in the United States and about 600 worldwide, in multiple geometries — circular tanks, long-flow reactors and square reactors. SBRs are just another treatment mode in which we can retrofit the AnoxKaldnes media.

tpo: How would you assess the size of the market for this technology?

Thomson: Our research indicates that there are more than 500 existing SBRs in the United States and Canada and more than 1,300 in total worldwide. A number of these are industrial systems. They are generally smaller systems, about 1 mgd and less. **tpo**

Tallahassee's career progression plan trainers give a thumbs-up for good training.

Up With Skills

AFTER TALLAHASSEE UPGRADED ITS WASTEWATER RECLAMATION TREATMENT FACILITY, THE UTILITY DEVELOPED AN EMPLOYEE CAREER PROGRESSION PLAN TO IMPROVE WORKFORCE SKILLS

By Ann Stawski

In 2011, the City of Tallahassee, Florida, finished major improvements to enhance water quality and reduce wastewater effluent nitrogen. This included an overhaul at the 26.5 mgd (design) Thomas P. Smith Water Reclamation Facility.

The upgrades meant employees had to learn new processes, but Joe Cheatham, wastewater treatment operations manager, saw an even bigger challenge: 20 percent of the wastewater department's 150 employees were eligible to retire in less than 10 years. "With the facility upgrades, we were going to need a lot of training," he says. "But a large part of our workforce would soon be at retirement age, and then we'd have gaps to fill. The upgrades were a driver in us becoming proactive."

The Tallahassee Wastewater Department, serving 72,000 customers, did not have a comprehensive program to train the current and incoming workforce effectively or groom team members for advancement. In response, wastewater and city officials created a workforce development program for the department.

CAREER PROGRESSION

The city assigned a compliance and career progression manager to oversee development of a succession program. The approach centered around a career progression ladder, focusing on existing and new employees. The idea was to roll out the program in the wastewater department and then let it serve as a model to the other agencies in the city, Florida's capital.

The compliance manager and a team of employees began work on the employee development initiative in 2011. They started with an outline, intending to create a culture of continuous improvement with a focus of working in teams. After significant benchmarking, research and visits to other facilities, they created a plan that outlined the program's purpose, scope, responsibilities, procedures and tracking.

The development team used resources from Florida State University's Certified Public Manager Program to establish part of its curriculum and coursework on leadership. The team also looked to the Florida Sterling Council for guidance on training. The council, established by the governor's office, works to develop businesses and organizations throughout the state. The training component touches on knowledge, workforce development, operational processes and results.

In March 2014, the city adopted a career progression plan that aims to build a healthy work culture and a highly skilled workforce, develop and retain quality employees, provide career advancement opportunities through a defined training program, and instill a culture of excellence and teamwork.

> "When you're training your employees right and they feel important in what they are doing and perform the best to their ability, a career progression plan is worth everything."
> **JOE CHEATHAM**

"We want to promote our staff from within," says Cheatham. "That means keeping track of the key performance indicators on a scorecard. We now track training hours, the number of people advanced, turnover rates and overtime. We believe that with a better trained workforce, we'll improve our safety record and reduce claims."

Tallahassee employees participate in hands-on training.

CLEARED FOR LAUNCH

After approval of the plan, the city launched its pilot program, targeting nine wastewater field employees, the largest group in the department, including mainly newly hired and junior equipment operators and maintenance and repair workers.

"The pilot program enabled us to standardize some of the job responsibilities and reduce the number of titles, creating a clearer path for career progression," says Cheatham. "We focused on our junior level employees first, because they need the most training and it will take a couple of years to develop them."

The utility assigned supervisors as in-house trainers: "No one knows better how procedures should flow than our supervisors, and they can lead junior level staff to that level of continuous improvement." The training used for the pilot program will be integrated into a training program for the utility as a whole.

The next phase of the plan will focus on developing wastewater department employees at all levels, including supervisors and management. Training means not only teaching but also listening to and engaging employees. To collect data, the city created an employee engagement survey. "We ask the same questions year after year and have seen our scores rise," says Cheatham. "We also schedule focus groups to discuss concerns and opportunities."

SIGNS OF PROGRESS

One year into the launch, Cheatham already sees success. Turnover is flat among junior staff; employees are more engaged and contribute in ways they previously did not. For example, team members recommended a major improvement to the bleach mixing system. They determined that the existing design was not working to capacity and presented maintenance issues.

Department leaders allowed the employees to try a different mixing solution for six months and then reviewed data. With the dilution changes, the system remained compliant, reduced maintenance and significantly reduced costs. "Our employees saved us more than $140,000," Cheatham says.

The department also started an employee recognition program that highlights innovations and achievements. As part of that, the department publicized the new bleach system and results with an article on the employee Internet portal. Those who devised the improvement presented the project to the city manager at a budget hearing.

Says Cheatham, "Our employees were responsible for a great idea. They deserved the recognition for a job well done."

tell us about your team

This feature in *TPO* aims to help clean-water plant leaders develop strong, cohesive operating teams. We welcome your story about team-building at your facility.

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

PUTTING IT TOGETHER

This year, the wastewater department has begun training for all employees, many of whom have been eager to take part.

"Putting together a program like this takes a lot of time, a lot of planning and a lot of resources," says Cheatham. "It may be difficult to assign a dollar amount on it, but when you're training your employees right and they feel important in what they are doing and perform the best to their ability, a career progression plan is worth everything." **tpo**

Digital Technology

By Craig Mandli

Analytical Instrumentation

ALL-TEST PRO AT5

AT5 hand-held electric motor circuit analysis instrument from ALL-TEST Pro LLC

The AT5 hand-held electric motor circuit analysis instrument from ALL-TEST Pro LLC performs a comprehensive assessment of a motor's health for troubleshooting, predictive maintenance and quality control of in-service, stored and incoming motors. Intuitive on-screen, menu-driven prompts guide users through the testing process. Operators can perform tests directly at motor terminals or, for hard-to-reach motors such as submersible pumps, from distances up to 1,000 feet. The unit is ideal for low-, medium- and high-voltage AC motors and DC motors, as well as generators and transformers. **860/399-4222; www.alltestpro.com.**

Type 8905 online analysis system from Burkert Fluid Control Systems

BURKERT FLUID CONTROL SYSTEMS TYPE 8905

The Type 8905 online analysis system from Burkert Fluid Control Systems monitors all important water parameters on one platform. It is a multichannel, multifunction unit for the sensor cubes and electronic modules from the EDIP platform. The efficient device integration platform uses modularity in the hardware and software of the system. It can be used for the continuous measurement of high-priority water parameters such as pH value, chlorine for disinfection purposes, conductivity, ORP value and turbidity. Modularity in hardware and software offers the high flexibility for easy installation, use and operation. The touch screen allows on-site configuration of newly installed modules. It is available as a compact system in one housing, offering up to six measurements and up to 30 analysis sensor cubes in one bus system. **800/325-1405; www.burkert-usa.com.**

ELECTRO-CHEMICAL DEVICES DC80

DC80 dechlorination analyzer from Electro-Chemical Devices

The plug-and-play DC80 dechlorination analyzer from Electro-Chemical Devices uses a zero-shift methodology to provide accurate measurement and protect total chlorine sensors from damage. Chlorine is metered into the sample, shifting from a near-zero chlorine concentration to a measurable value. The analyzer's offset function allows the metered value to be subtracted from the measurement. It monitors chlorine in drinking water, wastewater, cooling water and other dechlorination applications from 0.05 to 20 ppm. Its mounted system includes built-in flow control, advanced panel pressure regulators and rotometers. There is built-in automatic pH compensation for samples between 4 and 12 pH. The total chlorine sensor is a three-electrode amperometric sensor with a gold cathode, silver halide anode and 304 stainless steel counter electrode. **800/729-1333; www.ecdi.com.**

Sludge Judge from Nasco Whirl-Pak

NASCO WHIRL-PAK SLUDGE JUDGE

The Sludge Judge from Nasco Whirl-Pak can be used to take accurate readings of settleable solids, 5 percent or less, in a variety of liquids to any depth. It is ideal for sewage treatment plants, chemical plants and food processing facilities where accurate sample levels of settleable solids in noncaustic materials are needed. The unit holds approximately 3 ounces per foot. It comes in 5-foot sections of 3/4-inch plastic pipe with screw-type connectors. The top section includes a nylon rope for raising and lowering the sampler. Individual sections can be combined as required to achieve the length needed. Do not use in liquids over 165 degrees F. **800/558-9595; www.enasco.com.**

SARTORIUS CORPORATION MA160

MA160 moisture analyzer from Sartorius Corporation

The MA160 moisture analyzer from Sartorius Corporation uses the thermogravimetric method to determine the moisture content of liquid, pasty and solid substances. It delivers prompt, repeatable results and supports the development of new methods in three steps. It is ideal for the moisture analysis of a varying range of samples under different conditions. It can generate new methods that allow the operator to create and effectively manage proprietary measurement procedures for various samples. **800/635-2906; www.sartorius.us.**

Communication Equipment

Wireless Bridge for switches from Harwil Corporation

HARWIL CORPORATION WIRELESS BRIDGE

The Wireless Bridge for switches from Harwil Corporation eliminates wire, installation (conduit or trenching) and maintenance that would normally be needed for a switch to control a device. The range can cover distances of 1,000 feet. The system includes a switch sending unit that can be attached to two separate switches and a relay, and receiving unit that has 10- and 15-amp relays. It can be used to control water levels in a tank, detect moisture intrusion or line breaks, remote control on/off status of equipment during installation or service. This system is ideal for temporary and portable applications. The two-switch unit allows forward/reverse or up/down remote control. The switch unit is powered by 9-24 VDC or three C-cell batteries. Relays are powered by 12-24 VDC, 120 or 220 VAC. **800/562-2447; www.harwil.com.**

INDUSTRIAL VIDEO & CONTROL VIDEO MANAGEMENT SOLUTION

Video Management Solution from Industrial Video & Control

The Video Management Solution from Industrial Video & Control provides comprehensive video surveillance and process monitoring, and can be easily integrated into existing process control systems. It can transmit video over existing SCADA networks, as well as high-speed networks. Powerful remote monitoring capabilities let an operator easily manage and monitor geographically dispersed video cameras, regardless of the location or the size of the video network. Video clips can be distributed via phone/email to notify when important alarms and events occur. The solution

automatically links real plant video to historical, operator, alarm and production databases, and provides the ability to view recorded video on process and operator consoles. A console recorder automatically captures HMI, SCADA and DCS displays, and provides live and recorded video of exactly what was on the operator's monitor at any point in time. It can be bundled with industrial video cameras for a complete video solution customized to exact needs. **781/255-7400; www.ivcco.com.**

Controllers

BLUE I WATER TECHNOLOGIES HYDROGUARD HG-702 TURBIPLUS

HYDROGUARD HG-702 TurbiPlus from Blue I Water Technologies

Monitoring, controlling and integrating water-quality data in real time, the HYDROGUARD HG-702 TurbiPlus from Blue I Water Technologies combines accurate measuring methods for industrial and drinking water systems. It monitors multiple quality parameters simultaneously, reports data and alerts online, and includes control relays. Chlorine and turbidity are measured colorimetrically on the same water sample for accurate data recording, and the instrument can incorporate additional sensors, such as pH, temperature, conductivity, pressure and flow. The device enables longer maintenance intervals, and detailed maintenance reminders and alarms provide useful information on incidents, timing and causes so that the technician can respond effectively. It includes self-calibration and self-cleaning, ensuring long-term stabilization. **732/363-2333; www.blueitechnologies.com.**

ELECTROSWITCH CORPORATION TD-CSR

Time Delay Control Switch Relay (TD-CSR) from ElectroSwitch Corporation

The Time Delay Control Switch Relay (TD-CSR) from ElectroSwitch Corporation provides a means of arc-flash mitigation by allowing personnel time to clear the arc-flash area during local breaker operation. Integrated into the lighted nameplate package, two front panel mounted push-buttons provide the ability to manually initiate a time-delayed breaker trip or close operation. A flashing LED alerts the operator of either a pending trip or close operation, allowing adequate time to evacuate the arc-flash area. Its standard 10-second time delay and intuitive push-button design simplifies training and requires no special installation wiring. It has local LED indication, a remote SCADA contact alarm, single or dual trip coil monitoring and a safety inter-lock (turn to latch) option. **781/335-5200; www.electroswitch.com.**

METROPOLITAN INDUSTRIES LMS II

LMS II level management system from Metropolitan Industries

The LMS II level management system from Metropolitan Industries is a preprogrammed, high-performance wet well level controller that gives users access to basic SCADA features. A menu-configurable, constant-speed pump down level controller, it allows for the control of one to three pumps, single/dual level transducers, a 0-20 mA flow-meter input, and a completely redundant float backup controller. Seal fails and thermal inputs are available by default. It can be accessed remotely and controlled via a laptop or directly on the touch screen at a lift station. With either an existing Internet connection or cell modem and MetroMail alarm-dialing system, users can receive alarm notification via any SMS text or email-compatible device. With a color touch-screen interface, it allows users to seamlessly alter pump and transducer options. Each unit comes with integrated help screens. **815/886-9200; www.metropolitanind.com.**

MICROMETRIX CORP. STREAMING CURRENT CONTROLLER

Streaming Current Controller from Micrometrix Corp.

The Streaming Current Controller from Micrometrix Corp. monitors and controls coagulant/polymer dosage. It responds to changes in raw-water quality and prevents plant upsets. The controller has graphical data trending and alarm functions, and allows the user to customize parameters for the optional automatic cleaning system. The sensor has a user-serviceable probe, which extends sensor life. It enables optimized treatment and chemical savings of 20 to 30 percent. **770/271-1330; www.micrometrix.com.**

PHOENIX CONTACT DESIGNLINE

Designline industrial PCs from Phoenix Contact

Designline industrial PCs from Phoenix Contact are available with an Intel Core i7 processor in 18.5- and 21.5-inch screen sizes, as well as the original 15-inch version. These models are IP65 rated and have a fanless design, making it possible to mount directly on the factory floor, eliminating the need for additional control cabinets and housing. The VESA-mounting hardware mounts securely on the machine, improving ergonomics for the operator. The device can be installed at eye level on the front of the machine and used as a hardware platform for a manufacturing execution system. The units have multi-touch capability for intuitive gesture control. They take up minimal space, and the integrated function button on the front ensures easy operation such as brightness adjustment, an easy-to-access software keyboard and a right-click function. **800/322-3225; www.phoenixcontact.com.**

PULSAFEEDER MICROVISION

MicroVision conductivity cooling tower controller from Pulsafeeder

The MicroVision conductivity cooling tower controller from Pulsafeeder comes standard with Toroidal Sensor Technology, which reduces the potential for fouling, and there is no need to recalibrate. It is a microprocessor-based controller with selectable timer and dual biocide control. Designed specifically for cooling tower applications, it comes standard with the functions needed to accurately monitor and control cooling tower water, such as a toroidal conductivity sensor, large graphical display with large, easy-to-read font, statistics screen with relay runtime, flow switch input, three drum level inputs, 4-20 mA isolated analog output, dry contact alarm output, battery backup, selectable timer, dry contact/hall effect water meter input, and the bleed output supports solenoid valve or motorized ball valve. **800/333-6677; www.pulsatron.com.**

SCHNEIDER ELECTRIC MODICON M580

Modicon M580 Ethernet programmable automation controller (ePAC) from Schneider Electric

The Modicon M580 Ethernet programmable automation controller (ePAC) from Schneider Electric has hot standby functionality (HSBY), native Eth-

ernet and embedded cybersecurity. In addition to the redundancy features, the controller delivers online configuration changes without stopping the process to maximize uptime. CANopen fieldbus is natively integrated through the embedded CANopen module. **888/778-2733; www.schneider-electric.us.**

TORREY PINES ECHOTHERM CO50

EchoTherm CO50 programmable HPLC column chiller/heater from Torrey Pines Scientific

The EchoTherm CO50 programmable HPLC column chiller/heater from Torrey Pines Scientific has a temperature range of 39.2 to 212 degrees F. The Peltier-based system has a five-program memory of 10 steps per program and the ability to repeat any program from 1 to 99 times automatically. **866/573-9104; www.torreypinesscientific.com.**

Control/Electrical Panels

ABB HEAVY-DUTY SAFETY SWITCH

Heavy-duty safety switches from ABB Low Voltage Products

Heavy-duty safety switches from the ABB Low Voltage Products division meet the necessary UL98, CSA and NEMA KS-1 standards for demanding service-entrance and motor-load applications. The 600-volt and 200 kA-rated switches use the same globally rated bodies as ABB's rotary-style switches, providing performance, reliability and safety to the heavy-duty market segment. They offer touch-safe visible blades and operating mechanisms that are fully enclosed and protected from dirt and debris. All enclosure types come with gaskets, are free of sharp edges and offer a spacious interior for easier and safer wiring and installation of optional accessories. They range from 30 to 1,200 amps and are available as fused and non-fused, with Types 1/12/3R/4X steel or stainless steel enclosures. **262/785-8525; http://new.abb.com/low-voltage.**

BEIJER ELECTRONICS QTERM

QTERM-A7 and QTERM-A12 operator panels from Beijer Electronics

QTERM-A7 and QTERM-A12 operator panels from Beijer Electronics are designed to withstand wind, dust, snow/ice, rain and extreme heat/cold. They are integrated with motors, pumps, compressors, purifiers, reactors and dryers. They are certified by UL for Class I Division 2 hazardous environments, as well as designed to NEMA 4X, IP66 and UL 50E Type 4X sealing standards. They have bright 7- or 12.1-inch displays, based on TFT color LCD and resistive touch-screen technologies. Each has an Ethernet port, two serial ports, two USB ports and an optional two-port CAN module. The units support -22 to 158 degree F operating temperatures and -40 to 185 degree F storage temperatures. They can be ordered with iX runtime software or with native Windows CE software, and in standard or modular enclosures. **801/466-8770; www.beijerinc.com.**

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.

OLS Series control panels from Orenco Controls

They are ideal for any pumping application where consistent flow and energy-efficient operation are essential, such as lift stations, dewatering or sludge pumping. They can be used as a SCADA patch, connecting peripheral equipment to an existing SCADA system. Multiple drives can be configured through one user-friendly human-machine interface. Engineers can pre-program user interfaces to the site-specific needs of an installation, making the panel virtually plug-and-play. Maintenance staff can easily adjust settings and monitor the system remotely. These outdoor-rated control panels, housed in a weatherproof enclosure, have circuit protection, heat dissipation systems (fan or A/C), phase and voltage protection, and level controls. **877/257-8712; www.orencocontrols.com.**

PRIMEX ECO SMART STATION

ECO Smart Station control system from PRIMEX

The ECO Smart Station control system from PRIMEX provides energy-efficient pump control in municipal lift station applications using VFD technology. The EnergyView Controller with kW Logix Software uses an Efficiency Auto-Tune algorithm that searches for the pump speed that will consume the least amount of energy per gallons of liquid pumped. The pump motor power is monitored by the VFDs and transmitted to the controller. No power meters are required. The auto-tune program accounts for the reduction in flow and head characteristics of the pump resulting from speed reductions to determine the best efficiency frequency. When the best efficiency frequency is found, the pumps will operate at this speed during every cycle. This ECO mode of operation is efficient during low and normal in-flows to the pump station. **844/477-4639; www.primexcontrols.com.**

SEE WATER SIMPLE SIMPLEX

Simple Simplex control panels from See Water

Simple Simplex control panels from See Water are designed to alert high liquid level and control a 120/208/240-volt pump under 1 hp. The SSP-1 and SSP-2 have two- and three-float operation. The SSP-3 Plugger includes a 120-volt receptacle for quick and easy installation of the pump/pump switch. They have an 8- by 6- by 4-inch NEMA 4X indoor/outdoor enclosure, red beacon alarm light, 85 dBA buzzer, alarm test and silence buttons. They are ideal for sewage pump chambers, sump pump basins and onsite applications. **888/733-9283; www.seewaterinc.com.**

Custom control panels from Unison Solutions

UNISON SOLUTIONS CUSTOM CONTROL PANELS

Custom control panels from Unison Solutions are built to meet the specifications of each individual system installation. The in-house, UL-certified panel shop is certified for industrial controls (UL-508A) and hazardous locations (UL-698A & UL-1203). Programmers have developed an extensive library of PLC code using Allen-Bradley, Modicon and GE Ladder Logic. These systems seamlessly integrate with existing facility equipment through the use of optional communication interfaces including, but not limited to, Ethernet TCP/IP, Modbus and Modbus/TCP. **563/585-0967; www.unisonsolutions.com.**

Drives

YASKAWA AMERICA U1000

U1000 industrial matrix drive from Yaskawa America

The U1000 industrial matrix drive from Yaskawa America has low harmonic distortion and regeneration in a space-saving design. It comes with nine bidirectional switches arranged in a matrix to convert a three-phase AC input voltage directly into a three-phase AC output voltage, eliminating the need for a rectifying circuit and DC smoothing circuit. The drive is available in 240-volt Class 10-100 hp and 480-volt Class 7.5-350 hp. **800/927-5292; www.yaskawa.com.**

Flow Control and Software

ENDRESS+HAUSER MEMOBASE PLUS

Memobase Plus calibration software from Endress+Hauser

Memobase Plus calibration software from Endress+Hauser is designed for pH, oxygen, conductivity and chlorine sensors. The software provides complete traceability of test solutions, sensors, calibrations and measurements. Calibration reports are generated automatically as a PDF document or CSV file that can be exported to Excel or similar software. Memobase Plus is capable of managing four different sensor types simultaneously and is FDA CFR Part 11 compliant. **888/363-7377; www.us.endress.com.**

ENGINEERED SOFTWARE PIPE-FLO PROFESSIONAL

PIPE-FLO Professional from Engineered Software

PIPE-FLO Professional from Engineered Software enables engineers to operate a piping system in a steady state, improving product quality, reducing maintenance costs and increasing plant reliability. When the plant is running smoothly, hazardous work conditions are avoided, environmental emissions are kept under control, and prime product output is increased. It assists in making sure fluid properties at a given point remain constant, including the fluid pressure, temperature and flow rate. Modeling a piping system shows the steady state conditions that satisfy conservation of mass and conservation of energy. If the actual system is not operating at those conditions, it can be used to perform a "what if" analysis on the system to troubleshoot and identify the root cause of the problem. **800/786-8545; www.eng-software.com.**

SMITH & LOVELESS QUICKSMART

QUICKSMART system controls from Smith & Loveless

QUICKSMART system controls from Smith & Loveless provide monitoring and adjustment for headworks functions, including grit pumping, removal and washing in one easy-to-use control system. The touch-screen layout simplifies control modification, screen navigation and viewing of system status. Screen function buttons and a status bar are accessible from each screen. A maintenance log displays periodic recommended operation and maintenance instructions, and makes lubrication suggestions based on actual system runtimes. An I/O status screen displays controller digital and analog I/O status. The 7-inch 65,000-color TFT LCD touch-screen HMI controller is UL listed, NEMA 4-rated when installed in an enclosure, and surge-protected. **913/888-5201; www.smithandloveless.com.**

Flow Monitoring

FLUID COMPONENTS INTERNATIONAL ST100L

ST100L flowmeter from Fluid Components International

The ST100L air/gas in-line thermal mass flowmeter with Vortab flow conditioner from Fluid Components International can provide accurate flow measurement without a long straight pipe run. This in-line model is designed for line sizes of 1, 1.5 or 2 inches, and the flow conditioner eliminates both swirl and profile disturbances to produce a repeatable flow profile. It is typically installed in a system's chlorine gas inlet line to the chlorinator panel. Its wetted material, including sensor element, in-line flow body, flow conditioner and process connections, are all fabricated of Hastelloy C-276 to ensure corrosion protection and long life. It can measure flow with a 100-1 turndown ratio in ranges from 0.006 to 1850 SCFM. The transmitter/electronics can be integrally mounted with the flow body or remotely mounted up to 1,000 feet away. The transmitter enclosure is NEMA4X/IP67 rated and available in painted aluminum or stainless steel. **800/854-1993; www.fluidcomponents.com.**

GREYLINE INSTRUMENTS DFM 5.1 DOPPLER FLOW METER

DFM 5.1 Doppler Flow Meter from Greyline Instruments

The DFM 5.1 Doppler Flow Meter from Greyline Instruments measures flow from outside a pipe. It uses Doppler signal processing for fast, clean processing, greater data resolution and an improved ability to filter out noise, which all combine to produce data accuracy. It mounts on any 1/2-inch I.D. or larger pipe and is designed for difficult liquids like wastewater, biosolids, slurries, abrasives or any liquid with bubbles or suspended solids. Calibration and startup is simple with the built-in five-button keypad. It has a large, backlit display and totalizer, isolated 4-20mA output and six control relays. Options include a built-in data logger and reporting system with USB output, Windows software and intrinsically safe sensor. **888/473-9546; www.greyline.com.**

INSTRUMENTS DIRECT NCMP-SMART

NCMP-SMART flowmeter from Instruments Direct

The NCMP-SMART portable ultrasonic transit-time flowmeter from Instruments Direct is capable of transmitting a strong signal multiple times a second, and communicates with BLE (Bluetooth, low energy) smart devices, such as phones, tablets, iPods and other Apple or Android brand devices with BLE functionality, allowing an operator to communicate with it for liquid applications. Because the operator provides the reading device, the cost of the unit is significantly less. **888/722-5543; www.instrumentsdirect.com.**

TELEMATICS CONTROLS KAYDEN CLASSIC 810

The Kayden Classic 810 flow switch from Telematics Controls is configurable for flow, level, interface (liquid and slurry) and temperature applications. It only actuates when specific and preset interface conditions are met. The device uses an advanced microprocessor to perform continuous self-diagnostics on the electronics module and sensor elements. Using an intelligent user interface, the unit is designed to be easy to install and adjust while displaying process

Kayden Classic 810 flow switch from Telematics Controls

conditions. It can also be controlled and monitored remotely. It's housed inside copper-free aluminum and powder coated in polyester TGIC, and has a NEMA 4X coating for additional corrosion- and weather-resistance. **403/253-7939; www.telematic.com.**

Gas/Odor/Leak Detection Equipment

C-21 DRI-GAS Sampling System from Analytical Technology

ANALYTICAL TECHNOLOGY C-21 DRI-GAS SAMPLING SYSTEM

The C-21 DRI-GAS Sampling System from Analytical Technology is a solution for monitoring combustible and toxic gases in areas where there are condensing levels of moisture that often result in premature sensor failure. The system draws gas samples from high-humidity vent stacks, ducts, wet wells or other humid locations. It removes water vapor from the gas sample by contact with a cold plate that condenses moisture and delivers a dehumidified gas sample suitable for toxic and combustible gas monitoring equipment. **800/959-0299; www.analyticaltechnology.com.**

ARIZONA INSTRUMENT JEROME 651

Jerome 651 fixed hydrogen sulfide detection system from Arizona Instrument

The Jerome 651 fixed hydrogen sulfide detection system from Arizona Instrument is capable of reading hydrogen sulfide levels as low as 3 ppb and reports all data to a centralized monitoring location. To pinpoint the source of hydrogen sulfide emissions, just remove the Jerome 631-X from the 651 housing and investigate. **800/528-7411; www.azic.com.**

REGAL Series 3000 gas detector from Chlorinators Incorporated

CHLORINATORS INCORPORATED REGAL SERIES 3000

The REGAL Series 3000 gas detector from Chlorinators Incorporated accurately senses the presence of chlorine and/or sulfur dioxide in an enclosed environment. In the event of a possible gas leak, it continuously displays the concentration level(s) in parts per million, while simultaneously indicating the highest level detected on an LED bar graph. Versions are available in both single- and dual-sensor models. Models 3001 (CL2) and 3003 (SO2) are single-sensor detectors and Models 3002 (CL2), 3004 (SO2) and 3005 (CL2 and SO2) are dual-sensor. **772/288-4854; www.regalchlorinators.com.**

DETCON GMI PS500

GMI PS500 high-performance multi-gas monitor from Detcon

The GMI PS500 high-performance multi-gas monitor from Detcon is designed to detect VOCs, oxygen enrichment or deficiency, and a wide range of flammable and toxic gases. The portable monitor displays up to five gases simultaneously using electrochemical, catalytic, infrared and PID sensing technologies with a plug-and-play design. It is suitable for confined space entry, offering an optional internal sampling pump and diffusion mode capability. It is housed in a high-impact rubberized case and is rated IP65 dust-tight and water-resistant. It has onboard data logging and is equipped with a loud, distinctive 95 dBA audible alarm along with a highly visible light bar. **713/559-9200; www.detcon.com.**

EAGLE MICROSYSTEMS GD-1000 PREMIER SERIES

The Model GD-1000 Premier Series gas detector from Eagle Microsystems can detect a range of gases, including chlorine, ammonia, sulfur dioxide, ozone and methane. It is capable of responding to levels of gas in air over a multitude of ranges. The unit consists of an electrochemical gas sensor and a microprocessor-based alarm indicator unit. The sensor can be mounted in the area of potential leakage while the monitor remains in a safe area, protecting the operator from exposure to the gas leak. The operator is alerted to a leak by an audible alarm and flashing display on the indicator. The alarm-indicating unit can interface with up to two sensors, each of which can monitor the same or a different gas. It provides an isolated 4-20 mAdc output signal for recording or transmission to remote instrumentation or a computer. RS232 (std) and RS485 (opt) digital serial ports are available. **610/323-2250; www.eaglemicrosystems.com.**

Model GD-1000 Premier Series gas detector from Eagle Microsystems

FORCE FLOW/HALOGEN HEXACON III

Hexacon III emergency chlorine valve shut-off system from Force Flow/Halogen

The Hexacon III emergency chlorine valve shut-off system from Force Flow/Halogen adds an additional level of safety to chlorine feed systems. It stops a chlorine leak within seconds of detection by automatically closing the ton container or cylinder valve. The actuator quickly mounts to the valve without the use of any tools, allowing the valve to be manually opened or closed. It confirms that the valve was torque closed to the institute-recommended standard, and all fire codes recognize and approve the shut-off system as an alternate to a scrubber. **949/261-5030; www.halogenvalve.com.**

GFG INSTRUMENTATION G460

G460 multi-sensor atmospheric monitor from GfG Instrumentation

The G460 multi-sensor atmospheric monitor from GfG Instrumentation is rugged and compact, with a concussion-proof boot along with highly dust- and water-resistant housing. It has completely automatic calibration, one-button operation, top-mounted display, interchangeable battery packs, a highly configurable smart sensor design, and standard data and event logging. Options include a dual-range infrared combustible gas sensor, a motorized pump operable in diffusion or sample draw mode, and up to seven channels of detection. A wide range of additional sensors is available. **800/959-0329; www.goodforgas.com.**

HEMCO CORPORATION UNIFLOW SE AIRE STREAM

Uniflow SE Aire Stream fume hoods from HEMCO Corporation

Uniflow SE Aire Stream fume hoods from HEMCO Corporation are constructed from chemical-resistant, flame-retardant, nonmetallic composite resin materials with unitized construction that does not require screws, bolts, rivets or metallic hardware to assemble. The fume chamber is molded one-piece seamless with all corners coved for easy cleaning and light reflectivity. They are UL 1805 certified and are available in 48-, 60-, 72-

and 96-inch widths in either constant air volume or restricted bypass models. They are equipped with a 36-inch-high extended view height, slotted rear VaraFlow baffle system, aerodynamic sash lift with perforated air-sweep, and molded-in belled outlet collar for reduced airflow resistance. Units are shipped completely assembled and can include a selection of accessories that can be factory installed to meet specific needs. Work surfaces in a variety of materials and a choice of base cabinets including acid or flammable storage are available. **816/796-2900; www.hemcocorp.com.**

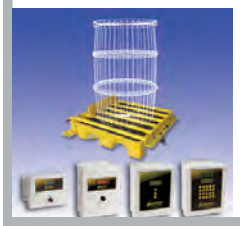
ION SCIENCE TIGER LT

Tiger LT photoionization detector from ION Science

The Tiger LT entry-level photoionization detector from ION Science has a worldwide Intrinsic Safety certification that meets ATEX, IECEx, UL and CSA standards for use in potentially explosive atmospheres. It is a streamlined, low-cost version of the company's Tiger model. Ideal for conducting environmental surveys, this hand-held instrument incorporates a fence three-electrode format to ensure increased resistance to humidity and contamination for reliability and accuracy in the field, considerably reducing drift issues and extending runtime. With a detection range of 0.1 to 5,000 ppm utilizing a standard two-point calibration protocol, it offers ideal response time of just two seconds and equally quick cleardown. It comes with long-life rechargeable lithium-ion batteries that provide up to 24 hours of use. It is IP65 rated against water ingress and includes a loud 95 dBA audible alarm. **877/864-7710; www.ionscienceusa.com.**

SCALETRON INDUSTRIES MODEL 4042 ECO

The Model 4042 ECO Spill Containment Scale from Scaletron Industries meets a broad range of water, wastewater, industrial and chemical-processing applications, and complies with secondary spill containment requirements as specified by the EPA, OSHA and other regulatory agencies. Designed to capture splashes and small spills of hazardous chemicals, the scale has a steel base protected by a corrosion-resistant finish and a polyethylene containment basin. With a total weight capacity of 2,000 pounds, it can accommodate drums and cylinders measuring up to 24 inches in diameter. A 3.5-digit digital display with a 4-20 mA output signal is standard, with options for a 4.5 or 5-digit digital display, or a Scaletron Model 1099 Chemical Process Controller. Accuracy is to either 0.5 or 0.1 percent, at 0.25 percent of full capacity, depending on the type of indicator being used. **215/766-2670; www.scaletronscales.com.**



Model 4042 ECO Spill Containment Scale from Scaletron Industries

SCANTEK RKI GX-2009

RKI GX-2009 four-gas monitor from Scantek

The RKI GX-2009 four-gas monitor from Scantek weighs just 4.6 ounces and fits in the palm of an operator's hand. It simultaneously monitors and displays combustibles, oxygen, carbon monoxide and hydrogen sulfide. It has dual audible alarm ports and alarm LEDs on three sides so that alarm conditions are obvious from multiple perspectives, especially in high-noise environments. It comes with a large LCD display, STEL and TWA readouts, and 20 hours of operation with batteries. It is intrinsically safe, with a water-resistant and dustproof design with IP67 rating. Its impact-resistant rubber overmold body is RFI resistant and comes with a large-capacity data logging system. **800/224-3813; www.scantekinc.com.**

SCOTT SAFETY MERIDIAN UNIVERSAL GAS DETECTOR

Meridian Universal Gas Detector from Scott Safety

The Meridian Universal Gas Detector from Scott Safety has a detector head designed to accept all sensor types, including electrochemical, catalytic bead, infrared or metal oxide semiconductor. It can support up to three sensors per transmitter. Hot swappable plug-and-play sensors make it easy to install and replace sensors in hazardous locations without powering down or declassifying the area. Its toxic and oxygen sensors are range agnostic, allowing the operator to change sensor range without recalibration. Sensors can be bench-calibrated in a lab, then installed in the field without additional recalibration. Its modular design and support for multiple communication protocols allows it to integrate into an existing infrastructure. It has global regulatory approvals and SIL2 certification from TUV-Rheinland. **800/247-7257; www.scotthealthsafety.com.**

Gauges/Testing Equipment

CHEMETRICS K-7511

K-7511 ultra low-range dissolved oxygen test kit from CHEMetrics

The K-7511 ultra low-range dissolved oxygen test kit from CHEMetrics can be used as the primary method for determining dissolved oxygen, a means to verify (and calibrate) readings obtained by online methods, or as a backup method if an online system is not operational. It eliminates the need for calibration or routine maintenance requirements associated with online methods. It is not subject to salinity or dissolved gas interferences. Low-range dissolved oxygen test kits include a special sampling tube for use with boiler feedwater. This device allows the user to break the tip of the vacuum-sealed ampoule in a flowing sample stream in order to preclude error from contamination by atmospheric oxygen. The kit contains everything needed to perform 30 tests, including refills, visual comparator, adhesive mounting clamp, permanent mounting clamp, sampling tube and instructions. **800/356-3072; www.chemetrics.com.**

Meters

KROHNE OPTIWAVE 5200

Optiwave 5200 C/F radar level meter from KROHNE

The Optiwave 5200 C/F, 10 GHz FMCW radar level meter from KROHNE is designed for liquid applications in up to a 98-foot measuring range. The two-wire, loop-powered device measures level and volume in storage or process tanks, with process conditions up to 482 degrees F and pressures to 580 psi in general purpose or hazardous locations (Class I, Division 1). **800/356-9464; www.us.krohne.com.**

LOVIBOND TINTOMETER MD 600

The MD 600 multi-parameter colorimeter from Lovibond Tintometer has an LED photo detection light source and over 120 methods in eight language options, ideal for laboratory or field use. This compact instrument has easy to understand on-screen assistance with 20 user-defined methods and the ability to store 1,000 tests,

MD 600 multi-parameter colorimeter from Lovibond Tintometer

including both sample cell size and reagent. The scroll-driven menu allows users to find the test they are looking for quickly. New methods are developed and available frequently. It is preprogrammed with a variety of popular ranges, including DPD chlorine, COD, phosphate and molybdate. It uses VARIO chemistries, which include powders (packaged in bulk quantities for lower cost testing), tablets for convenient and precise testing, and liquids and ampule reagents to meet specific range testing. **800/922-5242; www.lovibond.com.**

Universal Panel Meter from OTEK Corp.

OTEK CORP. UNIVERSAL PANEL METER

The Universal Panel Meter from OTEK Corp. has an auto-tricolor alphanumeric display, with field configurability, data logging, retransmission and universal power input. It has automatic signal fail detection with runtime stamp via isolated serial communication, isolated serial USB, RS-485 or Ethernet, and four open collector transistors/four SPDT relays (per channel). It can be used for many applications without having to order a specific part number. It accepts analog or digital signals and displays them in alphanumeric form. It also has solid-state relays, analog outputs and is packaged in industry-standard housings. Units are designed to replace form, fit and function of existing units in the field and customized to the same wiring. It can measure signals and be used as a slave display, message center, controller or paperless recorder, monitoring and controlling up to five isolated parameters. **520/748-7900; www.otekcorp.com.**

Meter Boxes

Empire Series fiberglass enclosures from Allied Moulded Products

ALLIED MOULDED PRODUCTS EMPIRE SERIES

Compression-molded Empire Series 36- by 30- by 12-inch fiberglass enclosures from Allied Moulded Products have increased strength, reduced weight, corrosion- and UV-resistance, and ease of modifications. They are molded with the ULTRAGUARD fiberglass formulation and provide resistance to color and glass change, as well as fiber blooming. They are designed to provide a watertight seal to NEMA 4X standards using 316 stainless steel hardware for the latching mechanism and a formed-in-place polyurethane gasket system. They have molded-in back panel boss inserts and a molded-in flange. They are available with twist latches or a three-point latch handle, and come with or without a viewing window. **800/722-2679; www.alliedmoulded.com.**

Monitors

AccuTank ultrasonic level monitoring system from FLO-CORP

FLO-CORP ACCUTANK

The AccuTank ultrasonic level monitoring system from FLO-CORP comes with everything needed to configure and remotely monitor tank levels from anywhere. Ultrasonic technology allows the sensor to be located on top of the tank for a non-contacting, precise read of liquid level. The unit includes a process monitor, an ultrasonic level transmitter specific to application requirements, and process monitoring software/interface. Optional eXmod relay expansion modules enable batch controlling, four-relay output and 10-amp AC/DC rated relays. **877/356-5463; www.flo-corp.com.**

MiniWave level transmitter from Hawk Measurement America

HAWK MEASUREMENT AMERICA MINIWAVE

The MiniWave non-contact level transmitter from Hawk Measurement America is a loop-powered ultrasonic level transmitter designed for continuous measurement of liquids. The 2-inch transducer offers high chemical compatibility. Easy and flexible mounting, along with a push-button on the front face, enable easy installation and configuration. A four-line graphic display allows easy level indication and configuration. Its powder-coated cast aluminum housing has a glass window for easy display viewing. **888/429-5538; www.hawkmeasure.com.**

TROLL 9500 Multiparameter Sonde from In-Situ Inc.

IN-SITU TROLL 9500 MULTIPARAMETER SONDE

The flexible TROLL 9500 Multiparameter Sonde from In-Situ Inc. offers water quality and quantity measurements in a single probe. Customizable sensor options combined with long-lasting internal power and a corrosion-resistant design makes it ideal for spot-checking, sampling and long-term groundwater or surface water deployments. Its fast response makes it ideal for vertical profiling in dynamic water conditions. It helps in establishing an early warning system with real-time telemetry options. **800/446-7488; www.in-situ.com.**

AMI Fluoride monitor from SWAN Analytical USA

SWAN ANALYTICAL USA AMI FLUORIDE

The AMI Fluoride continuous online monitor for fluoride in drinking water from SWAN Analytical USA has reading ranges directly in line with current and future EPA and CDC guidelines and regulations with resolution to 0.01 ppm from 0 to 9.99 ppm. It is a reagentless system meeting the requirements of many process monitoring and control applications. Capable of displaying readings, settings, events and alarms critical to the operator's needs, it has a built-in data logger to collect and download data critical to reporting and managing fluoride dosing. Two analog outputs, two control or alarm outputs, and a controlling digital input are standard. Optional third analog output or bus-type serial digital outputs are available for SCADA integration. A USB card can be added to support extensive data logging over long periods. **847/229-1209; www.swan-analytical-usa.com.**

FirstLine BMS wireless battery monitoring system from Staco Energy Products

STACO ENERGY PRODUCTS FIRSTLINE BMS

The FirstLine BMS wireless battery monitoring system from Staco Energy Products helps minimize reliability risks and maintenance costs while maximizing battery life and safety. It provides real-time, proactive, battery state of health data, with continuous voltage, current, impedance, temperature and cycling data available at all times, archived and graphically displayed for immediate analysis. It has an LCD graphic touch-screen data collector for on-site review with Ethernet/RS 485/ input and output dry contact ports for communication,

with RJ485 port for Web connectivity and remote monitoring. It has email, text and dry contact alarm notification capability. The unit can store up to two years of data for daily, monthly or yearly reports. **866/261-1191; www.stacoenergy.com.**

Operations/Maintenance/ Process Control Software

RACO MFG. AND ENGINEERING ALARMAGENT.COM

AlarmAgent.com from RACO Mfg. and Engineering

AlarmAgent.com from RACO Mfg. and Engineering includes a SaaS application that supports OPC connectivity for fast, reliable data transfer. It displays data remotely collected on a convenient real-time monitoring dashboard and allows for customized data visualization. The program provides local OPC services for machines with Windows XP or later, and tight security control. The operator can use data in any control architecture and share data with third-party OPC clients/servers over a WAN or LAN. **800/722-6999; www.alarmagent.com.**

SIERRA INSTRUMENTS QMIX

qMix gas mixing software package from Sierra Instruments

The qMix gas mixing software package from Sierra Instruments is included with every QuadraTherm 640i/780i thermal mass flowmeter on a beta trial basis. It allows the user to create custom gases or gas mixtures to compensate for gas compositional changes in the field. It can be used when the gas composition changes in the pipe or when moving the meter to another location with a different gas composition. It retains accuracy without the need for gas recalibration every time the gas changes. It allows users to create and upload unlimited gas mixtures onto one meter, and save custom gas mixtures onto your personal "My Gases Database" for later use. **800/866-0200; www.sierrainstruments.com.**

Process Control Systems

AXIOMTEK ICO300-MI

ICO300-MI embedded IoT gateway platform supporting Intel IoT Gateway from Axiomtek

ICO300-MI, an embedded IoT gateway platform supporting Intel IoT Gateway from Axiomtek, uses a low-power Intel Atom processor E3815 (1.46 GHz) and supports DDR3L system memory maximum up to 4 GB. It simplifies the development process and achieves accelerated business transformation of IoT environment. This intelligent Intel Atom-based IoT gateway system provides an ideal solution for IoT and M2M, industrial and embedded applications such as power plant automation, facility monitoring systems, intelligent transportation systems and other harsh environments. The application-ready machine-to-machine platform supports Intel Moon Island Gateway solution for the Internet of Things (IoT). Users can connect widely distributed systems via wireless network such as 3G/GPRS. It avails users to manage a variety of systems effortlessly with a wide range of industrial interfaces for both new and existing installation. **626/581-3232; www.axiomtek.com.**

FOSTER TRANSFORMER SELV SAFETY-ISOLATING TRANSFORMER

Safety Extra Low Voltage (SELV) safety-isolating transformers from Foster Transformer

Safety Extra Low Voltage (SELV) safety-isolating transformers from Foster Transformer are certified to EN 61558-1, EN 61558-2-6 and the latest edition of EN 60335-1. Many models are also UL and C-UL Recognized as Inherently Limited Class 2 transformers under UL 5085-1, UL 5085-3, CSA C22.2 No. 66.1-06, and CSA C22.2 No. 66.3-06. In addition to providing isolation for the connected load, they are capable of withstanding a direct short circuit in excess of 15 days and require no external fusing. Transformers are glow-wire compliant per EN 60335-1 for appliance applications and offered with output ratings of 75 and 100 VA. Models are available with input voltage ratings from 115 through 460 volts, 50/60 Hz, including dual voltage models for North American/European applications. Output voltages are 24 or 26.5 volts. Connection options include lead wires, glow-wire compliant terminals and terminal blocks. **800/963-9799; www.foster-transformer.com.**

GRUNDFOS PUMPS HYDRO MPC BOOSTERPAQ

Hydro MPC BoosterpaQ pressure-boosting system from Grundfos Pumps

The Hydro MPC BoosterpaQ fully integrated and compact pressure-boosting system from Grundfos Pumps offers multiple configurations, with up to six pumps in parallel, to accommodate water supply systems as well as industrial and irrigation applications. The CU 352 intuitive graphical interface controller makes the system user-friendly while ensuring efficient operation. Using actual pump-curve data, the intelligent CU 352 controller helps to optimize energy consumption by controlling/staging the number of pumps in operation as well as the speed of the individual pumps in order to continually adjust the performance of the system to variations in demand. A large 3 1/2- by 4 5/8-inch intuitive color screen ensures easy operation, while the startup wizard facilitates commissioning. The controller communicates via common fieldbus protocols with a built-in Ethernet connection, enabling remote access via a Web browser. **800/921-7867; http://us.grundfos.com.**

KRUGER USA ENVISTA VIS

ENVISTA Vis advanced polymer optimization system from Kruger USA

The ENVISTA Vis advanced polymer optimization system from Kruger USA determines and controls the optimum polymer dose for biosolids dewatering operations. The system consists of integral auto sampling, sample conditioning and sample dilution components. It automatically accounts for the variability in feed sludge quality typical at many wastewater treatment plants. It measures the absorbance of light in a diluted sample of dewatered centrate or pressate at regular intervals. A characteristic parabolic curve of absorbance is developed that correlates with the concentration of residual polymer in the sample. The system then automatically adjusts the plant's polymer system to feed the optimum dose. Full-scale testing has demonstrated a polymer savings of 30 percent without any negative impact on final cake solids. It reduces operator attention and manpower by automating polymer-dosing adjustments while producing a consistent, high-quality end product. **919/677-8310; www.krugerusa.com.** *(continued)*

MARKLAND SPECIALTY ENGINEERING AUTOMATIC SLUDGE BLANKET LEVEL DETECTOR

Automatic Sludge Blanket Level Detector from Markland Specialty Engineering

The Automatic Sludge Blanket Level Detector from Markland Specialty Engineering helps monitor and control interface levels in sedimentation basins and clarifiers, including DAF units, decanting tanks, hoppers and upflow filter reactors. It automates solids removal when treating raw water, wastewater and backwash from sand/membrane filters. Users can program solids-removal pumps to operate only when necessary, preventing carryover, optimizing feed density for improved filter press/centrifuge/digester performance and improving outflow for reuse. It uses high-intensity infrared light to measure the settled sludge bed and overlying cloud layer. A slim profile makes it suited for constricted spaces. **855/873-7791; www.sludgecontrols.com.**

Circulating Baths from PolyScience

POLYSCIENCE CIRCULATING BATHS

PolyScience Circulating Baths are versatile temperature control products available with six different controllers. They offer a wide range of functionality, with temperature ranges from 104 to 392 degrees F. They have time/temperature programming capabilities with connectivity options for RS-232, RS-485, Ethernet, USB to flash drive and USB to PC. Remote on/off and external temperature probe ports are built in. Specialized models are available specifically designed to conform to APHA, AWWA, WEF and EPA testing standards. **800/229-7569; www.polyscience.com.**

SCADA Systems

VTScada from Trihedral Engineering Limited

TRIHEDRAL ENGINEERING LIMITED VTSCADA 11.1

VTScada from Trihedral Engineering Limited includes discoverable tools and an architecture that integrates all core SCADA components in one package. It helps operators grow from a fully featured single server application to a multimillion tag system that keeps features like alarm notification tightly integrated. The driver library supports combinations of standard (and many proprietary) PLCs and RTUs. In minutes, configure redundant servers, historians, Internet servers or networks. Built-in version control provides accountability and improves recovery from unexpected effects of configuration. Over 200 graphic widgets make it easy to represent values as realistic meters, switches, buttons and animations. Choose from over 4,500 industry-specific images, symbols, polygons and animations. Configure displays to appear consistently across multiple devices and resolutions. **800/463-2783; www.trihedral.com.**

Sensors

AMETEK PMT PRODUCTS MODEL IDT

The Model IDT intrinsically safe pressure transmitter from AMETEK PMT Products is designed for use in hazardous areas for pressure measurement applications that require a rugged, compact design. Its approvals include FM US, FM Canada (cFMus), ATEX and IECEx. Its 0.2 percent typical accuracy allows it to be used on critical applications. It incorporates a stainless steel isolation diaphragm and 316 stainless steel construction that resists the corrosive effects of caustic media or washdowns, and that makes it compatible with a variety of media. Monel versions and Hastelloy diaphragms for hydrogen sulfide applications are available. It is offered in pressure ranges from full vacuum to 5,000 psig, including very low pressure 0 to 1 psi, 0 to 3 psi and 0 to 6 psi versions, and 15 through 300 psia. **800/553-9092; www.ametekusg.com.**

Model IDT pressure transmitter from AMETEK PMT Products

BINMASTER LEVEL CONTROLS SMARTBOB2 SS

The SmartBob2 SS sensor from BinMaster measures the level of solid material beneath a liquid surface, without climbing tanks. It is ideal for measuring salt, sediment, sand or waste that has settled underwater. The weighted sensor is attached to a stainless steel cable that can withstand corrosive materials. The sensor is mounted on top of a tank, and a weighted probe drops down through the liquid until it comes in contact with the material settled at the bottom of the tank. The probe automatically retracts and makes an accurate record of the data. The results are monitored from a control console or PC loaded with eBob software. The reports include the distance to the solid material, the height of the solid material and what percentage of the tank is full of solid material. A single console can monitor the contents of up to 128 tanks. **402/434-9102; www.binmaster.com.**

SmartBob2 SS sensor from BinMaster

FLUID CONSERVATION SYSTEMS PERMANET+

PermaNet+ system from Fluid Conservation Systems

The PermaNet+ system from Fluid Conservation Systems provides remote monitoring and correlation of water distribution system leaks. The acoustic leak-noise sensor provides sensitivity identical to the Permalog+ platform. The sensor attaches magnetically to water pipelines and proactively listens for leak noise to occur within the distribution network. It then transmits the acoustic data from the leak-noise sensors directly to the cloud using the existing cellular network, with no need for additional repeating infrastructure or time-consuming installation and setup. By transmitting the leak-noise audio files to the cloud, it's possible for utility personnel to listen to leaks and eliminate false positives from the office, conserving fuel and unnecessary man-hours. As part of the OmniColl remote asset-monitoring platform, the system displays the reported leak data on a geographical overlay and exports the data for immediate remote correlation with one click. **800/531-5465; www.fluidconservation.com.**

Valueline pressure transmitter from Keller America

KELLER AMERICA VALUELINE

The Valueline pressure transmitter from Keller America uses microprocessor technology to provide Total Error Band (TEB) accuracy, with fully conditioned analog output over a wide compensated temperature range. Available with a choice of electrical connections, custom pressure ranges and voltage or current outputs, it integrates into new and existing systems, including PLC, VFD, SCADA and most commercially available displays and controllers. When equipped with a 4-20 mA analog output, it includes guaranteed lightning protection. Internal circuitry protects it from fast-rising transients. **877/253-5537; www.kelleramerica.com.** tpo

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- ❒ ALL-TEST Pro AT5 electric motor circuit analysis instrument
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- ❒ Electro-Chemical Devices DC80 dechlorination analyzer
- ❒ Nasco Whirl-Pak Sludge Judge
- ❒ Sartorius Corporation MA160 moisture analyzer

Communication Equipment
- ❒ Harwil Corporation Wireless Bridge
- ❒ Industrial Video & Control Video Management Solution

Controllers
- ❒ Blue I Water Technologies HYDROGUARD HG-702 TurbiPlus
- ❒ ElectroSwitch Corporation Time Delay Control Switch Relay (TD-CSR)
- ❒ Metropolitan Industries LMS II level management system
- ❒ Micrometrix Corp. Streaming Current Controller
- ❒ Phoenix Contact Designline industrial PCs
- ❒ Pulsafeeder MicroVision conductivity cooling tower controller
- ❒ Schneider Electric Modicon M580 Ethernet programmable automation controller
- ❒ Torrey Pines Scientific EchoTherm CO50 programmable HPLC column chiller/heater

Control/Electrical Panels
- ❒ ABB Low Voltage Products division heavy-duty safety switch
- ❒ Beijer Electronics QTERM-A7 and QTERM-A12 operator panels
- ❒ Orenco Controls OLS Series control panels
- ❒ PRIMEX ECO Smart Station control system
- ❒ See Water Simple Simplex control panels
- ❒ Unison Solutions custom control panels

Drives
- ❒ Yaskawa America U1000 industrial matrix drive

Flow Control and Software
- ❒ Endress+Hauser Memobase Plus calibration software
- ❒ Engineered Software PIPE-FLO Professional
- ❒ Smith & Loveless QUICKSMART system controls

Flow Monitoring
- ❒ Fluid Components International ST100L flowmeter
- ❒ Greyline Instruments DFM 5.1 Doppler Flow Meter
- ❒ Instruments Direct NCMP-SMART flowmeter
- ❒ Telematics Controls Kayden Classic 810 flow switch

Gas/Odor/Leak Detection Equipment
- ❒ Analytical Technology C-21 DRI-GAS Sampling System
- ❒ Arizona Instrument Jerome 651 fixed hydrogen sulfide detection system
- ❒ Chlorinators Incorporated REGAL Series 3000 gas detector
- ❒ Detcon GMI PS500 multi-gas monitor
- ❒ Eagle Microsystems Model GD-1000 Premier Series gas detector
- ❒ Force Flow/Halogen Hexacon III emergency chlorine valve shut-off system
- ❒ GfG Instrumentation G460 multi-sensor atmospheric monitor
- ❒ HEMCO Corporation Uniflow SE Aire Stream fume hoods
- ❒ ION Science Tiger LT photoionization detector
- ❒ Scaletron Industries Model 4042 ECO Spill Containment Scale
- ❒ Scantek RKI GX-2009 four-gas monitor
- ❒ Scott Safety Meridian Universal Gas Detector

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- ❒ SWAN Analytical USA AMI Fluoride monitor
- ❒ Staco Energy Products FirstLine BMS wireless battery monitoring system

Operations/Maintenance/Process Control Software
- ❒ RACO Mfg. and Engineering AlarmAgent.com
- ❒ Sierra Instruments qMix gas mixing software package

Process Control Systems
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- ❒ Foster Transformer Safety Extra Low Voltage (SELV) safety-isolating transformers
- ❒ Grundfos Pumps Hydro MPC BoosterpaQ pressure-boosting system
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By Craig Mandli

Water department uses durable ammonia flow control for monochloramine production

Problem

The Jefferson Parish (Louisiana) Water Department provides 60 mgd of drinking water to New Orleans residents. The department needed a reliable mass flow controller to precisely dose ammonia gas to achieve the ammonia-to-chlorine ratio that creates monochloramine. Existing meters broke down from the ingress of liquid ammonia.

Solution

Alicat Scientific provided a combination of **MS-series mass flowmeters** and **MCS-series mass flow controllers** configured for aggressive gases like ammonia. The devices provide fast, repeatable, accurate results and can easily resume operation after the ingress of liquid ammonia. This is accomplished by the wetted materials used in the device, including a 316 stainless steel sensor and FFKM elastomers. A controller-mounted multifunctional digital interface allows operators to see the flow being called for on the controller.

RESULT

The department no longer loses time and money servicing the mass flow units. Liquid ammonia in the Alicat can be simply flushed out while operations continue. **888/290-6060; www.alicat.com.**

New flowmeters lead to higher accuracy

Problem

Plant managers at Davidson Water in Lexington, North Carolina, estimated annual nonrevenue water at 16.7 percent, translating to as much as 2 mgd during summer. Management researched solutions to finding leaks in the distribution system.

Solution

"We wanted to understand what was occurring at each critical point in our system," says Robert Walters, assistant manager. "In total, we identified 14 metering locations." **McCrometer** recommended the **FPI Mag flowmeter.** It has ±0.5 percent accuracy and installs without cutting pipe, welding flanges, dewatering lines or interrupting service. This reduces installation time and costs. The utility installed 14 FPI Mag flowmeters to measure water leaving the plant and at other locations, including rural water towers and booster stations.

RESULT

The flow data pinpointed zones with issues so that leaks could be found and resolved. Managers report nonrevenue water decreased to 13 percent and expect losses to continue dropping. **800/220-2279; www.mccrometer.com.**

Wireless mesh networking for industry-standard sensors provides monitoring solution

Problem

The water treatment plant in South Beloit, Wisconsin, needed a better way to monitor data from remote sensors like level sensors and flowmeters. Wired SCADA systems became problematic as they aged, and replacing them would have been costly.

Solution

The plant chose the **Wzzard intelligent sensing platform** from **B+B SmartWorx.** The platform creates a complete connectivity stack between sensors at the network edge and applications at the network core or in the cloud. Wireless Wzzard Intelligent Edge Nodes connect to new or existing industry-standard sensors, read their data and wirelessly transmit it to a Spectre Network Gateway. Every node has routing capabilities, forming reliable, scalable, self-sustaining wireless mesh networks. Individual nodes need not be within wireless range of the gateway, as they can route the data across fellow nodes until it reaches its destination. The gateway then provides secure wireless or wired connections to the Internet with automatic failover. It can simultaneously provide connectivity for the Wzzard mesh network and additional equipment via its Ethernet, RS-232/485 and I/O ports.

RESULT

The technology delivered remote sensor data more reliably. **815/433-5100; www.bb-elec.com.**

Monitoring orthophosphate reduces chemical costs

Problem

The Fox River Water Pollution Control Center (FRWPCC) in Brookfield, Wisconsin, uses chemical phosphorus removal, keeping the facility compliant with a 1.0 mg/L total phosphorus limit. The monthly cost for alum treatment often exceeded $10,000.

Solution

Rick Wenzel, process supervisor, recommended the **IQ SensorNet P700 Orthophosphate Analyzer** from **YSI, a xylem brand.** The unit continuously monitors the phosphate concentration in filtered effluent and reports the value to a SCADA system, which sends a signal to control the alum dosage.

RESULT

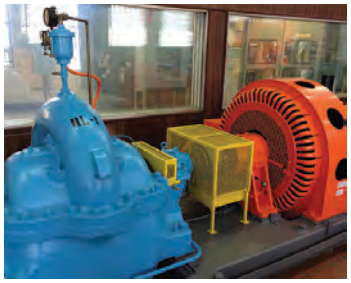
The unit helped reduce alum usage by more than 5,500 gallons in the first five months of operation, saving $2,500 per month. The data revealed regular peaks and the effects of construction projects, which were interfering with biological phosphorus removal. Now, the staff has information to help determine the most efficient means for removing phosphorus. **937/767-7241; www.ysi.com.**

Utility reduces main breaks with model predictive control

Problem

The Windsor Utilities Commission, managed by EnWin Utilities, distributes water to 72,000 customers in Windsor, Ontario. The aging infrastructure was averaging 238 main breaks a year at a cost of about $5,000 each. EnWin determined that a significant number of breaks were caused by pressure spikes and dips throughout the system.

Solution



To mitigate control pressure fluctuations and related main breaks, **Rockwell Automation** recommended a model predictive control (MPC) solution that leverages the utility's SCADA system and **Allen-Bradley PowerFlex** variable-frequency drives. The MPC solution controls pressure fluctuations by monitoring and adjusting multiple system variables, including pressure station data, medium-voltage drives and flow control valves. The onboard solution embeds MPC functionality directly in the Allen-Bradley ControlLogix controller. No additional server is required.

RESULT

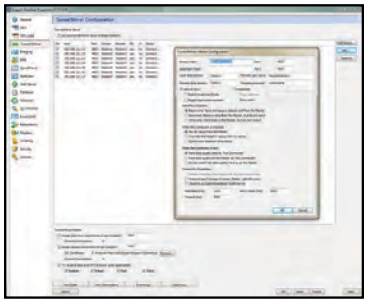
EnWin reduced annual water main breaks by 21 percent. The utility reduced system pressure by 2.8 psi and the standard deviation by 29 percent. These improvements led to $250,000 in savings from lower operational and electricity costs and less system leakage. **414/382-2000; www.rockwellautomation.com.**

Remote data sharing program helps integrate data for $10 billion water project

Problem

Water resource engineers for the City of Montreal, Quebec, needed to integrate production data from all of the city's seven pumping stations. They needed a reliable and secure way to bring key data to a central control location for storage and analysis, and share key data among plants. The ultimate goal was to improve efficiency.

Solution



The data was available on SCADA systems at each pumping plant via OPC servers, but networking OPC using the distributed component object model was neither reliable nor secure. The engineering team decided to use OPC tunneling. **Cogent DataHub** from **Software Toolbox** securely and efficiently accomplished the remote data sharing. Reliability goals were met using the redundancy capabilities of DataHub, which was installed at each site.

RESULT

The system has been running for months without any problems. The data integration is meeting or exceeding its goals. The program enabled sharing of data securely between satellite locations, giving operators at each plant a complete picture of the status of the entire system. **704/849-2773; www.softwaretoolbox.com.**

University saves water with advanced metering analytics

Problem

Located in the Central Valley, one of the driest regions in California, the University of California Merced needed to meet new water compliance standards.

Solution

The university turned to **Badger Meter,** using **BEACON Advanced Metering Analytics (AMA).** According to Emron Quarqat, water operations crew leader, what started out as a friendly student competition to reduce water consumption turned out to be an eye-opening experience for the whole campus. "BEACON AMA's automated data collection and online software has significantly reduced the time and resources needed to ensure and document our new compliance standards," says Quarqat. "The whole campus has its eyes on water conservation, and we now know where our water is going." Leveraging BEACON AMA's cellular radio endpoints, use of existing cellular networks and easy-to-use software product, the university is equipped with near-real-time data to monitor its reclaimed water, irrigation and wastewater.

RESULT

In the first year, campus dormitories reduced consumption by 14 percent, saving 79,000 gallons of water. They also saved 1.4 million gallons from 16 water leaks detected. In later years, conservation became a habit as students used BEACON AMA's monitoring capabilities, including the EyeOnWater smartphone app, to achieve another 9 percent reduction. The technology has quickly detected several leaks, including five toilets leaking a total of 150 gph, saving 1 million gallons of water per year. **800/616-3837; www.badgermeter.com.** tpo

industry news

Val-Matic renews ISO certification

Val-Matic Valve & Manufacturing renewed its ISO 9001:2008 certification. The company received its first certification in 2006.

Chromalox acquires ProTrace Engineering

Chromalox, manufacturer of advanced thermal technologies, acquired ProTrace Engineering. Headquartered in Calgary, Alberta, ProTrace provides engineering services, specializing in electric heat tracing, temporary construction power and power system protection.

Meurer Research completes expansion

Meurer Research, an engineering company, manufacturer and installer of advanced water and wastewater equipment, moved to a larger manufacturing facility in Golden, Colorado. As part of the expansion, the company added precision laser-cutting and fabrication equipment.

Schneider Electric acquires foxray software

Schneider Electric acquired LimeWare, provider of system analysis and auditing software for Schneider Electric's Foxboro Evo process automation and I/A Series distributed control systems. The foxray technology provides configuration management, alarm management, operation action analysis and overall documentation. LimeWare's offerings will be fully integrated into Schneider's process automation business and will continue to be managed by its executive team.

US Peroxide changes name to USP Technologies

US Peroxide, a Trojan Technologies business and provider of peroxygen-based programs to the municipal and industrial water treatment market, changed its name to USP Technologies.

Prime Resins names business development manager

Prime Resins named Casey Pieczonka Florida business development manager. A licensed, certified underground utility and excavating contractor, his areas of expertise include CIPP rehabilitation, manhole and lift station rehabilitation, construction administration, sanitary/storm sewer pipe evaluation, spray-applied coatings and dewatering.

Study finds water utilities change readers every 8.2 years

Water utilities typically change their AMR/AMI meter reading systems every 8.2 years, far more frequently than the 20-year life expectancy for the meters, according to a study by Dr. Howard Scott (www.thescottreport.com). Scott analyzed 30 years of data covering about 11,000 projects involving 58.8 million AMR/AMI units. **tpo**

1. LARSON ELECTRONICS QUADPOD MOUNTED WORK LIGHT

The 800-watt quadpod mounted work light (WAL-QP-2X400LTL-LED-100) from Larson Electronics features solid wheels for portability and two 400-watt LED light heads. The light provides about 50,000 square feet of coverage and delivers 104,000 lumens. The fixtures are IP67 rated waterproof. The towers can be elevated to 12 feet and collapsed to 7 feet. **800/369-6671; www.magnalight.com.**

2. GRUNDFOS PRESSURE-BOOSTING SYSTEM

The Hydro MPC BoosterpaQ compact pressure-boosting system from Grundfos Pumps features multiple configurations for up to six pumps in parallel. The CU 352 intuitive graphical interface controller ensures efficient operation. The controller communicates via common fieldbus protocols and has a built-in Ethernet connection for remote Web access. **800/921-7867; http://us.grundfos.com.**

3. VICTAULIC EXPANSION BARREL

The W256 expansion barrel from Victaulic accommodates up to 42 inches of in-line expansion and contraction. The barrel eliminates the need for expansion loops or multiple expansion compensators. Standard Victaulic Style W07 AGS rigid couplings are used to join the barrel to the pipeline. The barrel is made of ductile iron and features redundant engineered seals for a long service life. The barrel is available in 24- to 42-inch sizes and accommodates pressures up to 300 psi. **610/559-3300; www.victaulic.com.**

4. REED DUAL SOCKET, ADJUSTABLE WRENCH

The L2N1ADJ dual socket, adjustable ratchet wrench from Reed Manufacturing enables workers to access nuts in tight locations. The two back-to-back socket sizes (1 1/4 and 1 1/16) feature a 12-point design that helps the sockets grip and hold for pipeline and construction work. Loosening the large wing nut swings the socket head from side to side. Flipping the socket head by disassembling the wing nut and bolt makes it possible to use either socket opening. Weighing 2.3 pounds, the wrench has a torque rating of 200 ft-lbs. **800/666-3691; www.reedmfgco.com.**

5. IWAKI AMERICA HIGH-FLOW PUMP

The MX-505 pump from Iwaki America, made of glass fiber reinforced polypropylene, is capable of flows to 225 gpm and total dynamic head up to 86 feet. Designed for high-flow applications, the pump features a dry-run design. **508/429-1440; www.iwakiamerica.com.**

6. SPIRAX SARCO HEAT EXCHANGER

The EasiHeat DHW heat exchanger from Spirax Sarco features S.I.M.S. (Spirax Intelligent Monitoring System) technology that delivers energy management and system performance data. A 7-inch touch screen provides visual access to data detailing how and where energy is consumed. The unit constantly supplies up to 4 million Btu of hot water at a stable temperature on demand, eliminating the need for large storage volumes. Packages are compatible for connection to existing proprietary networks and can interact with Ethernet and Modbus systems, as well as Profibus, CANopen and EtherCAT. **800/356-9362; www.spirax.com.**

7. BIONOMIC HIGH-PERFORMANCE VENTURI SCRUBBERS

Series 7000/8000 integrated scrubber packages from Bionomic Industries feature a recirculation pump, piping networks, instrumentation and automated controls. The scrubber packages meet PM 10 and PM 2.5 particulate emission standards and are available in a variety of materials for operation on extremely corrosive or erosive gas contaminant streams. An advanced throat design and diverging section provide high collection efficiencies at reduced pressure drops. Throat sections are available for manual operation or can be equipped with an optional automatic adjustment mechanism for maximum flexibility. **800/311-6767; www.bionomicind.com.**

8. DVO PHOSPHORUS RECOVERY SYSTEM

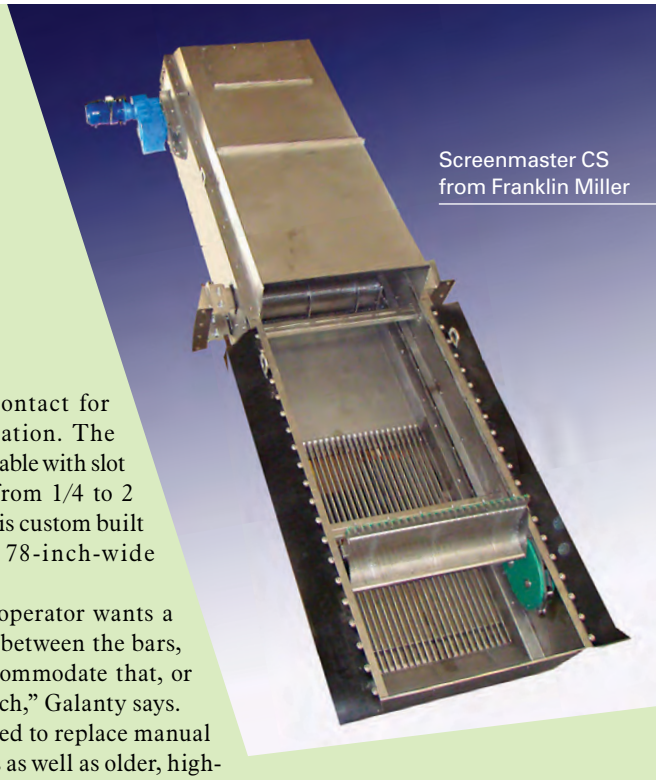
The Two-Stage Mixed Plug Flow anaerobic digester and phosphorus recovery system from DVO is designed to remove 75 to 95 percent of phosphorus from anaerobically digested waste. Phosphorus-rich solids generated by the recovery system can be marketed as a soil amendment, fertilizer or potting soil/peat moss replacement. **920/849-9797; www.dvoinc.net.**

9. CRESCENT SELF-ADJUSTING PIPE WRENCH

The CPW12 12-inch, self-adjusting pipe wrench from Crescent, a member of the Apex Tool Group, is designed for one-handed performance. The wrench works on most common pipe, from 5/8 to 1 1/2 inches, including black iron, galvanized, PVC and copper. A black oxide finish resists corrosion. **919/362-1670; www.crescenttool.com.** tpo

FREE INFO ON THESE PRODUCTS – RETURN FOLLOWING FORM

wastewater:
product spotlight


Screenmaster CS from Franklin Miller

Bar screen with oversized rakes eliminates bottom sprockets for reduced maintenance

By Ed Wodalski

The **Screenmaster CS (chain screen) mechanical bar screen** from **Franklin Miller** provides efficient cleaning and removal of solids from channel installations. The screen features a continuous rotary motion and rake heads that penetrate the screen slots as they reach the channel bottom and lift accumulated debris to a discharge height of 38 feet. Screenings drop from the discharge chute into a bin, conveyor or Franklin Miller screenings conditioner.

"The rakes themselves are oversized so you can pick up larger objects and need fewer rake heads because you get more solids out per revolution," says Bill Galanty, president, Franklin Miller.

Powered by a 3/4 or 1 hp electric motor, the bar screen can operate continuously or be activated by a S320 program controller on a timed basis or when an ultrasonic level sensor indicates high water levels.

Made from 316L as well as 304L stainless steel for corrosion resistance, the bar screen has no bottom bearings or sprockets for reduced maintenance and smooth operation.

Each rake head features UHMW slotted backing that eliminates metal-to-metal contact for quiet operation. The unit is available with slot openings from 1/4 to 2 inches and is custom built for up to 78-inch-wide channels.

"If an operator wants a 1-inch slot between the bars, we can accommodate that, or even 1/4 inch," Galanty says.

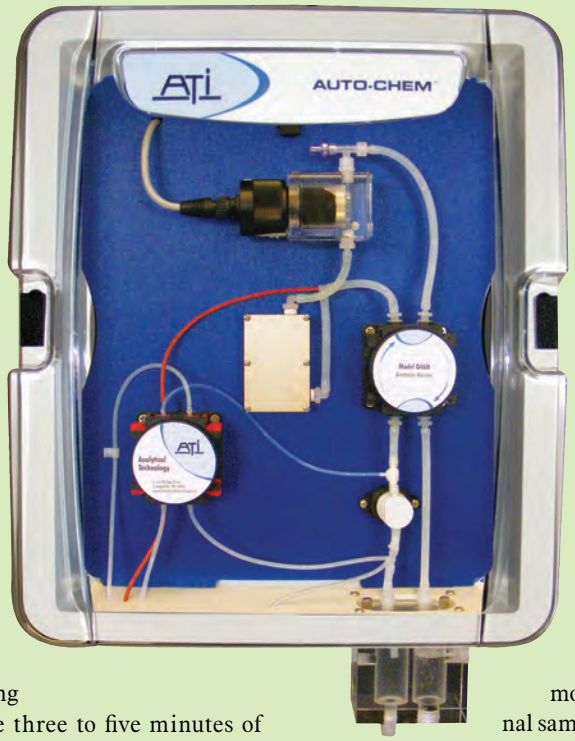
Designed to replace manual bar screens as well as older, high-maintenance mechanical screens, the Screenmaster CS has a 10- to 20-year estimated life span. Options include ultra-fine screen, screw conveyors and Spiralift SC Wash Press that grinds, washes and compacts solids for disposal in landfills. **800/932-0599; www.franklinmiller.com.**

FREE INFO ON THIS PRODUCT – RETURN FOLLOWING FORM

(continued)

Ammonia monitor provides continuous chemical feedback

By Ed Wodalski



Q46N from Analytical Technology Inc. (ATI)

The **Q46N monitor** from **Analytical Technology Inc. (ATI)** continuously measures free ammonia, total ammonia and monochloramine in potable water. Designed for monitoring chloraminated water to minimize excess ammonia, the system features fast response for real-time measurement and better process control.

Unlike colorimetric and ion selective electrode monitors, the electrochemical Q46N monitor converts ammonia to monochloramine and measures the monochloramine.

"What that allows us to do is real-time, continuous monitoring," says Bill Popp, national sales manager, ATI. "You know from second to second instead of every five minutes what the true concentration of ammonia is. Let's say you're driving down the road but your display only updates every five minutes. You pass a cop with radar. Would you want to guess how fast you were going? If you're adjusting chemical feed rate in a batch mode, you have three to five minutes of undershoot or overshoot that you could be dealing with. How do you know when you have enough? If you're trying to maintain a fairly tight control, it's going to be very difficult to do."

The ammonia monitor utilizes a simple chemical system with inexpensive reagents. Three separate reagents are required for operation.

"The reagents are sodium hexametaphosphate, which is a sequestering reagent," Popp says. "The second reagent is chlorine bleach. The reaction converts ammonia to monochloramine. The third reagent is hydrogen peroxide, which destroys excess chlorine. The reagents are readily available. You can buy them from us or mix them yourself. The goal is to make the operating cost extremely low."

Multiple communication options include Profibus, Modbus and Ethernet, as well as analog.

"Inside a plant, if you're upgrading a system or adding new equipment, it's easier to install a single bus," Popp says. "Think of it as a line that goes along the inside wall of the building. If you can take a monitor and clip onto that line, you're not running additional wires for each monitor. You're getting all the instruments basically communicating on one set of wires."

When reading free ammonia, water comes into the bottom of the monitor where an electrochemical sensor measures the amount of monochloramine, establishing a baseline. An internal sample pump draws the sample and adds the sequestering reagent, followed by the chlorine and peroxide. A second sensor measures monochloramine concentration after the chemicals are added. The baseline reading is subtracted from the second reading, determining the amount of free ammonia in the sample.

The monitor requires routine maintenance every three to six months (change membrane and electrolyte). A year's supply of replacement parts is included with the monitor. **800/959-0299; www.analyticaltechnology.com.**

tpo

worth noting

people/awards

Greg Hall Jr., superintendent of the Conroe (Texas) Wastewater Treatment Plant, received the Employee of the Year award for the Conroe Public Works Department for streamlining operations, improving training, implementing technology and educating the public.

Jeffrey Bailey, assistant supervisor at the Allen Harim Harbeson Wastewater Plant (Delaware), was named 2014 Wastewater Professional of the Year by the Water and Wastewater Professionals group. Bailey also has duties at the Dagsboro spray irrigation wastewater facility.

Tim Dumas was named chief plant operator at the Wastewater/Water Plant in the Village of Massena, New York. **Dante Romeo** was appointed to an operator position at the plant.

Aaron Zahn was named 2015 Young Floridian by the University of Florida Bob Graham Center. As president and CEO of BCR Environmental and NuTerra, Zahn has counseled the U.S. EPA, the World Health Organization, the Florida Department of Environmental Protection, and state and local leaders on the economic and environmental impacts of innovative wastewater and organic waste infrastructure.

The **CH2M** global engineering firm received an honor award from the American Council of Engineering Companies for project developments at the Wilson Creek Regional Wastewater Treatment Plant in Collin County, Texas.

The **City of La Plata Wastewater Treatment Plant** received the Wastewater System of the Year award from the Maryland Rural Water Association for improved quality and consistency of treatment and quality and consistency of wastewater service to customers.

The **City of St. Charles Wastewater Treatment Facility,** operated by Woodard & Curran, was named small treatment facility recipient of the 2014 Safety Survey Award by the Missouri Water Environment Association.

The South Dakota Department of Environment and Natural Resources presented the **Ellsworth Air Force Base, City of Vermillion, City of Sturgis** and **City of Mitchell** with 2014 Operation and Maintenance Wastewater Treatment Awards.

Madison County Public Water Supply District (PWSD) 1 was honored for the best tasting water in the state at the Missouri Rural Water Association (MRWA) Annual Open House.

Frederica Water Department's **Dustan Russum** was named the 2014 Water Professional of the Year by Delaware Water and Wastewater Professionals. Allen Harim Harbeson Wastewater Plant's **Jeffrey Bailey** was named Wastewater Professional of the Year. WWES Associates owner **Brian C. Carbaugh** was named On-Site Professional of the Year. The Allen J. Williams Lifetime Achievement Award went to **David Austin,** owner of Delaware Log Homes, and **W. David Harrington** of Artesian Resources.

Stephen Morton was promoted to water plant superintendent for the City of Muskogee, Oklahoma.

Glenn Clifford was named 2015 Australia New South Wales Water Industry Operator of the Year.

The **Village of Van Etten,** New York, received the 2015 Water System of the Year award from the New York Rural Water Association.

Harold Henderson of Mud Creek Wastewater Treatment Plant was named by Georgia Association of Water Professionals (GAWP) as TopOp for District 7.

Reynaldo Aldava, lead wastewater operator for Surprise, Arizona, was recognized as 2015 Large System Treatment Plant Operator of the Year by the Arizona Water Association.

Brian Bruce was appointed president of New York American Water.

The **Newton (North Carolina) Water Treatment Plant** was honored for the 13th consecutive year with the Area-Wide Optimization Program Award by U.S. EPA.

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

education

AWWA

The American Water Works Association is offering these courses:

- Sept. 2 – Cross-Connection Control: Plans and Troubleshooting Webinar
- Sept. 9 – Managing Cyber Risks to Water Utility Business and Control Systems Webinar
- Sept. 14 – Nov. 13 – Water Treatment Operator Level 1 - Fall 2015, online
- Sept. 14 – Nov. 13 – Water Treatment Operator Level 2 - Fall 2015, online
- Sept. 14 – Nov. 13 – Water Treatment Operator Level 3 - Fall 2015, online
- Sept. 14 – Nov. 13 – High-Tech Operator Course 1 - Fall 2015, online
- Sept. 16 – Managing Leakage With Advanced Practices Webinar
- Sept. 24 – Operations Innovation: Driving High Performance Results, Denver, Colorado
- Sept. 28-29 – Wetland Construction: Planning and Functional Design, Bordentown, New Jersey

Visit www.awwa.org.

Arkansas

The Arkansas Environmental Training Academy is offering these courses:

- Sept. 1 – Water Treatment Exam Prep, Fayetteville
- Sept. 2 – Water Math Exam Prep, Fayetteville
- Sept. 2-3 – Customer Service Inspector, Texarkana
- Sept. 3 – Water Distribution Exam Prep, Fayetteville
- Sept. 8-11 – Basic Water Math (Night Class), Fort Smith
- Sept. 8 – Basic Water Math, Camden
- Sept. 9 – Applied Water Math, Camden
- Sept. 10 – PWS Compliance, Camden
- Sept. 10 – Backflow Prevention Association of Arkansas Seminar, Fayetteville
- Sept. 14-18 – Backflow Assembly Tester, Little Rock
- Sept. 15 – Backflow Assembly Tester Recertification, Little Rock
- Sept. 15-17 – Advanced Water Treatment, Greers Ferry
- Sept. 22-24 – Intermediate Water Distribution, Rogers
- Sept. 22-24 – Backflow Assembly Repair, Fayetteville
- Sept. 22-25 – Applied Water Math (Night Class), Fort Smith
- Sept. 23 – Backflow Assembly Tester Recertification, Fayetteville
- Sept. 29-Oct. 1 – Advanced Water Distribution, North Little Rock

Visit www.sautech.edu/aeta/.

The Arkansas Rural Water Association is offering these courses:

- Sept. 2-3 – Water Exam Review, Lonoke
- Sept. 22-24 – Intermediate Distribution, Lonoke

Visit www.arkansasruralwater.org.

California

The California-Nevada Section AWWA is offering these courses:

(continued)

- Sept. 2 – Water Use Efficiency Grade 3 Workshop, Rancho Cucamonga
- Sept. 8 – D1-D2 Review, West Sacramento
- Sept. 9 – 8-Hour D1-D2 Math Review, West Sacramento
- Sept. 10 – Cross Connection Workshop, Rancho Cucamonga
- Sept. 10 – D3-D4 Review, West Sacramento
- Sept. 11 – 8-Hour D3-D4 Math Review, West Sacramento
- Sept. 11 – Backflow Refresher, Rancho Cucamonga
- Sept. 14 – Backflow Tester Course, West Sacramento
- Sept. 14 – Backflow Tester Course, Rancho Cucamonga
- Sept. 14 – D2-D3 Review, Riverside
- Sept. 15 – D2-D3 Math Review, Riverside
- Sept. 15 – D4-D5 Math Review, Riverside
- Sept. 16 – D4-D5 Review, Riverside
- Sept. 23 – Behind the Curtain of Drinking Water, Rancho Cucamonga

Visit www.ca-nv-awwa.org/.

Illinois

The Illinois Section AWWA is offering these courses:

- Sept. 1 – Phosphate Technology and Biofilm Control, Carpentersville
- Sept. 1 – Water Loss and Hands-On Meter Testing and Leak Detection, Channahon
- Sept. 2 – Keeping the Water Inside Your Pipe and the Dirt Outside, Peoria
- Sept. 2 – Intro to EPA's Enforcement and Compliance History Online Webinar
- Sept. 2 – Backflow Codes, Installation and Repair, Elgin
- Sept. 3 – SCADA 101, Park Forest
- Sept. 16 – Prestressed Concrete Cylinder Pipe Webinar
- Sept. 23-Nov. 11 – Water Distribution System O&M 8-Week Night Class, Westmont
- Sept. 29 – Planning, Design and Construction, Pittsfield Water Treatment Plant, Pittsfield

Visit www.isawwa.org.

The Illinois Environmental Resources Training Center is offering these courses:

- Sept. 9 – Locates for Water and Sewer Lines, Edwardsville
- Sept. 15-18 – Cross Connection Control, Rockford
- Sept. 21-25 – Wastewater Short School, Rockford
- Sept. 28 – Class D Water Operations 1, Geneva
- Sept. 29 – Class D Water Operations 2, Geneva

Visit www.siue.edu.

Michigan

The Michigan Water Environment Association is offering these seminars:

- Sept. 8 – Fundamentals of Activated Sludge I, Linden
- Sept. 10 – Collections Seminar, East Lansing
- Sept. 24 – Fundamentals of Maintenance Practices II, Manistee

Visit www.mi-wea.org.

The Michigan Section AWWA is offering these courses:

- Sept. 1-3 – Basic Math and Hydraulics Short Course, Roscommon
- Sept. 10 – Advanced Cross Connection Seminar, Lansing
- Sept. 28-30 – Distribution System Short Course, Roscommon

Visit www.mi-water.org.

Missouri

The Missouri Water Environment Association is offering a Lab Practices Workshop Sept. 17 in Jefferson City. Visit www.mwea.org.

New Jersey

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

- Sept. 1-3 – Operation and Maintenance of Pumps, New Brunswick
- Sept. 9 – Electricity, Motors and Meters, New Brunswick
- Sept. 9, 2015-May 20, 2016 – Advanced Water Operations, North Brunswick
- Sept. 10, 17, 24 – Drinking Water Operator Review Course, New Brunswick
- Sept. 16 – Introduction to Backflow Prevention, North Brunswick
- Sept. 16 – Introduction to Odor Assessment and Control, North Brunswick
- Sept. 17-18 – Ladder Logic, New Brunswick
- Sept. 21 – Writing Skills for Utility and Operations Personnel, New Brunswick

(continued)

events

Sept. 10
Florida Section AWWA Region V Eighth Annual Water and Wastewater Expo, Harborside Convention Center, Fort Myers. Visit www.fsawwa.org.

Sept. 13-16
Rocky Mountain AWWA/Rocky Mountain WEA Joint Annual Conference, Embassy Suites, Loveland, Colorado. Visit www.rmwea.org.

Sept. 14-15
Odour Management Conference and Technology Showcase, Ontario Science Centre, Toronto. Visit www.odourconference.com.

Sept. 14-17
Virginia AWWA WaterJAM 2015, Virginia Beach. Visit www.vaawwa.org.

Sept. 15-16
The Water Expo, Miami, Florida. Visit www.thewaterexpo.com.

Sept. 15-17
Michigan AWWA Annual Conference, Kewadin Hotel and Convention Center, Sault Ste. Marie. Visit www.mi-water.org.

Sept. 15-18
Western Canada Water 2015 Annual Conference and Exhibition, Winnipeg, Manitoba. Visit www.wcwwa.ca.

Sept. 16-18
Intermountain Section AWWA Annual Conference, University Inn and Conference Center, Logan, Utah. Visit www.ims-awwa.org.

Sept. 21-23
2015 OU International WaTER Conference, Norman, Oklahoma. Visit www.ou.edu.

Sept. 22-24
Tri-State Seminar, South Point Hotel, Las Vegas, Nevada, sponsored by the California Water Environment Association, Nevada Water Environment Association and Arizona Water Association. Visit www.tristateseminar.com.

Sept. 26-30
Water Environment Federation Technical Exhibition and Conference (WEFTEC), McCormick Place, Chicago. Visit www.weftec.org.

Sept. 30-Oct. 1
Texas Desal 2015, Austin. Visit www.texasdesal.com.

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POSITIONS AVAILABLE

Wastewater Plant Chief Operator: The city of Winter Haven, FL is seeking a Chief Wastewater Plant Operator. The minimum annual salary is $44,179.20; starting salary based on experience. The Chief Operator performs responsible work in supervising wastewater treatment/disposal operations and personnel and ensures compliance with FDEP regulations. Requires a high school diploma or equivalent, five years of experience in the operation of wastewater treatment facilities; supervisory experience preferred. Possession of a FDEP Class "A" Wastewater Certificate. Position may close without notice. Please find other details and application online at www.mywinterhaven.com (o09)

SERVICE/REPAIR

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New Jersey *(continued)*

- Sept. 22 – Water Loss Management, New Brunswick
- Sept. 24-25 – Management Skills for Supervisors, New Brunswick
- Sept. 28 – Variable Frequency Drives, New Brunswick
- Sept. 28 – Introduction to RFPs: The Do's and Don'ts, North Brunswick
- Sept. 28 – Operations Math: The Basics, North Brunswick
- Sept. 28 – Introduction to Management and Supervision, North Brunswick

Visit www.cpe.rutgers.edu.

New York

The New York Section AWWA is offering these courses.

- Sept. 1 – Guidance With Rev. Total Coliform Rule/Harmful Algae/UCMR, Ballston
- Sept. 2 – Guidance With Rev. Total Coliform Rule/Harmful Algae/UCMR, Utica
- Sept. 2 – Automatic Control Valves, Troy
- Sept. 9 – Water Meter Technology, Woodbury
- Sept. 14 – Basic Laboratory Skills, Poughkeepsie
- Sept. 14 – Basic Laboratory Skills, Troy
- Sept. 15 – Hydrants, Valves and Meters, Springville
- Sept. 15 – Process Verification and Calibration, Troy
- Sept. 17 – Basic Laboratory Skills, Utica
- Sept. 18 – Process Verification and Calibration, Utica
- Sept. 29 – Automatic Control Valves, Norwich
- Sept. 30 – Automatic Control Valves, Wayne County

Visit www.nysawwa.org.

The New York Water Environment Association is offering a Fundamentals of Wastewater Asset Management Seminar Sept. 15 in Watertown. Visit www.nywea.org.

North Carolina

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

- Sept. 10 – NCWPCSOCC Exams, Kenansville, Morganton, Raleigh, Salisbury, Williamston
- Sept. 14 – 2015 Eastern Collection and Distribution School, Durham
- Sept. 22-24 – Customer Service Representative Training, Lillington

Visit www.ncsafewater.org.

Oklahoma

The Oklahoma Environmental Training Center in Midwest City is offering these courses:

- Sept. 4 – Proctored Exam
- Sept. 14-17 – A/B Water Lab Operator
- Sept. 21-22 – D-Water Operator
- Sept. 28-Oct. 1 – A/B Water Operator

Visit www.rose.edu.

Accurate Environmental in Oklahoma is offering these courses:

- Sept. 1-3 – D Water and Wastewater Operator, Stillwater
- Sept. 4 – Open Exam Session, Stillwater
- Sept. 11 – Open Exam Session, Tulsa
- Sept. 14 – General Refresher for Water Lab Operators, Stillwater
- Sept. 21-24 – A/B Water Laboratory, Stillwater
- Sept. 22-24 – D Water and Wastewater Operator, Tulsa
- Sept. 28-Oct. 1 – C Water Laboratory, Stillwater

Visit www.accuratelabs.com/classschedule.php.

Texas

The Texas Water Utilities Association is offering these courses:

- Sept. 8 – Wastewater Collection, San Marcos
- Sept. 15 – Utility Safety, Gatesville
- Sept. 22 – Basic Wastewater, Victoria
- Sept. 22 – Wastewater Collection, US Water, Austin
- Sept. 29 – Water Distribution, Longview
- Sept. 29 – Math Concepts, online

Visit www.twua.org.

Wisconsin

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

- Sept. 9 – Advanced Communication Skills, Madison
- Sept. 21-22 – Managing Snow and Ice Control Operations, online
- Sept. 23 – Management Assessment, Madison

Visit www.epdweb.engr.wisc.edu.

The UW-Milwaukee School of Continuing Education is offering a Design and Maintenance of Infiltration Practices course Sept. 24-25 in Milwaukee. Visit www4.uwm.edu.

The Wisconsin Rural Water Association is offering a General Safety course Sept. 1 in Plover. Visit www.wrwa.org.

The Wisconsin Department of Natural Resources is offering these courses:

- Sept. 1 – Groundwater Supply and Distribution Certification, Fond du Lac
- Sept. 22 – Groundwater Supply and Distribution Certification, Chippewa Falls

Visit www.dnr.wi.gov. **tpo**

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

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