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SEPTEMBER 2016

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When two worlds collide

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Superintendent
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on the cover

It might be easy to miss the Penacook Wastewater Treatment Plant, partly hidden behind a farm in the Penacook Village area of Concord, New Hampshire. Yet, for the past 42 years, its operators, now led by superintendent Dan Driscoll, have done exceptional work. (Photography by Oliver Parini)

top performers:

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Keeping Tabs From Lake to Tap

Effective monitoring and control systems help the Crown plant team produce a quality product and earn Phase IV Partnership status.

By Jim Force

WASTEWATER: PLANT Page 46

Ample Agility

The award-winning town of Hampton team finds ways to deal with substantial variations in seasonal flows and influent strength.

By Ted J. Rulseh

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Cool Heads Amid Chaos

Silent Hero Award winners soldier on through multiple challenges to help a major Nova Scotia wastewater treatment project come in on time and under budget.

By Jack Powell

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A Hidden Gem

Penacook Wastewater Treatment Plant operators adapt to new technology and produce exceptional quality effluent while running two facilities.

By Trude Witham

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I wasn't there for the same reasons as the clean-water professionals. I still made observations worth noting about the state of the industry.

By Ted J. Rulseh, Editor

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A Texas city deploys an innovative hybrid technology to resolve a long-standing lagoon solids accumulation and restore permit compliance.

By Chip Bettel

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After a failed pollution control plant upgrade, an Ohio city worked with a partner to enhance solids handling and generate its own power.

By Doug Day

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A new education center in Virginia's Prince William County includes a spacious laboratory with windows that let visitors watch technicians do their work.

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By Jennifer West

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When Two Worlds Collide

Biological and membrane processes must work together to produce high-quality water for reuse, but they don't necessarily play well together from an O&M perspective.

By Ed Kobylinski, Neil Massart, Sandeep Sathyamoorthy and Jonathan Loveland

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New Technology Slated for WEFTEC 2016

By Craig Mandli

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By Ted J. Rulseh

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Product Spotlight – Wastewater: Wilden high-pressure aluminum pump handles viscous, solids-laden slurries

Product Spotlight – Water: Watts MasterSeries backflow prevention valve assemblies meet latest lead-free standards

By Ed Wodalski

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People/Awards; Events

coming next month: October 2016

FOCUS: Tanks, Structures and Components/ WEFTEC Show Issue

» Let's Be Clear: Looking again at stormwater

» Top Performers:

Wastewater Plant: Orbal Oxidation Ditch in Ohio City, Ohio

Wastewater Plant: Lower Bird Creek, Tulsa, Oklahoma
Operator: Rob Scott, UConn Water Reclamation Facility

Water Operator: Justin Maughan, Nibley, Utah

» How We Do It: Solving a nitrogen problem in a California prison

» Sustainable Operations: Quest for efficiency at Twin Cities' Metropolitan Council

» In My Words: New approaches to biological nutrient reduction

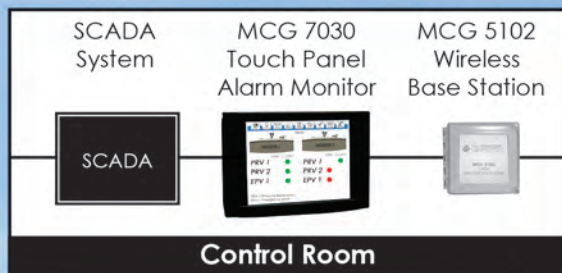
» Tech Talk: The power of microscopic examination

» PlantScapes: Striking murals in the city of Livermore, California

» Technology Deep Dive: PONDUS process for anaerobic digestion

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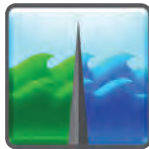
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let's be clear

My Day at the Operators Conference

I WASN'T THERE FOR THE SAME REASONS AS THE CLEAN-WATER PROFESSIONALS.

I STILL MADE OBSERVATIONS WORTH NOTING ABOUT THE STATE OF THE INDUSTRY.

By Ted J. Rulseh, Editor

I really should do this more often. Last May, I attended the Southeast Region Meeting of the Wisconsin Wastewater Operators Association, hosted by Plymouth Utilities.

I talk to operators on the phone, I tour clean-water plants now and then, and I attend national trade shows like WEFTEC and ACE. But to really see how the industry works, you need to get to the regional, state and local conferences put on by operators themselves, usually with a little help from equipment manufacturers.



Mike Penkwitz, wastewater superintendent, invited me to the meeting as a speaker. I gave my "Fire Chief Project" presentation, which advocates raising clean-water operators to the status of the fire chief, and making kids grow up wanting to be clean-water operators. Everett Russell of Dorner Valves and Automation followed my talk with highly practical

advice on valve identification and maintenance.

In the morning session, Ralph "Rusty" Schroedel, P.E., of the AECOM engineering firm, talked about the change in the industry's focus from treatment and disposal to resource recovery. His observations on new nutrient removal approaches were especially interesting — watch for more on that topic on these pages in the future.

John Nelson of The Nature Conservancy described how to look to farms upstream for phosphorus reduction, as at least a partial alternative to plant upgrades. And Fred Hegeman of the Wisconsin DNR walked the group through the calculations for determining how much biosolids to apply to farmland based on crop nutrient needs.

I learned a lot from the presentations. I also made a few general observations that are worth remembering, for me and maybe in some cases for the operator community:

- **Nice recognition.** Giving a welcome to the conference, Brian Yerges, Plymouth city administrator, played a short video promoting the city. It didn't show or mention the wastewater treatment plant. I imagine very few city videos do so. The reason is obvious, I suppose. I must say, however, that the mere fact Yerges

was there indicates that he and city leadership respect and value the role of the treatment plant and the operations team.

- **Still gray.** Early in my presentation, I asked for a show of hands from those under age 40 in attendance. You can imagine that very few hands went up. You could almost hear a sigh of recognition from the large majority north of 40.
- **Gender gap.** I didn't have to ask for a show of hands from women. They were also clearly a minority. In that perhaps lies opportunity — a potential source of new operators and new perspectives for the industry.

Early in my presentation, I asked for a show of hands from those under age 40 in attendance. You can imagine that very few hands went up.

- **Love those tours.** After the session, Penkwitz offered a tour of the Plymouth plant. Most of the attendees made the roughly 1 1/2-mile trip from the downtown restaurant meeting site to the plant, which discharges to the Mullet River. It was an unguided tour — operators know what they're looking at and what might interest them. One item of interest was the plant's energy system with Capstone microturbine cogeneration.
- **It's a community.** It was clear from the warm welcomes that many of these folks, including the vendors, have been friends for quite a while. It was also obvious that they are still very much engaged as professionals. You could tell from the long question/answer sessions after most presentations that these operators were not just there to take up space and earn continuing education credits.

It was a day well spent, even apart from being asked to autograph a copy of *TPO* magazine and a *TPO* T-shirt (trust me when I say that is a rare event indeed). The day reinforced my respect for the industry and the people in it. I hope I can do it again, somewhere, next year. **tpo**

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Keeping the commitment

I am a top-level certified water operator in the state of Colorado. I proudly work at a local municipality, and I consider myself blessed. I have a responsibility and a commitment to the public. I am honored to take care of their health when it comes to drinking water.

In regards to the article, "A Look Back at Flint" (*TPO*, July 2016), I believe that if operators do not possess a passion for public health and safety, then they are in the wrong profession. I have heard too many times of operators either cheating or plotting to cheat on their state certification

exams. I would feel uncomfortable letting a heart surgeon work on my body if he or she had cheated through medical school.

I think the public should have the confidence in the proper training and education of water operators. Treatment should be performed within the regulations and by properly certified staff who are willing to report and strive to fix abnormalities. Public health and safety is our No. 1 priority. Always. Period.

Zach Gilbert, CWP
Water Plant Operator
City of Fort Collins (Colorado) Utilities

Who's really at fault?

I'm glad you touched on the operator in Flint. With all that has been written, you are the first to mention the operator, except for his wrongful indictment. Had you gone further, you would have discovered that the operator's boss, the Public Works director, was unqualified to supervise him or the wastewater operators.

The Public Works director was a solar panel installer who shouldn't have been appointed. Where are the professional watchdogs when it comes to these kinds of appointments? Where are they on the task forces reviewing the operation? No one on the Michigan task force had any operations experience. The Public Works director or the mayor should have been indicted, not the operator.

Robert E. Adamski, P.E., BCEE, F.SAME, F.ASCE

'What would I do?'

You give valuable thought as to what may have been going through the minds of operators in Flint. I am sure a lot of operators would grumble and complain; some might even take a stand. There are also those who would merely shrug and buy bottled water, regrettably.

What would I do if I discovered a cover-up like that? First, I verify that it was indeed a cover-up and not a case of "I thought somebody else was on it." I have witnessed that scenario more times than I care to remember, thankfully always related to relatively minor issues.

If I did indeed verify a cover-up, I would have to get all of my ducks in a row, so to say. Sacrificing my career by blindly charging ahead would serve no good purpose as I would be discredited without hard evidence. Once I was properly prepared and ready for the likely repercussions of my actions, then I would take steps to fix the problem. Start low on the chain of command and work my way up, understanding that time is of the essence and every day that the problem exists increases the risks to the public.

Chances are, my tenure would come to an end. That is acceptable. We have a responsibility to provide cost-efficient, palatable, safe drinking water to every person who turns on a tap. It is not merely a job, but also a duty and honor to which we have been entrusted.

When I interviewed for my current position, I was asked a very important question: Would I falsify records to protect myself or the city? Would I do so if directed to by my superiors or others? My answer was a very firm, "No, and if that is something that I could be asked I am not the right person for the position."

Would my family be supportive? Absolutely. My wife recently lost a job to which she was dedicated because she refused to not follow proper sampling techniques. Her superior instructed her to continue as previous operators had and she refused.

Respectfully,
Raymond Page
Treatment Supervisor
City of Brookings, Oregon

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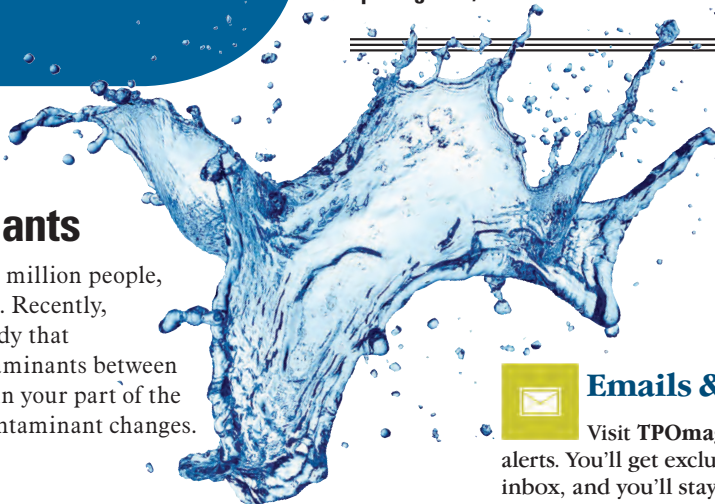
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STUDY SAYS?

Top 10 Trends in Groundwater Contaminants

Nearly half of the U.S. population, or 140 million people, rely on groundwater as a drinking source. Recently, the U.S. Geological Survey released a study that documents changes in groundwater contaminants between 1988 and 2001. Find out what's trending in your part of the country, and take note of these Top 10 contaminant changes.

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John Gonzalez, Northeast Ohio Regional Sewer District
Cleveland Trumps Up Infrastructure Ahead of GOP Convention,
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How to Solve a Nutrient Dilemma

In Oconomowoc, Wisconsin, watershed partners have united in an effort to reduce both point and non-point phosphorus discharges in a program called “adaptive management.” Find out how this first-of-its kind program is changing the phosphorus discussion for wastewater treatment plants.

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Keeping Tabs From Lake to Tap

EFFECTIVE MONITORING AND CONTROL SYSTEMS HELP THE CROWN PLANT TEAM PRODUCE A QUALITY PRODUCT AND EARN PHASE IV PARTNERSHIP STATUS

STORY: **Jim Force**

PHOTOGRAPHY: **Amy Voigt**

ACHIEVING PHASE IV IN THE PARTNERSHIP FOR Safe Water Program - Treatment Optimization Program means more than peer recognition at the Crown Water Filtration Plant in Westlake, Ohio. It's the guidebook for process improvements, and it serves as an ideal training template for new operators joining the plant team.

"With retirements and new people coming on board, Phase IV is an excellent way to explain the operation of the plant to new operators," says Mark Petrie, plant manager. "It helps them get a better understanding of our operation."

The Crown plant achieved Phase III Directors Award status in the Partnership program in 2004 and has maintained that distinction for 11 years. Now the Phase IV award has recognized the plant's continuing efforts to optimize its treatment processes, including chlorination, automation and turbidity control, while meeting and surpassing all federal standards for water quality. It's just the 15th water treatment plant in the nation to achieve the Phase IV status.

The Crown plant, owned by Cleveland Water, is one of four large water treatment plants serving metropolitan Cleveland. It provides water to about

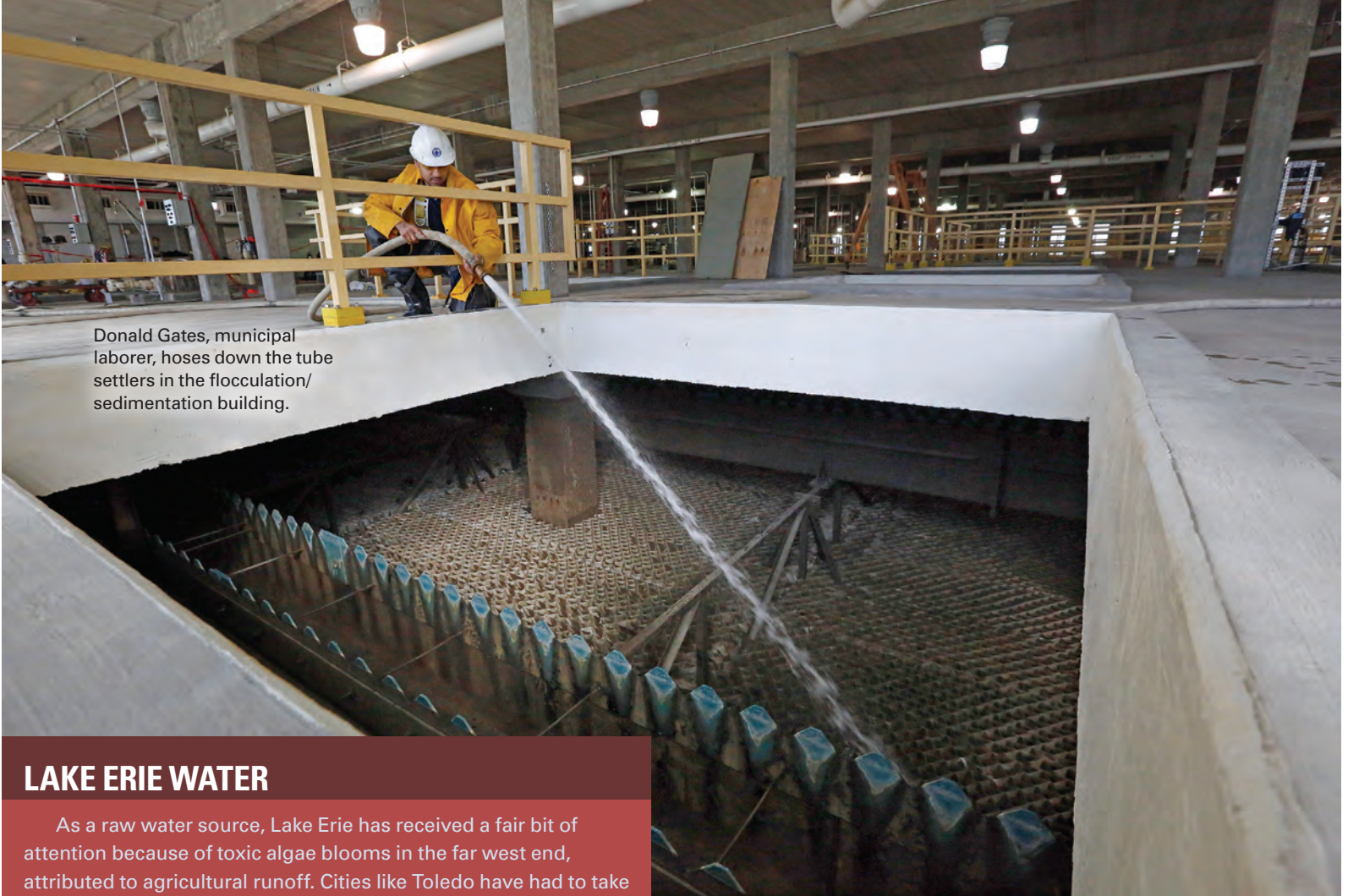


Adrian Lamb, left, water plant operator I, and Victor Ervin, water plant operator II, clean the sludge press (Evoqua Water Technologies) at the Crown Water Filtration Plant.



“ In 2013, we switched from gaseous chlorine to sodium hypochlorite at 6.5 percent solution. It costs a bit more but improves the safety of our operations and makes us a better neighbor.”

MARK PETRIE



Donald Gates, municipal laborer, hoses down the tube settlers in the flocculation/sedimentation building.

LAKE ERIE WATER

As a raw water source, Lake Erie has received a fair bit of attention because of toxic algae blooms in the far west end, attributed to agricultural runoff. Cities like Toledo have had to take special precautions to guard against algae-based toxicity in their drinking water systems.

Cleveland, however, draws its water from the central basin of the lake. According to Maggie Rodgers, operations manager of the Crown Water Filtration Plant, that section of the lake is deeper and has not experienced toxic algae.

The plant adds powdered activated carbon and permanganate for taste and odor control. “We produce good-tasting, safe water,” Rodgers says. “Even in winter, we keep adding PAC and permanganate. We want to produce the best water around.”

Besides Rodgers, the team at the Crown plant includes:

- Mark Petrie, plant manager
- Muhammad Hague, Scott Naelitz and Franco Noce, assistant plant managers
- Victor Ervin, Bernard Branner, Mark Mittelstaedt and Darby Svoboda, water plant operator II; Jason Laboda, George Dunne, Adrian Lamb, Ernest Lee, Ralph Pasterak, Richard Readinger and Kimberly Smith, water plant operator I
- Fidel Rodriguez, machinist unit leader; Shirleter Bryant, Gene Greenawalt, Michael Percy and Stephen Woyma, machinists; Frederick Anderson, machinist helper
- Ken Criss and Richelle Gmys, electricians
- David DiMauro, labor foreman; Donald Gates and Emerson Young, laborers
- Jonathon Sedely, senior chemist
- Paul Simundza, chief system analyst
- Mary Bangert, store keeper

one-fourth of the metro area’s 1.3 million people. Commissioned in 1958, the plant treats an average of 41.5 mgd, drawing from Lake Erie through a crib 2.5 miles offshore.

An 8-foot main brings the lake water by gravity to the raw water well, where vertical pumps (Peerless and Layne/Verti-Line) lift it to two 54-inch mains that feed the plant. Under normal demand, only one main is in use, but when demand rises above 60 mgd, both mains operate. The plant capacity is 130 mgd.

CONVENTIONAL PROCESS

Treatment begins with addition of potassium permanganate and later powdered activated carbon to the raw water mains upstream of the rapid mixers and coagulant. Two raw water basket screens (Evoqua) remove large debris before the water passes through inline rapid mixers in the north and

Crown Water Filtration Plant, Westlake, Ohio

BUILT: | 1958

OWNER: | Cleveland Water

POPULATION SERVED: | 350,000

AREA SERVED: | 15 communities in Cleveland metro area

EMPLOYEES: | 30

AVERAGE FLOW: | 41.5 mgd

TREATMENT PROCESS: | Conventional surface water

SOURCE WATER: | Lake Erie

SYSTEM STORAGE: | 36.5 million gallons

WEBSITE: | www.clevelandwater.com

GPS COORDINATES: | Latitude: 41°28'25.32"N; longitude: 81°52'46.35"W



south raw mains. The plant uses alum blended with 5 percent polymer (USALCO, LLC) as a flocculant.

The plant is designed with 25 multistage flocculators; tube settlers are positioned near the top of each of the 10 sedimentation basins. Settled water flows to a dozen 72-inch-deep, anthracite-filled mono-media filters equipped with Leopold - a Xylem Brand underdrains. Sodium hypochlorite provides disinfection, and orthophosphate is added for corrosion control.

The plant also feeds fluoride into the process water. Finished water is stored in a 36.5-million-gallon inground reservoir before distribution to customers through a 650-mile piping network that consists of four zones. "We pump directly to two of the zones," says Maggie Rodgers, plant operations manager. "Secondary pump stations supply the remaining two zones."

Two Perrin plate presses (Evoqua) dewater the residuals to a dry cake distributed to farmers who value the lime content, which is added to aid in press plate operation. Petrie says the plant is studying alternative residuals management options.

The existing control system was upgraded to Allen Bradley ControlLogix (Rockwell Automation) during a \$10 million plant renovation project from 2010 to 2013. The Hach Water Information Management Solution and Laboratory Informational Management System are used daily for plant operations and Partnership IV requirements.

SUBSTANTIAL RENOVATION

The Phase IV designation recognizes plant programs to improve and optimize operations. At the Crown plant, the renovation included upgrades to disinfection and filtration. "In 2013, we switched from gaseous chlorine to sodium hypochlorite at 6.5 percent solution," says Petrie. "It costs a bit more but improves the safety of our operations and makes us a better neighbor."

The plant also installed a water softening system to reduce the sodium hypochlorite concentration to 6.5 percent from the 12 percent delivered by semi-tanker. That also reduced the mineral content of the solution and helped prevent scaling in the pipe delivery system.

As with any surface water, turbidity is often an issue, and a major target of the optimization program. The Crown plant has optimized pretreatment to enhance filter performance.

For one thing, the plant now uses Hach Solitax monitoring equipment in each sedimentation basin to monitor turbidity. Petrie says that since the automation, operators no longer need to take grab samples every four hours. "We monitor turbidity in the basins, with the goal of keeping turbidity down so we can optimize our filter operation," he says. "We have found the most efficient filtering rate to be 5 to 7 mgd per filter."

Raw water turbidity normally runs between 10 and 20 NTU; it averages 0.40 NTU in the sedimentation basins. The plant team aims to keep filter influent at about 0.30 NTU. "Our operators are instructed to implement the filter-to-waste sequence if turbidity is above 0.09 NTU at filter effluent," says Petrie. "Normally, we record turbidities of 0.02 to 0.03 NTU at the filter effluent, and our combined filter effluent at 0.03 to 0.05 NTU entering the reservoir."

(continued)



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Pretreatment enhancement using Partnership IV guidelines also reduces filter-to-waste occurrences. The new SCADA instrumentation automatically monitors produced water turbidity and returns the filtered water to the head of the plant if the NTU standards aren't being met.

Spikes in raw turbidity can occur, especially during stormy weather. "During Hurricane Sandy, which hit

“ We don't put water into our reservoir that we wouldn't drink ourselves.”

MARK PETRIE

the East Coast but created high winds and rain across the Midwest, we saw turbidities as high as 370 NTU,” says Petrie. Despite that, the plant stayed within Partnership guidelines.

To keep the filters operating at peak efficiency, the Crown plant maintains a 0.20 mg/L chlorine dosage at the filter effluent. “We've been using hypochlorite for a couple of years — just enough to keep our filters where they should be,” says Petrie. The main plant chlorination occurs to the filter effluent water before it enters the reservoir.

IN CONTROL

Turbidity is just one of the many operating parameters monitored and analyzed by the plant's new data systems. The upgrade gives the staff instant snapshots of a range of parameters, helping them analyze and control water quality more precisely and easily than in the old days. “Plant optimization is the key to producing high-quality safe drinking water,” states Petrie.

The WIMS provides a complete picture of the water treatment, including secure data collection, reporting, user-defined alerts, and charting, graphing and mapping tools. It also interfaces with the SCADA and LIMS. While tying all the new systems together, the Crown management team, along with Paul Simundza, chief system analyst, incorporated new operational procedures and safeguards.

“The Partnership for Safe Water's Level IV calls for optimized data collection and analysis,” says Franco Noce, assistant plant manager. “With our new systems, we're able to compile a complete data history that can be analyzed every month. It's a good system, and it has helped us in our work.”

Petrie adds that hands-on control is also vital as a backup: “It's great to have SCADA, but it's important that our operators understand how to do the math and feed the correct amount of chemicals manually. We need to understand both methods.”

TEAM APPROACH

Entrusted with millions of dollars' worth of resources and responsible for supplying high-quality drinking water and adequate fire flow for more than 300,000 people in 15 communities, the Crown plant staff works as a team. In a union operation, the crew works closely toward common goals. “Communications are vital, and management is hands-on as we all work together to solve problems,” Petrie says.



From left, Mark Petrie, plant manager, and Scott Naelitz and Franco Noce, assistant plant managers, in the pump room at the Crown plant.

Muhammad Hague, assistant plant manager, stresses the importance of daily staff meetings and the use of a Microsoft SharePoint system to log data digitally on all shifts, including nights and weekends. “All of us have access: managers, analysts, laborers, the maintenance crew,” he says. “If issues arise, we address them immediately.”

With the assistance of Scott Naelitz, assistant plant manager, cross-training with an emphasis on safety has been instrumental in facilitating the cooperation and understanding. “They've enabled us to overcome any inter-departmental barriers and work hand in hand,” says Petrie.

While the Crown plant team is deservedly proud of the Level IV status in the Partnership for Safe Water, the true test of the facility and its staff is in the quality of the water it produces.

As Petrie puts it, “We don't put water into our reservoir that we wouldn't drink ourselves.” **tpo**

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Hungry Bugs

A TEXAS CITY DEPLOYS AN INNOVATIVE HYBRID TECHNOLOGY TO RESOLVE A LONG-STANDING LAGOON SOLIDS ACCUMULATION AND RESTORE PERMIT COMPLIANCE

By Chip Bettle

In 2011, the Texas city of Celeste experienced severe solids accumulation in its wastewater treatment lagoon, causing dramatic loss of retention time and significant discharge permit exceedances. Strong odors forced neighbors a mile or more downwind to close their windows.

Celeste, a city of 800, 10 miles northwest of Greenville in Hunt County, addressed the issue with an innovative hybrid aeration and digestion technology. After a year in operation, the process eliminated the solids buildup and enabled the plant to restore permit compliance.



NICK OF TIME

Celeste's leaders were just days away from investing more than \$150,000 to mechanically dredge a section of one wastewater lagoon when they learned

LEFT: Inlet in pond 1 before installation of the Blue Frog System. BELOW: Celeste lagoon, one year later.



An aerator with a specialized engineered biofilm is used for ammonia reduction.

about a more affordable alternative that promised long-term, environmentally sustainable results.

"We were literally about to sign the contract to dredge the pond when we got the call from Blue Frog," says Mayor Larry Godwin. "They explained how their system would save us money and keep us from having to continuously dredge the lagoons. We decided to take a closer look. I'm glad we did."

The Blue Frog System (Absolute Aeration) is a hybrid technology that uses biological processes to enhance organic solids digestion. Known as bio-dredging, the process selects for the indigenous bacteria that are in the lagoon and already adapted to local conditions and the wastewater substrate.

NATURAL PROCESS

The bacteria form synergistic anaerobic biofilms in tight, mineral-based granules, forming a granular sludge bed reactor over the entire bottom of the lagoon. Surface biosolids are delivered to the bed, liquefied and then turned into gas by the bacteria immobilized in and on the granules.

Produced gas rises and gently mixes the water column, continuously feeding the granules to increase their productivity. Once the granular sludge bed reactor is established, bacteria grow and die in direct response to the level of nutrients coming into the lagoon.

This organic biological control is well suited for the natural fluctuations in flow that characterize municipal wastewater lagoons. In addition, biological control is more cost-effective than traditional oxygen-adding strategies that require significant horsepower to drive aeration blowers.

In Celeste, the design strategy was to digest recalcitrant solids that had built up over 30 years at the bottom of the lagoons and to keep up with the incoming solids daily to eliminate buildup, ultimately increasing the pond's

retention time. The system was also designed to meet the monthly permitted discharge requirements of 30 mg/L BOD and 90 mg/L TSS.

ENGINEERED PROCESS

The city has two wastewater treatment lagoons. Pond 1 has an asymmetric depth, 8 feet at the inlet and 4.5 to 5 feet at the outlet. Pond 2 is 5 feet deep. The average flow is 95,000 gpd.

Wastewater treatment lagoon optimization requires a thorough understanding of what is happening chemically, physically and biologically inside. Water chemistry changes with loading, dissolved oxygen, temperature, sunlight or other influences, bringing corresponding changes in the lagoon's microbial ecosystems. These changes alter the quality of the water.

The Blue Frog System was delivered in June 2012. The process began by installing an engineered floating boom called a continuously stirred tank reactor, used to create hydraulic walls to redirect horizontal flowing water down to the anaerobic zone.

The CSTR functions as an engineered tank that concentrates bacteria and solids at the bottom of the lagoon. Placed over the inflow, it serves as a flow equalization tank, a selector tank that selects for sludge-digesting bacteria, and an incubation tank that produces a large population of high-quality microbes.

The Blue Frog team had to be creative during installation to build around the high levels of accumulated solids. The CSTR was temporarily redesigned to the current solids levels and retrofitted six months after the solids were reduced.

“It's been four years since we installed the Blue Frog System, and our lagoons look and smell as good as any public lake in the state. Where there was nothing but a filthy, stinking pool of sludge, there's now clear water.”

MARK COLES

STRONG RESULTS

Within weeks of installation, the Blue Frog units had noticeably reduced the solids. In six months, they had eliminated more than 50 percent of the organic solids. Within the first year, the ponds were essentially sludge-free. Incoming organic waste was digested before it could settle, and the neighbors could safely open their windows again.

The Blue Frog team continues to work with the city, charting monthly data and using the lagoons as a test site for new advancements. Effluent BOD and TSS consistently remain below the permitted limits.

“It's been four years since we installed the Blue Frog System, and our lagoons look and smell as good as any public lake in the state,” says Mark Coles, city employee. “Where there was nothing but a filthy, stinking pool of sludge, there's now clear water.”

As federal and state regulators enact more restrictive regulations, pressure is increasing to replace lagoons with activated sludge plants. Still, lagoons

are a cost-effective way to treat wastewater and can be revitalized with emerging technologies.

The results in Celeste demonstrate that proactive municipalities can make changes to resolve wastewater treatment problems. Current technology can be an important way to optimize lagoon systems to achieve effluent quality comparable to activated sludge systems.

ABOUT THE AUTHOR

Chip Bettie is a co-inventor of Blue Frog technology and executive vice president of engineering for Absolute Aeration of Greeley, Colorado. He can be reached at custserv@bluefrogssystem.net. **tpo**

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Strolling the grounds at the Penacook Wastewater Treatment Plant are, from left, Derek Emerson, Robert Sleis and Timothy King, operators; Dan Driscoll, plant superintendent; and Albert Richards, equipment operator.



A Hidden Gem

STORY: **Trude Witham** | PHOTOGRAPHY: **Oliver Parini**

PENACOOK WASTEWATER TREATMENT PLANT OPERATORS ADAPT TO NEW TECHNOLOGY AND PRODUCE EXCEPTIONAL QUALITY EFFLUENT WHILE RUNNING TWO FACILITIES



IT MIGHT BE EASY TO MISS THE PENACOOK WASTEWATER TREATMENT Plant. It sits behind a farm, partially hidden in the Penacook Village area of Concord, New Hampshire. Yet, for the past 42 years, its operators have done exceptional work.

“Five years ago, this plant didn’t get the attention it deserved,” says Dan Driscoll, wastewater treatment plant superintendent. “The maintenance end wasn’t where it needed to be, so we doubled our efforts by painting the walls, cleaning and buffing the floors, upgrading the lights and improving the overall aesthetics. And someone noticed.”

That someone was Ken Kessler from the state Department of Environmental Services. “In 2014, Ken inspected the plant and reviewed all our compliance documentation,” recalls Driscoll. The next year, the plant received the U.S. EPA Regional Wastewater Treatment Plant Excellence Award. Plant staff members were surprised, but shouldn’t have been.

Owned and operated by the City of Concord, the Penacook plant has had very few violations. “Our water goes out very clean,” says Driscoll. “TSS has been as low as 3 to 6 mg/L, and BOD as low as 7 to 9 mg/L.”

The operators have faced challenges that include a significant flow reduction, a switch to new technology, and issues with pH and inflow and infiltration (I&I). Their workload is heavy, as they also operate the city’s Hall Street Wastewater Treatment Plant.

NEW TECHNOLOGY

The Penacook conventional activated sludge plant was built in 1973 to treat industrial discharge from the former Allied Leather Tannery. Says Driscoll, “We went through some of our historical reports, and it appears that the flow when the plant first went online was around

Penacook Wastewater Treatment Plant, Concord, New Hampshire



BUILT: | 1973

POPULATION SERVED: | 3,700 residents

EMPLOYEES: | 15 (Penacook and Hall Street, combined)

FLOWS: | 1.2 mgd design, 0.40 mgd average, 5.5 mgd peak

TREATMENT LEVEL: | Secondary

TREATMENT PROCESS: | Sequencing batch reactor

RECEIVING WATER: | Merrimack River

BIOSOLIDS: | Lime-stabilized Class A

ANNUAL BUDGET: | \$600,000 (operating)

WEBSITE: | www.concordnh.gov/wastewater

GPS COORDINATES: | Latitude: 43°10'53.46"N;
Longitude: 71°31'17.50"W

**Penacook Wastewater Treatment Plant
PERMIT AND PERFORMANCE (monthly averages)**

	PERMIT	EFFLUENT
BOD	30 mg/L	12 mg/L
TSS	30 mg/L	8 mg/L
E. coli	126/100 mL	2.6/100 mL
pH	6.5-8.0	Compliant

“Our water goes out very clean. TSS has been as low as 3 to 6 mg/L, and BOD as low as 7 to 9 mg/L.”

DAN DRISCOLL

2.5 mgd. When the tannery reduced operations in 1979, the flow dropped to about 1.5 mgd.”

The tannery shut down in 1987 and the treatment plant flow decreased to 0.40 mgd, its current level. The plant serves 3,700 residents in Penacook and part of Boscawen.

The lower flow created problems. “The activated sludge stayed in the system longer, which caused unwanted bacterial growth,” says Driscoll. “The plant was still meeting permit, but the team members knew they needed to do a complete process overhaul.”

In 2005, the plant switched to sequencing batch reactor technology. The former primary clarifier and aeration tank are now storage basins for high flows that occur mostly in early spring. The plant chose SBR technology for several reasons. “The operators were already familiar with the pumps and blowers used in the process, and it could be easily retrofitted into the old tankage,” says Driscoll. “It could also provide nutrient removal if needed in the future.”

Wastewater enters at a 25-foot-deep well, and is pumped through a mechanical step screen. From there, it enters one of two SBRs (Evoqua Water Technologies). Treated water flows into one of two equalization tanks, is disinfected with sodium hypochlorite, and is sent to chlorine contact tanks before discharging to the Merrimack River.

Liquid sludge is trucked to the Hall Street plant and combined with that plant’s sludge. It is then dewatered, turned into Class A biosolids in an alkaline stabilization process, and transferred to trailers. Resource Management of Holderness, New Hampshire, trucks the biosolids for use on farm fields or as a component of a manufactured topsoil product.



Timothy King tests for chlorine residual (upper photo) while Dan Driscoll swaps a chlorine pump as part of a regular rotation.

(continued)

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UPGRADED PLANT

Besides the SBR systems, the 2005 Penacook plant upgrade included:

- Two Spiralift screw pumps (Evoqua)
- Three centrifugal pumps (Fairbanks Morse) for equalization tank pumping
- Chlorination system with three peristaltic tube pumps (Watson-Marlow)
- Three centrifugal aeration blowers (Continental Blower) for the SBRs
- Two submersible waste pumps and two motive pumps (all Flygt - a Xylem Brand) installed in the SBRs
- Two gravity thickener tanks retrofitted to aerated waste storage tanks, with a floating mixer (Evoqua) and three Delta blowers (Aerzen)
- New SCADA system (Rockwell Automation)

Startup went smoothly. "In the original plant, the flow ran from the primary clarifiers down a center channel between two separate aeration trains," says Driscoll. "A series of gates fed off this channel, allowing the flow to be diverted to any or all of the four aeration basins. During construction, the two smaller front basins were isolated by closing the gates feeding them. All flow was diverted to one of the larger back tanks, allowing the old treatment process to continue largely unaffected while work was completed on the SBR system."

Evoqua representatives were on site for a little over a week to train operators on the SBRs. "Operators had no problem learning the SBR because it is so automated," Driscoll says. "Also, sampling was very similar to the extended aeration process. The system has a proprietary program that allows us to easily adjust process parameters to achieve the best effluent quality."

SHARING DUTIES

A team of 15 takes care of the Penacook plant and the Hall Street facility, a 10 mgd (design) modified activated sludge/biofilter plant 10 miles away. Commissioned in 1981, Hall Street serves Concord and portions of neighboring Bow. The plant treats an average flow of 4 mgd along with 5 million gallons of landfill leachate and 2 million gallons of domestic septage per year. The plant generates 7,500 wet tons of Class A biosolids annually.

Four operators and the operations supervisor rotate duties Monday through Friday at the Penacook and Hall Street plants. One operator and one maintenance worker handle the Penacook plant. A dedicated

technician does the majority of the laboratory work. The maintenance crew performs equipment troubleshooting and repair. Says Driscoll, "There are times, maybe once a month, when we send an additional operator to the Penacook plant for a day or two to help with a larger job or for safety reasons."

Besides overseeing the operations supervisor position, Driscoll handles project work and regulatory tasks. "Since I got the superintendent's job, I've had to buy a new chair because I'm in it more," he says.

REMOVING THE GRIT

Penacook plant operators see flows double or triple during storm events from I&I. "With the plant upgrade, the aeration tankage was retained and is used for storage during high flows," says Driscoll. "Once flows return to normal, the stored wastewater is drained back to the plant's headworks and processed through the system." The city is addressing I&I by lining or replacing piping over the next five years.

During late summer and early fall, plant operators tackle low pH. "The flows are lower and we start nitrifying, which drives the pH down," Driscoll says. "We manage that by adding more chlorine and reducing the air in the SBR as much as we can. We've never had a pH violation, but we have to keep an eye on it."

Operators' biggest challenge is cleaning the SBRs. "Every year, we remove one SBR from service for maintenance," Driscoll says. "We drain the tanks, store the system solids and prepare the tank for cleaning, refilling and testing before placing it back online. This is very labor intensive and requires a methodical approach."

Since the plant upgrade did not include a grit removal system, any grit that enters the plant accumulates in the SBRs. "After operating the systems for a few years, we decided to take the SBRs down one at a time, inspect the equipment and remove any accumulated grit," Driscoll says. "When we inspected the first SBR, it was clear there was more grit than we expected."

(continued)

Robert Sleis performs a sludge blanket check on a sequencing batch reactor.





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DEDICATED GROUP

The operators of the City of Concord's Penacock and Hall Street wastewater treatment plants are a hardworking group. "They are totally dedicated and will work until the job is done without any complaints," says Dan Driscoll, plant superintendent. "They're invested in making sure things continue to run the way they're supposed to."

Driscoll oversees both plants. He has been with the city for five years, and holds a Grade 4 (highest) wastewater operator license. He moved to his current job in November 2015. The team includes:

- Juho Adie, operations supervisor (Grade 4, new employee)
- Brian Cate (Grade 4, 38 years), Derek Emerson (Grade 3, 17 years), Robert Sleis (Grade 2, seven years), Timothy King (Grade 2, one year), operators
- Thomas Neforas, laboratory manager (Grade 4, 10 years)
- Kristin Noel, laboratory/industrial pretreatment technician (Grade 4, 10 years)
- Joe Mulleavey, maintenance supervisor (Grade 1, 19 years); Troy Hardy, maintenance technician (15 years); and Richard Tibbetts, maintenance aide (31 years)
- Daniel Brodeur, utility electrician (six years); and David Hussey (33 years) and Roy Tobin (30 years), utility technicians
- Albert Richards, equipment operator (30 years)

Says Driscoll, "The group works very well together, and they look out for each other. If someone is having a problem, they all work as a team to solve it."

The team at the Penacock plant includes, from left, Albert Richards, equipment operator; Richard Tibbetts, maintenance aide; Roy Tobin, utility technician; Robert Sleis, operator; David Hussey, utility technician; Troy Hardy, maintenance technician; Derek Emerson, operator; Dan Driscoll, plant superintendent; Daniel Brodeur, utility electrician; Thomas Neforas, laboratory manager; Joe Mulleavey, maintenance supervisor; Kristin Noel, laboratory/industrial pretreatment technician; and Timothy King, operator.

“In 2016, we will complete some lighting and controls projects to help conserve energy and reduce the plants' carbon footprint.”

DAN DRISCOLL

Operators shoveled the grit from the tank floor into wheelbarrows and transported it to the corner of the tank, then added water to create a slurry, which was removed with a city vacuum truck. It took six workers eight hours to complete the process for each tank.

To reduce labor, the operators tried using cribs (small dump containers on wheels). They used a rented crane to lower the cribs into the tank and then shovel the relatively dry grit into them. The crane then removed the full crib. With this method, the team can remove all grit from an SBR in an hour and a half with four workers.

"SBR downtime was reduced from almost three days to a little more than a day, which has significantly reduced issues with process solids storage and process issues when the SBR returns to service," says Driscoll.

He considers it more cost-effective cleaning the tanks manually than constructing a grit removal system: "We have less equipment to maintain



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Albert Richards greases bearings in the step screens.

and we use less electricity. In the end, it's about providing the best final product at the lowest cost with the least environmental impact; we feel this process does just that."

SUSTAINABLE FUTURE

While Driscoll doesn't foresee major upgrades at the Penacook plant, the Hall Street facility will be upgraded over the next 10 years. An engineering design is in process for three new secondary clarifiers to be built in 2017-2018. This year, the plant will receive a new screw pump, three new lift pumps and new sludge transfer pumps. A \$1.8 million upgrade to the Class A biosolids processing operation will include modifications to the odor control and ventilation systems.

Greater energy efficiency is a future goal. "In 2016, we will complete some lighting and controls projects to help conserve energy and reduce the plants' carbon footprint," says Driscoll.

In 2015, the city retained a consultant to study the long-term biosolids options. "Their recommendation is to construct a digester to reduce the biosolids mass and produce a Class A biosolid product without adding quicklime," Driscoll says. "This would produce a more desirable product without the high pH. The city is seriously considering this option, although construction would be several years away."

In the short term, Driscoll will be looking for new employees: "I have a fantastic crew, but many of them are retiring. In the next three years, I'll lose half the staff. I've only had to hire one person in the last five years."

The reason is simple: The city treats its people well. Says Driscoll: "If we need something, we can plan for it, and ultimately purchase technology and equipment that make our lives as pleasant as possible." **tpo**



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A Big Turnaround

AFTER A FAILED POLLUTION CONTROL PLANT UPGRADE, AN OHIO CITY WORKED WITH A PARTNER TO ENHANCE SOLIDS HANDLING AND GENERATE ITS OWN POWER

By Doug Day

After spending millions of dollars for a system upgrade, the Wooster (Ohio) Water Pollution Control Plant was regularly violating its effluent permit. It had more solids — not less as planned. The digesters could not handle the extra load, and there wasn't enough biogas to run the new generator.

After finding the right partner, the plant is now in full compliance and saves hundreds of thousands of dollars a year by producing enough electricity to power itself along with the city's water treatment plant.

UPGRADE GOES BAD

With a population of 27,000, Wooster is served by a combined sewer system and a treatment plant with an average flow of 4.5 mgd. The city has used anaerobic digestion for biogas production since its first plant was built in 1938. "In the 1930s, that was pretty high-tech," says Kevin Givins, manager of the city Utilities Division. "They ran the methane through a boiler to heat the digesters and the building."

The plant has had three major upgrades, the most recent completed in 2007. "The plant capacity almost doubled, from 15 mgd to 27 mgd," says



The three upgraded anaerobic digesters sit behind one of the Wooster plant's final clarifiers.

Quasar owns and operates the digestion and gas generation equipment and sells the power to the plant through a 20-year agreement. Just in front of the tall feedstock tank is the biofilter; to the right are the solids receiving station and the control building that houses the gravity belt thickener. Behind the feedstock tank are the three upgraded anaerobic digesters.

Givins, who became manager in 2012. "Unfortunately, it wasn't a very good project. To spend \$25 million in a community our size, and to come out of it with constant violations and eventually being under findings and orders from the Ohio EPA, there were a lot of unhappy people in town. It was a pretty big, bitter pill to swallow.

"We had to do something. The upgrade was supposed to eliminate a lot of our solids handling. It actually created more solids because we had digesters that hadn't been touched in about 30 years. We had to slow down the pumping of solids, and that meant more buildup. Being a combined sewer plant, we would get a rain event and then we were violating because we're sending too many solids into the receiving stream."

The project also produced less biogas than expected. "We installed a 375 kW Waukesha engine, but we were never able to fully utilize it," says Givins. "When we did run it, it would only run for four or five hours at no higher than about 200 kW."

“We invested close to \$280,000 for a 1/4-mile distribution line and transformers, but we'll get payback on that in two to three years. There is not an electric meter at the water plant anymore.”

KEVIN GIVINS

in violation, EPA was making site visits almost weekly, and we were under orders to make some changes," says Givins.

The city sought proposals in 2013, and quasar energy group responded with a plan to put up \$5 million of its own capital to retrofit the anaerobic digesters, install a new cogeneration system, increase solids management capacity, install enhanced mixing technology, and add a state-of-the-art SCADA system. The city's share was \$1.5 million. Under a 20-year purchase power agreement, quasar operates the digesters, produces electricity from the biogas, and sells the power to the city.

Quasar's engineering and laboratory offices are located in Wooster. "They already had a presence here, so that made the transition a little easier," says

(continued)

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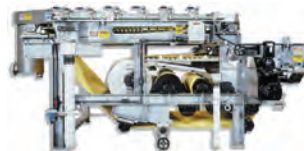
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The 1.1 MW Caterpillar combined heat and power generator set will help the Wooster plant save about \$400,000 a year on electricity costs. It powers the city's nearby drinking water treatment plant.

Givins. "The time from groundbreaking to testing the generator was about 14 weeks. There's no way the city could have done a project that quickly."

POSITIVE OUTCOME

The equipment went online in July 2014. Thickening enabled loading of the digesters with sludge at 8 percent solids instead of 1.5 to 2 percent. A secondary digester was also converted to provide a third primary digester. In the first year, the plant saved \$246,000 on electricity, even though the sys-

tem wasn't operating at full capacity for several months as the equipment was fine-tuned. Power savings now at full capacity are about \$400,000 a year.

The biogas system generates biogas at about 150 scfm to fuel a 1.1 MW Caterpillar engine-generator. A power line to the drinking water plant was added in August 2015. "We invested close to \$280,000 for a 1/4-mile distribution line and transformers, but we'll get payback on that in two to three years," says Givins. "There is not an electric meter at the water plant anymore."

The water plant had no emergency power source, but the new line allows it to access the wastewater plant's 2.2 MW Caterpillar diesel emergency generator. If necessary, both plants can operate on that power source.

Another benefit of the project is that Quasar now handles the biosolids — some 3,500 tons per year. "We used to track all our fields and applications and do all the reporting," says Givins. "That burden has been taken from us. They do it for other facilities so they have the contacts and the manpower that we just don't have, and are in a better position to get to more fields than we could."

BRIGHT OUTLOOK

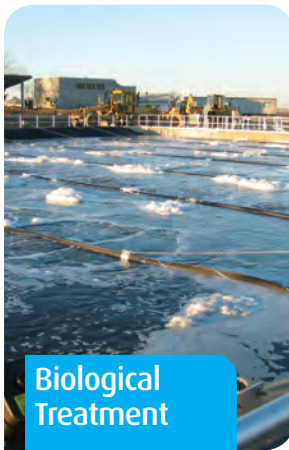
After years of trouble, Givins says it's nice to see good things happening. Last January, the city received a \$1.66 million settlement from one company involved in the failed plant upgrade; litigation with other parties continues.

The improved plant has become an economic development tool, allowing a hand sanitizer maker and a dairy company to locate in the city. Now the city is considering production of compressed gas to fuel the city's vehicles. When he buys new vehicles, Givins orders them with compressed natural gas conversion kits, just in case. **tpo**

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Cool Heads

Amid Chaos

SILENT HERO AWARD WINNERS SOLDIER ON THROUGH MULTIPLE CHALLENGES TO HELP A MAJOR NOVA SCOTIA WASTEWATER TREATMENT PROJECT COME IN ON TIME AND UNDER BUDGET

STORY: **Jack Powell**

PHOTOGRAPHY: **Warren Robertson**

“We found Silent Hero very fitting because these people typically don't want to be in the spotlight; they want to be behind the scenes and provide safe drinking water and environmentally responsible discharge of wastewater.”

ROBERT GILLIS

THEY WERE INDISPENSABLE. FIVE PROFESSIONALS kept on going amid the chaos of building a new wastewater treatment plant in Nova Scotia, working around the existing facility without missing a beat.

With a combined 85-plus years' experience, the operations team was essential in shepherding the \$64 million project that expanded and upgraded the Eastern Passage Wastewater Treatment Facility in Halifax, ensuring discharge of clean water into Halifax Harbour.

For performing under such challenging conditions, the Halifax Water crew earned the 2015 Silent Hero Award from the Atlantic Canada Water & Wastewater Association, a section of AWWA. Launched in 2005, the award goes to operators from the Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland/Labrador areas who go beyond the call of duty to serve their communities.

The honor went last October to Philip Winter, plant supervisor; operators Evan Beaton, Andrew Eisan and Ryan Gould (who has since left the

plant); and Donald MacDonald, building process maintainer. The citation reads, in part, "Their dedication and pride in their work was evident throughout the project and helped make the facility a success story. The operators put extra effort in when needed, especially during the early parts of the break-in period when numerous alarm callouts occurred."

Describing the award, Robert Gillis, project engineer, says, "We found Silent Hero very fitting because these people typically don't want to be in the spotlight; they want to be behind the scenes and provide safe drinking water and environmentally responsible discharge of wastewater. They do their jobs without any complaints, they work hard, take pride and have a passion for what they do."

ENORMOUS PROJECT

They needed a lot of passion: The design-build project was the largest capital program Halifax Water had undertaken since its creation in 2007,

Philip Winter, plant supervisor, strolls along the secondary clarifiers (Polychem) at the Eastern Passage Wastewater Treatment Facility.





ABOVE: Evan Beaton, operator, reviews treatment samples in the lab. BELOW: The Eastern Passage facility recently underwent a \$64 million expansion and upgrade.



residents in the communities of Cole Harbour and Eastern Passage. It is designed to handle 50,000 or more over a projected 25-year life.

The facility is highly automated and energy efficient: Energy cost savings over its design life are projected at \$7.7 million. Most important, the plant meets its discharge limits for BOD, TSS and fecal coliform.

FRENZIED ACTIVITY

Gillis, who joined the Halifax Water Utility in 2011, says the big challenge was keeping the existing plant operating during the project. That meant business as usual even while the new facility was being built, new pipes installed and new processes implemented. Thanks to strong teamwork, construction went smoothly. In fact, the project came in right on schedule, \$500,000 under budget and with operating performance that exceeded regulatory limits.

SCALING THE LEARNING CURVE

The \$64 million expansion and upgrade of the Eastern Passage Wastewater Treatment Facility required operators to get up to speed on a range of equipment and processes. These included:

- A renovated headworks with a new building, fine screens and vortex grit removal (Veolia).
- An activated sludge system with new aeration tanks (Sanitaire) and secondary clarifiers (Polychem).
- A UV disinfection system (TrojanUV).
- A three-stage odor-control system (Enduro) with bio-scrubber, biofilter and carbon filter.

The upgrade also includes a new solids management facility in which waste activated sludge is thickened using drum thickeners (Parkson) before being mixed with primary sludge and dewatered with centrifuges (Flottweg) to 35 percent solids. The material is ultimately trucked to a facility where it is converted to a Class A biosolids product (N-Viro process, Walker Industries).

"As with any new construction, there were startup and commissioning issues," says Robert Gillis, project engineer. "That meant a lot of alarm calls at night and a lot of testing to make sure plant performance met expectations. It also meant that operators had to do sampling every four hours, even on weekends and holidays. They did all that without complaints."

and it tested everyone's mettle. Construction started in November 2011, and ended two years later. Four factors drove the renovation of the 42-year-old plant: asset renewal, expansion for community growth, an upgrade from primary treatment to secondary treatment, and compliance with municipal, regional and national environmental regulations.

The new 19.1 mgd (design) conventional activated sludge plant, one of the largest secondary wastewater facilities in Atlantic Canada, serves 38,000

“It was one big construction site,” says Gillis, who sold water/wastewater equipment for 13 years. “There were trailers, tons of debris and a lot of noise and congestion with 50 to 100 contract workers running around, plus dirt from all the digging. Team members jumped in right from the start. Not only did they have to do their normal work, but they were also tasked with reviewing drawings of the new facility and providing comments on the layout of piping, pumps, equipment and accessories to determine their impact on lab work and treatment processes.”

Winter, plant supervisor for six years, credits “excellent teamwork” for the project’s success. He cites close cooperation between the operators and the construction team from Maple Reinders Constructors of Mississauga, Ontario, and Maxim 2000 Construction of Dartmouth, Nova Scotia.

TEAM CONTRIBUTIONS

“Since the construction was around the existing plant in a horseshoe shape, with the old plant sitting in the middle, disruption wasn’t as bad as it could have been,” says Winter, a Canadian who earned his Class IV wastewater certification while working at an industrial treatment plant in South Carolina. “Our contractors did a good job, and there was only a moderate degree of chaos because the project was so well planned. That said, we did the best we could with what we had, and the quality of our treatment didn’t degrade during the construction process.”

A wastewater professional since 1984, Winter was working at a wastewater plant in another province when he saw an ad in a newspaper for the plant supervisor’s job in Halifax. He applied and was hired. He has an associate degree in mechanical engineering from Conestoga College Institute of Technology and Advanced Learning in Ontario. He worked for seven years in North and South Carolina as a wastewater treatment operator for a poultry processor.

STARTUP PROVES CHALLENGING

Even with Winter’s long experience, the startup proved trying. Mud and debris had to be cleaned up after construction. Crews had to learn to operate new equipment, get up to speed on the secondary treatment system, and perform on-site biosolids processing. It took time to stabilize processes to get the desired results, but after a few months of shakeout, the plant lived up to expectations. The facility had no trouble getting to less than 10 mg/L TSS, and average about 8 mg/L.

Beaton, a 14-year veteran, admits it was tough to work during plant construction, citing communications obstacles and numerous channels to navigate. “Several tiers of command — concrete pourers, electricians, engineers from the component side and engineers from our side — sometimes made it difficult to know what was going on until we were halfway through,” he says.

He’s grateful that the utility and contractors offered courses to help him and his colleagues climb the steep learning curve. Over the two years, Beaton learned about specifications for the new pumps and dewatering equipment, how to add polymer and per-

form chemical analysis with updated systems, and how to operate new centrifuges, aerators and a new UV disinfection process.

FROM ICE TO WASTEWATER

Beaton saw the project as another step in his development. Before joining the Eastern Passage plant, he worked for the city of Halifax in the ice rink system. After a few years, he got “tired of working nights and weekends and feeling cold even in the summer.” He joined the treatment plant as a

“There were trailers, tons of debris and a lot of noise and congestion with 50 to 100 contract workers running around, plus dirt from all the digging. Team members jumped in right from the start.”

ROBERT GILLIS

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“Even though we’ve worked out most of the bugs in the new facility, it’s always something different every day. That keeps me motivated.”

EVAN BEATON

process assistant and earned his Class II wastewater certification.

A native of Cape Breton Island, Beaton attended Chancellor Regional Vocational School (now part of the Nova Scotia Community College system), and took a two-year program in TV and radio repair. A recession prompted him to move to Halifax, where he settled down and married.

Working at the treatment plant has been a good move: “There are certain obstacles to be met, but it’s not the same-old, same-old grind. Even though we’ve worked out most of the bugs in the new facility, it’s always something different every day. That keeps me motivated.”

DIVERSE BACKGROUND

Eisan, a Class IV operator, has been in the Canadian wastewater business for 26 years. He previously worked at the Fall River and Timberlea wastewater treatment plants (both in Halifax suburbs), and some smaller plants in the Halifax Regional Municipality.

Eisan, a Halifax native, attended Holland College, a community college in Prince Edward Island, where he took a two-year program in conservation



BULLISH ON CAREERS

Want opportunities for advancement? A chance to learn new things every day? Pursue a career in wastewater. That’s the consensus of the Silent Hero Award winners.

“Wastewater treatment is a good career,” says Philip Winter, plant supervisor at the Eastern Passage Wastewater Treatment Facility in Halifax, Nova Scotia. “It’s very dynamic. Also, it requires a substantial education and substantial application of what you learned. It’s not boring at all. The processes and the techniques and the chemistry behind them are constantly evolving. If you want to do theoretical work, you can. If you want to do operations work, there’s plenty to be found. The same goes for the mechanical side with repair and maintenance of these plants.”

Operator Andrew Eisan agrees: “Even with its ups and downs, wastewater offers a lot of growth. I like coming to work in the morning, and that’s the main thing.”

Fellow operator Evan Beaton recommended a wastewater career to his nephew: “I told him that with new regulations there needs to be expansions and improvements in the wastewater system. The field will grow over time. Several community colleges offer environmental courses that can be used to get into the field. It’s not something that will be outsourced; it’s onward and upward.”

Robert Gillis, the project engineer who nominated Winter, Eisan and Beaton for the Silent Hero Award, is equally enthusiastic. “Water and wastewater are great careers,” he says. “There are a lot of challenges that take problem-solving skills and adapting to constant changes. There’s always a need for strong people. There will be no shortage of water and wastewater needs.”

studies. When his college career didn’t work out, he found a job as a summer intern at a leachate treatment facility on a landfill site. From there, he worked at a treatment plant at Aerotech Park near Halifax International Airport.

“While this big renovation project had its share of challenges, for us it was business as usual, keeping the old plant running as it had,” says Eisan. “There were a lot of contractors. You’d go to work one day and think you’d be working on something, and then they’d want to try something else and you had to accommodate them. Our schedules were compromised. That was tough getting used to, but we did.”

STAYING THE COURSE

The Silent Hero Award winners aren’t resting on their laurels; they’re way too busy. The operators work in three-person teams that do everything from process changes to centrifuge operation, to monitoring of sludge levels in the primary and secondary clarifiers, to laboratory testing and equipment maintenance.

MacDonald is the plant’s jack of all trades. A given day might find him

(continued)

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Colton Clarke, plant technician, reviews plant operation on the SCADA system display.

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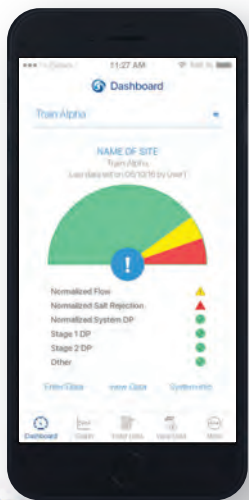
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Through the Looking Glass

A NEW EDUCATION CENTER IN VIRGINIA'S PRINCE WILLIAM COUNTY INCLUDES A SPACIOUS LABORATORY WITH WINDOWS THAT LET VISITORS WATCH TECHNICIANS DO THEIR WORK

By Craig Mandli

Working in a water and wastewater lab can be a lonely task. That isn't the case in Virginia's Prince William County, where a new education center gives visitors an up-close look at the laboratory and tells how the county gets and treats its water.

The Durward E. Grubbs Environmental Education Center, which opened in October 2015 at the H.L. Mooney Advanced Water Reclamation Facility, is roughly two-thirds lab space and one-third interactive museum. The aim is to show how water flows from the Potomac River to the tap and back again.

"The facility actually serves two purposes," says Marlo Thomas-Watson, Prince William County Service Authority community relations manager. "We needed to upgrade our lab, and our governing board felt it was appropriate to have a wing of the facility devoted to public outreach. Allowing people to learn about what we do is important, especially when it comes to making decisions for infrastructure upgrades."

The center is named for Durward E. Grubbs Jr., a founding member and former chairman of the authority's board of directors and a champion of public education.

WATCHFUL EYES

The reclamation facility processes roughly 24 mgd. Daily testing is performed in the Grubbs Center's state-of-the-art, 6,200-square-foot laboratory. A team of 15 technicians constantly monitors chlorine, bacteria, coliform, total phosphorus, BOD and other parameters. In the event of a ruptured water main, the lab tests water from the affected site to ensure that it is safe to drink after the break is repaired.



Interactive displays, light-up maps, backlit photographs, and life-size pipes show the complete urban water cycle.

Mary Eure, lab supervisor, says the new facility enables her staff to better serve the community. "More than 5,000 water-quality tests are performed in our new lab each month," she says. "It replaces our 1,000-square-foot lab, where our technicians worked in tight space and the volume of work often made it difficult."

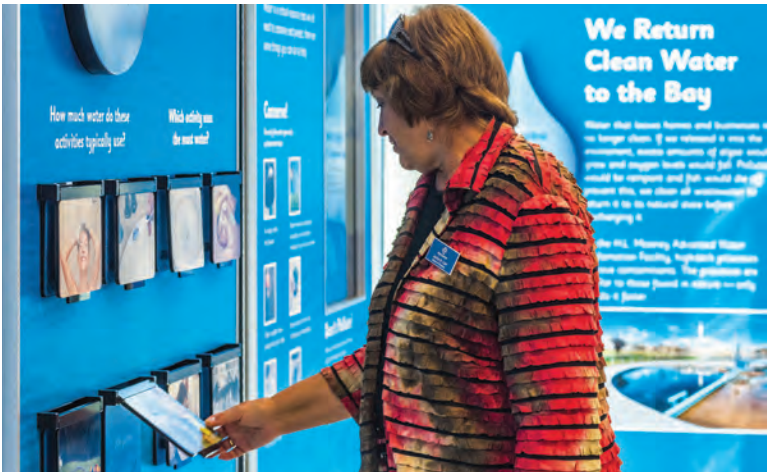
Visitors to the Grubbs Center can watch lab technicians at work through large windows. While staff members had to adjust to working in front of an audience, they now appreciate the interest visitors take. Many have found ways to interact with visitors.

"It was a little odd having people watching us work at the beginning, but you get used to it pretty quick," Eure says. "The people always have a lot of great questions, and many take a genuine interest in what we're doing."

The larger facility also enables the lab staff to offer commercial testing. Neighboring agencies, companies and homeowners with wells can have their water tested. "There's no way we could have taken on that additional work in our old space," says Eure. "The ability to add revenue and offer additional services has been terrific."



The 24 mgd H.L. Mooney Advanced Water Reclamation Facility serves 250,000 customers in and around Woodbridge, Virginia.



The Durward E. Grubbs Environmental Education Center, which opened in October 2015, is two-thirds lab space and one-third interactive museum.

MAKING A CONNECTION

Seeing science in action is only part of the experience. Interactive displays, light-up maps, backlit photographs, and life-size pipes show how water is withdrawn from the Potomac River, treated, sent to customers' taps, treated as wastewater and returned to the river. A map on the wall shows the county's drinking water sources. A large aquarium is home to fish native to the Potomac River and Chesapeake Bay.

"People tend to misunderstand how complicated the treatment process actually is from start to finish," says Thomas-Watson. "People are in awe of what they learn."

Exhibits also include a graph showing the gallons of water used daily and a history lesson on pipes, sewers and the wastewater process. A large ceiling display shows blown-up microbes that are key to the treatment process.

"People are taken aback to find out that the average shower uses 25 gallons of water," says Thomas-Watson. "They are surprised to see how many steps we've taken in updating the purification process over the last century. We show them the wooden pipes that sewage used to run through before it was discharged, untreated, into the river. We've come a long way."

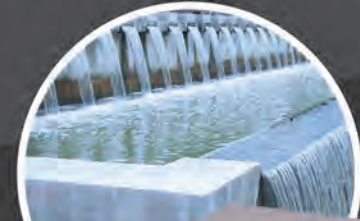
The center's halls are often filled with students. Teaching children and educators about how water comes to their homes is a priority of the center. Requests for reclamation facility tours have multiplied tenfold since the center opened. "We use a lot of state-of-the-art equipment in our treatment processes that people learn about in the educational center and want to learn more about," says Thomas-Watson. "Being able to see the process in action is very valuable."

SETTING AN EXAMPLE

The authority's board of directors fully supported the education component of the Grubbs Center. The authority strives to be an open, high-per-

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forming utility, and that mission includes educating customers, according to spokesperson Kipp Hanley.

"Operating in the Chesapeake Bay Watershed means adhering to extremely high environmental standards, which we have accomplished with seven straight years of perfect compliance at our H.L. Mooney Advanced Water Reclamation Facility," says Hanley. "Fish come right up to our plant outfall to take advantage of the clean, oxygenated waters that flow into Neabsco Creek."

Hanley encourages all water and wastewater agencies to get their publics involved and informed. "We've found that an educated customer is typically a happy customer," he says. "Once they realize the importance of what we're doing and the role they can play in the process, they are more likely to support facility and technology upgrades and to take steps to be part of the water conservation solution." **tpo**

PLANTSCAPES



CLOCKWISE FROM TOP LEFT: Operator Lewis Kovar stands on plank that leads to a water-quality monitoring point in the assimilated wetland; a 7.2 acre concrete-lined aeration lagoon at the Thibodaux plant; typical concrete apron at one of the 40 discharge points that empty into the wetlands; and aerators operating in the lagoon.

“The natural wetlands are being enhanced by receiving effluent from the wastewater treatment plant.”

JOE VAN MARKE

Teaming With Nature

FEDERAL, STATE AND LOCAL PARTNERSHIP HELPS A LOUISIANA WASTEWATER TREATMENT PLANT IMPROVE WILDLIFE HABITAT IN A NATURAL ESTUARY AREA

By Jeff Smith

The Thibodaux Wastewater Treatment Plant is an aerated lagoon system with mechanical bar screens, high-flow trickling filters, and primary and final clarifiers.

The 8 mgd (design) facility sits on 570 acres next to more than 3,500 acres of swamp and forested bottomland known as the Barataria-Terrebonne National Estuary (BTNE), wedged between the Mississippi and Atchafalaya rivers in southern Louisiana.

On an average day, 2.5 mgd of treated effluent flows through the facility's assimilated wetland into the BTNE to help improve the habitat for raccoons, deer, squirrels, bobcats, muskrats, mink and otters, plus frogs, turtles, alligators, egrets, herons and hawks. The habitat also nurtures an array of plants including maiden cane and bull tongue.

ENHANCING LIFE

After conventional treatment and UV disinfection, an 80 hp submersible pump (Pumpex Type K304) moves the effluent to the assimilated wetland 2 miles away. It passes through a 2-inch PVC pipe to a distribution system with 40 discharge points spaced 50 feet apart. The effluent then flows across a rock cascade into a tupelo gum cypress swamp.

“The natural wetlands are being enhanced by receiving effluent from the wastewater treatment plant,” says Joe Van Marke, city chemist. Van Marke, responsible for Thibodaux's water and wastewater treatment plants, says the discharge site is perfect: A levee on the north and high ridges on the east and west sides form a nearly 200-foot-wide natural flow corridor that is identifiable and suitable for testing.

To determine the effectiveness of treatment and the impacts on the wetland, a biology professor at Nicholls State University in Thibodaux oversees regular monitoring of water quality. “Our operators keep the grass mowed

around the discharge points to make sure the discharge water is full-flowing,” Van Marke says.

Created by Congress in the late 1980s as part of the Clean Water Act, the National Estuary Program is administered by the U.S. EPA to help states develop plans to protect and restore the productivity of estuaries while supporting economic growth and recreation. The State of Louisiana committed to the voluntary program in 1990. In 1992, the Thibodaux plant was adapted so that the wetlands could be used for tertiary treatment. Before that, the swamp had been cut off from its supply of freshwater.

BIRD HAVEN

The Barataria-Terrebonne swamps and marshes contain nine of Louisiana's scenic streams and are among the nation's top three areas for bird-watching. Nearly 400 bird species have been spotted in the BTNE system. The southern half of the system contains estuaries that exchange water with the Gulf of Mexico, while the northern end contains freshwater wetlands and backswamps.

Van Marke says the wetland area has always been forested and that logging as a means of removing nutrients will likely continue. Future recreation in the wetland will be limited, since hunting and fishing are prohibited on the site. Directional drilling for mineral extraction will be allowed. Kevin Chiasson, plant supervisor, gives tours of the treatment facility.

The treatment plant is in a sugar cane field 60 miles southwest of New Orleans. Its outfall is the Pointe Au Chenes Swamp, about a mile from the plant. Shrubbery and trees hide the plant from a subdivision on its western side.

Van Marke says, “The city and our treatment plant do our best to support the efforts of the state by adding water suitable for plants, vegetation and wildlife in the wetlands.” tpo

Drying Efficiencies

NEW BELT FILTER PRESS FROM BDP INDUSTRIES IS DESIGNED TO SAVE WATER AND WASTEWATER AGENCIES TIME AND MONEY

By Jennifer West

Efficiency and energy savings are major priorities for water and wastewater treatment plants.

Those attributes were on display in many products exhibited at the 2016 Water & Wastewater Equipment, Treatment & Transport Show in Indianapolis. An example is the Model 3DP belt filter press from BDP Industries, which offers high feed flow rates, easy access for service, and reduced maintenance in producing cake at 16 to 35 percent solids. Drier material cuts hauling costs.

“We replace a lot of antiquated systems,” says Mike Smith, sales engineer. “The unit also replaces drying beds and lagoon systems.” The Model 3DP has been used in hundreds of applications around the country.

The Model 3DP uses a three-belt technology that allows for independent speed control in each zone. A unique independent gravity zone applies gravity and pressure zones to maximize the belt fabric and yield a thicker cake. “It’s dewatered by pressure and shear force,” says Smith.

Although the press is not new, the company continues to make improvements every year. For instance, the press has a curved wedge layout that more effectively applies pressure to the cake. By simply curving the wedge, pressure is applied immediately and the entire belt length is used.

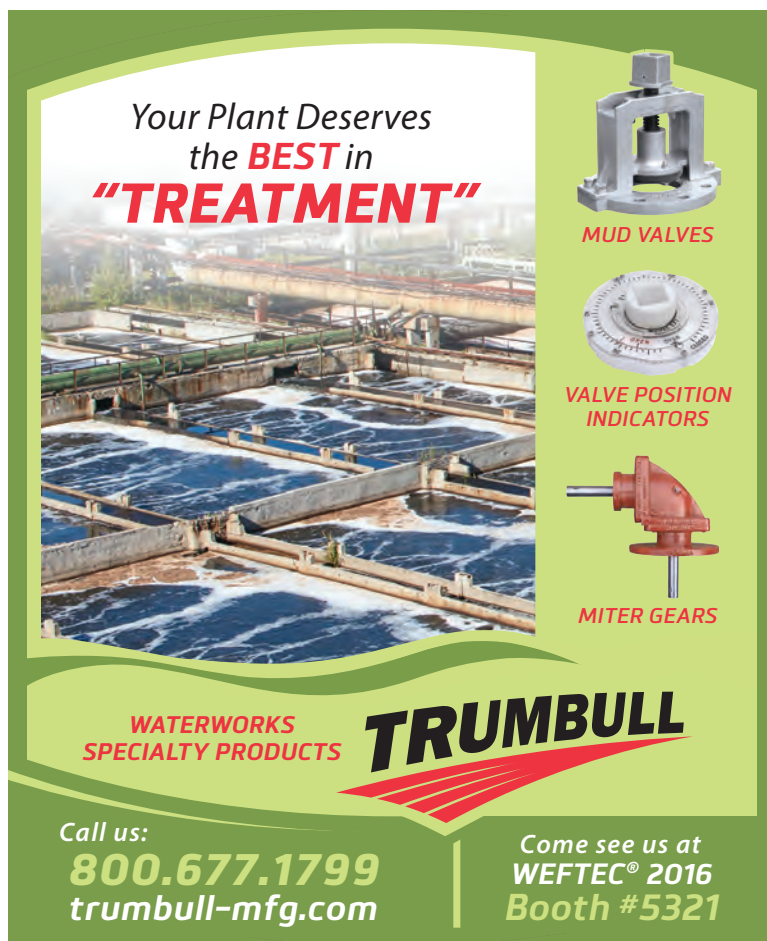
A vertical roll configuration eliminates rewetting by keeping the filtrate from rolling back into the lower rollers. The filtrate instead drips to filtrate pans beneath each roll, improving cake retention. Also, to eliminate roll failures, BDP designed the 3DP to carry the stress load on the solid inner roll. This reduces stress fatigue and helps lower maintenance costs.

In addition, the Model 3DP does not require a platform. Instead, the gravity zone and controls are at operator level, simplifying daily work and maintenance. A tubular frame design eliminates corners and ledges, creating smoother surfaces that simplify cleaning. “It saves area, time and money for plants,” says Smith.

The company markets the unit as a highly durable, rugged machine with a life expectancy of 20 years. Tubular frame construction and a hot-dip galvanized coating inside and out add reliability and provide corrosion resistance.

Smith calls the WWETT Show a positive experience: Attendees visited their booth throughout the show’s three days of exhibits. “We had small interest from operators, but quite a bit of interest from the handling side,” he says. “There are lots of uses for haulers who are doing high quantity.”

518/695-5417; www.bdpindustries.com. **tpo**



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PHOTO COURTESY OF BDP INDUSTRIES

The Model 3DP belt press from BDP Industries is efficiency in a nutshell. It combines pressure and shear force to maximize the dewatering process.



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www.wwettshow.com

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Operator Bill Lowney checks biosolids quality at the rotary dewatering press (Fournier).

Ample *Agility*

THE AWARD-WINNING TOWN OF HAMPTON TEAM FINDS WAYS TO DEAL WITH SUBSTANTIAL VARIATIONS IN SEASONAL FLOWS AND INFLUENT STRENGTH

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Elizabeth Frantz**



PUBLIC WORKS DIRECTOR CHRIS JACOBS SUMS UP the challenges of treating wastewater in the town of Hampton, New Hampshire: “It’s like we’re trying to run a bakery, but the cake mix constantly changes.”

That’s largely because Hampton is an Atlantic beachfront tourist community of 15,000 whose population swells to as high as 30,000 in summer. On top of that, some 100,000 visitors may crowd the mile-long Hampton Beach on hot summer days. Adding to the difficulty, a brewery opened in town two years ago, and its wastewater sharply increased the BOD loading.

Leavitt E. Magrath Wastewater Treatment Plant, Hampton, New Hampshire

BUILT: | 1964 (major upgrade 1976, other upgrades since)

POPULATION SERVED: | 15,000

SERVICE AREA: | 14.6 square miles

FLOWS: | 3.9 mgd design; 2.2 (winter) to 2.7 (summer) mgd average

TREATMENT LEVEL: | Secondary

TREATMENT PROCESS: | Modified Ludzack-Ettinger

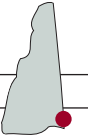
RECEIVING WATER: | Unnamed Tide Mill Creek tributary stream

BIOSOLIDS: | Landfilled

ANNUAL BUDGET: | \$1.5 million (operations)

WEBSITE: | www.hamptonnh.gov

GPS COORDINATES: | Latitude: 42°55'28.27"N; longitude: 70°49'27.27"W



The job of finessing the Leavitt E. Magrath Wastewater Treatment Plant through those changes falls to a seven-member team led by Mike Dube, operations manager, and Mike Carle, chief operator. Aside from a hiccup here and there, the two have kept the plant running efficiently and in compliance with its permit since they arrived in the late 1990s.

Recent years have brought recognition for their work, in the form of a 2013 New Hampshire Water Pollution Control Association Plant of the Year award, a 2014 U.S. EPA Regional Wastewater Treatment Plant Excellence Award and a 2015 Environmental Champion Award from Aquarion, the private water company serving Hampton and nearby communities.

Ken Kessler of the New Hampshire Department of Environmental Services (DES) and Carl McMorran, operations manager of Aquarion, were instrumental in nominating the plant for two of the awards.

Dube says the awards are related to major improvements on a main oceanfront pump station and the plant’s biosolids dewatering equipment, both completed in 2013. Those projects helped the plant fulfill its role in keeping Hampton Beach among the cleanest in the country, while protecting the marsh and clam flats in the harbor.

“Hampton Beach has a five-star rating as one of the best beaches around. When the summer temperature gets above 90 degrees, everybody comes here to try to cool off.”

MIKE DUBE

BEACH BONANZA

The town of Hampton is best known for Hampton Beach, a wide expanse of state-owned oceanfront that draws visitors from a wide area. “Hampton Beach has a five-star rating as one of the best beaches around,” says Dube. “When the summer temperature gets above 90 degrees, everybody comes here to try to cool off.”

That means higher flows to the treatment plant. Design capacity is 3.9 mgd; the winter average flow is 2.2 mgd. In summer, seasonal residents push that to 2.7 mgd. On summer days when the beach is crowded, flows can spike.

“We can hit 4.5 mgd at midday, although it goes down to about 2 mgd overnight,” Carle says. “So the daily average is still below 80 percent of our



“Lately, we’re headed in the right direction. The elected officials we have in place now are looking out for the future of the town and making the necessary plans to improve it.”

MIKE DUBE

The team at the Leavitt E. Magrath Wastewater Treatment Plant includes, from left, Bill Lowney, Marie Hall, Mike Dube, Mike Carle, Cliff Lavigne, Rob Pierce, Steve Aslin and Mike Moran.

LITTLE THINGS COUNT

It’s not just the million-dollar projects that make things better at the Leavitt E. Magrath Wastewater Treatment Plant. Sometimes it takes nothing more than a couple of sheets of paper, or the repurposing of a plastic reagent bottle.

Ideas arise constantly from a staff that totals more than 100 years of experience. The team includes:

- Steve Aslin, maintenance technician/grease inspector (Grade 4 wastewater operator license, 19 years with the town of Hampton)
- Rob Pierce, lab technician, Grade 2, 10 years
- Bill Lowney, operator, Grade 1, 10 years
- Cliff Lavigne, truck driver, Grade 1, nine years
- Mike Moran, equipment mechanic, Grade 2, five years
- Marie Hall, Public Works secretary, 26 years

“We have a lot of operator ingenuity here,” says Mike Dube, operations manager (Grade 4, 18 years). Mike Carle, chief operator, was recognized twice by the Water Environment Federation in its Operator Ingenuity Contest, first for a “fecal clock” and then for a

makeshift but effective shield to keep an influent composite sampler from getting clogged by wipes or rags.

“We use the IDEXX test for fecal coliform,” says Carle (Grade 4, 17 years). “It’s an 18-hour test. On weekends we rotate the lab duties, so the person coming in may not know when it’s time to conclude and read the test.” The “clock” consists of a sheet of manila paper with two dials printed on it, one for indicating when the test was started and the other when to read it. “It’s a simple visual reminder,” Carle says.

Dube notes that clogging of the influent sampler used to be “a maintenance nightmare, especially when the temperature was 10 degrees outside and our people had to clean it off.” To create the sampler shield, Carle took a 500 mL bottle from a pH buffer solution, cut the bottom off and modified the neck. When fastened in place, the bottle formed a shroud over the intake. “Now the rags don’t get sucked into the intake and clog it up,” Carle says. “At best they just slide on by. At worst they get caught on the hose.” Either way, the sampler is able to operate continuously.

Dube says, “Little things like that help us do our jobs a bit better.”

design flow. We typically exceed 3.9 mgd on only a handful of days for the year, and usually those are rain events.”

The plant’s permit includes ammonia limits of 1.1 mg/L in summer and 2.7 mg/L in winter. Effluent ammonia is typically below the detection limit. “We’ve started tracking total nitrogen and are almost always below 5 mg/L,” Carle says. That parameter is not in the permit, but may be in the future, Dube observes. There is no phosphorus limit.

REFINED PROCESS

The Leavitt E. Magrath plant was built in 1964 and received a major 1976 upgrade. It uses the modified Ludzack-Ettinger process. Influent enters the headworks building and passes through a bar screen (Headworks International). Rags and debris drop into a Screwactor spiral conveyor/compactor (also Headworks) for dewatering. “It acts like a big sausage-maker,” Dube says.

The wastewater is then delivered to a bucket elevated grit chamber (Schloss) that dumps the material into a screw auger for dewatering. From there the flow goes to three wet wells, from which three Chicago pumps (Grundfos) rated for a combined 2,000 gpm deliver it to the primary clarifiers. “We typically run one primary,” says Dube. “We have two, and we put the other one on for storm surges or when work is done on the first clarifier. It’s nice having that redundancy.”

Primary effluent goes to the aeration system, first entering an anoxic zone. A recycle pump (Flygt - a Xylem Brand) delivers return activated sludge at a ratio of 1 1/2 to two times the influent flow. “We have that recycle pump hooked up to an ORP meter (Hach) at the tail end of the anoxic process,” says Carle. “The internal recycle pump used to operate at one speed. Now the recycle rate fluctuates according to the ORP setting. That saves money on electricity.”

The anoxic zone is followed by three aerated zones. “If you picture a large square divided into four smaller squares, that’s the setup of our aeration tanks,” Carle says. “The flow goes through the tanks sequentially.”

From aeration, the flow moves on to three Tow-Bro secondary clarifiers (Evoqua Water Technologies). Two are typically online and the other is kept as a spare. Secondary effluent is disinfected with sodium hypochlorite and dechlorinated with sodium bisulfite before discharge to a tributary of the Tide Mill Creek.

SOLIDS SIDE

The Hampton plant sends undigested biosolids to landfill. Primary and waste activated sludges are handled separately before dewatering. Primary sludge goes through a gravity thickener (FMC) and waste activated material through a rotary drum thickener (Parkson Corp.).

From separate storage tanks, the materials are mixed in the pipeline that feeds a rotary press (Fournier). “On a blend of 20 percent secondary and 80 percent primary sludge, we produce cake at 22 to 27 percent solids,” says Carle. Plant personnel haul the material to the landfill.

In 2013, the team replaced an older four-channel dewatering press with the current six-channel unit (Fournier) at a cost of \$1.3 million. “The old press didn’t have secondary-only dewatering capability because of the channel sizes,” Dube says. “So we went with smaller channels, which enable us to dewater secondary solids.

“As part of that project, we diverted the recycle water from the rotary drum thickener and the press so it goes into the wet wells instead of back through the headworks. The advantage is that we get a more accurate reading of the loadings coming into the plant.”

The other major 2013 project was a \$2.4 million rebuild of the Church Street pump station serving the beach area. “The previous pump station was so old that it was registered as a historical site,” says Dube. “We had to go through all the hoops and waivers to be able to take it out. It wasn’t cost-effective to rehabilitate it.”

Carle recalls, “We had to dig down to 30 feet below the low tide mark — the contractor was essentially digging into the Atlantic Ocean. It took them several months to dewater the area. We located the new station 2 feet above the 100-year tide mark, taking into consideration the rising sea levels.” The pump station contains three Flygt premium-efficiency submersible pumps, each rated 30 hp, significantly smaller than old pumps. For the energy effi-



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TSS	2-3 mg/L	30 mg/L monthly avg. 45 mg/L weekly avg. 50 mg/L daily avg.
Ammonia	Non-detect	1.1 mg/L summer 2.7 mg/L winter

Rob Pierce, lab technician, enters lab data into the daily bench sheet.

ciency gains, the town received a \$50,000 incentive rebate from Unitil, the local electric utility.

ADAPTING TO CHANGE

While efficiency is important, the greater quest is keeping up with changes in influent volume and strength. For that, Carle and the team get help from the Hach Water Information Management Solution.

“Using the WIMS data, I can look up our BOD loadings coming in for the week,” Carle says. “Then I can go back two or three years if I want to and compare and say, ‘Yes, this is a spike, and this is a real difference.’ Then I can compare that to different parameters to see when the plant was running well and when it wasn’t. I can then use different process strategies, whether that be a mixed liquor suspended solids level or the food-to-microorganism ratio, and see which one correlated the best.

“One of our biggest process challenges has been the addition of the brewery. After they came into town, we saw our influent BOD loading almost triple. It took us a while to figure out how to deal with that, but since we did, it’s been fine. We recently switched process strategies to maintain a constant solids retention time of 13 days. Now on our best days, you can read a newspaper at the bottom of our 8-foot-deep chlorine contact chamber.”

When minor day-to-day problems crop up, the team addresses them with an eye toward lasting fixes. Dube recalls, “We had a chlorine violation because

somebody turned a chemical feed pump off and forgot to turn it back on. We said, ‘All right, what can we do to keep that from happening again?’ We tied that pump into our SCADA system, so that if it’s not turned back on, there’s going to be an alarm.”

NEVER AT A STANDSTILL

The Hampton team continues to face down difficult issues. One is I&I. In 2006, contractors replaced many of the aging sewer mains along the beach in a \$10 million project. “We actually saw a drop in flow of a million gallons a day,” says Carle. “The trouble with being on the beach is that we have 10-foot tides here, so during springtime we would essentially be receiving the Atlantic Ocean.” More work on I&I reduction needs to be done.

“We’re also trying to add some new equipment and make more improvements at the plant,” Dube says. “That includes upgrading the septage receiving station and adding an emergency generator for our aeration blower building.”

Given the plant’s age, repairs and maintenance are daily concerns. “We’ve installed the Hach JOB CAL computerized preventive maintenance program,” says Dube. “It helps us track all of our equipment repairs and scheduled maintenance. The operators log in to look at what’s due to be checked or worked on and just go in and do it.”

While budget issues are challenging, the Hampton team faces the future optimistically. “I’m sure all treatment plants go through ups and downs,” says Dube. “Lately, we’re headed in the right direction. The elected officials we have in place now are looking out for the future of the town and making the necessary plans to improve it.”

Mike Dube, wastewater operations manager



Carle adds, "It's a team effort here. As operators, we can't do our jobs without the support of the people who haul the biosolids, do the lab work and do the maintenance. We try to cross-train everybody to be able to do everything."

That's especially important in a plant where change is always in the mix.

tpo

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 <p>Emerson / Rosemount 2400 Barranca Pkwy., Irvine, CA 92606 800-854-8527 949-757-8500 Fax: 949-474-7250 liquid.csc@emerson.com www.rosemountanalytical.com WEFTEC Booth 6929</p>		X	X	X	X				X			
 <p>FCI - Fluid Components International 1755 La Costa Meadows Dr., San Marcos, CA 92078 800-854-1993 760-744-6950 Fax: 760-736-6250 eflow@fluidcomponents.com www.fluidcomponents.com See ad page 51</p>	X	X							X	X	X	
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 <p>Grace Industries 305 Bend Hill Rd., Fredonia, PA 16124 724-962-9231 Fax: 724-962-3611 sales@graceindustries.com www.graceindustries.com</p>	X	X		X								

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						X	
X				X			
X				X			
				X		X	
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 <p>King Lee Technologies 8949 Kenamar Dr. BL 107, San Diego, CA 92121 800-800-9019 858-693-4062 Fax: 858-693-4917 klt@kingleetechnology.com www.kingleetechnology.com</p> <p>See ad page 40</p>	X			X		X			
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 <p>MARKLAND Specialty Engineering Ltd. 305 Armstrong Ave., Georgetown, ON L7G 4X6 855-873-7791 905-873-7791 Fax: 905-873-6012 markland@sludgecontrols.com www.sludgecontrols.com</p> <p>See ad page 67</p>		X	X		X			X	X
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 <p>ProMinent 136 Industry Dr., Pittsburgh, PA 15275 412-787-2484 Fax: 412-787-0704 sales@prominent.us www.prominent.us</p> <p>See ad page 86</p>		X	X				X		
 <p>RKI Instruments, Inc. 33248 Central Ave., Union City, CA 94587 800-754-5165 510-441-5656 Fax: 510-441-5650 orders@rkiinstruments.com www.rkiinstruments.com</p> <p>See ad page 86</p>					X				
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X			X			X	
			X				
				X			
		X		X		X	
			X				
			X	X			Sampling Systems
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X						X	
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When Two Worlds Collide

BIOLOGICAL AND MEMBRANE PROCESSES MUST WORK TOGETHER TO PRODUCE HIGH-QUALITY WATER FOR REUSE, BUT THEY DON'T NECESSARILY PLAY WELL TOGETHER FROM AN O&M PERSPECTIVE

By Ed Kobylinski, Neil Massart, Sandeep Sathyamoorthy and Jonathan Loveland

As utilities develop facilities to maximize water resources, indirect potable reuse and direct potable reuse are becoming more common. Microfiltration or ultrafiltration membranes are often installed for pretreatment ahead of reverse osmosis, and advanced biological treatment often precedes membrane treatment. However, the integration of advanced biological treatment and tertiary membrane treatment result in operations and maintenance challenges. When the two treatment worlds collide, it's helpful for operators to understand the issues and their options to keep both processes working effectively and consistently.

DAILY DISAGREEMENT

Biological and membrane process flows need fundamentally different management. Membranes want a steady influent flow, whereas biological systems have to treat flow as it arrives. Membranes, especially RO, typically do not treat highly variable diurnal flows and are more difficult to operate under such flow conditions.

Figure 1 illustrates a typical diurnal flow pattern for a wastewater treatment plant with a 10 mgd average flow. Hourly flows can vary by as much as 30 to -60 percent. In such a plant, membranes will experience significant flow variations throughout the day. Although MF and UF membranes can typically handle flow variations, RO systems have a more limited range — from 85 to 100 percent of their design flow.

So for the plant just described, the RO membranes could not process more than 10 mgd of influent, and the RO trains would have to be turned off when influent flow dipped below 8.5 mgd. As a result, a significant fraction of effluent could not be reused. The RO trains would need to be taken out of service and flushed or cleaned daily, since biological growth tends to accumulate on idle RO membranes.

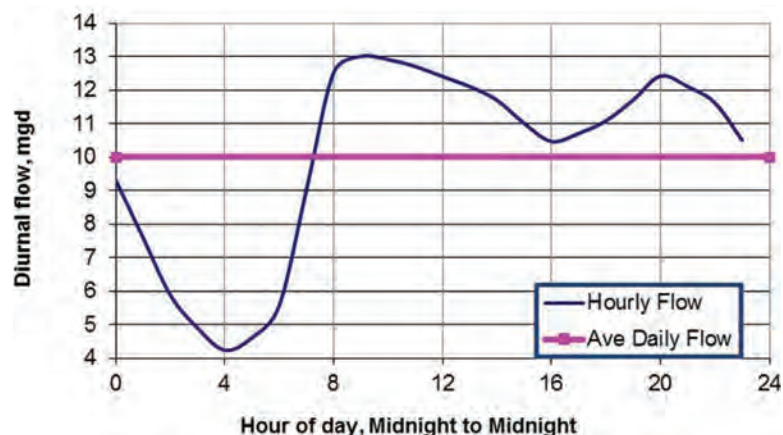


FIGURE 1: Wastewater treatment plant diurnal flow curve.



PHOTOS COURTESY OF BLACK & VEATCH

Flow equalization within reuse systems benefits both biological and membrane treatment systems and produces higher water yield and a better-quality final product.

ALTERNATIVE SOLUTIONS

The obvious solution to this problem is flow equalization. There are multiple equalization options each with advantages and disadvantages. Inline equalization often requires separate pumping of the forward flow, whereas offline systems can store just the flow in excess of the targeted continuous daily flow.

Option 1: Equalization ahead of RO

Equalization ahead of the RO system provides the flow relief needed to dampen hourly fluctuations and allows the RO to operate at a constant flow for longer periods. The RO system in this case can be designed for the true average daily flow rather than oversized to meet a peak hourly flow, thereby reducing the installed cost. Equalization also minimizes the number of times operators have to shut down, flush, clean the RO train and put it in storage mode until the flow rises.

While this simplifies operation of the RO flow equalization, it leaves the upstream facilities exposed to all daily and hourly flow fluctuations and the attendant operating complexity. The upstream facilities, including the MF/UF system, must be designed for the variable flows.

(continued)

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Option 2: Equalization ahead of MF/UF

Equalization ahead of the MF/UF system requires storage of high-quality biologically treated effluent containing low concentrations of suspended solids with little chance of creating odors. A continuous or scheduled program of chlorine dosing is needed to prevent excessive slime growth. Even with equalization to dampen the diurnal fluctuations through the MF/UF, an RO equalization tank is still needed to simplify RO operation.

As with Option 1, this equalization option allows the MF/UF system to be designed for lower, longer-term flow averages, so it can be operated at a more steady state for longer periods, simplifying operation. In addition, chemical feed systems can be operated at steady state. Equalization lets operators focus more time on the big picture and less time tweaking and balancing chemical feed rates to address changing conditions.

Option 3: Primary effluent equalization

The biological plant can be a mystery for many membrane system operators. Equalization ahead of the biological process allows loading to be controlled throughout the day and minimizes wide load fluctuations. Although



Some equalization ahead of the RO is usually needed to simplify operation, reduce operation and maintenance costs, and maximize production of reclaimed water.

equalization of flow matters most for membrane operations, equalization of load matters more for biological systems.

The BOD and TKN loads drive aeration and sludge wasting, which affects the need to adjust airflow rates for dissolved oxygen control, MLSS recycle rates for denitrification, and return/waste activated sludge flow rates. Managing the load produces steadier and simpler daily operation. A steady daily flow also simplifies clarifier operation. This option enables operators to better control the biological process and so produce a better-quality effluent with less colloidal material to feed the membrane systems.

Equalization also improves biological system performance by increasing removal of soluble BOD, thereby limiting RO membrane fouling. Less frequent major cleaning of the membranes extends membrane life and also cuts operating costs by enabling operation at a lower pressure.

Equalization of load before biological treatment has a downside — odor generation. In effect, the utility pays for less frequent membrane cleaning with cleaning and odor management of the equalization tank. As a remedy, two equalization tanks provide operating flexibility and make tank cleaning and maintenance easier.

Overall, primary effluent equalization is better than Options 1 and 2 because it produces a better-quality feed to the membranes and simplifies operation of three major sections of the facility. On the other hand, integration of primary effluent equalization into existing facilities considering potable reuse can be challenging where there are significant site constraints.

Option 4: Influent flow equalization

Influent flow equalization can take many forms, including temporary storage in the collections system or an on-site tank. Storage of incoming flow is a major source of odors. Site constraints often dictate the choice between influent or primary effluent equalization, but primary clarifier effluent storage is generally preferred. Options 3 or 4 are generally better than Options 1 and 2 because they equalize flow and simplify biological and membrane system operations, while also yielding substantial improvements in biological effluent quality.

SIDESTREAM EQUALIZATION

The sidestreams from sludge digestion and dewatering have high concentrations of pollutants, especially in plants with anaerobic digestion. If these high-strength waste streams are sent back to the head of the plant, the influent or primary effluent equalization basins can catch and equalize the loads.

Because many plants dewater solids on an intermittent schedule, separate equalization and even treatment of this sidestream load can be beneficial to overall biological plant operation. Reducing the sidestream loads simplifies operation of the main liquid stream process and produces a more stable effluent quality.

Polymers are used both to dewater and thicken sludges. While polymers are necessary, any polymer in the plant effluent increases the potential for membrane fouling; MF/UF systems are particularly at risk. Whether RO equipment is at risk depends on the type of polymer used. Solvent-based polymers, for example, can be problematic; solvents that are not biodegradable can foul and even damage RO membranes.

In many reclaim cases, only a portion of plant effluent is sent to the membrane systems. If all sidestreams containing polymer are separated and returned to the treatment train that does not send effluent to the reclaim system, polymer fouling can be avoided. If polymers are used properly in thickening and dewatering, almost all polymer should be absorbed onto the solids.

Testing can help operators determine whether a particular polymer contributes to or causes membrane fouling. Some newer polymers are biodegradable. Sending sidestreams back to the biological system allows microbes to convert the polymer to biomass. On-site pilot testing helps ensure that all components of the polymer solution are biodegraded and nothing slips through that would foul the membranes. An on-site membrane pilot unit also brings opportunities to investigate other membranes and membrane-cleaning procedures.

FINAL ANALYSIS

Biological and membrane treatment are very different, but both can significantly benefit from flow equalization. Equalization as far upstream as

Biological and membrane process flows need fundamentally different management. Membranes want a steady influent flow, whereas biological systems have to treat flow as it arrives.

possible makes operation easier for both systems and ultimately produces better-quality reclaimed water.

RO systems do not have much flexibility for turndown, so some equalization ahead of the RO is usually needed to simplify operation, reduce operation and maintenance costs, and maximize reclaimed water production. Equalization within reuse systems benefits both biological and membrane systems and produces a better final product.

ABOUT THE AUTHORS

Ed Kobylinski is a senior wastewater process expert, Neil Massart is director of the operations technology group, Dr. Sandeep Sathyamoorthy is process and innovation leader, and Jonathan Loveland is global practice leader for alternative water supply, all in the water business of Black & Veatch. tpo

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New Technology Slated for WEFTEC 2016

By Craig Mandli

WEFTEC, the Water Environment Federation's annual technical exhibition and conference, 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. 24-28 in New Orleans, Louisiana, promises to show off some of the finest new products on the market for municipal and industrial water and wastewater professionals. Below is a smattering of some of the newest products that will be highlighted at this year's show.

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800/327-7791; www.cuesinc.com; Booth 1111

Cretex LSS Internal Manhole Chimney Seal

Cretex LSS Internal Manhole Chimney Seal is a mechanical seal installed on the frame and grade ring sections of sanitary sewer manholes. These seals eliminate and prevent manhole frame-chimney inflow. During wet weather, clear water (inflow) enters manholes through deteriorated and broken frame-chimney joints, which may burden the collections system. Each seal is made up of a high-grade rubber sleeve and stainless steel expansion bands, which can be easily removed and reinstalled to allow for future manhole adjustments. It has a 50-year design life and is available in four



widths, allowing complete chimney coverage of up to 24 vertical inches with a single seal.

800/345-3764; www.cretexseals.com; Booth 1319

Flygt - a Xylem Brand Conceptor

The **Conceptor**, a new wastewater pumping technology from **Flygt - a Xylem Brand**, combines what the company knows about tough wastewater challenges with a fully integrated design. Visit Xylem on Sept. 26, at 10 a.m., for the unveiling.



855/995-4261; www.xylem.com/pumping; Booth 2529

Force Flow/ Halogen Chlor-Scale and Eclipse

The **Chlor-Scale** ton container scale from **Force Flow** safely cradles a chlorine ton container while providing critical feed and chemical inventory information. It can be combined with the Halogen Eclipse emergency valve shut-off system to instantly close the container valve when a signal is received from a leak detector, panic button or from SCADA.



925/893-6723; www.forceflow.com; www.halogenvalve.com; Booths 2216 (Halogen) and 2218 (Force Flow)

Fournier Industries Rotary Press

The **Fournier Industries Rotary Press** uses screens and pressure to efficiently dewater all types of municipal and industrial sludge. Its heavy-duty construction with few components reduces maintenance, and the advanced control system allows for unattended operation. The totally enclosed design mitigates odors and provides a healthy work environment. The unit can be equipped with a single dewatering channel or up to six channels on a single machine. It has low power usage, low noise levels, very little water use and a compact footprint. **952/288-5771; www.rotary-press.com; Booth 3708**



Franklin Miller Taskmaster TM8500

Taskmaster TM8500 grinders from **Franklin Miller** employ cutter cartridge technology that reduces maintenance and increases unit strength by taking six individual cutters and spacers and combining them into one rugged cartridge. They can be used in wastewater treatment plant headworks, sludge lines, pump stations, and in prison sewer systems. They provide optimal protection of

plant processes and equipment, as well as trouble-free operation. These versatile processors finely reduce such materials as rags, plastics, wood, debris, tampons, sanitary napkins, and solid waste to keep pipelines flowing, reduce pump downtime, enhance screenings handling and protect dewatering equipment such as centrifuges and filter presses.

800/932-0599; www.franklinmiller.com; Booth 1329



Grundfos Dosing Skid System (DSS)

The **Grundfos Dosing Skid System (DSS)** is a pre-engineered floor or panel dosing system package that offers integrated controls and one-, two- or three-pump configurations designed to accurately meter liquid chemicals for a variety of water supply/treatment systems, as well as industrial and manufacturing applications. It uses an intelligent drive and microprocessor controller to ensure that each dose is performed precisely and with low pulsation, even with chemicals of high-viscosity or off-gassing properties. Packaged skid systems are available for all models of hydraulically and mechanically actuated metering pumps including SMART Digital Dosing pumps with stepper motor technology offering up to 3,000-to-1 flow turndown. **913/227-3400; www.grundfos.us; Booth 4117**



Hach Company RTC-SD

The **Real-Time Control** system for Sludge Dewatering (RTC-SD) from **Hach Company** allows plants to achieve optimized polymer dosages by analyzing flow and feed sludge concentration in real time. This results in lower polymer usage, greater solids capture, and less maintenance within the plant. It can help improve solids capture and throughput, leading to increased throughput and reduced secondary wasting rates. **800/227-4224; www.hach.com; Booth 3814**



Hayward Flow Control HLS Series Level Sensor

The **HLS Series Level Sensor** from **Hayward Flow Control** is an accurate level sensor that is not affected by foaming, waves or headspace vapors. With a complete CPVC housing and construction, it is ideal for corrosive fluids and environments where metals cannot perform. It measures hydrostatic pressure and converts the reading to an analog 4-20mA signal, which can be displayed

on a wide range of indicating transmitters or taken directly into a PLC.



Its large ceramic diaphragm ensures accuracy and repeatability, while a triple-sealed cable entry into body and PFA-coated cable offers superior chemical compatibility. It has a 0 to 15 feet and 0 to 33 feet water measurement range, with 30- and 49-foot cable lengths standard, and other lengths available upon request.

888/429-4635; www.haywardflowcontrol.com; Booth 5349

Huber Technology RoFAS Septage Receiving Station

The **RoFAS Septage Receiving Station** from



Huber Technology is designed to handle harsh environments that may cause standard receiving stations to fail. It easily handles large rocks and debris, protecting headworks from unpredictable septage. Its large-capacity center-feed drum allows for rapid off-loading of tanker trucks. It provides the option for a fully automatic hauler station with card key access, quick connect, and data logging. It can help create revenue opportunity for a quick return on investment.

704/949-1010; www.huberforum.net; Booth 4029

Hydro International Hydro MicroScreen

The **Hydro MicroScreen** from **Hydro International** can serve as a replacement for primary clarification with a 90 percent smaller footprint, and 50 percent less power usage. The rotating screen physically separates fine solids, with customizable removal rates up to 80 percent TSS, 60 percent BOD and 40 percent FOG from flow streams, reducing loading on downstream treatment processes, improving treatment capacity and efficiency, lowering operating costs, and increasing energy recovery in a very small footprint.



866/615-8130; www.hydro-int.com; Booth 3329

InfoSense SL-RAT

The Sewer Line Rapid Assessment Tool, or **SL-RAT**, from **InfoSense** allows municipalities to save time, water and money by using active acoustics to provide a quick view of blockage conditions within gravity-fed sewers. The test takes three minutes with no flow contact, and allows technicians



to inspect 10,000 to 20,000 feet per day with two people. The unit is EPA validated and GPS enabled. Data can be downloaded to the Sewer Line Data Organizer (SL-DOG) for archiving, visualization in Google Earth, or integration with enterprise/GIS applications.

877/747-3245; www.infosenseinc.com; Booth 1541

JDV Equipment Level Loder

The **Level Loder** from **JDV Equipment**



provides a means to dispose of processed waste and material with increased odor control and reduced risk of personnel being unnecessarily exposed to processed material. It helps contain odor by covering standard dumpsters used for hauling processed material, allowing for even distribution of material while increasing the fill percentage of the dumpster without the need for personnel to manually even out the waste material. It allows for outdoor installation with enhanced pest control measures without exposing material to the environment, freeing indoor square footage for other needs and allowing for a decrease in capital expenses for design, engineering and installation for new construction/upgrade projects.

973/366-6556; www.jdvequipment.com; Booth 3445

JWC Environmental IFT Rotary Drum Sludge Thickener

The **IFT Rotary Drum Sludge Thickener** from **JWC Environmental** achieves 5 to 15 percent solids for municipal wastewater biosolids. The Rotary Drum Thickener uses woven wire mesh screening panels that allow for capture rates in excess of 98 percent and a much lower polymer use. The drums are constructed with easily removable panels for drum retrofit or repair. The IFT is also fully enclosed to control odors in the thickening area. The extremely short dwell time in the mixing tank drives a smaller equipment footprint and low polymer requirements.



800/331-2277; www.jwce.com; Booth 4516

Keller America LevelRat

The **LevelRat** from **Keller America** proves that wastewater level transmitters don't need to be bulky, that nonstick diaphragms don't need to be large and fragile, lead times can be short, and that transmitters can be protected from lightning.



It offers 0.5 percent FS TEB accuracy and dual outputs— analog and RS485 digital. Models equipped with a 4-20mA analog output include lightning protection carrying a lifetime guarantee against damage from electrical surge.

877/253-5537; www.kelleramerica.com; Booth 6446

Komline-Sanderson Biosolids Drying System

Biosolids Drying Systems

from **Komline-Sanderson** are capable of handling in excess of 1,000 tons of wet cake per day. Excess heat from combustion engines or turbines can be used to heat thermal fluid or produce steam. The dryer's shaft, hollow paddles and trough are all heated. The robust design and low speed with minimal rotating parts results in reduced maintenance costs. Indirect drying using the airtight dryer results in minimal off-gas volume, which allows simplified odor control systems and safe operation resulting in reduced disposal costs for the beneficial reuse of biosolids as fertilizer and green fuel.



800/225-5457; www.komline.com; Booth 2229

Lakeside Equipment Raptor

Raptor Septage Acceptance Plants and **Raptor Septage Complete Plants** from **Lakeside Equipment**

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 well. Properly screening the hauled waste allows the waste to be used more successfully in energy production or processed through the facility.



630/837-5640; www.lakeside-equipment.com; Booth 2918

Neptune Chemical Pump Series MP7000

The **Series MP7000** mechanically actuated diaphragm metering pump from **Neptune Chemical Pump** 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 provides a maximum capacity range up to 27 gph at 235 psi.



215/699-8700; www.neptune1.com; Booth 519

Nidec Motor Corporation U.S. Motors TITAN II 5000

U.S. Motors TITAN II 5000 frame motors from **Nidec Motor Corporation** are made with robust cast iron construction to minimize internal stresses and vibration, and can withstand severe-duty applications. The motor was recently redesigned for increased flexibility and convertibility, and can be provided with a self-contained sleeve bearing system.

888/637-7333; www.usmotors.com; Booth 2945



Penn Valley Pump Double Disc Pump

The **Double Disc Pump** from **Penn Valley Pump** provides a low life-cycle cost. The design eliminates the friction wear associated with progressive cavity and rotary lobe pump styles. The pump can run dry without damage and incorporates a sealing trunnion that requires no maintenance, no seal water, no packing, no lubrication and does not leak. The company offers a free "Swap Your Pump" trial program that provides the opportunity to try the pump risk-free.

800/311-3311; www.pennvalleypump.com; Booth 5229



PRIMEX PC-3000X

The PRIMEX PC-3000X controller is designed to operate up to three pumps in pump-up or pump-down applications. Intuitive menu navigation and quick setting adjustments are provided by a rotary selector wheel, back and escape buttons. The blue OLED display offers easy-to-read level readout and fault annunciation. When controlling the level in a tank, the input is connected to a 4-20mA sensor. It is configurable with no programming software required. A red LED indicates an active alarm, while green LEDs indicate the pumps required. It has multiple alternation configurations, bar graph levels and constant or variable speed control.

844/477-4639; www.primexcontrols.com; Booth 4339



RapidView IBAK North America 3D GeoSense

The **3D GeoSense** system from **RapidView IBAK North America** provides the power to map lateral pipelines with accuracy and speed. The sensor tracks the movement of the camera as it travels through the lateral, capturing distance, position and depth in three-dimensional space,

and displayed by data logging software. It means technicians no longer have to track the system above ground with a locator, as they can simply conduct the inspection and collect the positional data. The system is ideal for cross-bore analysis.

800/656-4225; www.rapidview.com; Booth 7739



Rubuschi Robox Energy

The **Robox Energy** package from **Robuschi and Gardner Denver** is the first rotary screw blower package to be powered by an efficient permanent magnet motor. Pairing the permanent magnet motor with a rotary screw blower, the unit offers high-efficiency operation and wide turndown capability. Robuschi's Smart Process Control program offers further cost reduction by pairing the integral VFD with a PLC controller, delivering only the air you need, when you need it. It offers pressure operation to 15 psi, and flow rates to 1,450 cfm.

866/428-5253; www.robuschiusa.com; Booth 3317



Seametrics iMAG 4700 Series

The NSF-61 approved **iMAG 4700 Series** flanged magnetometer from **Seametrics** is designed to fit anywhere from 4- to 12-inch pipe for usage in wastewater treatment plants, municipal and industrial water applications, pump skids, pump stations and packaged plants. It has mounted or remote display options, plus-or-minus .75-percent accuracy, minimal straight pipe requirements, various power and communication options, and user-changeable rate and total units. With three IP68-rated models to choose from, there's a unit for every budget and application.

800/975-8153; www.seametrics.com; Booth 653



SEEPLEX ALPHA Systems

SEEPLEX ALPHA Systems are used in a variety of water and wastewater treatment chemical metering applications, including disinfection, chlorination, pH control, coagulation, and flocculation. These plug-and-play packaged skid solutions eliminate much of the time and costs associated with engineering, procuring, assembling, and installing flow control systems. They come in simplex, duplex, or triplex



pump configurations for floor or wall mounting. They are delivered complete with user-customized color display touch-screen controls and all necessary components for chemical metering packaged in a single unit. All wetted components are corrosion resistant, including the self-priming NSF/ANSI 61 certified progressive cavity pumps, which provide precise, repeatable dosing with minimal pulsation and no vapor lock for chemical consumption reduction and byproduct minimization.

937/864-7150; www.seepex.com; Booth 1351

Shand & Jurs 973XXT

The **973XXT** from **Shand & Jurs** is a candlestick waste gas flare with remote-tip ignition and touch-screen flare control box. The company offers a complete line of digester gas safety equipment including waste gas burners with touch-screen controls, electric drip traps, and radar gauges for municipal sewage treatment plants, landfills, dairies, food processing and breweries.

708/236-6000; www.sandj.com; Booth 1537



Singer Valve LCP-TP

The **LCP-TP Level Controller** from **Singer Valve** is a single-process controller designed to complement the company's Single Solenoid Operated/Override Control Valves and sensor. It's programmed with customized level control algorithms and offers both local control via interactive display or remote control via 4-20mA or Serial Modbus SCADA communication. It has AC or DC external power options and contains a 24-volt DC internal power supply for PLC and field sensor power. It has an IP 67 enclosure rating and is UL certified, built with surge protection as well as overcircuit protection. It is equipped with data logging and trending features.

604/594-5404; www.singervalue.com; Booth 7129



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 5539

Superior Signal Smoke Candles

Smoke Candles from **Superior Signal** can help reduce wet weather SSOs and surface inflows. The company's smoke candles and blowers are engineered specifically for sewer testing. It is a fast, inexpensive and easy way to find the most common sources of surface inflows. Classic Smoke Candles provide a highly visible smoke to find more faults, and at a longer distance. The 3C Classic Smoke Candle produces a volume of 40,000 cubic feet of smoke in just three minutes. Technicians can join multiple candles together to create larger volumes of smoke visible for a longer period of time.

800/945-8378; www.superiorsignal.com; Booth 3120



Tank Connection Aqua AGT 2020

Tank Connection will introduce the latest addition to its line of coating products, **Aqua AGT 2020**. The company has combined its expertise in bolted RTP panel fabrication with experts in porcelain/vitreous enamel technologies to develop an advanced glass technology. This high-performance glass coating system addresses the deficiencies in today's glass coatings. It is superior in its formulation and two-fire process, exceeding AWWA D103 and EN ISO 28765:2016 requirements.

620/423-3010; www.tankconnection.com; Booth 1451



Tideflex Technologies Mixing System

The **Tideflex Mixing System (TMS)** from **Tideflex Technologies** eliminates short-circuiting, water stagnation and achieves complete mixing in water storage tanks. Red Valve's engineering team developed a variable orifice inlet nozzle that provides superior mixing characteristics. When used in the TMS, Tideflex Variable Orifice Nozzles optimize jet velocity at all flow rates and discharge an elliptically shaped jet, which produces rapid and complete mixing that improves water quality. It separates the inlet and outlet with one manifold pipe, so short-circuiting is eliminated.

412/279-0044; www.tideflex.com; Booth 2639



Total Piping Solutions Quick Cam Repair Clamp

The **Quick Cam Repair Clamp** from **Total Piping Solutions** is a wide-range high-performance clamp that uses a smart gasketing system to provide working pressures to 200 psi in diameters ranging from 2 to 42 inches. It is available in widths of 9, 12, 15, 23, 30 and 36 inches in length, and constructed of either 100 percent stainless steel materials or with an optional ductile iron lug system.

716/372-0160; www.tps.us; Booth 955



Trumbull Industries Mud Valve

Mud Valves from **Trumbull Industries** are used in treatment plants to drain tanks for maintenance or cleaning. They provide trouble-free, low-maintenance operation. Each one receives a unique serial number stamp after passing inspection by quality assurance. In addition, they are certified for compliance with both NSF-61 and NSF-372, providing assurance that they are safe for use in a public water system. They are adaptable to specific needs with options including sliding stems and optional materials for seats, which are mechanically retained for ease of replacement.

800/677-1799; www.trumbull-mfg.com; Booth 5321



Vac-Con Combination Machine

The full line of **Vac-Con Combination Machines** is available in configurations from 3.5- to 16-cubic-yard capacities, with hydrostatically driven two- and three-stage centrifugal compressors or several optional positive-displacement blowers. High-pressure, smooth-flow water systems are offered up to 120 gpm and 3,000 psi. These machines can be equipped with a 180-degree articulating front-mounted hose reel and high-pressure hose diameters from 5/8 to 1 1/4 inches. There are front- and rear-mounted telescopic booms available with up to a 10-foot extension. In addition to pipe cleaning functions, units can double as vacuum excavators with the optional hydroexcavation package.

904/284-4200; www.vac-con.com; Booth 7729



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 1516



VEGA Americas VEGAPULS WL 61

The **VEGAPULS WL 61** from **VEGA Americas** measures level and flow in a variety of settings, including wastewater processing plants, pump stations, and overflow basins. Unaffected by extreme temperatures, high winds, and heavy rains, it is a reliable level measurement solution that can measure through FOG, foam, condensation, and other detriments to track level in water and wastewater facilities.

800/367-5383; www.vega.com; Booth 163



Vogelsang XRipper

XRipper twin-shaft grinders from **Vogelsang** effectively shred flushable wipes and tough material, preventing clogs and damage. They have high torque and low power usage; reduced maintenance, downtime and costs; no stack tightening; a repair-in-place design; and drop-in competitor replacement.

800/984-9400; www.vogelsangusa.com; Booth 619



Watson-Marlow Fluid Technology Group Bredel

Bredel hose pumps from **Watson-Marlow Fluid Technology Group** reliably handle harsh materials, including abrasive sewage, making them ideal for feeding primary or thickened sludge to digesters or filter presses. Unlike other pump types, the abrasive nature of grit-filled sludge does not affect peristaltic hose pump life. With operating pressures to 232 psi and flow rates to 475 gpm, they eliminate ancillary equipment such as run-dry protection, seal water flush systems and inline check valves, and are virtually maintenance-free.

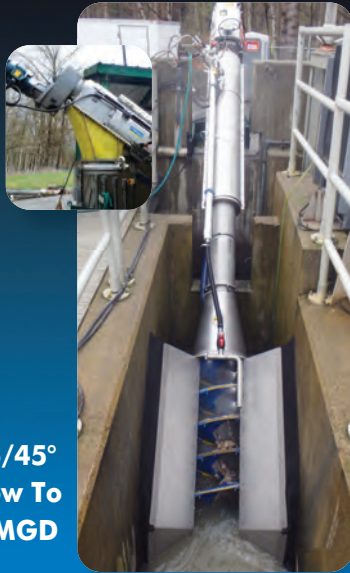
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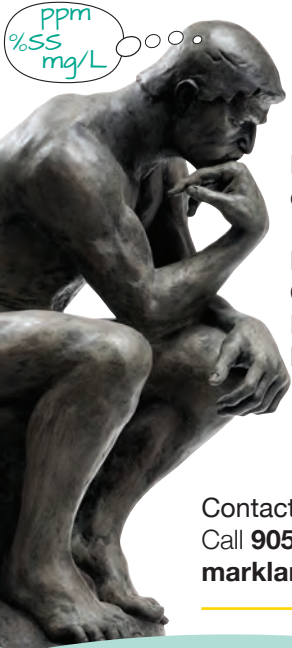
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A New Power in Water

THE MERGER OF TWO LEADING WATER RESEARCH ORGANIZATIONS CREATES A SINGLE ENTITY WITH A \$200 MILLION PORTFOLIO FOCUSED ON RESOURCE RECOVERY AND REUSE

By Ted J. Rulseh

Last May, the Water Environment Research Foundation (WERF) and the WateReuse Research Foundation (WRRF) announced plans for a merger to create the Water Environment & Reuse Foundation (WE&RF).

This new nonprofit organization brings together a portfolio of research in water, wastewater and stormwater valued at more than \$200 million. The Water Environment Research Foundation, established in 1989, traditionally focused on research related to wastewater and stormwater. The WateReuse Research Foundation, founded in 1993, produced applied research specifically in water reuse, primarily from wastewater.

WE&RF will focus on research in resource recovery and reuse, helping provide the science for next-generation technology and innovation to meet growing demand for clean water. The foundation is supported by more than 200 utilities, businesses, industrial and commercial enterprises, educational institutions, and government agencies. The water agencies represent more than 50 million residential and small-business water consumers.

Melissa Meeker, chief executive officer of the new foundation, says the merger strengthens the industry's movement toward One Water, which recognizes the true value of water, wastewater and stormwater.

Meeker previously was executive director of WERF and WRRF. Her background also includes serving as executive director of the South Florida Water Management District and several years with the Florida Department of Environmental Protection. She talked about the new research foundation in an interview with *Treatment Plant Operator*.



Melissa Meeker, chief executive officer of the Water Environment & Reuse Foundation (WE&RF).

“We are developing an organization that will not be in silos but will have a One Water focus. In strategic planning, the new board has been intent on predicting industry needs 10 to 15 years down the road.”

MELISSA MEEKER

tpo: What was the impetus behind this merger?

Meeker: The merger is in large part the result of a movement that recognizes that all water has value. All water is reused and renewable, through desalination, stormwater harvesting, more effective wastewater treatment, or any other number of avenues. Our merger reflects that fundamental principle.

tpo: In your view, why does this merger make sense?

Meeker: I believe there are significant synergies. It's a great opportunity to consolidate two research organizations that were already focused on wastewater and stormwater. Whereas we used to think of these as wasted water, as a disposal issue, we now focus on the resources we can pull out of those streams. Bringing the two foundations together was a perfect fit.

tpo: As individual organizations, how did WERF and WRRF differ?

Meeker: WERF historically focused on the wastewater side. They did some stormwater research as well, but in the wastewater aspect they focused mainly on resource recovery — nutrients and energy. WRRF was totally focused on the water side and left nutrients and energy to WERF. The focus was on reuse of wastewater, from agricultural water reuse all the way up to direct potable reuse. WRRF also had a focus on desalination.

tpo: Please describe how the two organizations will be more effective as one.

Meeker: We're bringing together the entire wastewater side of the industry. We've always worked in our own silos, and yet we know that the same

issues we've been dealing with in wastewater and water reuse will have to be dealt with on stormwater as well. So we'll bring together the lessons we've learned individually and share them. It's taking our successes and blending them across all of the water sources that were once thought of as disposal issues, with the aim of capturing all the beneficial uses that we can.

tpo: Do you see the merged organization gaining efficiencies in terms of cost?

Meeker: We've worked very hard to ensure that we didn't have any duplicative research. I believe the savings will come in combining our entire portfolio and the staff expertise that helped create that portfolio, and having them map out future research needs together, working with the industry to reduce overlap and help our money go even further.

“ We've been focusing on wastewater for many years — the discharges to surface water and the downstream impacts to the ecology and to people downstream who pull from the water supply. The issues are the same in dealing with stormwater.”

MELISSA MEEKER

tpo: Will there still be two sides of the house within the new organization?

Meeker: I would say absolutely not. We are developing an organization that will not be in silos but will have a One Water focus. In strategic planning, the new board has been intent on predicting industry needs 10 to 15 years down the road. We're going to completely restructure how we approach research, keeping our very rigorous peer review processes in place, but also thinking about problems differently and trying to come up with solutions that really help the industry take the next steps.

tpo: How will the board and staff for the new organization be assembled?

Meeker: The combined foundation will include the staff of both research foundations. We will also combine both boards completely. Our new bylaws set the number of board members at 21. We have 38 now, but there is language to allow us to get to the final number through attrition. All members of the new board will complete their appointed terms. That allows us to bring in all the expertise from both boards to frame where we're going in the future.

tpo: How would you describe the priorities of the merged organization over the next five, 10 or 15 years?

Meeker: Our goal is to further the conversation of One Water. That covers everything from dealing with public perception to technology and innovation. Our membership is very interested in how new technologies and new ways to think about resilient water supplies fold into everything from their permits to their governance. My focus is on everything that has not traditionally been a water supply. That includes wastewater, stormwater and desalination.

tpo: How does stormwater fit into the reuse equation?

Meeker: We've been focusing on wastewater for many years — the discharges to surface water and the downstream impacts to the ecology and to people downstream who pull from the water supply. The issues are the same in dealing with stormwater. On the Eastern Seaboard, for example, or in Oregon and Washington, the stormwater issues are just as important to them as wastewater discharges. You can use a lot of the same technologies on the reuse side for stormwater.

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In California, specifically San Diego and Los Angeles, plans have been put in place to maximize wastewater reuse, but that still doesn't address all their needs as they try to limit the water they have to import. So could they somehow integrate the stormwater system with the wastewater before it goes into the purification facility to capture that source of water as well?

tpo: Are there any specific technologies that you see as especially promising as areas of focus for research?

Meeker: We're very excited about the Leaders Innovation Forum for Technology. That's a WERF initiative focused on cutting-edge technologies that haven't gone to commercialization yet. These are technologies that may be past bench testing and need to be piloted. There's a lack of financial assistance for that part of the sector. LIFT aims to connect innovative technologies with agencies that are willing to try them out. It also works to get utility representatives to places where new technology is being implemented, so they can see it and talk to the operators. Some really good matchmaking is taking place.

These are exciting times. We have a lot of work to do. The industry has high expectations, as do we. Our goal is to figure out the best way to put together a research foundation that can help the industry move forward. **tpo**

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PHOTO BY LOREN MAYO

The truck is designed as a stand-alone cleaning system for large-diameter pipe, digesters, grit chambers, lift stations, ponds, lagoons, and other potentially hard-to-clean facilities.

That Extra Boost

POLSTON APPLIED TECHNOLOGIES ADDS DOWNHOLE PUMPING CAPABILITY TO VACUUM AND JETTING IN A COMBINATION TRUCK DESIGNED FOR ESPECIALLY BIG AND TOUGH CLEANING JOBS

By Ted J. Rulseh

Combination trucks are reliable workhorses used for years in wastewater tank and pipe cleaning. Still, some big jobs call for more capability than jetting and vacuum can deliver.

Polston Applied Technologies has developed what it calls Combination³ (as in “cubed”) technology for such applications. Besides jetting and vacuum, the Model PAT 934 truck carries downhole pumping capability.

The truck is designed as a stand-alone cleaning system for large-diameter pipe, digesters, grit chambers, lift stations, ponds, lagoons, and other potentially hard-to-clean facilities. Built on a Western Star 4900 chassis, it delivers up to 470 hp and a 4,500 cfm Roots blower with cyclone.

A Hammelmann water pump can deliver high-pressure water. The self-retracting hydraulic hose reel can carry 500 feet of high-pressure hose; the water tank carries 1,000 gallons. An 8-inch submersible hydraulic downhole pump can move up to 2,500 gpm. The truck’s hydraulic knuckleboom crane rotates 180 degrees to enable cleaning in hard-to-reach places.

The company offers the truck as a service and not for sale. Denver Stutler, Polston CEO, talked about the technology in an interview with *Treatment Plant Operator*.

tpo: What market challenges were you aiming to address in developing this technology?

Stutler: We saw wet environments that were being cleaned inefficiently with equipment that wasn’t built for the task. We address problems that until now did not have truly viable solutions. For example, there are

thousands of rural wastewater treatment plants that can never shut down. Our technology can perform in surcharged conditions, allowing the facilities to remain online during cleaning, and with no need for bypass pumping. That saves time and money. We also restore the capacity of those facilities and extend the life of their structures.

tpo: What is the basic advantage of this technology?


Stutler: To the traditional jetter and vacuum, we add the downhole system, which makes us like a dredge on wheels. For large treatment plants in the range of 10 to 20 mgd, it’s a three-in-one tool, like a Swiss Army knife. It provides on a single chassis the ability to clean systems while they remain in operation. Having one truck that can perform multiple functions reduces mobilization and demobilization, and limits the amount of equipment on site. It makes big jobs simpler.

tpo: How does the downhole pumping contribute to the performance of this truck?

Stutler: Vacuum technology involves only suction. You can only vacuum one atmosphere. If you are trying to vacuum water and sand, the vacuum is going to pick up the water, because it’s lighter, and it’s going to fill the tank with water before it fills with sand. Our experience shows that a slurry can be pumped faster than it can be vacuumed in most cases. In fact, when we deploy the downhole pump, we can move material up to 10 times faster than a vacuum.

(continued)

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tpo: Can you give a practical example of how this system works?

Stutler: Let's consider pipe. There's a million miles of wastewater collection pipe in the United States, and 8 to 10 percent of that is large-diameter pipe, 36 inches and above. The debris in those pipes is submerged. We can clean those pipes while the water is still in them, without bypassing the system. We put our high-pressure jets under the water and push the debris to a manhole. Then we put our downhole pump on top of the debris and pump it to the surface as a slurry. We're not pulling it to the truck as with vacuum. We're pushing it to the truck. Then our process separates the solids from the liquid.

tpo: What is the pumping capacity of this truck?

Stutler: The hydraulic system has the capacity to run four pumps, each rated at 2,500 gpm. Most of the time, we only run one pump, and generally we are pumping about 2,000 gpm when working with slurries (high-percent solids).

tpo: How does the sound level of this equipment compare with other technologies?

Stutler: In the downhole pumping mode, it's extremely quiet, at under 80 dBA, so we can clean in residential neighborhoods and other sensitive surroundings. In Orlando, Florida, we worked at night cleaning thousands of feet of large-diameter pipe, without even one noise complaint.

tpo: How does this vehicle serve large facilities such as tanks, digesters and grit basins at major treatment plants?

Stutler: We have a dripless extending tube system that has up to 49 feet of reach. We found after doing considerable analysis that the reach we

have accommodates a large percentage of the market we serve. However, we are looking at even longer reaches.

tpo: What has your company done to raise awareness of this technology?

Stutler: We built our first prototype in 2012, and in 2013 we did a "seeing is believing" tour featuring demonstrations. We've had to roll up our

“Our technology can perform in surcharged conditions, allowing the facilities to remain online during cleaning, and with no need for bypass pumping. That saves time and money.”

DENVER STUTLER

sleeves and show that we can perform. In 2014, we strengthened and expanded our organization, built another truck, and began doing actual work and solving problems. Our reputation grew by word-of-mouth.

tpo: Looking ahead, where do you see your company focusing to achieve growth?

Stutler: We're focused on applications where vacuum alone is not able to perform successfully. We don't profess to be a panacea. We profess to solve specific problems that others traditionally have not solved. The market appears to have embraced our vision, because our trucks are busy. **tpo**



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Digital Technology

By Craig Mandli

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Licensed frequency data modems from Weidmuller

Control/Electrical Panels



AEDGE WATER TECHNOLOGIES INGENIUS

InGenius control panels from AdEdge Water Technologies are custom-engineered programmable logic control panels designed to meet site specifications for monitoring and integrating treatment systems with auxiliary equipment and controls for water systems. The panels integrate the

InGenius control panels from AdEdge Water Technologies

process in one place for safety, monitoring, ease of service and installation. They are NEMA 1-4, 4X, 12, 13 certified, and constructed from thermoplastic, stainless steel, painted steel and fiberglass. They have a hand on/off selector, backwash indicator, LED lamps, security key latch and probe-mounted displays for flow, pH, chlorine, TDS and turbidity. They include level and relay controls, auxiliary power supplies, power converter (110- to 24-volt or 12-volt and AC to DC), surge protection, Ethernet networking, audible/visual alarm indicators and a SCADA interface. **866/823-3343; www.adedgetech.com.**

PHOENIX CONTACT TP 3000

The TP 3000 Series human machine interface operator panel from Phoenix Contact comes with screen sizes ranging from 5.7 to 15 inches, with certain panels available in a 16-9 aspect ratio widescreen. They employ a durable metal housing with a fanless design that



TP 3000 Series human machine interface operator panel from Phoenix Contact

consumes less energy and produces less heat. Free VISU+ EXPRESS programming software provides easy programming and has trending, alarming, logging and recipe handling. The software supports many communication protocols, including EtherNet/IP, Modbus TCP, and OPC DA, making it compatible with PLCs from a variety of manufacturers. It supports gesturing, allowing the user to swipe between screens, similar to a smart device. In addition, a free app is available to mirror the HMI screens on a smart device. **800/322-3225; www.phoenixcontact.com.**

PRIMEX PC-3000X

The PRIMEX PC-3000X controller is designed to operate up to three pumps in pump-up or pump-down applications, and sequence pumps on and off in response to changes in level input. Intuitive menu navigation and quick setting adjustments are provided by a rotary selector wheel, back and escape buttons. The blue OLED display offers easy-to-read level readout and fault annunciation. When controlling the level in a tank, the input is connected to a 4-20mA sensor. It is configurable with no programming software required. A red LED indicates an active alarm, while green LEDs indicate pumps required, multiple alternation configurations, bar graph levels and constant or variable speed control. **844/477-4639; www.primexcontrols.com.**



PC-3000X controller from PRIMEX

Drives



VACON 100 FLOW from Danfoss Drives

DANFOSS DRIVES VACON 100 FLOW

The VACON 100 FLOW from Danfoss Drives is designed to offer versatile flow control in water systems and industrial pump and fan applications. It combines the core functionality of the VACON 100 drive with dedicated functions that can benefit flow-control processes and improve the efficiency and redundancy of pump systems. It includes multi-pump solutions and application selection menus. The enhanced pump performance protects pipes and equipment to ensure reliable operation. Standard PID control uses a sensor to control pump speed instead

of an external controller. This helps the drive to quickly react to fluctuations in demand for accurate process control and optimized energy savings. Versions are available in 0.75 to 1,000 hp and in a voltage range of 230 to 690 volts. **800/432-6367; www.danfossdrives.com.**

Flow Monitoring

BLUE-WHITE INDUSTRIES BW DIGI-METER F-2000 SERIES

The BW DIGI-METER F-2000 Series electronic insertion-style flowmeter from Blue-White Industries monitors flow in a wide range of applications. Standard models display flow rate, total flow, and include an NPN open collector output for communication with data loggers, SCADA systems and other external devices. Options include 4-20mA / 0-10 VDC, batch processing and a high/low flow rate alarm output. The electronic display and communication enclosure can be sensor mounted, or remotely mounted to a pipe or panel. Pipe fittings are available for both inline and clamp-on saddle-mount styles. Pipe sizes range from 3/8 through 12 inches. They come factory programmed with a calibration certificate, with a front

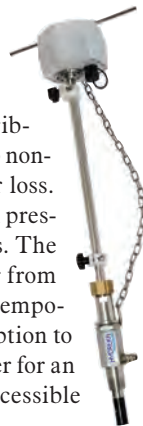


BW DIGI-METER F-2000 Series flowmeter from Blue-White Industries

panel security lockout, total reset function that can be disabled, and a weather-resistant ABS enclosure. They are NEMA 4X-rated. Standard models can be battery operated using four AA batteries. All other models require a 15-24 VDC plug-in transformer, with battery backup optional. **714/893-8529; www.blue-white.com.**

MATCHPOINT WATER ASSET MANAGEMENT HYDREKA HYDRINS 2

The Hydreka HydrINS 2 insertion flowmeter, distributed by Matchpoint Water Asset Management, helps keep non-revenue water under control through minimizing water loss. It provides accurate bidirectional flow measurement and pressure data for water distribution and raw water pipelines. The unit is available in various lengths to suit pipe diameter from 6 to 78 inches and is easily deployed in permanent or temporary applications. Installation is simple, with no interruption to water supply. A display unit is connected to the flowmeter for an instantaneous reading of all flow data. The data is accessible through different sources including AMR, 4-20mA, pulse output, manual download or daily GPRS communication. It can be used throughout the water distribution network, including metering at reservoirs, treatment plants, pumping stations, water pipes, for zoning and district metered areas, and night flow monitoring and meter testing. **910/509-7225; www.matchpointinc.us.**



Hydreka HydrINS 2 insertion flowmeter, distributed by Matchpoint Water Asset Management



280W-CI ultrasonic water meter from Spire Metering Technology

SPIRE METERING TECHNOLOGY 280W-CI

The 280W-CI commercial and industrial ultrasonic water meter from Spire Metering Technology has no moving parts and retains its accuracy over its lifetime. It has quad path technology, which means there are eight different sensors to improve accuracy, increase tolerance to installation errors by local installers, and reduce the straight-pipe run requirements of typical ultrasonic meters. It can be used for district metering areas for leak detection. It has a tamper-proof design, is not affected by

water impurities and withstands harsh environments. It can detect very low flows, and comes AMR/AMI ready so leakages found by the meter can be sent quickly to the central office without human intervention. **888/738-0188; www.spiremt.com.**

UNIVERSAL FLOW MONITORS P420 SERIES

The all-plastic P420 Series vortex shedding flow rate transmitter from Universal Flow Monitors is designed for monitoring low-viscosity corrosive liquids where local display is not required. Made of welded all-PVC or all-CVPC construction, it is effective for a broad range of chemical applications such as phosphoric acid, sodium hypochlorite, ferric chloride, brine and acids. These transmitters have no moving parts to stick, coat or bind. They are offered in pipe sizes 3/8 through 2 inches and flow rates from 6 to 200 gpm with a 10-1 turndown ratio. Electronic output is 4-20mA. Optional intrinsically safe circuitry is available to be used with an approved barrier in all hazardous location classes, divisions and groups. Accuracy is plus 2 percent of full scale and repeatability is plus 0.25 percent of indicated flow. **888/569-3090; www.flowmeters.com.**



P420 Series flow rate transmitter from Universal Flow Monitors

Monitors

ANALYTICAL TECHNOLOGY Q46N FREE AMMONIA MONITOR

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 three reagents required for operation that can be purchased directly from the company or easily mixed on site using readily available chemicals. It comes with replacement parts for routine maintenance, a monitor, chemistry module, sensor membranes and electrolyte, reagent bottle brackets, reagent pickup tubing assemblies, and a copy of the manual packed inside the chemistry module. **800/959-0299; www.analyticaltechnology.com.**



Q46N Free Ammonia Monitor from Analytical Technology

ARIZONA INSTRUMENT JEROME J605

The Jerome J605 gold film hydrogen sulfide analyzer from Arizona Instrument is designed to detect hydrogen sulfide gas at concentrations as low as 3 parts per billion with a resolution of 20 parts per trillion. It has onboard data logging that can store up to 20,000 measurements for detailed recordkeeping and analysis, as well as a USB interface for data transfer and SCADA interface capabilities. Its solid-state design, durable metal casing and 18-hour battery life are ideal for nearly any case, and are always ready when needed. **800/528-4711; www.azic.com.**



Jerome J605 hydrogen sulfide analyzer from Arizona Instrument



SmartBob2 SS sensor from BinMaster Level Controls

BINMASTER LEVEL CONTROLS SMARTBOB2 SS

The SmartBob2 SS sensor from BinMaster Level Controls measures the level of solid material below a liquid surface, such as in interface applications. It can be used in tanks where solid material settles at the bottom of a tank, such as for measuring the level of settled salt, sediment or sand under water, making it an alternative to

relying on sight tubes. It can be used in any application where solid material needs to be measured under liquid in water treatment or wastewater facilities. The sensor drops a weighted bob through the liquid; when the bob comes into contact with solid settled material at the bottom of the tank, it retracts and sends a measurement to a control console or a PC loaded with eBob software. **800/278-4241; www.binmaster.com.**

CAMPBELL SCIENTIFIC CVS4200

The CVS4200 programmable vacuum sampler from Campbell Scientific can collect samples based on individual customer needs. It surpasses EPA specifications, can pace sampling based on time and flow, and communicate data back to the operator's desk in real time. It provides rapid transport velocities of samples, meaning more accurate samples, even of solids. Information is easily controlled and

viewable on a backlit screen. It is constructed from composite or discrete models, and interfaces with the company's data loggers for more measurement and control capabilities. Diagnostics have revolutionized the data returned by samplers, when used in tandem with SCADA and other systems, allowing operators to monitor the entire system from one location. **435/227-9632; www.campbellsci.com.**



CVS4200 programmable vacuum sampler from Campbell Scientific

CEM CORPORATION SMART 6



SMART 6 rapid moisture/solids analyzer from CEM Corporation

The SMART 6 rapid moisture/solids analyzer from CEM Corporation checks the moisture/solids content in liquids, solids and slurries to optimize the wastewater treatment process with rapid testing in an easy-to-use system. It provides results in as little as two minutes and comes preprogrammed with methods for cake, feed, polymer and TSS. It can help optimize polymer usage; improve accuracy of blending in composting and chemical stabilization; maintain high solids to reduce incineration and transportation costs; rapidly calculate total suspended solids, volatile suspended solids and volatile solids; ensure regulatory compliance for discharge; assist in the efficient use of clarifiers, thickeners, digesters, centrifuges, vacuum filters and presses; and help adjust wasting rates for proper solids management. **704/821-7015; www.cem.com.**

CHALLENGE TECHNOLOGY ODM-100

The ODM-100 from Challenge Technology allows the user to place the device at any point in the treatment process to monitor biological activity via respiration in a continuous or sequential batch mode, depending on what information the user needs. It allows for the continuous monitoring of the influent loading used to adjust processes and warn of potential upsets or toxic events. This application also allows evaluation of loading history for daily and seasonal optimization of processes. It can be used to optimize aeration and return activated sludge volumes based on real-time loading, or continuous monitoring of mixed liquor for rapid assessment of changing oxygen demand in an aeration basin that is not dependent on a plant aeration system. It can be used for batch monitoring of mixed liquor and detailed evaluation of treatment processes at any point in-plant, or batch testing of trucked-in or industrial wastewater to evaluate treatability and possible toxic events. **479/927-1008; www.challenge-sys.com.**



ODM-100 monitor from Challenge Technology

CHEMETRICS 530 NM SINGLE ANALYTE METER VERIFICATION KIT



530 nm Single Analyte Meter (SAM) Verification Kit from CHEMetrics

The 530 nm Single Analyte Meter (SAM) Verification Kit from CHEMetrics allows an analyst to quickly and routinely check the performance of five different CHEMetrics photometers, including chlorine (I-2001), dissolved oxygen (I-2002), chlorine dioxide (I-2005), ozone (DPD) (I-2019) and peracetic acid (I-2020). Appropriate for instrument verification in the lab or in the field, it is packaged in a compact, durable polypropylene carrying case, and includes a set of ampoules containing various dye solutions specific to the wavelength of the particular photometer.

CHEMetrics determines the absorbance value of each dye ampoule in the kit using a spectrophotometer certified with optical standards traceable to NIST. The analyst measures the dye ampoules in the photometer and compares the results to values in the Certificate of Conformance supplied with each kit. **800/356-3072; www.chemetrics.com.**

ELECTRO-CHEMICAL DEVICES OZ80 OZONE ANALYZER

The OZ80 Ozone Analyzer from Electro-Chemical Devices has a reagentless design for low operating costs and offers a choice of three factory-calibrated measurement ranges designed to help process and plant engineers achieve accurate measurement with a simple easy-to-install system that can be up and running in less than 15 minutes. It is factory assembled and calibrated prior to arriving at the plant. All the technician needs to do is mount the panel and connect the drainlines, plug in the power cord and select the outputs on the display as 0 to 2 ppm for water disinfection or 0 to 20 ppm for oxidation and bleaching operations. Dual-range measurement of both ozone parameters is also available. Powerful amperometric sensors detect and monitor ozone levels in water. They are manufactured with a gold cathode, a silver anode and a rugged microporous membrane. **800/729-1333; www.ecdi.com.**



OZ80 Ozone Analyzer from Electro-Chemical Devices

FLUID COMPONENTS INTERNATIONAL FS10i

Designed for industrial processes, manufacturing operations, pumps, compressed air, gas compressors and HVAC systems requiring flow assurance and alarming, the compact FS10i flow switch/monitor from Fluid Components International has independently rated SIL 2 compliance to ensure a reliable flow-sensing instrument for repeatable and fast-responding flow trip point or alarm warning within seconds. It has air/gas sensitivity and a setpoint range from 0.25 to 400 standard feet per second and for water or liquids from 0.01 to 0.5 feet per second. It is suitable for use in fluid temperatures from minus 40 to 250 degrees F and at pressures up to 2,000 psi. Applications include cooling water and fluids, leak detection, lubricant flow assurance, ventilation verification, chemical injection assurance, nitrogen purge verifications and compressor leak detection. **760/744-6950; www.fluidcomponents.com.**



FS10i flow switch/monitor from Fluid Components International

FLUID CONSERVATION SYSTEMS PERMANET+



PermaNet+ wireless network from Fluid Conservation Systems

The PermaNet+ wireless network from Fluid Conservation Systems helps reduce water lost from leaks while saving time, money and labor. It has an acoustic leak noise sensor, cloud reporting with live monitoring, and geographic mapping of deployed loggers. Responses are immediate when leaks are detected, eliminating the need for site visits and drive-by patrols. The system is installed in the chamber, removing the need for above-ground installations. It works with FCS Permalog wireless leak noise loggers. Customers will receive leak reports generated by Permalogs on any internet-enabled device, and the status of each deployed logger is shown on map-based software. The system can also send a leak alert whenever a logger detects a potential leak, enabling rapid response and minimizing water loss. **800/531-5465; www.fluidconservation.com.**

FORCE FLOW WIZARD 4000 WITH AUTO REFILL CONTROL

The Wizard 4000 with Auto Refill Control (ARC) from Force Flow provides all the chemical usage and feed rate data that the standard Wizard offers, along with the ability to automatically refill the chemical day tank from a bulk supply. Auto Mode requires no operator input, Semi-Auto Mode requires an operator to initiate fill, and Batch Mode fills a preset amount of water for diluting dry chemicals. It allows operators to remotely monitor the chemical status from a PLC or SCADA system. Up to four day tanks can be independently monitored and refilled using a single unit. **800/893-6723; www.forceflow.com.**



Wizard 4000 with Auto Refill Control (ARC) from Force Flow



CPVC HLS Level Sensor from Hayward Flow Control

HAYWARD FLOW CONTROL CPVC HLS LEVEL SENSOR

The CPVC HLS Level Sensor from Hayward Flow Control is a highly accurate level sensor that is not affected by foaming, waves or headspace vapors. With a complete CPVC housing and construction, it is ideal for corrosive fluids and environments where metals cannot perform. It measures hydrostatic pressure and converts the reading to an analog 4-20mA signal, which can be displayed on a wide range of indicating transmitters or taken directly into a PLC. It has all CPVC housing with FPM or EPDM seals, a large ceramic diaphragm that ensures accuracy and repeatability, triple-sealed cable entry into the body, a PFA-coated cable that offers chemical compatibility, a 0-to-15-foot and 0-to-33-foot water measurement range, and 30- and 49-foot standard cable lengths, with other lengths available upon request. The unit has a direct analog output, 0.25 percent accuracy full scale, and laser-printed sensor details on the body. **888/429-4635; www.haywardflowcontrol.com.**

KELLER AMERICA LEVELRAT

The LevelRat non-fouling digital submersible level transmitter from Keller America has been upgraded to include better accuracy and dual output signals — one analog and one digital. Analog outputs include 4-20mA, 0-5 VDC, or 0-10 VDC, with RS485 digital communications opening additional options and compatibility with new and existing systems. The RS485 output uses the same modified Modbus communication protocol as Keller's other digital transmitters. It makes direct connection to Modbus SCADA, PLC and RTU units possible, allows up to 128 transmitters to be connected on a single bus, and facilitates connection to a PC running CCS30 software, which gives users the ability to actively view real-time pressure/temperature changes, run software-assisted level logging and make adjustments to the analog output. **877/253-5537; www.kelleramerica.com.**



LevelRat level transmitter from Keller America



MD 600 multiparameter colorimeter from Lovibond Tintometer

LOVIBOND TINTOMETER MD 600

The MD 600 multiparameter colorimeter from Lovibond Tintometer tests for a wide range of water-quality parameters and is ideal for use in either the field or laboratory. Using the Open Reagent System (which uses VARIO Powder Packs, tablet, liquid and ampule reagents) it has a six-LED photo detector array and supports over 120 preprogrammed methods (from alkalinity through zinc) and 20 user-defined methods. Up to 1,000

data sets can be stored in the instrument's internal memory to ensure good recordkeeping and can be transferred to a computer or printer through user-friendly outputs. As new methods are developed, users can download updates for free. Many parameters have the flexibility of using the Powder Pack, tablet and/or liquid reagents. **800/922-5242; www.lovibond.us.**

MARKLAND SPECIALTY ENGINEERING SUSPENDED SOLIDS DENSITY METER

The Suspended Solids Density Meter from Markland Specialty Engineering provides real-time knowledge of primary, secondary, return activated and backwash sludge, slurry and silt concentrations in pipes, tanks and clarifiers. It allows users to program underflow pumps to shut off before biosolids or feed solids density becomes too thin, and to optimize polymer dosing and equipment variables for enhanced dewatering. The nonintrusive inline pipe spool-piece sensor uses ultrasound to provide continuous percentage of suspended solids readings, unaffected by the color of particulates or fluid. It can offer early awareness of breaks in filtration material when used to measure filtrate concentrations. It sends out a pulse of sound and, when the solution is clear, receives a strong echo and reads zero. With particles present, the echo amplitude is reduced, and the meter measures the percentage of suspended solids. These readings enable calculation of mass flow rate. This process control instrument is simple to install, calibrate and clean. A throw-in-style probe is also available. **855/873-7791; www.sludgecontrols.com.**



Suspended Solids Density Meter from Markland Specialty Engineering

MARS COMPANY VEROFLOW-4 PORTABLE METER TESTER

The Veroflow-4 Portable Meter Tester from Mars Company is designed for large meter testing in the field of all lengths and types. It is based on comparison meter technology, and fully linearized to 10 points to compensate for inherent test meter accuracy curves. There's no need for a correction card. It consists of an NIST traceable 3-inch turbine meter, NIST traceable 3/4-inch turbine meter, 3-inch gate valve, 3/4-inch ball valve and a pressure gauge. The inlet and outlet are equipped with brass National Standard Fire Hose swivel couplings. It is accurate to .5 percent, with 10-point linearization, 0.1 percent repeatability accuracy, a NEMA 4X explosion-proof enclosure, and an illuminated multi-function display. **800/782-5268; www.marswater.com.**



Veroflow-4 Portable Meter Tester from Mars Company



Series 9000 total hydrocarbon analyzer from MOCON-Baseline

MOCON-BASELINE SERIES 9000

The Series 9000 total hydrocarbon analyzer from MOCON-Baseline monitors hydrocarbons in air or pure liquid-oxygen ozone-generation feed gas streams. Feed gas delivered to the ozone generator must be clean and free of hydrocarbons, and must be closely monitored during the process. Its range is factory set at 1 to 200 ppm (methane), MDQ 0.01 ppm. Analog, digital or logic output capability, as well as components for single or multipoint analysis, may be selected at time of order. Built-in

software, navigated by a large graphical display with an easy-to-use menu, allows operation with or without an external computer. Electronic control of fuel, air and sample delivery to the flame ionization detector — with auto-ignition — improves safety, performance and sensitivity. Programmable alarm levels and automatic calibration allow operation with minimal experience and enhance long-term analytical stability. **303/823-6661; www.baseline-mocon.com.**



SA1100 Scanning Analyzer from Palintest

PALINTEST SA1100 SCANNING ANALYZER

The Palintest SA1100 Scanning Analyzer provides USEPA-approved field measurement of lead in a robust, portable instrument. It is an accurate portable scanning voltammetry instrument certified by the U.S. EPA as an acceptable method to use in lead field analy-

sis. The MCL for lead set by the EPA is 0 ppb, and the WHO guideline value is less than 10 ppb. It can accurately determine lead levels of 2 to 100 µg/L. Independent comparative analysis demonstrated accurate correlation of test results between the unit and laboratory-based instrumentation. Each test takes approximately three minutes. **800/835-9629; www.palintest.com.**

PMC ENGINEERING MODEL DTM.OCS

The Model DTM.OCS high-performance digital transmitter from PMC Engineering offers pressure and temperature measurement with data logging capabilities and RS485/Modbus RTU. It is suitable for monitoring level in tanks and wells in addition to many other pressure measurements within the water industry. Pressure ranges from 0 to 6 feet of water and 0 to 1,500 psi in either gauge or absolute. Operating temperature is minus 40 to 185 degrees F. Reliability is enhanced by a proof pressure of more than 300 percent full scale. The RS485/Modbus communication protocol allows for changing the zero point and measurement unit, re-ranging and product identification. It incorporates piezoresistive silicon technology with hysteresis and repeatability of less than 0.01 percent and a static accuracy of less than 0.03 percent. Total errors including zero/span settings and thermals combine for better than 0.05 percent full scale. **203/792-8686; www.pmcl.com.**



Model DTM.OCS digital transmitter from PMC Engineering

SENSAPHONE SENTINEL PRO

The Sentinel PRO from Sensaphone is a cloud-based, cellular system that provides remote monitoring of unattended equipment and environmental conditions in water and wastewater applications where internet or Ethernet connectivity is unavailable. The

system supports the Modbus communications protocol and includes a second relay output to monitor and control

complex networks. Only one unit is required to monitor up to 64 Modbus registers or 12 different digital or analog status conditions. Users can manage multiple devices from one account using web-based tools. The cellular system can be used for unattended pump stations, wells and tank farms because it can detect changes in conditions such as tank levels, flow rates, pump status, turbidity, power supply, temperature,



Sentinel PRO remote monitoring system from Sensaphone

equipment malfunction and security breach. When the system identifies an issue, it immediately sends alerts by phone, text or email over standard cellular networks provided by AT&T or Verizon. **877/373-2700; www.sensaphone.com.**



ISOLOK SAA, SAB and SAL-B automatic point samplers from Sentry Equipment Corp.

SENTRY EQUIPMENT CORP. ISOLOK

ISOLOK SAA, SAB and SAL-B automatic point samplers for liquids and biosolids are available from Sentry Equipment Corp. ISOVALVE isolation valves allow samplers to be easily removed for inspection or service while process lines remain pressurized. These sampling solutions are safe,

clean, reliable and simple to use, reducing human error, providing consistent representative samples for analysis and process

control, and increasing safety, efficiency and cost savings. **262/567-7256; www.sentry-equip.com.**

SOLINST CANADA LTD. MODEL 3500 AQUAVENT

The Model 3500 AquaVent water level data logger from Solinst Canada Ltd. uses a vented pressure transducer for reliable, accurate data logging of water levels in shallow surface water and groundwater applications. It combines a pressure sensor, temperature thermistor and data logger within a 7/8- by 7-inch stainless steel housing. Permanent desiccants mean there is no need for replacement — providing moisture protection for the lifetime of the instrument. The vented pressure transducer is made of Hastelloy, making it durable and accurate in a wide range of temperature and monitoring conditions. The batteries, which are user-replaceable, can last eight to 10 years (based on one reading per minute). It has options for communicating strictly with Solinst software and accessories, or integrating into a telemetry system, SCADA/PLC system or network using SDI-12 or Modbus protocols. **905/873-2255; www.solinst.com.**



Model 3500 AquaVent water level data logger from Solinst Canada Ltd.



PLICSCOM display and adjustment module from VEGA Americas

VEGA AMERICAS PLICSCOM

The display and adjustment module PLICSCOM from VEGA Americas is available with optional Bluetooth, allowing users to wirelessly adjust any transmitter with a

smartphone, laptop or tablet from a distance of approximately 80 feet.

Instruments on tall vessels can be monitored without operators carrying heavy equipment up narrow ladders and devices on outdoor tanks can be checked from a vehicle or control room in the case of harsh environmental conditions. All displays come with a magnetic pen that can adjust a device through the housing window. Operators in explosive atmospheres can make on-site modifications without obtaining permits and authorizations. It is backward compatible with all plics sensors, and includes encryption software to keep process data safe and secure. **800/367-5383; www.vega-americas.com.**

VIATRAN MODEL 386

The Viatran Model 386 pressure transmitter has a flush tip zero cavity design that eliminates the traditional measurement challenges of pressure transmitter port clogging. It removes installation torque effects on the output signal. It further incorporates a solid stainless steel machined diaphragm (Inconel optional), along with all-welded sealed housings. This combination makes it virtually impervious to fluid ingress, reduc-



ing risk of potential damage to internal electronics. It has an isolated sensor that eliminates the need for adjustments to the pressure transmitter after installation. Units are available in 13 uniquely configurable standard ranges, covering 0 to 150 to 0 to 10,000 psig or psis, along with a variety of electrical connections. Depend-

Model 386 pressure transmitter from Viatran

ing upon range, it can withstand up to 1.5X proof pressure and up to 5X burst pressure. **716/629-3800; www.viatran.com.**

Operations/Maintenance/Process Control Software

ALLMAX SOFTWARE OPERATOR10

Operator10 from AllMax Software provides a central database for all of a plant's operational and process control data. Users have the ability to manually enter data, pull data directly from SCADA and/or import data from LIMS programs. The built-in tools allow for regulatory reporting/electronic submittal, custom report creation, graphing, process control calculations, built-in formulas (MCRT, SVI, F/M Ratio, etc.), easy customizable data entry sheets, customizable user dashboards, a full audit trail, and a biosolids module. Users benefit from easy access to historical/current plant data, decreased time on monthly reporting, better overall data management and improved plant efficiency. **800/670-1867; www.allmaxsoftware.com.**



Operator10 from AllMax Software



ANUE WATER TECHNOLOGIES FLO SPEC CONTROL SOFTWARE

Flo Spec Control Software from Anue Water Technologies is a fully SCADA-compliant program that allows for bidirectional monitoring and control of each system with access to Wi-Fi or Satellite/Local CAT 5 internet connectivity. It is manufactured in a NEMA 4 cabinet, and is standard with all

Flo Spec Control Software from Anue Water Technologies

three basic platforms, including Phantom I and II for point source odor control, FORSe 2 oxygen generation systems for force main corrosion control, and FORSe 5 Combination ozone and oxygen systems for larger odor and corrosion control applications. The efficiency of immediate data access and system control has allowed municipalities and industrial wastewater operations to reduce costs. The design allows stand-alone remote system monitoring as well SCADA interface as a standard product offering. Options include specific alarm alerts that can be sent to any computer or smartphone to identify and correct problems quickly. **760/727-2683; www.anuewater.com.**

AQUA-AEROBIC SYSTEMS INTELLIPRO FILTRATION OPTIMIZATION SYSTEM

The IntelliPro Filtration Optimization System from Aqua-Aerobic Systems is a PC-based control system for Aqua-Aerobic cloth media filters that uses real-time data to optimize chemical addition to meet phosphorus removal objectives. The sys-



IntelliPro Filtration Optimization System from Aqua-Aerobic Systems

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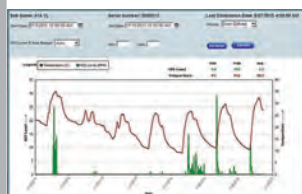
tem has automatic, optimal-dose selection for metal salts, polymer, and pH adjusting chemicals. It is an efficient solution that assists plants in achieving low-level phosphorus while minimizing expense associated with chemicals. **800/940-5008; www.aqua-aerobic.com**.

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PIPE-FLO Professional from Engineered Software



Link2Site Web Monitoring from Evoqua Water Technologies

EVOQUA WATER TECHNOLOGIES LINK2SITE WEB MONITORING

Link2Site Web Monitoring from Evoqua Water Technologies provides operators with remote access to hydrogen sulfide data for real-time monitoring and responsiveness to changing site conditions. The web platform interfaces with the Vapor-

Link hydrogen sulfide monitor and VersaDose dosing controller for comprehensive performance monitoring and dosing control. Operators can view and download trending graphs and charts to analyze system performance in order to ensure consistent, effective odor and corrosion treatment. The result is a more efficient use of chemicals, reduced labor requirements, and better odor and corrosion control. **800/345-3982;**

www.evoqua.com.



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The free *Enclosure Cooling for Water Treatment* guide from Thermal Edge helps operators discover the keys to maintaining the performance of electrical equipment. Electrical equipment in water and wastewater treatment facilities must be shielded from the harsh conditions commonly found in these locations. At the same time, it must protect from excess heat,



Enclosure Cooling for Water Treatment guide from Thermal Edge

which may affect its performance, reliability and life span. To control temperature, an enclosure cooling solution is often required. Download this free guide to learn how to protect sensitive electrical equipment in harsh water treatment environments, maintain a system, select the right enclosure cooling solution, and troubleshoot temperature control issues. Choosing the right enclosure cooling solution, sizing it correctly and maintaining it properly will protect valuable equipment, save money, reduce downtime, and ensure the safety and purity of the clean water flowing from the plant. **888/580-0202; www.thermal-edge.com**.

Process Control Systems

BEIJER ELECTRONICS IX TxF-2

Beijer Electronics’ iX TxF-2 Series of HMIs, including 5-, 7- and 10-inch operator interface panels, combine IP65 plastic housing with iX HMI programming software. The standard Ethernet and serial communications ports and broad PLC support allow them to interface with most PLC and controller systems. iX software has key HMI functions such as recipes, alarms, data logging, trends, security, as well as more advanced functions. The units combine vector-based graphics and smart functions that give engineers and technicians the ability to create intuitive operator interfaces without requiring extensive programming experience. **801/466-8770; www.beijerelectronics.com**.



iX TxF-2 Series of HMIs from Beijer Electronics



PDS-100 pumping system from Fluid Metering

FLUID METERING PDS-100

The PDS-100 from Fluid Metering is a programmable pumping system that uses precision stepper motors to control a variety of valveless piston pumps. It has a range from 500 nanoliters per dispense to 2 liters per minute continuous flow, and will accommodate all FMI pump sizes in both fixed and adjustable-displacement configurations. The pump heads are integrally mounted to the control unit, which is housed in a rugged anodized aluminum enclosure. The control unit

includes the stepper motor drives and programmable driver electronics. The front face of the enclosure has an LED readout used to display menu-driven programming, as well as membrane switches for navigating through the programming steps. It can be configured to control either one or two pump heads. In configurations with two pump heads, each pump can be controlled independently for dual proportional dispensing and metering, or synchronized to produce a smooth, pulseless flow. **800/223-3388; www.fmipump.com**.

FLYGT - A XYLEM BRAND MULTISMART

The MultiSmart pump station manager from Flygt - a Xylem Brand combines PLCs, RTUs and pump controllers in a comprehensive package. The pump station manager integrates numerous control panel components. It includes preprogrammed logic specifically designed to significantly reduce operating costs. It includes an easy-to-configure setup wizard for commissioning a new station. It has built-in local SCADA. Remote control programming reduces maintenance cost and frequency of site visits. **855/995-4261; www.xylem.com**.



MultiSmart pump station manager from Flygt - a Xylem Brand



GLOBAL TREAT OV-110 OMNI VALVE

The OV-110 Omni Valve from Global Treat offers versatility and provides ideal accuracy and reliability. It is an all-in-one chemical control valve for chemical feed. It is capable of operating in eight different control modes and can handle a wide range of chemicals and capacities. It is constructed from high-quality materials and is machine-made so there are few moving parts, which reduces the chance of long-term repairs. **800/370-4410; www.globaltreat.com.**

OV-110 Omni Valve from Global Treat

GORMAN-RUPP INTEGRINEX

The Integrinex line of lift station controls from Gorman-Rupp is designed to ensure system performance through precise matching of controls to pumps and motors. Customers have four choices in liquid level controls when they select a Gorman-Rupp ReliaSource solids-handling pump package. Basic is the most affordable choice for simple, reliable plug-and-play performance, and is designed for accurate start/stop operation in a duplex alternation pump system. Standard includes duplex and triplex alternation, level sensors, pump delay and alarms. Advanced control systems include soft starters and VFDs to manage electric inrush, hydraulic shock and matching starting and stopping torque-based management and monitoring. Remote View includes all the functionality of the advanced system with remote tablet-based management and monitoring. **419/755-1011; www.grpumps.com.**



Integrinex line of lift station controls from Gorman-Rupp



DLT 2.0 transmitter from Greyline Instruments

GREYLINE INSTRUMENTS DLT 2.0

The DLT 2.0 from Greyline Instruments can measure both differential level at a bar screen, plus open channel flow through a flume. It works with two non-contacting ultrasonic sensors. One sensor is installed upstream from the bar screen and a second downstream for differential level control. The second sensor can also be installed in a flume to control and transmit differential level control plus flow. The unit includes relays for bar screen rake and level control, as well as three 4-20mA outputs (upstream level, differential level, downstream level or flow). The large backlit LCD display shows level, differential level, flow and total flow. Intrinsically safe sensors and data logger are optional. **888/473-9546; www.greyline.com.**

HACH CHEMKEY

Chemkey parameters available for the Hach SL1000 Portable Parallel Analyzer (PPA) have been expanded to include hardness, alkalinity, orthophosphate and iron. The platform offers faster testing of multiple parameters, reduced variability from test to test and operator to operator, and less hassle. It is able to test up to four colorimetric and two probe-based parameters simultaneously, delivering field analysis in as little as 10 minutes. **800/227-4224; www.hach.com.**



Chemkey parameters for the SL1000 Portable Parallel Analyzer from Hach

(continued)

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The AlarmAgent Toolset from RACO Mfg. and Engineering Co. offers a reliable and comprehensive solution for gaining real-time insight into water and wastewater pump applications. It can help improve pump utilization and efficiency by using wireless alarm monitoring and notification, reporting and data delivery to a SCADA/HMI desk-

top. System data is captured and stored in the cloud for centralized analysis and reporting, as well as easy sharing across organizations. The easy-to-configure, simple-to-use system is designed to give users greater peace of mind. **800/722-6999; www.racoman.com.**

UNITED ELECTRIC CONTROLS ONE SERIES 1X

The One Series 1X line of explosion-proof, programmable transmit-

ters and switches from United Electric Controls provides alternatives to conventional mechanical switches and transmitters. They are used to control pumps and compressors, lubrication oil monitoring, hydraulic pressure, filter status and other industrial applications based on temperature or pressure. Options are available to meet customer requirements for integrated switching and sensing, intrinsic safety, power level and power source. Configurable I Am Working self-diagnostics provide assurance that the instrument is functioning properly. An integral digital process display shows what is happening in the process. Plugged port diagnostics flag potentially dangerous sensor clogs and memorize the highest and lowest process variables for process troubleshooting and learning. A programmable setpoint and dead-band provides versatile, accurate and repeatable alarm and shutdown switching. **617/926-1000; www.ueonline.com. tpo**



One Series 1X line of transmitters and switches from United Electric Controls

FREE INFO ON THESE PRODUCTS — RETURN FOLLOWING FORM

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- Phoenix Contact TP 3000 Series human machine interface operator panel
- PRIMEX PC-3000X controller

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- Blue-White Industries BW DIGI-METER F-2000 Series flowmeter
- Matchpoint Water Asset Management Hydreka HydrINS 2 insertion flowmeter
- Spire Metering Technology 280W-CI ultrasonic water meter
- Universal Flow Monitors P420 Series flow rate transmitter

Monitors

- Analytical Technology Q46N Free Ammonia Monitor
- Arizona Instrument Jerome J605 hydrogen sulfide analyzer
- BinMaster Level Controls SmartBob2 SS sensor
- Campbell Scientific CVS4200 programmable vacuum sampler
- CEM Corporation SMART 6 rapid moisture/solids analyzer
- Challenge Technology ODM-100 monitor
- CHEMetrics 530 nm Single Analyte Meter Verification Kit
- Electro-Chemical Devices OZ80 Ozone Analyzer
- Fluid Components International FS10i flow switch/monitor
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- Force Flow Wizard 4000 with Auto Refill Control
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- Keller America LevelRat level transmitter
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- Markland Specialty Engineering Suspended Solids Density Meter
- Mars Company Veroflow-4 Portable Meter Tester
- MOCON-Baseline Series 9000 total hydrocarbon analyzer
- Palintest SA1100 Scanning Analyzer
- PMC Engineering Model DTM.OCS digital transmitter
- Sensaphone Sentinel PRO system
- Sentry Equipment Corp. ISOLOK SAA, SAB and SAL-B automatic point samplers
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- Viatran Model 386 pressure transmitter

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Testing method helps determine activated carbon remaining service

Problem

Operators at the drinking water plant in Corvallis, Oregon, were unable to determine the remaining life of their eight activated carbon adsorbers.

Solution

Activated Carbon Services - PACS deployed its **aqueous-phase carbon adsorber remaining service** as a definitive test to answer the question. The test method is based on the Polanyi adsorption model and uses a gravimetric adsorption energy distribution full characterization to provide critical data for remaining service life. The device measures distribution of adsorption energies and associated pore volumes. By comparing starting carbon and used carbons, it can reveal the pores that are filled with adsorbate and no longer available.



RESULT

The remaining life method helped Corvallis learn that the adsorbers needed replacing. The method continues to obtain estimated carbon remaining service time before change-outs. **724/457-6576; www.pacslabs.com.**

Analyzer allows plant to decrease use of aluminum sulfate

Problem

The Fond du Lac (Wisconsin) Regional Wastewater Treatment Plant was spending a large amount on aluminum sulfate to keep effluent total phosphorus under 1 mg/L. Industrial discharges were contributing to highly variable phosphorus in the wastewater. The mode of operation was to make sure enough chemical was added to address the fluctuations.

Solution

Tom Kruzick of William Reid recommended the **ChemScan mini oP analyzer** from **ASA Analytics**. The unit was used as a monitoring device, allowing the aluminum sulfate to be manually adjusted once or twice a day. The analyzer is connected to the chemical feed pump via a SCADA system and is controlled automatically. The setpoint is currently 0.6 mg/L ortho phosphorus.



RESULT

Since installation of the analyzer in 2012, the plant has saved about \$100,000 per year on aluminum sulfate using manual control. The plant recently moved toward biological phosphorus removal with chemical polishing. Effluent total phosphorus is consistently around 0.8 mg/L. The plant is on pace to save \$50,000 more per year above the savings from manual adjustment, for a total of \$150,000. **262/717-9500; www.asaanalytics.com.**

Platform enables city to organize monitoring data

Problem

The City of Richmond, California, was having trouble organizing its environmental monitoring data into a single web platform. The network included meters from Isco, Telog and ADS. The lack of a single platform made data reporting and graphing tedious and time-consuming.

Solution

The city deployed a **FlowWorks** platform on the advice of George Elaro and the Infrastructure Engineering Corporation.



RESULT

FlowWorks has helped the city bring its data into one platform, keep it organized and easily run reports and generate graphs. This has simplified day-to-day tasks. The engineering and management teams now have access to all the flow monitors in the system as well as the SCADA data from the wastewater treatment operations. Combined sewer overflow events and potential spills are identified using an accurate system with alarm capabilities. **206/859-6999; www.flowworks.com.**

Intuitive pump control solves drive fault issues

Problem

Repeated random pump failures in a Connecticut community in the Catskills were caused by the drive faulting out on a phase loss. Water is pumped uphill from a 100-foot well into large storage tanks for distribution to the community. "The environment and landscape played a role in our challenge," says David Dretel, D&S Pump and Supply Co. "The problem was difficult to troubleshoot because power loss was happening randomly. Sometimes it would only occur once a week. The power faults also would happen during certain weather conditions and peak demand — not really things we could plan for."

Solution

Experts from **Goulds Water Technology**, a **Xylem** brand, teamed with distributor D&S and Foley's Pump Service. Installing the **Aquavar Intelligent Pump Controller** on the input of the SPD provided a more robust line filter (3.6 percent electrical impedance versus 3 percent). Xylem employees discovered that the drives were running without a pressure transducer. The system was also using a chlorinator when the drive ran full speed and was hooked up to the relay output. This meant the IPC would need to be used in a different setup. The team quickly configured the new controller.



RESULT

After setting up the new pump controllers, Xylem experts remained on site to test them and train the customers on features, data analysis and maintenance. The customer has seen improved performance and is providing a reliable water supply. **866/325-4210; www.goulds.com.**

Rural water plant finds leak with clamp-on flowmeter

Problem

A rural village water treatment plant in the Southwestern United States treats, stores and distributes 325,000 gpd. The village consumes an average of 125,000 gpd and can store up to 1 million gallons. The treatment plant was losing 210,000 gpd due to a leak.

Solution

The water authority brought in a portable **SITRANS FUP1010 clamp-on ultrasonic flowmeter** from **Siemens** to help find the leak. Workers checked the flow from the well and compared the readings to the line feeding the storage tank. The 8-inch pipe was buried in the side of a mountain. The differences in the clamp-on meter readings indicated the leak was on that line. The supervisor had plant personnel uncover the line in various sections and narrowed the search to the pipe section believed to be leaking. The leak was found and the 30-year-old pipe was repaired.



RESULT

By using the flowmeter to find the leak, the village avoided wasting more time and water and did not have to spend money for a consultant. Thousands of gallons in daily water loss was avoided, and the village was able to end water rationing. **800/365-8766; www.usa.siemens.com.**

Online monitoring of ammonium and nitrate helps facility meet strict discharge limits

Problem

Daily maximum discharge limits for ammonia and total inorganic nitrogen require exceptional performance at the Littleton Englewood (Colorado) Wastewater Treatment Plant. Operators needed a solution to monitor and control nitrification and denitrification in real time across a multistage biological process.

Solution

The plant team chose the **IQ SensorNet 2020 XT system** from **YSI, a Xylem Brand**, for its accurate results and low operator attention. DO, ammonium and nitrate sensors were installed at critical locations to monitor the process and control distribution of wastewater for the most efficient treatment. Optical nitrate sensors are deployed at the influent and effluent of the solids contact tanks, where the objective is to remove BOD and push nitrification downstream to the nitrifying trickling filters. Ammonium ion-selective electrode sensors are installed in the centrate return to control transfer of stored centrate and avoid overloading biological treatment. Ammonium sensors in the prechlorination tanks control the bypass of ammonia-rich secondary effluent around the nitrification process, maintaining the critical ammonia-to-chlorine ratio for efficient operation of the effluent chloramination disinfection process.



RESULT

The network configuration and modularity of the equipment means the monitoring system could easily be expanded to help solve problems with nitrification and denitrification. The system continues to provide real-time monitoring. **800/765-4974; www.ysi.com. tpo**

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industry news

American Water names president

American Water named Deborah A. Degillio president of American Water Enterprises. She replaces Sharon Cameron, who retired in May. Degillio was vice president and treasurer for American Water and has 20 years of experience in the utility and energy sectors. In her new role, she will lead American Water's Contract Services Group, Military Services Group and Homeowner Services.

DeZurik releases Valve Selection Guide

DeZurik's new Valve Selection Guide is designed to help users navigate the company's product line based on valve type, general specifications, common media and applications by industry. The guide's selection chart uses color-coded ratings to categorize each valve style's general usage in a particular application: Not Used, Limited Application, May Be Used, Typical Application and Maximum Performance. The chart considers both cost and performance factors for a specific application when determining its rating. The guide is viewable on DeZurik's website on the Bulletins page, www.dezurik.com/bulletins, under the "Valve Selection Guides & General Information." Printed copies may be requested from a local DeZurik representative.

WesTech partners with Cleanergy

WesTech partnered with Cleanergy to bring the Cleanergy GasBox biogas generator to the United States. The GasBox generates electricity and heat from biogas using a Stirling engine. The GasBox requires minimal to no gas cleaning, which allows for small and midsize wastewater treatment plants to achieve the power-generating benefits of biogas utilization. The GasBox can also run on biogas with a methane concentration as low as 18 percent, which eliminates the need at larger plants to burn off this biogas with a natural gas supplement.

NIBCO acquires Webstone valve assets

NIBCO acquired the valve assets of Webstone Company. The new business will be named Webstone, a brand of NIBCO. Based in Worcester, Massachusetts, Webstone has been a leader in ball valve technology since 1954.

F.S.R.C. Tanks joins Permastore distribution network

F.S.R.C. Tanks joined Permastore's global distribution network. F.S.R.C. will bring Permastore's Glass-Fused-to-Steel, fusion-bonded epoxy tanks and silos, and Permastore roofs and covers to the U.S. water and wastewater markets. **tpo**



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1. RKI INSTRUMENTS GAS MONITOR

The GX-6000 gas monitor from RKI Instruments simultaneously monitors up to six gases, including combustibles, carbon monoxide and hydrogen sulfide. Two additional smart channels accept PIP, IR or other toxic gas sensors. Features include an internal sample pump, man-down and panic alarm, LED flashlight, and auto-rotating LCD display. The monitor operates as a single-gas PID unit or utilizing all six channels. The PID sensor comes equipped with a library of over 600 VOC gases. **800/754-5165; www.rkiinstruments.com.**

2. EMERSON CT5100 CONTINUOUS GAS ANALYZER

The Rosemount CT5100 continuous gas analyzer from Emerson combines tunable diode laser and quantum cascade laser measurement technologies for process gas analysis and emission monitoring. It can detect down to sub-ppm levels and measure up to 12 component gases and pollutants simultaneously. The analyzer operates with no consumables and no in-field enclosure, and features a simplified sampling system that does not require any gas conditioning to remove moisture. **800/854-8257; www.rosemountanalytical.com.**

3. WANER ENGINEERING HYDRA-CELL TOUCH-SCREEN CONTROLLER

The Control Freak touch-screen controller from Wanner Engineering is designed to control motor speed for Hydra-Cell pumps. The con-

troller enables the user to enter flow rate, volume in gallons or liters and system pressure in psi or bar. The controller automatically runs the pump manually at the desired flow rate or volume total/time or in pre-set batches. It can run up to six pumps with one screen and 10 separate batch setup screens per pump. Features include a variable-frequency drive and password protection for pump algorithms. It can also be field calibrated for greater accuracy. The 7-inch color touch screen is in a NEMA-4X (or IP) enclosure and is visible in low-light areas. Operational features include real-time clock, pump-drive information screen, and analog and digital I/O for interfacing with external devices. **800/369-4172; www.hydra-cell.com.**

4. BIONOMIC HEI WET ELECTROSTATIC PRECIPITATOR SYSTEM

The HEI wet electrostatic precipitator system from Bionomic Industries features discharge electrode technology that can be sized to specific applications. It concentrates a high-intensity ionizing corona in strategic areas within the collecting tube rather than distributing it along the length of the treatment area of the tubes. Features include the Ultimix conditioning system for gas saturation and collection tube cleaning, and RotaBed pre-scrubber for acid removal and particulate loading reduction. Other features include PLC-based voltage and spark controls for maximum electric field stability, nonfouling insulator locations and corrosive-resistant construction. **800/311-6767; www.bionomicind.com.**

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5. TNE MEC WATERBORNE ACRYLIC PROTECTIVE COATING

The single-component, mastic waterborne acrylic coating from Tnemec Company is designed for use on minimally prepared, sound rusted steel and previously coated surfaces. Series 118 Uni-Bond Mastic offers 200 percent elasticity and can be used with acrylic and solvent-borne urethane and fluoropolymer finish coats. Surface preparation consists of power washing steel at 5,000 psi and some mechanical hand or power tool cleaning to remove loose rust, scale and deteriorated coatings. **800/863-6321; www.tnemec.com.**

6. ADS RAINALERT III WIRELESS RAINFALL MONITOR

The RainAlert III wireless rainfall monitor from ADS alerts operators via text or email messages when rainfall intensity exceeds a critical threshold. Designed for ultralow power consumption, the monitor offers up to six years of battery life, depending on modem configuration. Applications include infiltration and inflow studies, hydraulic modeling, overflow response and reporting. **800/633-7246; www.adsenv.com.**

7. YARNEY WATER SELF-CLEANING FILTERS

Filtaworx automatic self-cleaning screen filters from Yardney Water Filtration Systems are designed for cooling towers, industrial process water, incoming plant water, wastewater cleanup and industrial water for plant reuse. The system can be mounted in any position or orientation. It removes algae, slime and organic contaminants, sand grit and inorganic contaminants with fine-mesh filtration to 50 microns. Eight models handle flow rates from 444 gpm to 3,960 gpm. Features include corrosion-resistant 304 stainless steel filter body and self-cleaning mechanism. **951/656-6716; www.yardneyfilters.com.**

8. METROHM WET CHEMICAL ANALYSIS PLATFORM

The OMNIS wet chemical analysis modular platform from Metrohm USA can be expanded from a stand-alone titrator to a system that includes automation. The system can simultaneously perform four fully automated analyses and process up to 175 samples unattended. The Liquid Adapter makes reagent exchange contact-free. **866/638-7646; www.metrohmusa.com.**

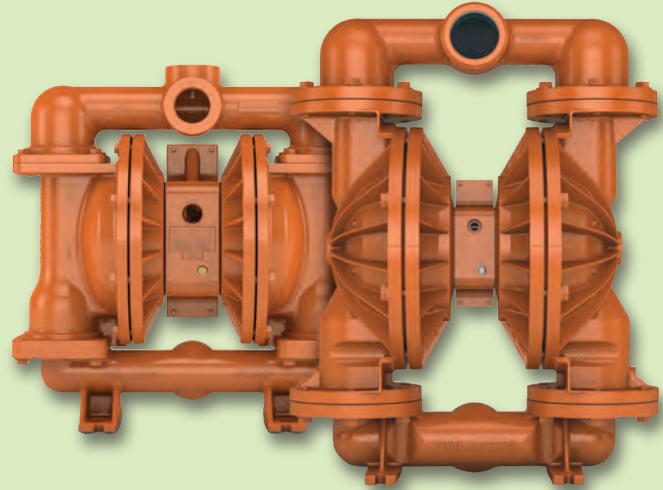
9. BECKART ENVIRONMENTAL DECANTER-, DISC-STYLE CENTRIFUGES

Decanter- and disc-style centrifuge systems from Beckart Environmental are designed to cost-effectively handle 5 to 150-plus gpm of wastewater in municipal treatment plants. The centrifuges feature automatic operation with a minimum of operator time, no compressed air requirements and interface with existing plant processes and treatment equipment. **262/656-7680; www.beckart.com.**

10. RUSSELECTRIC TRAINING SIMULATORS

Training simulators from Russelectric are designed and programmed to mimic the actual operation and performance of the switchgear/system and both the automatic and manual operation of the switchgear, enabling personnel to familiarize themselves with the system and its operation; accurately diagnose a range of utility, generator and breaker problems; and assess the impact of changes to programmable logic controller (PLC) setpoints, such as kW values and time delays by seeing how the system responds. Simulators are also designed for developing and validating site operating and emergency procedures without interfering with operation of the actual system. Any time the switchgear is upgraded, the simulator can be used to test the modified PLC and operator interface panel logic before downloading it to the online PLC system, greatly reducing live system testing time. **800/225-5250; www.russelectric.com.**

wastewater: product spotlight



HS430S Advanced FIT pump from Wilden, part of PSG, a Dover company

Wilden high-pressure aluminum pump handles viscous, solids-laden slurries

By Ed Wodalski

The **HS430S Advanced FIT** high-pressure aluminum pump from **Wilden, part of PSG, a Dover company**, is designed for applications that require high head pressures such as viscous and solids-laden slurries. Features include the FIT wetted path that minimizes the number of fasteners and allows for single socket reassembly for quicker, easier maintenance. The pump can be rested on its square flanges when performing field maintenance.

“Aluminum is our most popular material option,” says Tony Aguilar, sustaining engineer, Wilden. “It’s relatively inexpensive compared to other materials.”

A direct replacement for existing 1 1/2-inch high-pressure aluminum pumps, it requires no re-piping. The simplex design uses one liquid chamber to pump fluid and the other for pressure amplification. With a 2-1 pressure ratio, the pump can operate against a maximum of 240 psig discharge pressure without external boosters or amplifiers.

“This pump can be used almost anywhere you need to pump at relatively high pressure, or you have to deal with solids or higher viscosity liquids,” he says. “This particular pump can handle up to 1/4-inch solids.”

The pumps also feature the Pro-Flo SHIFT air distribution system for a 60 percent reduction in air consumption compared to other AODD pump technologies. **909/422-1730; www.wildenpump.com.**

11. WATSON-MARLOW QDOS 120 PERISTALTIC METERING PUMP

The Qdos 120 peristaltic metering pump from the Watson-Marlow Fluid Technology Group delivers flows up to 120 L/hr (31.7 gph) at a maximum pressure of 4 bar (58 psi). All models in the Qdos family are designed to eliminate the need for ancillaries, boost productivity and reduce chemical waste. There are no valves or seals to clog, leak, gas-lock or corrode. The fully contained ReNu pump head prevents spillage or exposure to chemicals. **800/282-8823; www.watson-marlow.com. tpomag.com**

(continued)

water: product spotlight

Watts MasterSeries backflow prevention valve assemblies meet latest lead-free standards

By Ed Wodalski

FEBCO MasterSeries LF850 and LF870V lead-free double-check valve assemblies from **Watts Water Technologies** are designed to prevent the backflow of pollutants that are objectionable but nontoxic from entering the potable water supply.

“The FEBCO MasterSeries is one of our most up-to-date assemblies in that they are USC 10th edition-approved,” says Jeff Hawkins, backflow prevention valve national product manager for Watts. “We have achieved numerous approvals and certifications for the MasterSeries product lines, from ASSE and USC to NSF, CSA, FM and UL. It is in many ways our most advanced backflow prevention valve.”

Features include an epoxy-coated, ductile iron body (Grade 65-45-12) with NRS or OSY resilient wedge gate valves and N-pattern orientation for installation in tight quarters (vertical-up/vertical-down and vertical-up/vertical-up orientations), as well as inline horizontal.

“The compact N-pattern has a tight centerline distance for mounting, which reduces the footprint for the valve,” Hawkins says. “If you have a tight mechanical room, the N-pattern offers real advantages. Or if you’re in an environment where you place the valve inside enclosures, the smaller the valves, the smaller the enclosure and less cost you have for the total installation.”

Other features include inline serviceability, reversible and replaceable check discs, field-replaceable check seats, stainless steel check components and reduced pressure loss.

Lead-free certified to NSF 61G standards, the wetted surface contacted by consumable water contains less than 0.25 percent of lead by weight. Valve sizes range from 2 1/2 to 10 inches in diameter and have a maxi-



FEBCO MasterSeries LF850 and LF870V from Watts Water Technologies

imum working pressure of 175 psi, hydrostatic safety pressure of 700 psi and temperature range of 33 to 140 degrees F.

The valves require little maintenance beyond annual certification.

“A certified plumber or certified backflow tester typically would exercise a double-check valve assembly once per year and validate the static differential pressure across each check,” Hawkins says. “You may find that you have experienced wear in the check seat or in the elastomeric material that forms the compliant seal in the check valve. Those are the typical service items you would verify, maintain or replace. Generally speaking, it’s the rubber disc that has worn. Occasionally you may have a damaged or broken check component, but that’s very rare.” www.febcoonline.com.

FREE INFO ON THIS PRODUCT — RETURN FOLLOWING FORM

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

- 1. Emerson Rosemount CT5100 continuous gas analyzer
- 2. Wanner Engineering Control Freak touch-screen controller
- 3. Bionomic Industries HEI wet electrostatic precipitator system
- 4. Tnemec Company waterborne acrylic coating
- 5. ADS RainAlert III wireless rainfall monitor
- 6. Yardney Water Filtration Systems self-cleaning screen filters
- 7. Metrohm OMNIS wet chemical analysis modular platform
- 8. Beckart Environmental decanter- and disc-style centrifuge systems
- 9. Russelectric training simulators
- 10. Watson-Marlow Fluid Technology Group Qdos 120 peristaltic metering pump
- Wilden, part of PSG, a Dover company, HS430S Advanced FIT pump
- Watts Water Technologies FEBCO MasterSeries LF850 and LF870V valve assemblies

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people/awards

Steve Hoambrecker was named the waste management director for the City of Waterloo, Iowa.

Isaac Garcia was named plant director of the Regional Wastewater Treatment Plant in Ruidoso, New Mexico. He had been chief plant operator since 2009. He replaces **Bobby Snowden**, who retired.

The **Town of Davie (Florida) Water Reclamation Facility** received the 2016 David W. York Water Reuse Award from the Florida Water Environment Association in the 1 to 5 mgd category.

Scottsdale Water's Gainey Ranch Wastewater Treatment Facility and wastewater collections team each received an Award of Honor from the Arizona Water Association for operating more than one year without losing any work time due to injury.

Brian Stacy, county engineer for Pierce County, Washington, was named president of the National Association of County Engineers. He has served as county engineer since 2004, and his area of responsibility includes the wastewater treatment plants. Stacy began his career at Pierce County in 1990 with the sewer utility, where he served as the wastewater utility manager from 1998-2004.

As part of the Severn Trent North America team, **Derek Albertson** was hired as operations manager for operation and maintenance of the 30 mgd Bridgeport (Connecticut) West Water Pollution Control Facility.

Clearas Water Recovery added **Dr. Art Umble**, wastewater practice leader, Americas Region for MWH Global, to its board of directors.

The **Northeast Water Reclamation Facility** in Rex received the Wastewater Plant of the Year award for plants treating 6 to 9.9 mgd from the Georgia Association of Water Professionals. It's the facility's ninth Plant of the Year award since 1989.

Dan McElhatten retired as pretreatment coordinator at the City of Tiffin, Ohio, and senior environmental project manager for BoJhun Environmental Services of Fostoria, Ohio.

George "Kenny" Niblett Jr., director of Public Works in Millsboro, Delaware, won the 2016 Chesapeake Water Environment Association Utility Manager Award for 2016.

Chris Tyhurst retired in July after 38 years working for the water treatment systems in Montague, California.

Josh McNitt was hired as wastewater manager in Dixon, Illinois. He will oversee 80 miles of sewers and the 3 mgd wastewater treatment plant.

Adam Bourassa was hired as the water services manager for the City of St. Cloud, Minnesota.

The **Monroe County (New York) Water Authority** was rated highest in customer satisfaction in the Northeast and received the J.D. Power Award. The first-of-its-kind survey rated the 84 largest water utilities from all over the country.

The Environmental Operators Certification Program hired **Kalpna Solanki** as executive director.

Carolyn Fankell, water treatment employee in Xenia, Ohio, retired in May after 16 years of service. Her duties ranged from laboratory functions to industrial and landfill monitoring.

The **City of Winder and operator ESG Operations** received Gold and Platinum awards from the Georgia Association of Water Professionals to recognize exceptional performance.

Ten Nevada Irrigation District employees were recognized for service:

- 25 years: **Bob MacDonald**, raw water maintenance superintendent
- 20 years: **Monica Reyes**, customer account administrator
- 15 years: **Aha Howard**, accounting administrator; **Robert Jordan**, utility worker; and **Barry Scicluna**, engineering technician
- 10 years: **Philip Goguen**, electrical systems superintendent; **Kenneth Bartsch**, equipment operator; **John Foppiano**, water distribution operator; **Nathan Allen**, operations technician; and **Pamela Robinson**, management assistant

Richard Hodge, water and sewer maintenance superintendent for Canton, was named Operator of the Month for May by the North Carolina Water Operator's Association. **Mark Jones**, chief filter plant operator, was named 2015 Filter Plant Operator of the Year.

The **City of Elmhurst (Illinois) Wastewater Treatment Plant** received the Clean Water Award from The Conservation Foundation.

The **Crosstown Water Treatment Plant** and the **South Fayette Water Treatment Plant** in Fayette County received the Gold Award from the Georgia Association of Water Professionals for meeting all treatment guidelines. The water system also won the Best Tasting Water Award for the state's District 3.

The **Richmond Lake Sanitary District Wastewater Treatment System** received the South Dakota Department of Environment and Natural Resources Award for outstanding operation environmental compliance.

The **Clayton County Water Authority** received the STREAM Award from the Metropolitan North Georgia Water Planning District for constructed wetlands. The Panhandle Constructed Wetlands System and the E.L. Huie Jr. Constructed Treatment Wetlands provide polishing treatment for the water.

Padre Dam Municipal Water District in California received a Bronze Anvil Award from the Public Relations Society of America, an Award of Distinction from the California Association of Public Information Officials, and a Platinum Hermes Creative Award from the Association of Marketing and Communication Professionals for its video, "Water, Too Good to Waste."

The **Grand Rapids Public Utility Commission** received a 2015 Wastewater Treatment Facility Operational Award from the Minnesota Pollution Control Agency.

Tidewater Utilities Southern Sussex District operators were recognized for outstanding teamwork and cooperation at the Delaware Technical Community College Water and Wastewater Professionals Annual Award Ceremony. The team was commended for upgrades at the Southern Shores Water Treatment Plant. The team also received the 2015 Best Tasting Water Award from the Delaware Rural Water Association.

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. tpo

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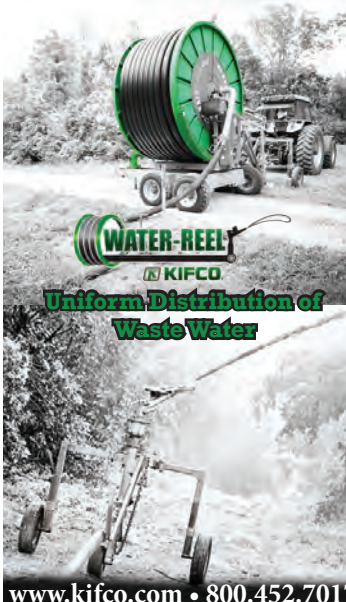
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events

Aug. 30-Sept. 1

Kansas Water Environment Association and AWWA-Kansas Section Joint Annual Conference, Capitol Plaza Hotel, Topeka. Visit www.kwea.net.

Sept. 8

Florida Water Environment Association Southwest Florida Water and Wastewater Exposition, Harborside Event Center, Fort Myers. Visit www.fwea.org.

Sept. 11-14

Rocky Mountain Water Environment Association-Rocky Mountain Section AWWA Annual Conference, Keystone, Colorado. Visit www.rmwea.org.

Sept. 12

New England Water Environment Association Collection Systems Conference, Holiday Inn, Boxborough, Massachusetts. Visit www.newea.org.

Sept. 12-15

Virginia Water Environment Association and Virginia Section AWWA WaterJAM 2016, Virginia Beach Convention Center. Visit www.vwea.org or www.vaawwa.org.

Sept. 13

New York Water Environment Association Watershed Science and Technical Conference, Diamond Mills Hotel, Saugerties. Visit www.nywea.org.

Sept. 13-16

Michigan Section AWWA Annual Conference, Harbor Springs. Visit www.mi-water.org.

Sept. 13-16

Ohio Section AWWA Annual Conference, Cincinnati. Visit www.oawwa.org.

Sept. 14-16

Intermountain Section AWWA Annual Conference, St. George, Utah. Visit www.ims-awwa.org.

Sept. 14-16

Wisconsin Section AWWA Annual Conference, Madison. Visit www.wiawwa.org.

Sept. 14-16

South Dakota Section AWWA Annual Conference, Sioux Falls. Visit www.sdawwa.org.

Sept. 18-21

Atlantic Canada Water and Wastewater Association Annual Conference, Delta Beausejour Hotel, Moncton, New Brunswick. Visit www.acwwa.ca.

Sept. 18-21

New England Section AWWA Annual Conference, Providence, Rhode Island. Visit www.newwa.org.

Sept. 20-23

Minnesota Section AWWA Annual Conference, Duluth. Visit www.mnawwa.org.

Sept. 24-28

Water Environment Federation Technical Exhibition and Conference, Morial Convention Center, New Orleans, Louisiana. Visit www.weftec.org.

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A large, detailed image of a Flygt 4320 submersible mixer. It features a grey motor housing with a propeller shaft extending from the front. The propeller has three large, yellow, curved blades. The entire unit is mounted on a silver metal frame with a tripod-like base.

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AND MAXIMUM
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