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JULY 2018

BUILDING THE TEAM:
Apprenticeship program
in Prestonsburg, Kentucky

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Right **in Tune**

**MATT JENKINS TAKES PRIDE IN
GETTING THE MOST FROM
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Matt Jenkins
Wastewater Systems Supervisor
La Center, Wash.

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Best blower installation practices

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Major water valve replacement

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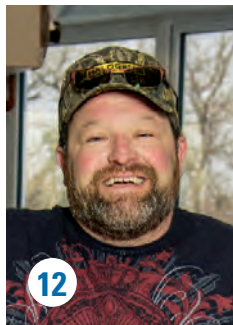
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on the cover

To Matt Jenkins, optimizing a wastewater treatment plant is a lot like tuning a guitar. "You can never just tune one or two strings and expect the others to stay the same," he says. "As the tension changes on the neck, the tone of each individual string will change. A plant is much the same." He applies that approach at the La Center (Washington) Water Reclamation Facility. (Photography by Ethan Rocke)

top performers:

WASTEWATER PLANT Page 38

35 Years Young

Age is no barrier to performance at the Pascagoula/Moss Point Regional Treatment Plant. Sound maintenance and continuing education for staff ensure quality effluent.

By Ted J. Rulseh

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Seeing the Big Picture

Award-winning project manager Mark Houle tackles challenges with experience, problem-solving skills and a dedicated team.

By Trude Witham

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Out of Disaster, a New Beginning

A chlorine leak disabled the Norton water plant's electrical and control systems. The team responded with quick repairs and big long-term process improvements.

By Jim Force

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Right in Tune

Matt Jenkins takes pride in getting the most from the clean-water plants he operates. That includes building cohesive and capable operations teams.

By Ted J. Rulseh

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The Passionate Centrist

Issues like improving water infrastructure need people willing to swear off extreme positions and approach problems in practical ways.

By Ted J. Rulseh, Editor

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Accurate Dosing, Room to Grow

Modular metering pump systems are designed to help treatment plant operators easily upgrade and reduce chemical consumption.

By Ted J. Rulseh

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By Jeff Smith

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By Tim Fallon

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Nonprofit Blue Drop looks to provide practical advice to clean-water and drinking water utilities while saving money for DC Water ratepayers and marketing biosolids products.

By Ted J. Rulseh

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A New Generation

A Kentucky city partners with a community college on an apprenticeship program to train potential replacements for water and wastewater workers planning to retire.

By Sandra Buettner

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Right Message, Right Time

The Iowa Children's Water Festival teaches fifth-graders about water's importance at an age when what they learn stays with them.

By Craig Mandli

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A low-powered electric mixer replaces some aerators in a Vermont treatment plant lagoon and delivers significant savings on energy.

By Steve Lund

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Long and cost-effective blower performance depends on proper installation, an understanding of control systems, and regularly scheduled maintenance.

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coming next month: August 2018

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» Top Performers:

Wastewater Plant: Burwell Road Wastewater Treatment Plant, Harvest, Alabama

Water Plant: Basin Creek Water Treatment Plant, Butte, Montana

Wastewater Plant: North Platte (Nebraska) Wastewater Treatment Plant

Wastewater Biosolids: Gasification project in Lebanon, Tennessee

» How We Do It: Fast-install aeration improvement

» Sustainable Operations: Microturbine cogeneration in Great Neck, New York

» In My Words: A desert city looks at direct potable water reuse

» PlantScapes: Decorative fencing and public art in Arlington, Virginia

» Hearts and Minds: Junior high Write-Off Contest promotes water knowledge

» Technology Deep Dive: A different solution to wipes problems

GREG BRECKLER
Operations Manager
Knox County Water & Sewer District
Knox Co., Ohio, USA

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let's be clear

The Passionate Centrist

ISSUES LIKE IMPROVING WATER
INFRASTRUCTURE NEED PEOPLE WILLING
TO SWEAR-OFF EXTREME POSITIONS AND
APPROACH PROBLEMS IN PRACTICAL WAYS

By Ted J. Rulseh, Editor



Doug Day, a good friend of mine and a contributor to this magazine, passed away in January 2017. I miss Doug for many things, one being the political discussions we had.

Doug and I were on opposite sides of the spectrum, neither of us extreme. I won't say who was on which side because in this context it doesn't matter. The point is that we could and often did sit down over lunch, kick around the issues of the day, and find we agreed on quite a bit. On the rest, we'd simply agree to disagree, and that alone was worthwhile.

I mention this because the capacity to discuss things the way Doug and I did is essential to creating sound public policy, and such policy in turn is essential to moving issues around water, wastewater and infrastructure in productive directions.

POLES IN OPPOSITION

I like to think that Doug and I were passionate centrists, and no, that isn't a contradiction in terms. "Centrist" isn't the same as "lukewarm" or "apathetic." It's possible to be passionate about political viewpoints but also have the capacity to see merit in opposing arguments and positions — especially those that split the difference between hyperpartisan ideologies.

Unfortunately, these days it seems that when a political issue hits the table the two sides (and by the way, why only two sides?) move to their extreme positions as surely as a magnet's north pole repels south, and there's no way of pushing them together. The harder you try, the more insistent the repulsive force.

If you doubt this, look at an issue like gun rights and the Second Amendment. Or national health care. Or LGBT rights. It's not to say that no one holds centrist positions, passionate or otherwise, on these issues. It's just that extreme positions tend to dominate the discussions — picture a cable talk show with two guests shouting over each other — when in reality there's lots of middle ground available.

TALKING TAXATION

Few issues are tougher to talk about than taxation, specifically how much is the right amount and for what exactly. This is central to discussions about water and wastewater infrastructure and how to renew and sustain it. In this case of

course, we're mostly talking about user fees, not taxes, but the substance is the same. The topic can benefit from a lot of passionate centrism.

I've often questioned the premise that "nobody likes to pay taxes." After all, why should we hate paying for good roads, good schools for our kids, nice parks for our families, clean cities, well-stocked libraries, fire and police protection, and, of course, clean streams, lakes and tap water?

The problem is that when we pay the taxes, we tend to divorce how much we pay from how much we get in return. Unless we think carefully, all we see are different levels of government "taking our hard-earned money." To many, taxes are always "too high" no matter how many times in recent history they've been cut at the federal, state and local levels.

To reconcile the conflict, and engage in public debates, we need to reach for the passionate centrist inside ourselves.

Inevitably, though, we need to discuss taxes (and fees) in terms of how much and for what and, oh boy, how things can get heated! When it comes to infrastructure, we want good public facilities and services. We also don't want to pay more per month or quarter for them.

THE CENTRIST INSIDE

To reconcile the conflict and engage in public debates, we need to reach for the passionate centrist inside ourselves. For my part, I imagine myself at one of those lunchtime discussions with my late friend Doug.

"Man, water and sewer rates are going up again. I'm already paying quite a bit per month."

"Yeah, that's true. But the engineers just said the water mains are falling apart and whole sections of town need rehabilitating."

"I know, but isn't that going to be really expensive?"

"Yes, but doesn't it seem like it's got to be done?"

"I suppose so. But how can we do it without breaking the ratepayers' backs?"

And that's the secret right there. Getting to "how" is a critical step toward getting to agreement. I like to think that's something passionate centrists are good at. We need more of them. **tpo**

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WHAT'S IN A NAME?

Shedding Wastewater's Stigma

The words traditionally used to define municipal treatment systems — sewer, sewage, wastewater — have never painted a flattering image in the minds of customers. Municipalities and the industry at large are constantly seeking new ways to change the public's view of wastewater. A lot of that is simple terminology. That's why one system in Albany County, New York, has taken that idea a step further by completely rebranding its wastewater division.

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EPA REGULATIONS

WWTP Blending

The U.S. Environmental Protection Agency (EPA) recently announced it will reach out to states, local communities and stakeholders as it begins a new rulemaking process to provide certainty surrounding the use of "blending" by wastewater treatment plants. The new rule will give municipalities more clarity on blending, according to EPA Administrator Scott Pruitt.

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OVERHEARD ONLINE

"If we were subjected to these kinds of droughts today, I would submit to you that we actually have no plan on how we could deal with this."

America's Water Infrastructure Is Failing, But Here's How We Could Start to Fix It
tpomag.com/featured



FACING WATER SHORTAGE

Arizona Eyes DPR

Until the beginning of this year, direct potable reuse in Arizona was unequivocally banned. But the state's Department of Environmental Quality has taken its first step in an effort to create a new set of rules and guidelines promoting

DPR systems. And as a drought-prone state, Arizona has faced increasing risk of water shortages in recent years. Read our interview online with the DEQ's value stream manager of groundwater protection and reuse.

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Norton Water Treatment Plant supervisor Jamie Amlong (left), and operator Drew Eagleburger check water turbidity using a Hach 2100N turbidimeter.

Out of Disaster, a New *Beginning*

A CHLORINE LEAK DISABLED THE NORTON WATER PLANT'S ELECTRICAL AND CONTROL SYSTEMS. THE TEAM RESPONDED WITH QUICK REPAIRS AND BIG LONG-TERM PROCESS IMPROVEMENTS.

STORY: **Jim Force** | PHOTOGRAPHY: **Denny Medley**

WHEN JAMIE AMLONG DROVE INTO the Norton (Kansas) Water Treatment Plant on a May morning in 2016, he had no idea he was about to confront a catastrophe.

He could smell chlorine gas and, assuming there was a small leak somewhere, he walked up to the chlorine contact building. That's when he noticed green gas puffing out around the door and a 15-foot patch of grass around the entrance burned to a crisp.

"A faulty heater had warmed up the room to the point where the lead plug on one of our chlorine cylinders melted," he recalls. The entire contents of the cylinder emptied into the room, creating a poisonous environment and adding more heat.

The gas also mixed with the moist air in the confined space, corroding the electrical conduits and connections and the electrical panel for the chlorine building and the backup generator. That disabled the chlorine scales, the chemical feed system, flowmeters, pumps, and the building's heating and lighting systems. The plant's SCADA system went down as well.

"We were dead in the water," says Amlong, who was then assistant plant superintendent. "It was like we went backward 750 years in one step."

Amlong and his team did more than respond to the emergency with dispatch. They turned it into an opportunity to improve the plant for the long haul. In recognition, they received the 2017 Most Improved Water System award from the Kansas Rural Water Association.

BEFORE THE FALL

Amlong was assistant plant superintendent when the chlorine leak occurred; he was named superintendent soon after. Built in 1964, the Norton treatment plant draws raw water from Keith Sebelius Lake (60 percent of the supply) and the balance from four groundwater wells. It was designed as a basic flocculation-sedimentation plant with a pair of gravity filters.

The plant had been challenged to meet drinking water standards for disinfection byproducts, an issue generally associated with surface water, along with standards for arsenic and other contaminants in groundwater. Norton blends its well water into the surface water flow.

In 2007-08, the plant was upgraded. The city rejected a proposal to add membrane filtration and instead refurbished the existing facility. Liquid chemical feed equipment replaced old dry feed systems for chlorine dioxide (the primary oxidant), ferric chloride for coagulation, and chlorine for disinfection. Caustic was added for pH control. New bulk storage tanks were

After a variety of improvements, the Norton plant produces water averaging 0.01 to 0.03 NTU, and its disinfection byproducts are at the lowest level ever.



Norton (Kansas) Water Treatment Plant

BUILT: | 1964, upgraded 2007-08

SERVICE AREA: | City of Norton

POPULATION SERVED: | 2,800

SOURCE WATER: | Sebelius reservoir (60 percent), groundwater wells (40 percent)

TREATMENT PROCESS: | Conventional

PRODUCTION: | 1.1 mgd summer, 0.37 mgd winter

SYSTEM STORAGE: | 700,000 gallons

AWARDS: | 2017 Most Improved Water System, Kansas Rural Water Assoc.

ANNUAL BUDGET: | \$517,000 (operations)

WEBSITE: | www.cityofnorton.org

GPS COORDINATES: Latitude: 39°49'15.07"N; longitude: 99°53'39.30"W



installed and equipped with spill protection, and a new chlorine contact basin was built.

The sand, gravel, and anthracite filters received an update with new media, a badly needed air scour system, and filter-to-waste piping. A third filter was added, and turbidity meters were installed on each filter. Production is about 1.1 mgd during the summer irrigation season and 0.35 mgd in winter. The flow is chlorinated just ahead of the filters, and ammonia is added to the 450,000-gallon clearwell. An elevated tank adds 250,000 gallons of storage. Distribution lines carry the finished water to 2,800 residents.

NORTON WATER TREATMENT FACILITY

“We were dead
in the water.
It was like we went
backwards 750
years in one step.”

JAMIE AMLONG

DISASTER AND RESPONSE

That was the normal state of operations at the Norton water plant until that fateful morning of May 3, 2016. The first thing Amlong did that day was call the Norton Volunteer Fire Department and his administration. He then ordered the plant evacuated and all vehicles removed from the property. He also called the local radio station to issue a boil order and used the city's reverse 911 phone network and Facebook to alert citizens that their water was not safe.

The Fire Department implemented the mandated safety procedures and fogged the chlorine building interior, then went in and manually shut down all six chlorine cylinders. That done, Amlong and his staff assessed the damage and called for help.

They contacted Tom Lasser of Hawkins Water Treatment Group, the plant's provider of the chemicals and chemical feed systems; Pat McCool of the Kansas Rural Water Association; and Dan Wells of the Kansas Department of Health and Environment. The response was immediate.

“Tom Lasser and Tim Bentzinger from Hawkins came down the next

The Norton Water Treatment Plant team includes, from left, Joyce Garrison, assistant supervisor; Jamie Amlong, supervisor; and Drew Eagleburger, operator.

CHANGE FOR THE BETTER

As if the chlorine leak and plant “burnout” weren't enough, the Norton (Kansas) Water Treatment Plant had to overcome a nasty taste and odor issue last year.

“I was getting complaints at City Hall,” says Chad Buckley, city administrator. “People weren't drinking the water. It looked bad and smelled bad. People were using bottled water.”

When Jamie Amlong assumed the leadership role, the team took a serious look at its chemicals and chemical feed systems and decided to make some significant changes.

Tom Lasser of chemical supplier Hawkins Water Treatment Group was a big help. “After the chlorine episode, he talked to us about our treatment process,” Amlong recalls. As a result, the Norton team changed coagulants and other chemicals and began

weekly jar testing to optimize chemical feed rates.

“At first we had to get permission from the Kansas Department of Health and Environment, and then we implemented the changes for one month,” Buckley says. The trial was successful, and the changes were made permanent, with good results.

“Where I heard complaints before, now I hear a lot of good comments,” Buckley says. “People note that things have really changed. It's nice to hear.”

Lasser adds, “When I came to work with the plant, I had dinner at the Eagle's Club. People there told me about the bad water. After we made the changes, I took a jug of clear, clean plant water back to the club. The people there insisted I'd bought it at the grocery store.”

day and started helping us with process controls,” Amlong recalls. McCool arrived later that day, and his Kansas Rural Water Association colleague Lonnie Boller drove through the night to get there. Together, the group began to put the plant back together.

BACK TO MANUAL

“Pat McCool and I shared ideas over the phone and in person,” Amlong recalls. “Our high-service pump was not affected, but we had to turn it on manually to fill the water storage tank.” While the clarifiers and filters were still functional, Amlong and operators Joyce Garrison, Drew Eagleburger, and Chancey Dial started running everything manually, working 19-hour days, seven days a week, until the plant returned to normal in August.

They opened and closed valves by hand and sprinkled powered chlorine into the clarifier to prevent biological growth. Kansas Rural Water Association’s Boller devised a homemade header system that enabled a return to normal chlorination.

“I’d seen a situation like this once before,” says Boller, a surface water technician. “So I had piping and valves and everything I needed in the car. I started putting things together outside, and when the building was cleared, we went back in and installed temporary chlorine bottles and injectors.”

The staff rigged temporary piping around equipment that had been knocked out by the electrical fail-

ure. With no functioning flowmeters, they fed all chemicals by hand and ran manual turbidity and chlorine residual checks. “It was a lot of longhand math,” Eagleburger says.

RESTORATION AND RECOVERY

Eventually, the chlorine room walls were cleaned and repainted. A new electrical panel was installed — outside the building. The staff pulled new wires through the affected conduits and ordered replacement parts, chlorine scales, chemical feed pumps and controls. Normal operation resumed on Aug. 23.

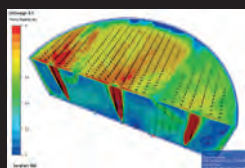
Amazingly, the recovery didn’t force the city to petition for outside government funding. By doing most of the work in-house and using the professional help available, Norton got its water plant back online at a cost of just over \$50,000. Insurance covered much of the repair and replacement expense.

If the disaster had a silver lining, it was a new approach to chemicals and



Supervisor Jamie Amlong and his team turned an emergency into an opportunity to improve their plant.

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“The less chemistry you have to do, the better the quality of water. The operators were really open to change. Their attitude was great.”

TOM LASSEER

chemical feed suggested by Lasser. “I looked at the chemistry they were using,” he says. “Previously, they had been testing only in the laboratory, so I worked with the staff to start running jar tests all across the plant, from the clarifiers to the top of the filters and to the bottom of the filters.”

Lasser recommended a new proprietary coagulant (AquaHawk 457) in place of ferric chloride. Since the raw water pH was suitable, he suggested the staff stop using caustic soda. The new approach included dosing a small amount of permanganate to remove manganese and some organics. Different feed points for both chemicals were established, at the surface water and well water inlets.

“The less chemistry you have to do, the better the quality of water,” Lasser says. He credits Mark Oberhelman of his firm for helping him understand the chemical processes at customer sites. “The operators were really open to change. Their attitude was great.”

Working with Lasser, the staff also cleaned out the sedimentation basin and established a clarifier blanket. The changes have worked wonders. Today, the plant produces water averaging 0.01 to 0.03 NTU and the lowest level of DBPs ever. “It’s absolutely fabulous what Jamie and the staff have been able to do,” Lasser says. “It’s been a lot of hard work.” **tpo**

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Amlong and the plant team received the 2017 Most Improved Water System award from the Kansas Rural Water Association.

To learn more about the Norton (Kansas) Water Treatment Plant, take a look at a video profile of the plant at www.tpomag.com.

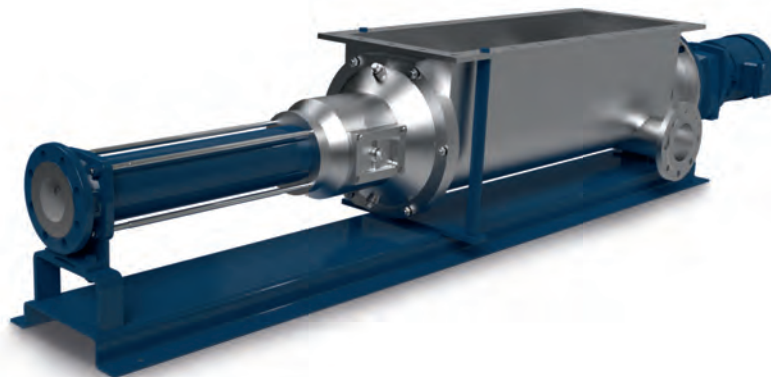
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1. BRAVO systems include NSF/ANSI 61 certified SEEPEX progressive cavity intelligent metering pumps for accurate dosing and low chemical consumption.
2. BRAVO systems (triplex unit shown here) give users a simplified, modular design that reduces costs and increases process control.
3. The SEEPEX Touch controller includes user-configurable software and touch-screen technology for pump control and monitoring.



Accurate Dosing, Room to Grow

MODULAR METERING PUMP SYSTEMS ARE DESIGNED TO HELP TREATMENT PLANT OPERATORS EASILY UPGRADE AND REDUCE CHEMICAL CONSUMPTION

By Ted J. Rulseh

Effective control of water treatment depends in part on the chemical feed pumps. Reliable pumps deliver consistently accurate doses of chemistry to achieve the process objectives, whether meeting an effluent permit or complying with strict drinking water purity standards.

Now SEEPEX offers a chemical metering system designed to support accurate and complete process control while minimizing chemical consumption. BRAVO metering systems are plug-and-play pre-engineered combinations of progressive cavity pumps delivered with all related components and controls.

The systems are designed as integrated modular and scalable solution for disinfection, pH control, flocculation, corrosion inhibition, contaminant elimination, and other applications in municipal, as well as industrial settings.

Being modular, the systems can accommodate today's flows and be easily field upgraded or expanded as process needs change. Gordon Fenton, director of engineering, research, and product development, talked about the technology in an interview with *Treatment Plant Operator*.

tpo: What was the rationale for developing this technology?

Fenton: The primary driver was to enable users to reduce chemical consumption. Customers need reliable industrial pumps that are not subject to flow variation from pulsating flows or varying feed point pressures. Consistent and nearly pulsation-free feed from progressive cavity pumps enables tight process control and minimizes chemical usage. Customers can often offset the cost of the new pumps through savings on chemicals within months or weeks. They see return on investment in reduced overtime, better water quality and less risk of compliance penalties.

tpo: What was the specific impetus for pre-engineered, modular systems?

Fenton: To maximize efficiencies, customers had to replace anywhere

from a few pumps to hundreds of pumps, and they lacked the in-house personnel to complete the conversions in a reasonable time. However, they said that if we could provide a pre-engineered system to replace their current system, the labor required for plant integration could be reduced by almost 70 percent, and they could realize a return in much less time. Our designers gathered design requirements for flexible, modular systems that would minimize the mechanical, electrical, and plumbing changes required for quick replacement.

tpo: What are the basic advantages of these pre-engineered, modular systems?

Fenton: The modular platform can be expanded or contracted to meet customers' requirements related to functionality, plant integration and space limitations. Pre-engineered modularity and flexibility is the key to providing customer-driven solutions without custom designs, which can take six to 12 weeks to design and manufacture. We can provide pre-engineered solutions in less than six weeks and at a lower cost.

tpo: What are the components included in these modular systems?

Fenton: It's a skid-mounted system platform that includes the intelligent metering pumps, true-union valves, piping and vent lines. Customers can include optional features such as pressure relief valves, calibration columns, pressure gauges and various complexities of control panels. Standardization of all parts means that replacements, including piping, can be shipped the same day if required.

tpo: How exactly does this technology deliver on its designed advantages?

Fenton: The pump is the key to the system. It has multiple benefits

including predictable and laminar flow, along with low shear that prevents damage to flocculants. Higher shear metering pumps may reduce chemical potency, leading to increased chemical usage. Progressive cavity metering pumps have only one moving part and only two wearing parts. There are no valves that can clog or fail, and the pump will not vapor lock. The pumps can handle an extremely wide range of flow rates and viscosities with very low flow variability based on pressure changes. Flow is almost pulsation-free, and that provides a very consistent chemical feed rate that permits tight process control.

tpo: What kinds of control options are available to users?

Fenton: Users can integrate their own control system directly with the intelligent metering pump. We also offer a very simple control panel where users can operate the pumps locally or have them controlled remotely from the plant control room by way of a selector switch. The final option is our SEEPEX Touch multiloop controller, which can control up to four process loops. It has a 6-inch color touch screen. It's inexpensive and provides great future flexibility without needing special software or cables. So, we can go from very simple to much more complex control integration, depending on the customer's process requirements.

tpo: How does the pump's design contribute to reliability and safety?

Fenton: It's designed with predictable wear characteristics and to limit the risk of catastrophic failures. Typically, over time, the flow rate for a given speed remains constant until the pump enters roughly the last 25 percent of its life. At that point, the speed will need to increase slightly in order to maintain the same flow. That's a signal to schedule maintenance long before the pump stops working. If the pump does eventually fail, the chemical is contained within the pump, so there is no risk of a spill and the safety issues that go with it.

tpo: How specifically does pre-engineering help users with installation or with replacement of existing systems?

Fenton: By supplying the pump within the system, we can eliminate installation issues created by poorly designed piping plans, which can keep customers from having successful applications and processes. BRAVO systems eliminate many installation variables that can cause reliability problems throughout the equipment's life. We can also deliver systems faster than most customers could schedule multiple contractors required for individual pump installation. This reduces the overall cost of ownership and the time to realize return on investment.

tpo: How widely is this product in use and in what locations or applications?

Fenton: BRAVO chemical metering systems were introduced at WEFTEC last October as a major refinement of our ALPHA chemical feed systems. The skids are very similar in design but more modular and adaptable and easier to maintain. New systems are being shipped weekly with large installations in the Carolinas, Florida, Texas, California and Ohio. We've added inventory, increased training, and hired more assembly and service people to ensure that customer expectations are met. **tpo**

“BRAVO systems eliminate many installation variables that can cause reliability problems throughout the equipment's life. We can also deliver systems faster than most customers could schedule multiple contractors required for individual pump installation.”

GORDON FENTON



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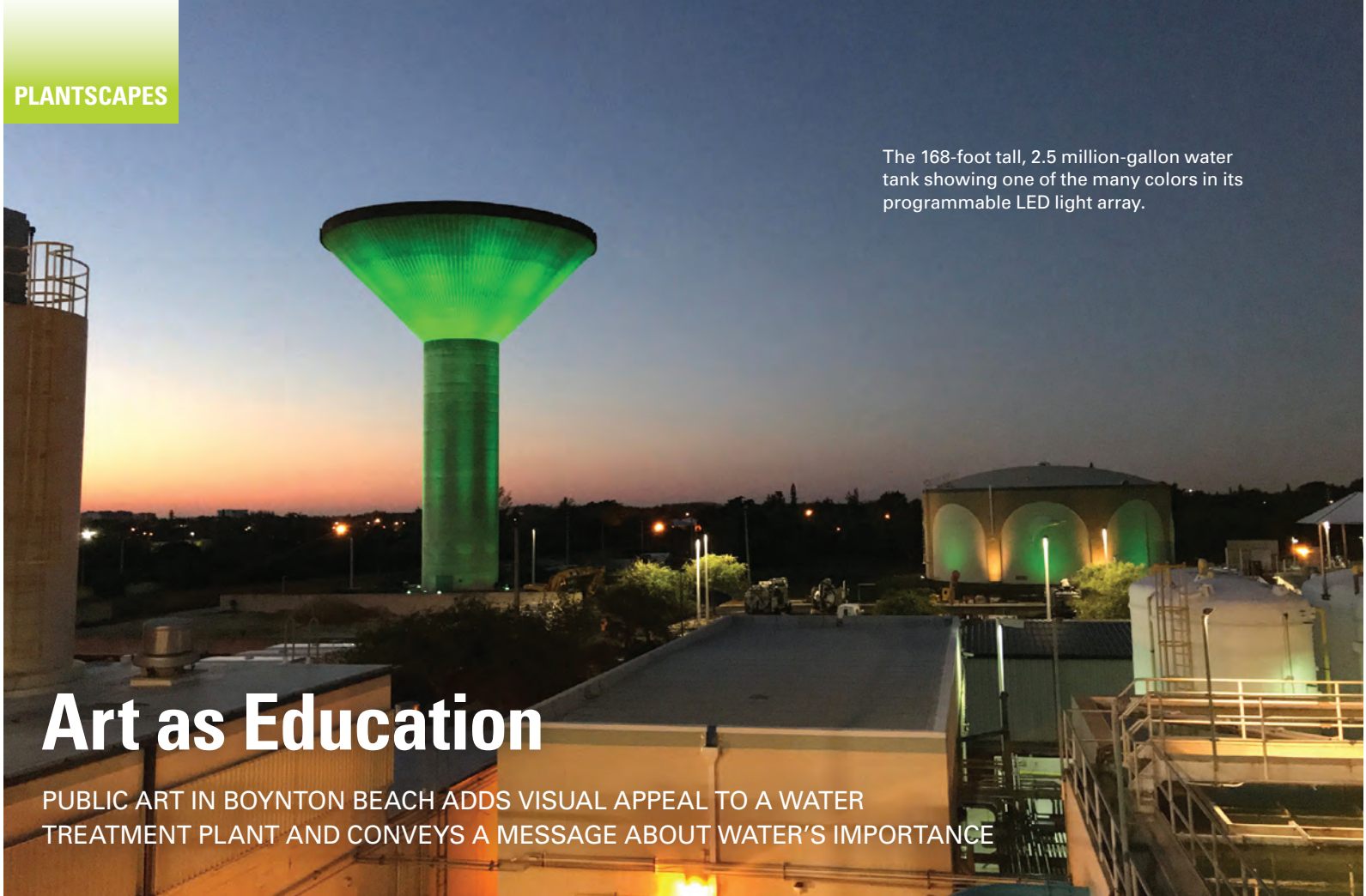
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The 168-foot tall, 2.5 million-gallon water tank showing one of the many colors in its programmable LED light array.

Art as Education

PUBLIC ART IN BOYNTON BEACH ADDS VISUAL APPEAL TO A WATER TREATMENT PLANT AND CONVEYS A MESSAGE ABOUT WATER'S IMPORTANCE

By Jeff Smith

The haiku inscribed at the top of a public art structure at the East Water Treatment Plant in the Florida city of Boynton Beach celebrates the source of water:

Water, you and I
Sky falling thru sand and stone
Are you thirsty yet?

"It's something different that promotes thought," says Joe Paterniti, P.E., interim director of utilities. The haiku is a component of public art that is the focal point on green space next to the plant site. One element, a 16-foot square pavilion, consists of stainless steel plates mounted on a structural steel frame. Designs on the plates, created by flame cutting or drillings, allow light to enter, suggesting the flow of water from the sky into the earth. The haiku is on the inside surface of an opening that rings the top center of the 14-foot-high structure.

“It’s really nice and is a good addition to the front park area of our plant.”
JOSEPH PATERNITI, P.E.

Called the Water Pavilion, the structure includes a drinking fountain with an integral pet fountain near the bottom, along with a bottle-filling station. Access is by a paved walkway that meanders through the half-acre Edward F. Harmening Arbor Memorial Park.

ART ON THE WALL

The second element of public art is displayed on part of a 164-foot-long, 6-foot-high wall that separates the plant from the park. It includes five 3-by-10-foot aluminum panels covered with vinyl reflective film. Colorful graphic

images of sky, flowing water and an aquifer blend with blue paint on the wall. By day, sunlight reflects off the Water Pavilion plates and the vinyl on the decorative wall. At night, LED lights and spotlights illuminate the artwork.

The Iowa-based artist team of David Dahlquist and Matt Niebuhr created the art. Their concept, “Water, You and I,” was chosen from some three dozen proposals from a call to artists coordinated by Debby Coles-Dobay, the city public arts manager. Respondents were asked to propose works that would be educational and represent the city’s drinking water and water reclamation systems.

The city’s Arts Commission Advisory Board chose two proposals, each to receive a \$2,500 honorarium. After interviews and presentations of the proposed work, the board made its final selection. The artist team was responsible for planning, management, installation and hard costs of the project, which was coordinated by Coles-Dobay and the utilities staff.

PART OF THE CULTURE

Public art has been a part of the Boynton Beach culture since 2005, when the city commission passed an

ordinance requiring 1 percent of each public project’s value be applied to art.

In 2015, the East Water Treatment Plant began a \$30.8 million project to increase capacity, update equipment and add an ion exchange resin system. The public art was installed in 2016, and the next year, the utility received the Envision Bronze award from the Institute for Sustainable Infrastructure.

During the project, a 168-foot-tall, 2.5 million-gallon pedestal-type water tower on the plant site was fitted with a programmable LED array. The lighted tower complements the art pieces, and its colors can be changed



Nighttime view of the Water Pavilion with the popular water fountain illuminated in blue.



A portion of the Haiku at the top of the 14-foot-high Water Pavilion.

Share Your Ideas

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

to support seasonal themes, special occasions, charity causes, and sports teams, such as the Miami Dolphins. Built in the 1970s, the water tower serves as a navigation aid to boaters on the Atlantic Ocean.

Coles-Dobay says the art is intended to create a connection for visitors. The art will be integrated with the community outreach program and will be a part of local school curricula. Paterniti observes, "It's really nice and is a good addition to the front park area of our plant." **tpo**



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SEEING THE BIG PICTURE

AWARD-WINNING PROJECT MANAGER MARK HOULE TACKLES CHALLENGES
WITH EXPERIENCE, PROBLEM-SOLVING SKILLS AND A DEDICATED TEAM

STORY: **Trude Witham** | PHOTOGRAPHY: **Amy Voigt**

MARK HOULE'S FIRST JOB WAS COLLECTING AND ANALYZING industrial wastewater samples and operating a 53 million-gallon retention basin for the Oakland County (Michigan) Water Resources Commissioner.

The part-time, summer intern position allowed Houle, a chemistry major, to pick up some skills. At the time, he had no idea the clean-water profession would become a lifelong career.

Today, Houle is project manager with SUEZ at the South Huron Valley Utility Authority in Brownstown Township, Michigan. He supervises a staff of 11 and oversees day-to-day operations of the authority's 24 mgd wastewater treatment plant, including laboratory, industrial pretreatment, and maintenance.

His successes include improving plant efficiency while using less chemicals. Through fine-tuning, the plant reduced ferric chloride use by 50 to 60 percent and saved about \$100,000 a year on energy. Houle also recommended and managed a plant upgrade from eight high-horsepower aerator/mixers to a fine-bubble air diffusion system (Environmental Dynamics International) that saves \$300,000 a year on electricity costs.

In 2015, Houle received the Michigan Water Environment Association Industrial Pretreatment Program Professional of the Year award. In 2017, he won Michigan Water Environment Association's Operations Professional of the Year for "remarkable dedication to an employer and to the MWEA."



Mark Houle, assistant project manager at the South Huron Valley Wastewater Treatment Plant.

A STEP UP

It's been 29 years since Houle took that intern position. When the job became full time, he continued his college studies in the evening. "It took me seven years, but in 1994 I got my bachelor's in chemistry from Lawrence Technological University in Southfield, Michigan," he says.

The five years of experience in wastewater enabled him to get his first wastewater license that same year. He then transferred to the Walled Lake-Novu Wastewater Treatment Plant in Oakland County. There, he operated the plant, collected and analyzed samples, and was responsible for equipment and lift station maintenance and bio-solids hauling.

Several other positions followed, as lab technician at the City of Mount Clemens Wastewater Treatment Plant and as operations manager for the South Huron Valley wastewater collections and treatment system. He was promoted to assistant project manager at the authority in 2013 and to project manager in December 2017.

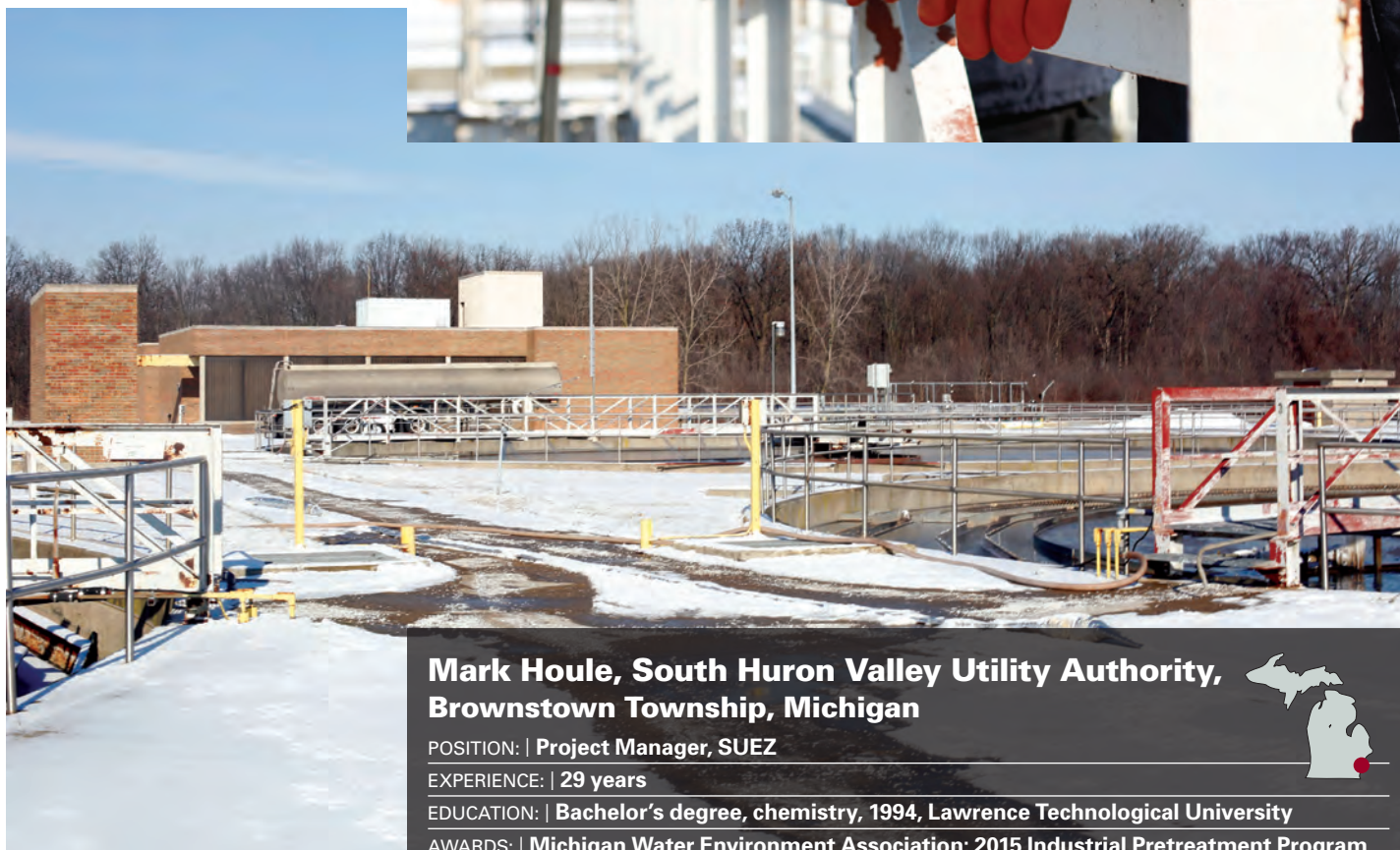
"The Mount Clemens position was a step up since I was responsible for all aspects of laboratory management, process control decisions, some plant supervision as needed, and coordinating the industrial pretreatment program," he says. He also trained and supervised operators, and that helped prepare him for his current position.

Houle is grateful to his early mentors: "Chuck McKinnon was my first manager, and I worked for him during that summer internship. He took a

Houle, right, shown with Eric Shotwell, operations specialist II, earned the 2015 Industrial Pretreatment Program Professional of the Year award and the 2017 Association Operations Professional of the Year award, both from the Michigan Water Environment Association.

“ Although our average daily flows are 8 to 9 mgd, we’ve seen 60 to 65 mgd four or five times since I’ve been here. We follow very aggressive wet-weather standard operating procedure to minimize the impacts.

MARK HOULE



Mark Houle, South Huron Valley Utility Authority, Brownstown Township, Michigan

POSITION: | **Project Manager, SUEZ**

EXPERIENCE: | **29 years**

EDUCATION: | **Bachelor's degree, chemistry, 1994, Lawrence Technological University**

AWARDS: | **Michigan Water Environment Association: 2015 Industrial Pretreatment Program Professional of the Year; 2017 Operations Professional of the Year**

GOAL: | **Continue to improve plant operations and performance**

GPS COORDINATES: | **Latitude: 42° 3'33.19"N; longitude: 83°12'30.46"W**



An upgrade of the plant to fine-bubble aeration (Environmental Dynamics International) has improved operations and saved energy.

ON THE ICE

When Mark Houle is off duty from the South Huron Valley Utility Authority, he enjoys playing ice hockey.

"For the past 12 years, I've played defense or wing in a men's league for Bob Maxey Ford in Troy, Michigan," he says. "We play on Sunday nights; it's a great bunch of people." Once a year, the team travels to Lansing for a tournament.

Houle has three sons, ages 15, 17 and 20. The oldest attends Western Michigan University; the two younger ones are also athletes, and Houle supervises preseason practices for their lacrosse team.

Houle also enjoys ice fishing, pingpong, and gazing at his small man-made backyard pond. "It came with the house, and there are turtles, frogs, toads, goldfish," he says. "Sometimes one of the turtles will walk out and come up to you to get fed. The pond is nice to look at when I'm having my coffee."

chance on me and gave me the opportunity to work in this field." Another mentor was Chuck Bellmore, his manager at Mount Clemens: "He let me figure things out and allowed me to do everything without hesitation so I could learn."

WELCOMING A CHALLENGE

Today, Houle continues to welcome challenges. "I'm that guy who usually says yes," he says. He believes he won the Industrial Pretreatment Program award because of his visibility and involvement on the Michigan Water Environment Association Industrial Pretreatment Program Committee. He has chaired the committee and served as vice chairman and secretary. A vendor who is on the committee nominated him for the award.

Houle oversees a successful industrial pretreatment program at the South Huron Valley treatment plant. "Right now, we have 11 permitted industrial users," he says. "These include a stamping plant, an electroplating and metal finishing plant, an auto assembly plant and a few landfills." Industrial flows have increased about 5 percent in the past five years, and another permitted user is to come online in late 2018.

Houle believes he won the operations award because of the plant's compliance record: "This award is definitely something to be proud of; but, I also take it with a grain of salt because you're only as good as your performance next week or next month."

He finds time to teach various wastewater classes for Michigan Water Environment Association a few times a month. "The Great Lakes Water Authority, which now runs the Detroit Water and Sewerage Department, is pushing their operators to be cross-trained, so I'm teaching all aspects of wastewater treatment," he says.

HANDLING THE FLOW

Houle's main challenge is the South Huron Valley facility. Built in 1986, the activated sludge, secondary treatment plant serves about 87,000 people in seven communities.

Raw influent enters the pumping station and flows by gravity through two Dupuron bar screens. It enters a sluice collections system and compactor and then the wet well. From there, the flow is pumped to two aerated grit chambers and then a Parshall flume. Under normal conditions, the flow is split into one or two of four Envirex primary clarifiers (Evoqua Water Technologies).

Secondary treatment is accomplished in aeration tanks with a five-stage anoxic/oxic variation of the activated sludge treatment process. Houle explains, "We call these systems biodecks, a term that is fairly unique to the South



Houle sees problem-solving and the ability to "see the big picture" as his greatest strengths. He also takes pride in having built trust with his staff: "Without that, we're not going to be successful."

To learn more about the South Huron Valley Wastewater Treatment Plant, take a look at a video profile of the plant at www.tpomag.com.

Huron Valley plant. Two to four biodecks, depending on flow volume, are used in parallel along with a final clarifier for each biodeck. The system achieves biological removal of phosphorus below permit limits without chemical addition under most conditions."

Additional primary clarifiers and secondary treatment tanks are placed online during prolonged high-flow events. An equalization basin handles short high-flow periods. When flows subside, the equalization basin is dewatered back to the wet well.

When the plant hits 100 percent capacity and the equalization basin is full, excess flow can be diverted to a wet-weather bypass. In that event, it is routed around the secondary treatment units to the disinfection tank.

Wet weather keeps the operators on their toes. "Although our average daily flows are 8 to 9 mgd, we've seen 60 to 65 mgd four or five times since I've been here," Houle says. Since the plant can bypass during heavy

rains, it has had no issues meeting NPDES limits during those events. "We follow very aggressive wet-weather standard operating procedure to minimize the impacts," he says.

Treated wastewater is disinfected with sodium hypochlorite and dechlorinated with sodium bisulfite. Biosolids are landfilled or land-applied (about 8 million gallons per year at 6 to 9 percent solids). Discharge is to the Detroit River.

BUILDING TRUST

As project manager, Houle has a heavy workload. He oversees process control, laboratory results, customer and labor relations, environmental com-

South Huron Valley Wastewater Treatment Plant PERMIT AND PERFORMANCE

	PERMIT Monthly Average	EFFLUENT Two-Year Average
BOD	25 mg/L	7 mg/L
TSS	30 mg/L	10 mg/L
Total phosphorus	1.0 mg/L	0.7 mg/L*
Fecal coliform	200 cfu/100 ml	35 cfu/100 ml

* Three-year average

pliance, and financials. He submits monitoring and operational reports to the authority and the state. He also oversees personnel scheduling and training.

"We're a union shop, so technically, I don't do operations, but I do weekly rounds and stormwater inspections," he says. "I generally put in 40 to 60 hours a week. I go in on weekends and after hours if needed, but my staff handles all the calls."

Problem-solving is his greatest strength: "I'm able to see the big picture and present solutions to the authority. They trust my opinion and take my advice." He has also built trust with his staff: "Without that, we're not going to be successful."

Houle holds Class A (highest) wastewater operator certification and Grade II industrial waste inspector certification. He has been with the South Huron Valley plant for almost 10 years and reports to David Carter, senior director of operations. Houle's team includes:

- Operations specialists: Lynn Marshner, Matt O'Donnell, Joe Rzeppa, and Eric Shotwell, all Class C; Andre Randall, Class A.
- Laboratory technicians: Nekeeta Harris and Jesus Medelez, both Class D.
- Maintenance technicians: Andy Mechel, Demetrius Stembridge, and Kia Thurston.
- Administrative assistant: Heide Mechel (nine years).

Houle has high praise for his team. "They care about what they do and are self-motivated. I can rely on them to do a good job."

MAKING THINGS BETTER

Houle says his greatest accomplishment was recommending and overseeing the plant's upgrade to a fine-bubble air diffuser system. "It was my idea, and I convinced the authority that the upgrade made both operational and economic sense," he says. "The old mixers were near the end of their life and were failing."

A cost analysis by the authority showed it was spending \$300,000 a year on electricity that could be saved by converting to the fine-bubble diffuser system. The authority hired an outside engineer and worked with them to design and oversee the project.

Houle says, "We upgraded half the plant in 2017, and the other half will be completed in spring 2018. The new system will use turbo blowers (APG-Neuros) and will be controlled through continuous online dissolved oxygen monitoring." Besides saving money, the system will improve effluent quality and will make higher flows easier to manage.

His next project is biosolids management. "There are only so many farm fields, and the landfills can only take so much since other municipalities use them," he says. "Twenty percent of our biosolids are landfilled, and the rest go to farms."

Houle is looking for other options. "Landfilling costs have gone up, and composting causes odor issues. I'm looking for people who will take biosolids for energy generation, or digesters to convert biosolids to energy that can be used to heat buildings or even provide some electricity."

Challenges like these, and Houle's success in meeting them, are the reasons he stays. "There is always room for continuous improvement here, so I see myself staying and making things even better. Sometimes the challenges try me, but when people thank me for keeping their basements dry and the river clean, that makes it all worth it." **tpo**

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A MAJOR VALVE REFURBISHMENT AND REPLACEMENT PROJECT BOOSTS RELIABILITY, SAFETY AND ENVIRONMENTAL PROTECTION AT THE HYPERION WATER RECLAMATION PLANT IN LOS ANGELES

By Tim Fallon

Built in the 1950s, the Hyperion Water Reclamation Plant in Los Angeles has undergone several upgrades to keep up with population growth and stay compliant with the Clean Water Act.

“Plant monitoring and proactive maintenance are vital to ensuring that our wastewater is safely treated and reclaimed or discharged to the ocean,” says Sean Kenney, senior construction engineer for city’s Environmental Engineering Division.

Among the most recent upgrades was a project to refurbish 10 critical isolation butterfly valves and the replacement of a 120-inch-diameter butterfly valve leading to the plant outfall pipeline. The fast-track project eliminated the risk of a catastrophic failure, enhancing facility safety and environmental protection.

CRITICAL DISCOVERY

The Hyperion plant is the largest wastewater treatment facility in the Los Angeles metropolitan area, treating 450 mgd. During a comprehensive 48-hour pipe inspection, plant officials discovered deterioration of the primary outfall pipeline.

That wasn’t unexpected, given that the pipeline and pump header were more than 60 years old. However, it also became apparent that the old isolation butterfly valves on the suction and discharge sides of the vertical turbine effluent pumps needed to be refurbished or replaced because of corrosion of the valve bodies and discs.

The 10 isolation valves provide shut-off to the pumps so that they can be maintained and repaired. When tide and plant hydraulic conditions allow, effluent flows by gravity through a 120-inch-diameter butterfly valve to the 5-mile outfall pipeline. Failure of any of those valves could create a backflow event, flooding the plant.

AGGRESSIVE SCHEDULE

To repair the pipeline, maintenance and construction crews needed to divert the treated wastewater from the primary outfall pipe to an emergency 1-mile outfall pipeline. The Environmental Engineering Division assessed the optimal process to get the upgrades done with the least impact to the plant operations and the environment, including one of



R. Scott Scheffler of Moog Flo-Tork with new 120-inch butterfly valve ready for delivery.

the most popular beaches in Los Angeles. The assessment found that Hyperion crews and suppliers would need to work around the clock for six weeks.

While refurbishing valves can save money, it can take longer than installing new valves. The existing valves first need to be inspected to see whether refurbishment is viable. Given the location, the Hyperion valves could be extracted only after the project had begun, delaying the project timeline as parts would have to be located and ordered before work could proceed.

The Department of Public Works had documented that the five 60-inch butterfly valves and the five 78-inch valves were Henry Pratt valves installed in the early 1970s. That meant the manufacturer could locate past files and have potential parts and replacement valves on hand as soon as the workers gained access to the vault.

There was one exception: the 120-inch gravity-fed butterfly valve, which was critical to public safety and plant operation. If that valve were to fail in the open position at high tide, effluent and water from Santa Monica Bay would back up the pipe and potentially flood the facility. There was no secondary valve, only a redundant cylinder for closing and opening the valve.

NEW ACTUATOR DESIGN

The valve was custom-made, and no original manufacturer marking could be found. It was so uniquely designed that the connecting flange bolt drilling on the valve was nonstandard and, therefore, so were the pipe flanges. Given the time constraints, replacement with a new butterfly valve with special flange drilling was the only viable option.



Deteriorating butterfly valves on the suction and discharge sides of these vertical turbine effluent pumps were refurbished.



The newly installed 120-inch butterfly valve includes a dual Moog Flo-Tork actuator.



An old 120-inch butterfly valve with dual-cylinder operator was replaced as part of the valve upgrade project.

That also required a new actuation system. The previous design used a high-pressure hydraulic power unit, or HPU, and operated two cylinders on a lever, providing a level of redundancy. If one cylinder failed or the HPU supplying the cylinder failed, the plant could rely on the other cylinder. However, in light of more recent technology, that approach is now considered dangerous and unreliable.

"The available pressure from the hydraulic power units was about 1,200 psi," says Sam Navid, construction manager for the Environmental Engineering Division. "We needed an actuator that would produce 1 million inch-lbs of torque." To meet that challenge, the team contacted Moog Flo-Tork for its expertise in designing reliable high-torque actuator systems.

The company designed an actuator that required 13.9 gallons of hydraulic oil per stroke with a rated working oil pressure of 3,000 psi. To that end, the system would produce up to 3 million inch-lbs of torque from either of the two rack-and-pinion actuators, which provided the required redundancy.

To meet the compressed project timeline, the company added shifts to supply the two actuators and shorten construction and assembly time by months. Although the assembly is compact, it creates great power with low oil volume. While the actuators are mechanically sandwiched together, they act as independent primary and emergency backup actuation systems.

FLAWLESS FUNCTIONING

"The new actuation system functioned very well in unison with the new butterfly valve because Moog Flo-Tork and Henry Pratt representatives worked closely together throughout design, fabrication, testing and installation," Navid says.

Allen Ruef, product line manager with Moog Flo-Tork, observes, "Hyperion initially indicated that they wanted an electric actuation system ... In this case, the footprint of the HPU is smaller and uses less oil — that's a benefit in itself."

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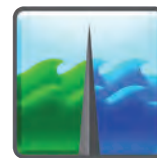
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The 10 refurbished Henry Pratt isolation valves and the 120-inch gravity-flow valve replacement were available for a timely installation. The new gravity-flow butterfly valve now has the latest technology to last well into the future. Navid states, "Since the installation, all 11 valves have operated around the clock flawlessly, giving plant managers and residents an upgraded level of safety and protection of the beautiful shoreline of Santa Monica Bay."

ABOUT THE AUTHOR

Tim Fallon (tfallon@henrypratt.com) is a Henry Pratt sales engineer with Mueller Water Products, a manufacturer of products and services for water transmission, distribution and measurement based in Atlanta. **tpo**



Shown working on a pump at the La Center Water Reclamation Facility are Matt Jenkins, right, wastewater systems supervisor; Bill Birdwell, foreground, lead operator; and Jeremy Klinski, operator.

“I have not met seasoned operators who won't show you everything they know, as long as you're open-minded and humble. That's the key to the growth I've had in this industry.”

MATT JENKINS

RIGHT IN TUNE

MATT JENKINS TAKES PRIDE IN GETTING THE MOST FROM THE CLEAN-WATER PLANTS HE OPERATES. THAT INCLUDES BUILDING COHESIVE AND CAPABLE OPERATIONS TEAMS.

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Ethan Rocke**

TO MATT JENKINS, OPTIMIZING A WASTEWATER TREATMENT PLANT is a lot like tuning a guitar.

“You can never just tune one or two strings and expect the others to stay the same,” he says. “As the tension changes on the neck, the tone of each individual string will change. A plant is much the same. You change one thing and it affects five or six other things. You basically work in a circle until finally it all stabilizes.”

That’s what Jenkins did for the City of Ridgefield (Washington) Wastewater Treatment Plant. In his two years there as lead operator, Jenkins and his team enacted process improvements that led to reductions of:

- 28 percent in routine horsepower demand
- 35 percent in overall power consumption
- 50 percent in UV output needed to meet disinfection limits
- 40 percent in polymer use
- 25 percent in biosolids produced
- 33 percent in biosolids hauling demand.

Now, Jenkins is wastewater systems supervisor at the La Center Water Reclamation Facility, not far from Ridgefield in Washington’s southwest corner, just over the border from Portland, Oregon. There, he oversees a membrane bioreactor plant while refining his skills in supervision and administration. “I’m not so much competitive as committed to daily growth,” says Jenkins, winner of the 2016 Western Washington Plant Operator of the Year award from the Pacific Northwest Clean Water Association. “I want to be the best version of me, so I can continue to grow in this position and in my career.”



Matt Jenkins believes in the importance of understanding the interaction of all parts of the plant and their influence on each other.

CAREER CHANGE

Jenkins was born in La Center, graduated from high school in Battle Ground, and earned an associate degree in social and behavioral science from Citrus College in Glendora, California, before spending two years at Portland State University on a football scholarship.

After that he went to work for Rentrak, a company that handled rental and distribution contracts between movie studios and video rental store chains. When the online world began to decimate brick-and-mortar video outlets, Jenkins decided to make a move. “I grew up working on farms,” he says. “I wanted physical labor, but I also wanted to use my mind.”

After exploring power, water and wastewater utilities, he landed with Veolia Water Technologies in 2008 as an operations and maintenance technician at the Westside treatment facility in Vancouver, Washington. There he moved up to maintenance technician II and later operator I, working mainly in solids processing and incineration. His colleagues were longtime employees Bill Machaud and Tom Warner: “They taught me everything I was willing to learn. They didn’t hold back.”

In 2010, Jenkins moved to La Center for an operator position that also enabled him to gain laboratory experience. At the time, the city was converting from a sequencing batch reactor to a 0.73 mgd (design) MBR plant; Jenkins was able to observe the commissioning. He worked up to lead operator, handled maintenance including in-house pump rebuilds that helped reduce costs, and worked on process control.



Matt Jenkins, La Center (Washington) Water Reclamation Facility

POSITION: | **Operations manager**

EXPERIENCE: | **10 years in the industry**

EDUCATION: | **Associate degree, social/behavioral science, Citrus College, Glendora, California**

CERTIFICATIONS: | **Group IV Wastewater Treatment Plant Operator**

AWARDS: | **2016 Washington Plant Operator of the Year, Pacific Northwest Clean Water Association**

GOALS: | **Implement asset management, improve supervisory/administrative skills**

GPS COORDINATES: | **Latitude: 45°51'40.01"N; longitude: 122°40'17.34"W**



The team at the La Center facility includes, from left, Bill Birdwell, lead operator; Jenkins; and Jeremy Klinski, operator.

“I’m not so much competitive as committed to daily growth. I want to be the best version of me, so I can continue to grow in this position and in my career.”

MATT JENKINS

NEW OPPORTUNITY

He made his biggest mark after joining the Ridgefield plant as chief operator in July 2015 and assuming responsible charge three months later. Ridgefield, a fast-growing city of 7,300, has a 0.7 mgd extended aeration plant with nitrification and UV disinfection, discharging to Lake River, an estuary of the Columbia River. BOD and TSS limits are 30 mg/L, and the ammonia limit is 1.4 mg/L (all monthly averages).

The plant had been struggling with process issues, including high energy costs and difficulty meeting the ammonia limit, among the strictest in the state. Jenkins, with operators Fred Crippen and Jim Strickler, pitched right in. “They were great operators who had a ton of institutional knowledge of the facility,” Jenkins says. “Fred had a strong skill set in maintenance, and Jim liked the biology — the sampling and process control. It made a really good balance. They had been with the city for about 20 years. They could have easily said, ‘Shut up, kid. We’ve always done it this way.’ Instead, they jumped on board.”

Early on, Jenkins noticed an issue with how the operators were sampling the secondary clarifier sludge blanket: “They were going down too quickly with the Sludge Judge. When that sampler hits the bottom, if it’s still filling, it’s sucking sludge, so you end up with false high readings. That in turn gives a false high reading for the total pounds in the system, and for all the process control numbers from there on out.

“We would overwaste, causing us to almost violate on the ammonia limit because we didn’t have enough biology on hand to treat the ammonia. To combat that, we turned up the return activated sludge and the air, which helped. But the plant would go through rapid swings.

“We would have overaged and would have to waste out to combat that problem, and then it would get young again. As it overaged, the effluent TSS would go up, so we had to run two units of UV disinfection to meet the fecal coliform limits. The waste activated sludge TSS to the thickener would go from 10,000 mg/L up to 18,000 mg/L. You have to dose polymer to the highest common denominator, so part of the time we were dosing twice as much polymer as needed.”

TAKING CONTROL

While the sludge blanket sampling wasn't the only issue, it was significant, and correcting it helped set the plant on a course toward process optimization. As the plant started to stabilize, it became feasible to turn the aeration down. In addition, the team replaced obsolete dissolved oxygen probes and meters with Hach SC200 meters using LDO2 probes. That immediately yielded more accurate DO readings.

Another step was to refine blower operations. “We were running an open header on two blowers to the two aeration basins,” Jenkins says. “The blowers were responding to the DO level in only one basin, so the other was either over- or underaerated. It was never where it needed to be.

“We ended up revalving the blowers and tying into SCADA. We were then able to assign each individual blower to an individual basin, so the blowers could function independently to meet each basin's demand. Once we did that, the basins stabilized immediately, and we were able to slowly back down the DO setpoint from about 4.0 mg/L to about 2.2 mg/L. The RAS rate had been about 120 percent, and we backed that down to about 50 percent. That stabilized the process.

“Once the WAS reached a stable number, we could reduce the polymer dose to the thickener. In addition, by that point, our effluent TSS was in the single digits, so we were able to take one UV bank offline and still be in single digits on our fecal counts. We also extended the anoxic zone, and that helped with alkalinity retention. Between that and the lower DO setpoint, we were able to reduce our sodium hydroxide dosing by about 40 percent.”

“Once the WAS reached a stable number, we could reduce the polymer dose to the thickener. In addition, by that point, our effluent TSS was in the single digits, so we were able to take one UV bank offline and still be in single digits on our fecal counts.”

MATT JENKINS

Another of the benefits of the process changes was improved control over microbe growth and lower sludge yield. That made it possible to take one of the plant's two aerobic digesters offline, reducing horsepower demand by 50 hp and saving significant energy.

BACK TO LA CENTER

After 2.5 years at Ridgefield, Jenkins returned to La Center as wastewater systems supervisor in late 2017. “It has been an experience getting reacquainted,” he says. The plant, designed by Ovivo USA, uses a pair of KUBOTA Membrane USA flat-plate MBRs. Effluent quality is excellent; BOD and TSS are consistently 1 mg/L or lower, and fecal coliform after closed-vessel UV disinfection is typically nondetect. Discharge is to the East Fork of the Lewis River.

Waste activated sludge passes through a rotary fan press (Prime Solution), where it is dewatered to 10 to 15 percent solids. It is batch-fed to a Fenton indirect thermal dryer (RDP Technologies), which dries it to 90 percent solids or higher. The resulting Class A Exceptional Quality material is supplied mainly to a tree farm as a soil additive.

Jenkins' staff includes Bill Birdwell, operator III; and Jeremy Klinski, operator I/operator-in-training. “There's not as much meat on the bone here



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A RESOURCE FOR LEARNING

During his time at the Ridgefield (Washington) Wastewater Treatment Plant, Matt Jenkins found a valuable resource in the Discovery Clean Water Alliance. It's a partnership of Clark County, which operates major wastewater treatment plants serving north Vancouver; the Clark Regional Wastewater District, which handles wastewater collection; and the cities of Ridgefield and Battle Ground.

"I ran a small Class 2 plant, but through the alliance, I had access to engineers and process control and instrumentation people through the alliance partner organizations," Jenkins says. A key mentor was Tom Burns, who hired him for his first wastewater job with Veolia Water Technologies and ultimately became operations manager with the Clark Regional district.

Jenkins recalls that Burns supported him from the time he started at Veolia Water Technologies: "He was a project manager, running two huge facilities in Vancouver. He might as well have been the president of the United States at that point in my life. He called me into his office on my second day on the job and just talked to me, person to person. He gave me a lot of motivation and inspired me to do the things I've been able to do since then. In 2015, when I was hired at Ridgefield, he was on the interview panel. I got to spend the next two years working with him as part of the alliance. I owe him a lot."

Today, Jenkins gives back by teaching classes in maintenance, process control and other topics at the Clackamas Community College Short School put on by the Oregon Water Education Foundation. He mainly instructs operators-in-training and Group I operators. "So many people out there want what this industry can offer, but they just don't know it's there or how to get to it," he says. "I really enjoy giving them insight into who to talk to and where to go — helping them to succeed."

Jenkins, shown with operator Jeremy Klinski, aims to refine his skills as a supervisor and administrator by remaining open-minded and humble.

as there was at Ridgefield for process control improvements, but there is some work to be done," he says.

Physical space is a challenge on the plant site: "At some point, we will have to treat 3 mgd average with a 6 mgd peak on a 0.75-acre parcel. Everything we do, from the MBRs, to the rotary fan press, to the dryer, is designed around footprint. The neat thing is that this plant is immediately expandable to a 1.5 mgd average day and a 3 mgd peak day with minimal construction. We just need to drop MBRs into two more tanks that are already existing."

STILL LEARNING

For his own development, Jenkins wants to become accomplished in asset management: "In our industry, it's becoming more and more important to plan for the future — to be able to plan the life cycle of equipment and to budget accordingly. I'd like to implement that here. The guys have done an excellent job taking care of PMs and corrective maintenance, but I want us to be dialed in to the point where we do predictive maintenance."

His long-term goal is to refine his skills as a supervisor and administrator. In that quest, he'll adopt the same approach to learning that has served

him well until now: "I have not met seasoned operators who won't show you everything they know, as long as you're open-minded and humble. That's the key to the growth I've had in this industry. Always be willing to learn. That's the main thing. And always be kind to others — or as my dad would say, 'Don't be a jerk.' Those things seem to go a long way." **tpo**

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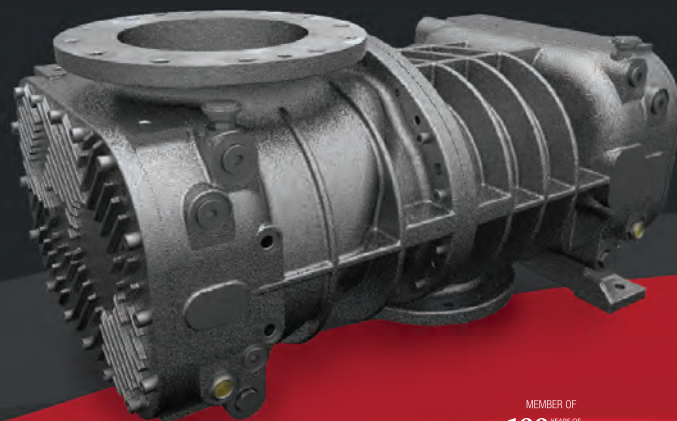
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Elevating the Industry

NONPROFIT BLUE DROP LOOKS TO PROVIDE PRACTICAL ADVICE TO CLEAN-WATER AND DRINKING WATER UTILITIES WHILE SAVING MONEY FOR DC WATER RATEPAYERS AND MARKETING BIOSOLIDS PRODUCTS

By Ted J. Rulseh

It isn't every day a major utility spins off a small, agile startup entity. But that's what DC Water did about two years ago.

DC Water is the utility that distributes drinking water and collects and treats wastewater for more than 672,000 residents of Washington, D.C., and provides wastewater treatment for 1.6 million people in neighboring counties.

That small and agile startup is Blue Drop, a nonprofit entity that shares expertise and best practices from DC Water with other water and wastewater utilities, markets biosolids products, and aims to elevate the stature of water agencies and the water professions.

Alan Heymann is president of Blue Drop and chief marketing officer with DC Water. He sees Blue Drop as working for the benefit of both DC Water ratepayers and utilities around the country that can benefit from DC Water's wisdom built on real-world experiences. He talked about Blue Drop, its mission and its activities in an interview with *Treatment Plant Operator*.

tpo: What is the history behind Blue Drop?

Heymann: Blue Drop was incorporated November 2016. The lead-up to that took about a year. We asked: Do we want it to be a department of DC Water? A separate organization? If separate, for profit or nonprofit? What should the governance look like? And what should be the relationship between DC Water and the new entity? It's fairly unusual for a large and bureaucratic organization to launch a small and nimble startup, but that's what we did. We got Blue Drop off the ground pretty quickly.

tpo: What is the overall mission of Blue Drop?

Heymann: We have a dual mission. The first part is to provide meaningful relief to DC Water ratepayers, both retail and wholesale. We do that in two basic ways: by generating revenue and by saving money, largely from the avoided cost of land application of biosolids. The second part of the mission is to elevate the status of the water sector by sharing what DC Water has built, or learned, or become adept at.

tpo: What areas of DC Water expertise is Blue Drop sharing with other utilities?

Heymann: Initially we have focused primarily on stakeholder engagement. We also do work in customer service and a little bit in change management. This summer we plan to branch out into executive coaching.

tpo: Why do you consider it important to emphasize stakeholder engagement?

Heymann: Our basic premise is that if a utility has a poor reputation among its customers or is not known by its customers, that utility is poorly



Alan Heymann, president of Blue Drop and chief marketing officer with DC Water

equipped to ask things of its customers that will represent an increasing burden in years to come. People who run utilities today are very aware of the difference stakeholder engagement makes.

tpo: What specifically are the coming burdens you speak of?

Heymann: Every utility faces growing cost of operations, whether for aging infrastructure that needs to be repaired or replaced or for further environmental mandates coming down from the federal or state level. These things are becoming more expensive, and the federal share of investment in water and wastewater in the United States is at a historic low. As a utility, where do you turn? You turn to your ratepayers. And if your ratepayers don't know you, that is a big problem.

tpo: How optimistic are you about utilities' capacity to engage with their stakeholders?

Heymann: The good news is that making the argument I just made is not as difficult as it used to be, and I think utility leaders get this. They're asking more of their customers not only in the rates they pay, but also in that construction is hard. It creates service disruptions. It creates noise, dust and traffic issues. I tend to look at this as a metaphor: a reservoir of goodwill that

you need to build up with your stakeholders before you need it. Anytime you ask more of someone in a relationship, especially with the stakeholders of a utility, you tap into that reservoir of goodwill. You can't go to customers with a rate increase before they know why that matters — before they understand why what you're asking is important to them.

tpo: What approach does Blue Drop take toward sharing expertise with utilities?

Heymann: It's peer-to-peer work, at lower cost than you would typically find in the private sector. That's because we're public sector employees and because we're a small and pretty lean crew. We don't have the staff capability to put somebody on site for six months at a time. We go in; we do workshops; we visit for a couple of days. We interview, we assess, and then all the reporting and recommendations we do on the consulting side are done from our offices here in D.C. That also keeps the cost down.

tpo: What do you offer in terms of deliverables to Blue Drop's utility clients?

Heymann: We take the lessons we've learned on our own journey to other utilities, especially those that are smaller and don't have large staffs and budgets. We say: We've got diagrams, communications plans, and playbooks you can use. Once we assess who your stakeholders are, how you need to reach them, and the staffing and resources you have at your disposal, we do a gap analysis. We recommend a set of best practices and leave you with a toolkit to use with your own team on your own time. We do this without creating the sort of consultant dependency where we have to be there at every step.

tpo: On the biosolids side, what does the DC Water program look like today?

Heymann: We've made some changes in the last few years. We had been doing lime stabilization of Class B biosolids, and we paid a contractor to take that material out to farms for land application. We were generating about 1,200 wet tons per day. Farmers were on a two-year waiting list for the material, but a few things were going on. First, we needed upgrades to the lime stabilization equipment. Second, there were questions about the stability of the Class B biosolids regulations — whether they would become more restrictive. And third, we saw an opportunity for cost reduction through the production of energy from biogas.

tpo: What did DC Water do in response to these developments?

Heymann: We toured the world looking for technologies for anaerobic digestion, and we settled on the CAMBI technology out of Norway. It combines thermal hydrolysis and anaerobic digestion in a fairly compact footprint.

tpo: What has been the result of adopting this technology?

Heymann: Three significant things have happened. One, we are generating enough energy from biogas to run about a third of our plant. That is a cost we no longer have to bear through buying that power off the grid. Two, we are generating a lot fewer biosolids — about 450 tons a day. That is a reduction in cost from fewer trucks going out the door. And three, we now have Class A Exceptional Quality biosolids coming right off the belt. It gets dewatered a little bit, but there's nothing else we have to do to get it to Class A. Before, if we wanted Class A, we had to take our Class B material and compost or blend it.

tpo: Where exactly does Blue Drop come in?

Heymann: The product is called Bloom, and it's trademarked. Blue Drop is the firm engaged in the marketing and sale of this product on behalf

of DC Water. We're focused on marketing a product that has economic value, as opposed to the traditional waste hauling and disposal model that the industry still by and large depends on. We can arrange short-haul truck shipments, and we can invoice customers for a few cubic yards of product, which is not something a big utility is usually equipped to do.

tpo: How is the marketing and sale of Bloom progressing?

Heymann: We're starting out small. Our first year in business we did about 9,000 tons. We're on track to do 20,000 tons this year and 40,000 tons next year — increasing proportions of what we're producing. It's for different markets. We're going after the soil blenders, nurseries and landscapers of the world, in addition to sticking with the farmers who have been using our product for quite a while.

tpo: In this capacity, what is the bottom-line benefit Blue Drop delivers to DC Water?

Heymann: The main value we provide is in the cost-savings from not having to land-apply the material we sell. If we sell a ton of Bloom for \$7 to \$8, on the back end that saves DC Water \$45 from not having to pay a contractor to land-apply it. It doesn't take a lot of imagination to see that down the line we could be talking about millions of dollars in savings.

tpo: What can other clean-water agencies learn from what Blue Drop and DC Water are doing on the biosolids side?

Heymann: Not every utility will generate the tonnage that we do, but the CAMBI process certainly can be applied on a much smaller scale, and it is in Europe. I know a lot of utilities are turning to anaerobic digestion. It's a large capital outlay, but it produces cost savings in the long haul, as we've already found. As a matter of fact, the economics of the CAMBI system were not built on the concept of selling the material. It was simply about reducing the tonnage and producing energy.

tpo: Why do you think clean-water agencies should be looking toward more advanced biosolids processes?

Heymann: The landscape for biosolids in the United States is very fragmented. The regulations are different state by state. There are places where you can't do certain things. In Massachusetts for example, access to farm-

“Our basic premise is that if a utility has a poor reputation among its customers or is not known by its customers, that utility is poorly equipped to ask things of its customers that will represent an increasing burden in years to come.”

ALAN HEYMAN

land is very limited, and utilities are incinerating their biosolids. There are a number of ways to manage biosolids, but I think the first message is that it is not always necessary to go with the straight-up waste disposal model, which by the way, is very expensive. There are other options available, even though permit compliance and moving the material off the property every day is the No. 1 goal.

tpo: What are the benefits of going to Class A Exceptional Quality biosolids?

Heymann: There is a great story to tell around that material. When you have Class A Exceptional Quality, it is safe for many uses. It is beneficial. It returns nutrients to the earth. It sequesters carbon. It's the very definition of locally produced material. We find as we search out new markets for Bloom that customers in the city are interested in having it in bags so they can use it at home. We're not there yet — we're doing only bulk sales — but that is something to be aware of. Demand will build up if you start to go down that road. **tpo**

A New Generation

A KENTUCKY CITY PARTNERS WITH A COMMUNITY COLLEGE ON AN APPRENTICESHIP PROGRAM TO TRAIN POTENTIAL REPLACEMENTS FOR WATER AND WASTEWATER WORKERS PLANNING TO RETIRE

By Sandra Buettner

The Kentucky city of Prestonsburg is partnering with Big Sandy Community & Technical College to create an apprenticeship program that will help fast-track students to become water and wastewater treatment plant operators.

The program is designed to address the aging of the operator workforce for these positions and to help prepare young people for other roles in the wastewater and water departments that will need to be filled after retirements.

The city's water and wastewater treatment plants serve 210 square miles at the northern end of Floyd County in eastern Kentucky. This includes a base of 3,500 residential and commercial customers. The 52-year-old wastewater treatment plant has an average flow of 0.75 mgd and is fed by 100 miles of collection lines and 60 pump stations.

SKEWING OLDER

"The workforce is currently skewed very much toward the retirement end, and we need to get an influx of younger workers to get them trained now to step in to fill these roles," says Turner Campbell, superintendent and CEO of the Prestonsburg City's Utilities Commission.

Utility staff members meet quarterly with other water and wastewater service providers in the region. At a recent meeting, a worker nearing retirement said the aging workforce needs to be addressed in the next three to five years to avoid a shortage of workers.

Prestonsburg Mayor Les Stapleton noted during the meeting that he works closely with Big Sandy and offered to help the college develop a program to address the issue. In assembling the program, utility leaders informed the college staff about the state guidelines and requirements that need to be followed for water and wastewater treatment plant training and for obtaining the proper licenses.

Donald Compton, manager of treatment with the commission, collaborated with the college during the formation of the apprenticeship program and will oversee it when it starts in fall at the two plants. Meanwhile, college staff members studied operator programs at other state colleges as they formulated their program.

WORK AND LEARN

Kelli Chaney, dean of career education and workforce development at Big Sandy, says the first cohort of the program will involve 10 plant employees who have industry experience but have not received the certifications and licenses they need to advance in the field.

The apprenticeship program will help them become licensed and certified in three years, as opposed to the five years it normally took before. When the program has been operating for about six months, it will open to members of the public with or without industry experience.

Under a work-and-learn model, the students will go to college two days a week for academic courses such as math and chemistry and then work at the utility three days a week, working one-on-one with licensed wastewater treatment operators. Students will be paid during their apprenticeships.

Once they receive proper safety training at the utility, they will start learning all aspects of treatment plant operation. Shadowing a licensed operator, they will be trained in light maintenance of pumps and motors, biosolids dewatering, chemical feed adjustments, creating taps for new water customers, and other tasks.

HELPING THE COMMUNITY

Apprenticeships will be prepared for roles not just at the wastewater and water treatment plants but also in the wastewater collections and water distribution systems so that they can potentially replace workers planning to retire in the coming years.

Another issue the program helps resolve is the unemployment created by the downturn in Kentucky's coal mining industry. "These water and wastewater treatment plant operator positions are good paying jobs and enable our citizens to stay in their community while at the same time working in a thriving industry," Campbell says.

"Coal workers have a unique skill set in that they have experience working on equipment. That makes it easy for them to adapt to our equipment. In addition, they have a good aptitude and work ethic, both traits that are transferrable and highly valuable in our industry."

“These water and wastewater treatment plant operator positions are good paying jobs and enable our citizens to stay in their community, while at the same time working in a thriving industry.”

TURNER CAMPBELL

LOOKING TO THE FUTURE

While creating the program, college staff members learned that municipalities throughout the state are dealing with worker shortages due to retirements. The college hopes to launch the apprenticeship program statewide in the next couple of years. "Our program is unique," Chaney says. "No other community college in the state that we know of has a program like this, and our college never had such a program until now."

Dr. Sherry Zylka, president of Big Sandy, observes, "We're looking forward to this partnership because community colleges are exquisitely poised to meet local needs such as this. We are always looking for ways to partner with local businesses and government entities to help our community prosper. We look forward to developing a best practices program that other people will come to us for, to help enrich their communities." tpo

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AGE IS NO BARRIER TO PERFORMANCE AT THE PASCAGOULA/MOSS POINT TREATMENT PLANT. SOUND MAINTENANCE AND CONTINUING EDUCATION FOR STAFF ENSURE QUALITY EFFLUENT.

STORY: **Ted J. Rulseh**

PHOTOGRAPHY: **Chuck Cook**

THERE'S NOTHING FANCY ABOUT THE Pascagoula/Moss Point (Mississippi) Regional Wastewater Treatment Plant. Day by day, year by year, it churns out clean effluent to help protect water quality and fisheries in the Gulf of Mexico.

It has done that for 35 years, treating wastewater from a mix of domestic, commercial and heavy industrial sources. Its nine team members fully embrace the mission of its owner, the Jackson County Utility Authority: to protect public health and the environment and ensure the wise, beneficial use of public resources.

Pascagoula/Moss Point is the only plant to receive the Mississippi Water Environment Association Most Outstanding Wastewater Treatment Facility award three times, most recently for 2017. "Even though it's older, it's been very well taken care of," observes Carrie Dennis, wastewater operations manager. "We're improving the facility to continue providing the best treatment quality possible. Having our own lab helps. Because we have a lab that can get us our numbers quickly, we can make adjustments quickly."

That's a precious capability because the plant sees significant and sometimes unpredictable flows from the area's chemical and petrochemical industries. Staff members, developed in a diligent training program, have long experience with the plant and have seen it through a variety of challenges, including hurricanes Katrina and Nate.



DIVERSE COMMUNITIES

The facility serves the Gulf of Mexico cities of Pascagoula (population 25,000) and Moss Point (13,000), not far west of the Alabama border. The area combines oil refining and related chemical businesses with natural beauty and recreation.

The Jackson County Utility Authority received millions of dollars in hurricane repair and recovery funds to repair and expand its clean-water capacity and is now investing in a multiphase capital improvement plan that includes upgrades at Pascagoula/Moss Point (10 mgd design, 5.2 mgd average).

The process is basic activated sludge. Influent enters through a bar screen and grit removal system and passes directly to three aeration basins, each with four surface aerators. The flow then enters two secondary clarifiers, followed by chlorine disinfection and discharge to the Pascagoula River, which feeds the Gulf a short distance downstream.

Waste activated sludge is dosed with polymer and passes through a



LEFT: Chuck Redmond, plant supervisor, is a leader of a highly experienced team at the Pascagoula/Moss Point Regional Wastewater Treatment Plant that produces quality effluent (belt press by Andritz). RIGHT: Team members Christian Navarez, laboratory manager; Chase Glisson, authority engineer; Redmond; and Lauren Smith, operator.



An Evoqua biofilter unit contributes to odor control in consideration of nearby residential development.

Pascagoula/Moss Point (Mississippi) Regional Wastewater Treatment Plant

BUILT: | 1983, 2017-18

EMPLOYEES: | 9

FLOWS: | 10 mgd design, 5.2 mgd average

POPULATION SERVED: | 34,500

TREATMENT LEVEL: | Secondary

TREATMENT PROCESS: | Activated sludge

BIOSOLIDS: | Land-applied

RECEIVING STREAM: | Pascagoula River

ANNUAL BUDGET: | \$3.2 million (operations, four wastewater treatment plants)

WEBSITE: | www.jcua-ms.us

GPS COORDINATES: | Latitude: 30°21'51.02"N;
Longitude: 88°33'44.70"



“Our management, for the most part, I would say that whenever we need something, we get it in a timely manner to continue to provide the quality service that we do.”

CHUCK REDMOND

with a new hydraulic forced vortex system from Smith & Loveless. An extensive piping upgrade is complete, and the mechanical bar screen is scheduled for replacement.

The aeration ditches are being rehabilitated one at a time; work on the first basin is in progress. New surface aerators (Philadelphia Mixing Solutions) have been installed. The basin has been drained and cleaned and the equipment refurbished.

Automated dissolved oxygen control (Evoqua Water Technologies) will be added using Hach oxygen sensors. The aerators will be able to speed up or slow down based on the DO level and will also be controllable by way of timers. Operating data will be displayed on the workstation of the cellular-based SCADA system (Mission Communications) in the control building.

Provision has also been made to simplify regular basin maintenance. “Some of the valves were over 30 years old and no longer operated the way we would expect,” Glisson says. “Instead of digging down 20 feet and replacing those valves, we added pumps (Weir Specialty Pumps (WEMCO)) that can empty out the wastewater to a level

where staff can go in to work on the equipment.” All three basins will ultimately be upgraded in essentially the same manner.

Meanwhile, in the clarifiers, the walkways are being rehabilitated; the tanks drained, cleaned, sandblasted, and repainted; and the drivetrains and arms refurbished. Two years ago, the chlorine system was updated with automated valves and automatic shut-off.

KEEPING IT RUNNING

While upgrades continue, plant team members provide diligence daily to keep clean effluent flowing. “The least-experienced operator we have, Lauren

Pascagoula/Moss Point Regional Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	265-280 mg/L	3-7 mg/L	30 mg/L monthly average 45 mg/L weekly average
TSS	255-290 mg/L	6-8 mg/L	30 mg/L monthly average 45 mg/L weekly average
Ammonia	22-30 mg/L	5-9 mg/L	Monitor and report
Total N	45-55 mg/L	12-15 mg/L	Monitor and report
Total P	22-35 mg/L	3-5 mg/L	Monitor and report

gravity belt thickener (Alfa Laval) before dewatering on a belt press (Andritz Separation). Class B biosolids at 18 to 20 percent solids are applied to 75 acres of district land planted to Bermuda grass, which is harvested as hay and sold as livestock feed. Biosolids production is about 400 cubic yards per month.

UPGRADES IN PROGRESS

The plant is in the second phase of its upgrade, according to Chase Glisson, an authority engineer. The headworks upgrade includes a biofilter (Evoqua Water Technologies) for odor control in recognition of residential and commercial development close by. An aging grit removal process has been replaced

Smith, has been here one year and is already Class 2 certified,” says Chuck Redmond, plant supervisor and certified Class 4 (highest).

Other team members with Class 4 certification are Billy Scara, lead operator (10 years); Curtis Evans, second shift lead operator (10 years); Curtis Hartzog, operator (six years); and James Jones, collections systems operator (10 years). The remaining team members are Richard Weathers (15 years) and Will Brown (8 years).

“We do basic preventive maintenance,” says Redmond, who has been with the authority for 27 years. “Each operator is given a set of PM tasks to do monthly. If something happens to break down or needs attention, we write a work order and send it right over to our maintenance department. They jump on it, depending on what priority we assign, and get it back in service for us. It’s all about day-to-day operations, general housekeeping, cleaning equipment, cutting grass, doing plant checks.

“We have a very dedicated team. They work hard, and they are very knowledgeable about the process we have. We handle most of our process sampling in-house. We have a mixed liquor monitor on our splitter box. We run our own cake and filtrate samples from the press. We take digester and mixed liquor samples and do DOs and pHs where needed.”

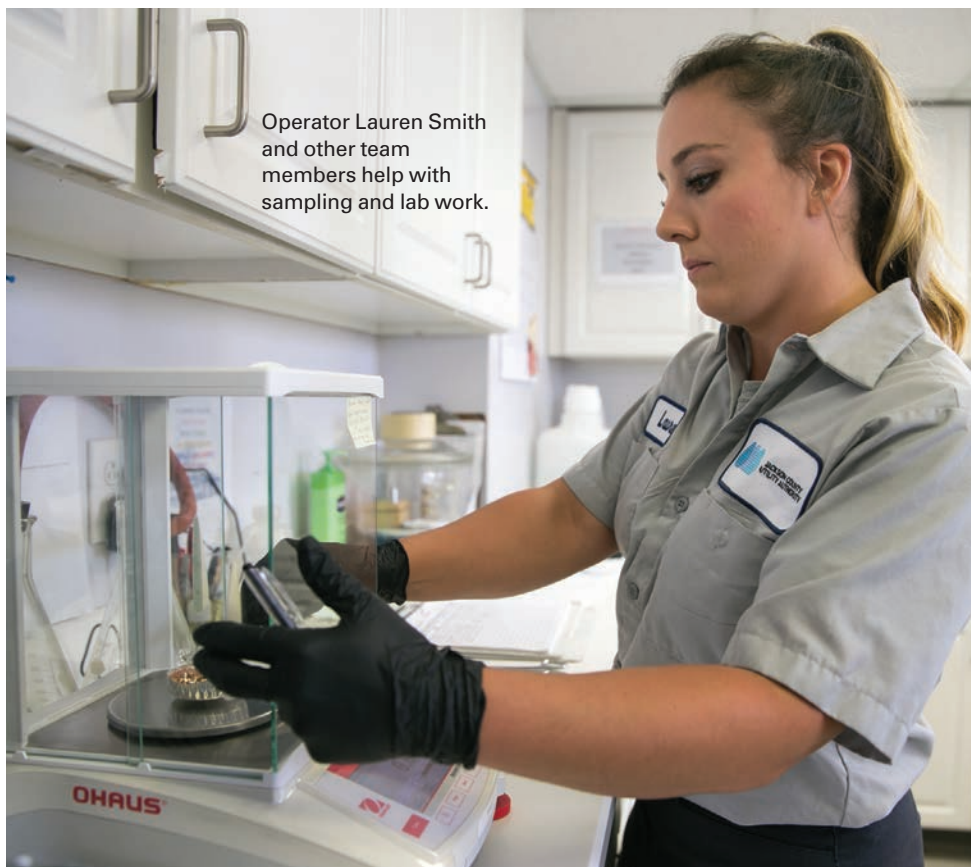
MINDING THE FLOW

A key responsibility for the team is keeping a handle on the industrial flows coming through the city-owned collections systems and adjusting the process as necessary. “We don’t own the collections systems that discharge to us, so we have to take more of a reactive posture,” Redmond says. “We don’t have a pretreatment coordinator, but we do have a compliance team working on that issue.”

Christian Nevarez, laboratory manager, observes, “Over the years, we’ve started a monitoring program where we went to all the pumping stations and ran specific tests to see what was going on with our facilities. We determined which ones are our problem areas, and we keep those on the monitoring program.

“The main problem areas are still monitored monthly and some on a quarterly basis. We’ve been able to establish when high solids are coming to a facility, or high ammonia levels, or loadings of fat, oil and grease. Then we have time to find the sources and try to get them to help us out.”

The lab is instrumental in maintaining compliance and process consis-



Operator Lauren Smith and other team members help with sampling and lab work.

tency. “We have a quality control program where we enter the data to make sure it meets our standards,” Nevarez says. “We recently put in a quality assurance/quality control officer into the lab. We run duplicate tests on a daily basis. Standard deviations are established at certain limits depending on the tests being run. The lab has its own quality assurance plan.”

All process control testing is performed in-house, as are compliance tests other than for metals, oil and grease, and bioassay. These are sent to a contract lab. The lab also looks at microscopy samples from the process when requested by plant operators.

MAKING CAREERS

Operator training is at the heart of effective plant performance and of career paths that help keep top talent within the organization. “When we

PART OF A NETWORK

The Pascagoula/Moss Point (Mississippi) Regional Wastewater Treatment Plant is one of seven clean-water facilities operated by the Jackson County Utility Authority. The major facilities are:

The **Escatawpa Wastewater Treatment Plant**, a 3 mgd (design) activated sludge facility that treats flow for the city of Moss Point and the Escatawpa Utility District. Final effluent is discharged to the Escatawpa River.

The **Gautier Wastewater Treatment Plant**, a 4 mgd facility, uses an oxidation ditch process. It treats wastewater for the Gautier Utility District. Final effluent is discharged to the West Pascagoula River.

The 5 mgd **West Jackson County Regional Land Treatment Facility** uses a lagoon and constructed wetland treatment process with spray irrigation. It lies within the U.S. Fish and Wildlife Service Mississippi Sandhill Crane Refuge and treats wastewater for the city

of Ocean Springs and the West Jackson County Utility District. It discharges to Bayou Costapia.

Aerobically digested biosolids from the three mechanical treatment plants are received at the West Jackson County facility before being taken to the authority’s land application site.

In addition, in 2011, the authority constructed three decentralized treatment facilities serving the communities of Big Point, Wade, and Hurley. These facilities are considered green infrastructure, as they are small-scale systems used for natural treatment that reduces pollutant discharges and replenishes aquifers through surface absorption.

Over the years, each of the authority’s treatment plants has received a Mississippi Water Environment Association Most Outstanding Wastewater Treatment Facility award.



Carrie Dennis, wastewater operations manager

“We’re improving the facility to continue providing the best treatment quality possible. Having our own lab helps. Because we have a lab that can get us our numbers quickly, we can make adjustments quickly.”

CARRIE DENNIS

bring in new employees, two or three of us work hands-on with them day to day,” Redmond says. “We take them out into the plant so they know what we expect of them and gradually train them on the process.” In their first six months, they’re required to complete Volume 1 of the Sacramento operator course.

“They start out on a 90-day probationary period. After that, with the training they receive, they are able to work independently and can do anything we ask of them, short of collecting permit samples, which they can’t do until they become certified. We also have a cross-training program where we send new employees to our other plants. They spend time in the lab and with the engineering and maintenance departments to get an understanding of what the departments do.”

Authority leaders encourage team members to raise their certification levels. Training is company-paid and covers events such as math workshops, day training sessions, and an annual short course hosted by the state Department of Environmental Quality and presented by the Mississippi Water and Pollution Control Operators Association. Typically, operators take four years to attain Class 4.

Employee retention runs high. “Usually, the biggest turnover our plant has is through promotion,” Redmond says. “People move to another of our facilities, or some might be more maintenance-inclined. We’ve had a couple

WEATHERING STORMS

A plant team gets tested when adversity strikes. And adversity struck hard back on Aug. 29, 2005, when Hurricane Katrina hit the Gulf Coast.

The Mississippi coastline wasn’t affected as severely as New Orleans, but still, the storm inundated the Pascagoula/Moss Regional Wastewater Treatment Plant. “That was a time when everybody worked together to get the plant back up and the pump stations running,” says Carrie Dennis, wastewater operations manager.

Chuck Redmond, plant supervisor, states, “I was at another facility at the time, but probably 90 percent of the equipment here went under water. Contractors had to come in and redo all the electrical, pumps, motors. They were back providing treatment by the end of the week — not the way we typically treat wastewater, but in some form or fashion, all our plants were functioning by the end of one week.”

Dennis adds, “I think we learned our lesson from Katrina, because when Hurricane Nate happened in October 2017, we were back up and going within a day.” That was with help from permanently installed diesel backup generators (Kohler Power Systems) serviced by Taylor Power with a total 700 kW capacity.

To learn more about the Pascagoula/Moss Point Regional Wastewater Treatment Plant, take a look at a video profile of the plant at www.tpomag.com.

switch over to become lab technicians. There’s a lot of opportunity once they get their foot in the door.”

That kind of continuity makes for a strong and resilient operation. Redmond observes, “Our structure has played a part in our ability to maintain our infrastructure and our assets. We have operations, compliance, laboratory and engineering. Our management, for the most part, I would say that whenever we need something, we get it in a timely manner to continue to provide the quality service that we do.”

Nevarez concludes, “We have a staff that really does care what they produce. It doesn’t only affect the environment. It affects the industry in our area, the fishing, the recreation. We do our best to put the highest water quality out into the ocean.” **tpo**

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Fifth-graders run into the exhibit hall at the 2018 Iowa Children's Water Festival. The annual event attracts more than 2,000 students.

PHOTOS COURTESY OF THE IOWA CHILDREN'S WATER FESTIVAL

Right Message, Right Time

THE IOWA CHILDREN'S WATER FESTIVAL TEACHES FIFTH-GRADERS ABOUT WATER'S IMPORTANCE AT AN AGE WHEN WHAT THEY LEARN STAYS WITH THEM

By Craig Mandli

There's a lesson about water pollution to be found in a plastic cup filled with gummy bears, chocolate sauce and other assorted sweets.

Every year in mid-May, fifth-graders throughout Iowa learn about the importance of clean water and conservation at the Iowa Children's Water Festival, held at the Des Moines Area Community College campus in Ankeny.

"It's teaching them at a young age the importance of saving our water and not throwing trash on the side of the road," says Linda Kinman, executive director of the Iowa Association of Water Agencies and volunteer coordinator for the festival. "We reach more than 2,000 fifth-graders in one day."

SWEET LESSON

The students take part in various activities focused on water conservation, surface waters, point and nonpoint source pollution, watersheds, wetlands, and the water cycle. The 2018 festival highlight was the "edible aquifer," in which volunteers helped students carefully layer sweets as a way to demonstrate water pollution.

"It teaches the children the importance of water, ways it can be polluted, and ways to prevent pollution at home," Kinman says. In a plastic cup, a bottom layer of gummy candy represents rocks. Ice cream on top represents topsoil. Chocolate sprinkles are oil and gas pollutants, and colorful sprinkles represent pollutants such as animal droppings, fertilizers and pesticides. Add a bit of rain (soda) and kids see pollution in action.

“Once we get volunteers here, they typically want to come back year after year. I think we all love seeing these lessons click with students.”

LINDA KINMAN

"After it rains, the students can see how the pollutants can get to the bottom, where the clean water is," Kinman says. A drinking straw in the concoction illustrates the effects of drilling into the ground and how pollutants can mix with the soil and the aquifer. "Water is a nonrenewable resource," Kinman says. "Children are our future. If they want clean drinking water, it's their responsibility."

MAKING A "SPLASH"

The free festival exposes kids to interactive presentations, experiments, exhibits, games and stage shows. They also learn about water-related careers and volunteer opportunities. Fifth grade is the ideal time to reach kids because that's when they start forming their worldview, Kinman says: "At that age, they can understand the concepts behind where their water comes from and why it's important to conserve it."

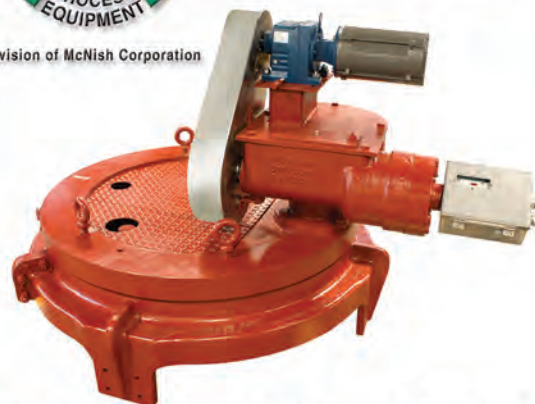


LEFT: Students use microscopes to examine a water sample for microbial critters. RIGHT: Attendees can take part in more than 60 hands-on exhibits and activities at the Iowa Children's Water Festival.



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Fifth-graders take in the sights inside the exhibit hall. The students learn about water-related careers and volunteer opportunities at the free festival as well.

For more than 20 years, the festival has drawn students from across the state. The goal is for kids to leave knowing the importance of protecting Iowa's water and ready to put what they learned into practice.

"The students engage in events like Recycle Relays, environmental bingo and other hands-on games," Kinman says. "They have full access to our exhibit hall with dozens of interactive exhibits. We cycle the students through three classroom activities and then a large-group 'splash' event that drives the messages home."

That event often includes Randy Pleima, general manager of the Mahaska Rural Water System. In the role of Professor Faucet, he has taught thousands of kids the importance of safe water for drinking and for a healthy life. "He comes with new games and trivia questions for every event," Kinman says. "He really owns that role, and every year, the kids love him."

MULTIPLE VOLUNTEERS

Presenters also include staffers from city departments including Des Moines Water Works, Des Moines Area Community College, the Iowa Department of Natural Resources, the U.S. Department of Agriculture, the Iowa Association of Municipal Utilities, the Iowa Rural Water Association and West Des Moines Water Works.

Employees from local industries are among the roughly 200 volunteers who staff the festival; recruiting isn't difficult. "Once we get volunteers here, they typically want to come back year after year," Kinman says. "I think we all love seeing these lessons click with students."

Another idea of the festival is that water conservation is important everywhere. "We tend to be a bit sheltered in Iowa, but if we were living in California, water issues would be a part of our everyday lives," Kinman says. "Regardless of where you live, it's important to know that your actions can have a direct affect on water quality. Water utilities are a silent voice. To get the word out about the importance of water, we need to tell our stories. This festival is one way we're doing that." **tpo**

An Easy Swap

A LOW-POWERED ELECTRIC MIXER REPLACES SOME AERATORS IN A VERMONT TREATMENT PLANT LAGOON AND DELIVERS SIGNIFICANT SAVINGS ON ENERGY

By Steve Lund

A simple change in equipment produced big savings on electricity for the Waterbury (Vermont) Wastewater Treatment Plant.

The plant was using surface aerators to provide mixing and aeration for its three lagoons, which hold 12 million gallons. The addition of a Medora Corporation - SolarBee / GridBee low-power subsurface mixer in the largest lagoon enabled the plant team to shut down some of the surface aerators and still get sufficient mixing and aeration.

The plant's eggbeater-style and fountain-style surface devices provide good aeration but are not efficient at mixing the large lagoon, and their 10 hp motors use substantial power. On the other hand, the low-power subsurface mixer motor is just 0.1 hp and draws only about 100 watts, but it creates a slow upwelling in the lagoon that provides good mixing of wastewater and bacteria.

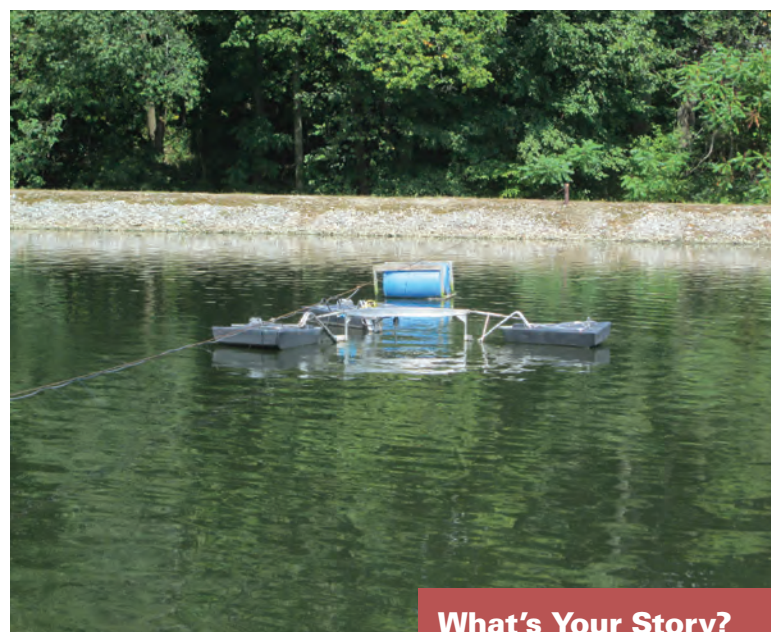
The impact on the plant's electricity bill was immediate, says Peter Krolczyk, plant superintendent: "The cost-savings to us have been close to 40 percent." That along with an incentive from Efficiency Vermont meant the first subsurface mixer, also called a circulator, paid for itself in its first year.

DATA FIRST

Waterbury operators did their own data collection to be sure mixing in the lagoon was adequate. "Nobody had done a really thorough job of collect-



Peter Krolczyk, left, superintendent, and Brandon Guyette, operator, outside the Waterbury (Vermont) Wastewater Treatment Plant.



A Medora Corporation - SolarBee / GridBee mixer floats on the large lagoon at the Waterbury plant.

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ing data, for example on dissolved oxygen or BOD, that could conclusively tell us that we were getting good mixing, so we actually did that ourselves," Krolczyk says. "It convinced us that we were getting good mixing and that it was not harming the process. It was actually enhancing it."

Krolczyk originally looked at a solar version of the same type of mixer, but his research convinced him that the grid-connected type would be more economical. Waterbury has since added two more GridBee units, a second one in the 6 million-gallon large lagoon, and another for one of the facility's two 3 million-gallon lagoons.

"We reduced our aerators from 17 to nine," Krolczyk says. "We're thinking about getting another circulator for our third lagoon. We've had very good success, and they are very low-maintenance. Even during the winter, these units don't miss a beat." The plant team reduces costs for its second and third mixers by doing the installation in-house and getting a reconstituted frame.

UPGRADE FOR PHOSPHORUS

While reducing electricity demand, Waterbury has been making process changes to meet a new requirement for phosphorous discharge in the Lake Champlain watershed. "We had to drop the phosphorus in our effluent from 3 to 7 ppm down to 0.8, and our new limit is going to be 0.2," Krolczyk says. "The whole plant, except for the lagoon system, got a complete upgrade."

Before the upgrade, Waterbury had a secondary lagoon system with chlorine disinfection. The new process adds a ballasted floc along with an anhydrous polymer and a coagulant to drop the phosphorus and solids out of the effluent. "We have a very enhanced process now," Krolczyk says. "We're able to get to any nutrient limit the EPA or the state wants us to meet."

The new process added a number of motors and other equipment: "The phosphorous treatment adds a lot of electrical load. Without the upgrade, we'd really be low with our electrical consumption."

AFTER THE STORM

The Waterbury plant has had one other adjustment that cuts electrical consumption: It shuts down some operations several days a week. That's possible because of reduced flows that are a lingering effect from Tropical Storm Irene in 2011. "We received a lot of damage in our little town," Krolczyk says. "The whole town was flooded. We lost our main pump station. We came within a couple of feet of our entire lagoon system washing out. We had surcharging from the river coming up our discharge pipe. It was an absolute disaster."

With help from the Federal Emergency Management Agency, the treatment plant has recovered, but the town has not. The plant has a design capacity of 0.51 mgd and a storage capacity of 12 million gallons. The typical flow had been about 0.28 mgd, but lately it is down to 0.15 mgd. "We lost a number of homes. We lost a number of businesses," Krolczyk says. A state office building was destroyed and rebuilt smaller than before; now it houses about 1,000 employees instead of 2,000.

"We've recovered from an equipment point of view, but from an economic point of view, we still haven't seen full recovery yet," Krolczyk says. "Our budget since Irene has really been affected by the loss of the influent." Flows are low enough that the plant can partially shut down

“We’re thinking about getting another circulator for our third lagoon. We’ve had very good success, and they are very low-maintenance. Even during the winter, these units don’t miss a beat.”

PETER KROLCZYK

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for part of the week: "The mixing and the aerating have to continue 24/7. What we turn off is the actual throughput. We just store it in the lagoons and don't allow it to run through the treatment plant."

Typically, the plant operates Monday, Tuesday, Wednesday and part of Thursday, and then the operations beyond mixing and aeration are shut down until the next Monday. The operators tried to run the plant at 100 to 120 gpm, but the results weren't satisfactory.

"It doesn't really perform well unless it's running at about 350 to 400 gpm. We just don't have the flows," Krolczyk says. "We monitor the levels of the lagoons. When they reach 12.5 feet, we turn the flow on. When the lagoons drop about a foot, we turn the flow off." Operating that way saves on chemicals and labor, as well as electricity. **tpo**

REWARDS FOR SAVINGS

Other treatment plants may have opportunities to save energy on mixing and aeration just like the Waterbury (Vermont) Wastewater Treatment Plant did. The project was supported by Efficiency Vermont, a statewide energy efficiency program funded through surcharges on utility bills. Similar programs exist in many states, and many offer services and incentives for wastewater treatment.

Low-power mixing technology is one of the tools Efficiency Vermont has found to be effective in some circumstances. "We tried to spread the word about how it worked, and Waterbury thought it would be a good fit for their system," says Michael Socks, an Efficiency Vermont engineer who worked on the Waterbury project.

"The operator loved not maintaining all those extra aerators out

there. The system itself has to be a good match for what these mixers can do. Nationwide, I'm guessing there might be quite a few that would fit in the same situation as Waterbury had."

Between 2012 and 2017, Efficiency Vermont completed projects at 58 wastewater treatment plants. "Identifying opportunities to reduce costs and helping operators project the cost for doing something a little bit different will not only reduce energy costs, but also in a lot of cases improve the quality of the treatment," Socks says.

Sources of information about energy efficiency programs available for wastewater treatment plants in other locations can include local utilities, the state energy office, or regional energy efficiency organizations.



PHOTOS COURTESY OF ATLAS COPCO

Blowers play a critical role in maintaining proper aeration for biological treatment in industrial and municipal wastewater treatment plants.

Blower Best Practices

LONG AND COST-EFFECTIVE BLOWER PERFORMANCE DEPENDS ON PROPER INSTALLATION, AN UNDERSTANDING OF CONTROL SYSTEMS, AND REGULARLY SCHEDULED MAINTENANCE

By Travis McGarrah

Blowers are integral to the wastewater treatment process, providing oxygen to help break down biological waste.

Smooth blower operation is essential to avoiding overaeration or loss of air supply. Blower manufacturers and treatment plant personnel can take steps to ensure that the equipment operates as intended. These include proper installation, machine control and maintenance.

INSTALLATION ALTITUDE

Blower installation is typically straightforward, but because blower designs vary, some issues can be missed. The most important is the machine's temperature limitation. Although the manufacturer is responsible for clearly stating the equipment's rating, that alone does not guarantee proper function.

Some machine ratings are set at sea level or only up to 3,000 feet elevation. When a blower is installed at higher elevation, it is critical to ask the manufacturer how this will affect the rating. Always consider that motors have less cooling air density at altitude.

HEAT REJECTION

Another key item is knowing the heat rejection for equipment installed

indoors. When equipment is run beyond its temperature limits, it may shut down and become inoperable, leading to huge aeration problems. In extreme cases, this may cause equipment failure and waste time and money.

It may seem that equipment rated for 110 degrees F is acceptable in an area with 100 degrees F maximum ambient temperature — but the blower room will always be hotter than it is outside. For example, a metal roof with no insulation generates significant extra heat.

When equipment is run beyond its temperature limits, it may shut down and become inoperable, leading to huge aeration problems. In extreme cases, this may cause equipment failure and waste of time and money.

To properly plan for ventilation, a complete analysis should be done to account for the outside temperature in addition to all heat sources in the blower room. With information on all potential heat sources, treatment plants can better analyze whether the equipment's temperature limit will be exceeded at extreme conditions. If so, increased ventilation or ducting of cooling air and heat losses may be needed.

It isn't always economical to plan for record temperatures, as these are rare, but it is good to know if the manufacturer has a way to run reduced loading to allow the equipment to operate. Running a blower at reduced load is better than not running it at all.

For colder climates, plants should closely monitor the minimum temperature and follow any requirements to keep lubrication and other items in line. Often, a blower room can be kept at an acceptable temperature just by using heat rejection from the equipment. Still, it remains necessary to check whether additional heating or ducting of process air is needed.

BLOWER CONTROL

Blower controls are easily overlooked but play a significant role in blower operation. Typically, the issue is lack of detail in documentation given to plant personnel. All blowers should have a controls narrative detailing how the controls work and how the plant interfaces with those controls.

Some blowers are supplied with no controls at all. Some come with proprietary micro-controllers and others with PLC-based controls. In each case, it is critical to understand how the equipment should be run. Most plants have a master control system that controls equipment automatically to maintain airflow or meet dissolved oxygen demand. Operators should thoroughly read, understand and follow the controls' function for panel operation.

Running equipment in the automatic control mode is key to meeting the process requirements and saving energy. These systems can typically save



Indoor blower installations need to consider proper ventilation and effective heating or cooling to keep blowers operating within their temperature limits (Atlas Copco ZIM multistage centrifugal blowers are pictured).

30 percent on energy versus a manual system. Operating equipment in manual due to misunderstanding of proper function can waste significant money.

Poorly working systems can put extra stress on equipment due to frequent shutdowns and restarts, leading to extra costs and overhauls down the road. To combat this, a plant needs good tuning from the equipment manufacturer and proper controls training for operators.

EFFECTIVE MAINTENANCE

For long-term equipment operation, maintenance is a must. Blower manufacturers provide recommended maintenance schedules that include information about routine items so that plants can appropriately budget for these expenses. Money spent on scheduled maintenance saves money in the long run.

For example, running a blower with a dirty filter allows dirt to be pulled into the equipment, and the dirt is then sent downstream, where it can cause clogged diffusers and other issues. In fact, the extra energy required to run a blower with a dirty filter would normally pay for the filter in less than one month due to the extra pressure loss at the blower inlet.

Aside from routine parts replacement, certain parts are only replaced when they stop working. Plant operators should ask for the expected lifetime

A photograph of a man with a beard, wearing a blue long-sleeved shirt and blue gloves. He is holding a yellow plastic container and pouring a yellow liquid into a clear test tube. He is looking intently at the test tube.

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Proper maintenance is essential to long-term, cost-effective blower operations (Atlas Copco ZS rotary screw blowers are pictured).

of all major components and the replacement lead time in case of failure. Manufacturers should offer this information and be realistic about expectations. Plants that cannot afford to have a unit down for the time required to get spare parts should keep major parts in stock.

Regular maintenance and planning for overhauls is even more important in plants running near capacity. In these situations, any down equipment can quickly lead to violation of requirements and heavy costs to

expedite parts and labor, or to rent equipment.

Most best practices for blower manufacturers and treatment plants boil down to one thing — effective communication. Because there is such variety in blower technology and plant applications, it is easy to overlook key aspects of installation and operation. Plants operators should describe their desired operation as clearly as possible, and manufacturers should give clear direction on how that can best be accomplished.

ABOUT THE AUTHOR

Travis McGarrah is product marketing manager for blower products for Atlas Copco. He can be reached at travis.mcgarrah@us.atlascopco.com or 281-840-0468.

tpo

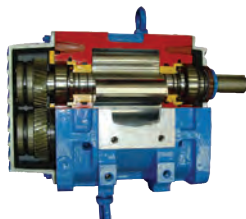
Pumps, Drives, Valves, Blowers and Distribution Systems

By Craig Mandli

Blowers

EURUS BLOWER ZG

ZG tri-lobe aeration blowers for MBBR, biosolids and/or equalization tanks from Eurus Blower are rated to 15 psig and flows to 6,000 cfm. They have integral-shaft ductile iron impellers, dual-splash lubrication, oversized roller bearings, piston ring air seals, Viton lip seals, as well as low vibration and noise characteristics. Packages have an integrated intake filter/silencer with washable filter media, heavy-duty base/integrated discharge silencer, vibration dampers, OSHA guard and a V-belt drive with auto belt tensioner. Options include motors, check valves, safety valves, flexible connectors and sound enclosures. **630-221-8282; www.eurusblower.com**



ZG tri-lobe aeration blowers from Eurus Blower



827 DVJ dry vacuum blower from Howden Roots

HOWDEN ROOTS 827 DVJ

The 827 DVJ dry vacuum blower from Howden Roots is a heavy-duty unit with integral ductile iron impellers. The casing headplates, gear cover and drive end are gray iron. Carburized and ground spur timing gears are taper-mounted on the shaft and secured with a locknut, cylindrical roller bearings, splash lubrication on both ends and easy-to-read sight glasses

for maintenance. The blower is capable of handling high inlet temperatures for rough applications because its efficient discharge jet plenum design allows cool atmospheric air to flow into the cylinder, allowing it to continue to run under blank-off conditions. It comes in a compact, lightweight package and is capable of delivering more than 5,700 cfm in an 8-inch gear diameter frame, as well as 28 inches Hg. **800-557-6687; www.howdenroots.com**

SULZER PUMPS SOLUTIONS HST TURBOCOMPRESSOR

The HST turbocompressor from Sulzer Pumps Solutions offers an advanced design with digitally controlled magnetic bearing technology and an efficient high-speed motor driven through a built-in frequency converter. It has no mechanical wearing parts or lubricants requiring minimal maintenance. This is made possible by an electronically controlled magnetic bearing technology, which levitates the integrated rotor/shaft/impeller single-piece assembly along the self-diagnostic features of the active magnetic bearing controller. The result is a compressor with no performance deterioration over time and no need for scheduled maintenance. **203-238-2700; www.sulzer.com**



HST turbocompressor from Sulzer Pumps Solutions

Drives

SCHNEIDER ELECTRIC / SQUARE D ALTIVAR PROCESS 680

The Altivar Process 680 from Schneider Electric / Square D is a compact, low harmonic drive system with an Active Front End, or AFE, with a three-level input switching stage architecture to reduce common mode voltage and improve performance and efficiency. The packaged, high-performance solution for low harmonic applications enables business optimization through improved life cycle asset management and optimized energy consumption. It reaches a total distortion factor of 2.3 percent, fulfilling the requirements per the IEEE 519 standard. It includes an efficiently designed input filter, which reduces common mode voltage, prolonging motor lifetime. This filter also allows the drive system to provide near sinusoidal input current regardless of percent input phase unbalance. It is UL 508A listed, available in Type 1 and Type 2 enclosures and compatible with generator sourced power. **919-266-3761; www.schneider-electric.us**



Altivar Process 680 from Schneider Electric / Square D



EC-2000 digital controller from DSI Dynamatic

Motor and Pump Controls

DSI DYNAMATIC EC-2000

The EC-2000 digital controller from DSI Dynamatic is a reliable way to breathe new life into any eddy current variable-speed drive, regardless of original manufacturer, including those no longer in production. It enables digital or analog integration of eddy current variable-speed drives with digital process control systems, SCADA systems or PLCs. The flexible keypad enables simple and intuitive programming of control parameters, digital display of any two of several status parameters and serial two-way communication and Ethernet IP interface for remote or automatic control. **800-548-2169; www.dynamatic.com**

GREYLINE INSTRUMENTS PSL 5.0

The PSL 5.0 Pump Station Level Controller from Greyline Instruments has redundant level sensing. It includes a noncontacting ultrasonic sensor and can be connected to a loop-powered pressure sensor for redundant sensing in applications with foam or grease. It will continuously recalibrate the pressure sensor and automatically switch back and forth from ultrasonic to the pressure sensor as required. It is designed for lift stations, wet wells and storage tanks. Calibration and relay setpoints are easy to enter through the user-friendly keypad and menu system. An automatic pump runtime logging and reporting system helps operators to plan pump maintenance and identify lazy pumps before they fail. It includes an isolated 4-20mA output and six programmable control relays for pump control, pump alternation and level alarms. An intrinsically safe sensor and a built-in data logger are optional. **315-788-9500; www.greyline.com**



PSL 5.0 Pump Station Level Controller from Greyline Instruments

WEIL PUMP PLC

PLC control panels from Weil Pump provide a platform for the control of just about any pumping system, including commercial, industrial, process and booster service pumps. They control one to four pumps and

work with a variety of level controls, from state-of-the-art transducers to traditional float switches. They are easy to use thanks to a large, color touch-screen and an intuitive user interface. Setting up wired or wireless remote monitoring and control of a system via network is simple. Additionally, the panels can integrate with an existing building automation system through BACnet and Modbus connections. Their advanced monitoring capabilities, multiple fail-safes and built-in troubleshooting provide early detection of faults to help keep mission-critical systems running smoothly and without interruption. **262-377-1399; www.weilpump.com**



PLC control panels from Weil Pump



Terminator Actuator from Halogen Valve Systems

Pipe/Parts/Components

HALOGEN VALVE SYSTEMS TERMINATOR ACTUATOR

The Terminator Actuator from Halogen Valve Systems is a safety device that automatically closes a chlorine cylinder or ton container valve in case of a leak or emergency. It is easily installed on either cylinders or ton containers that use standard USA-style chlorine valves. It is a DC-powered impact device that provides 40 to 50 ft-lbs of emergency closing torque as recommended by the Chlorine Institute. It uses the Gemini controller to provide power and logic to the actuator. The Gemini is a two-channel controller with an integral 12-volt battery that provides main and backup power. It provides a remote activation input for panic switches, gas detectors or activation via SCADA, and also offers a relay output that indicates when an emergency close operation has been performed. **949-261-5030; www.halogenvalve.com**

PEABODY ENGINEERING & SUPPLY PCS PUMP CONTAINMENT ENCLOSURE

The PCS Pump Containment Enclosure from Peabody Engineering & Supply is ideal for protecting the environment and your workers from injuries due to spilled or spraying chemicals. It can be used for indoor and outdoor applications for keeping pumps secure and out of the sun and weather. Polyethylene material allows for a wide range of chemical compatibility and is rugged and corrosion-free. It contains pumps/meters safely inside and protects workers and the environment from accidental leaks or chemical spray from tubing or pumps. An optional divider isolates pumps with different chemicals to allow for separate isolated containment and minimizes chemical reactions from mixed chemicals. A built-in reservoir collects discharged liquid and safely drains through a bottom drain port to an optional containment tank. They are available in blue or natural, with custom colors available by special request. The unit includes four aluminum clips and hardware for wall or deck mounting. **800-473-2263; www.4peabody.com**



PCS Pump Containment Enclosure from Peabody Engineering & Supply

PRIMEX ARC ARMOR

Arc Armor from PRIMEX is an enclosure system that reduces exposure to arc flash and electrical shock with its multiple-compartment design and single-wall construction. The service disconnect and motor starters are isolated into separate compartments designed with electrical and/or mechanical locking mechanisms to only allow access to qualified service personnel with the appropriate personal protective equipment.

The control logic circuitry is located in a separate compartment, where only control voltage is present (24-volt DC/120-volt AC). This design limits operator access and exposure to higher-voltage electrical components capable of producing an arc-flash incident. A control solution can be customized to individual specifications for lift stations, booster stations, stormwater, irrigation and industrial water/wastewater applications. Free-standing, wall-mount and pole-mount versions are available in a variety of enclosure sizes. It is UL/cUL listed. **844-477-4639; www.primexcontrols.com**



Arc Armor enclosure system from PRIMEX

Pumps



ProSeries-M M-3 peristaltic metering pump from Blue-White Industries

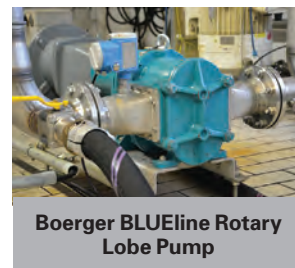
BLUE-WHITE INDUSTRIES PROSERIES-M M-3

The ProSeries-M M-3 peristaltic metering pump from Blue-White Industries has feed rates from 0.0002 to 33.3 gph, with pressure ratings to 125 psi. It comes with a heavy-duty multichannel pump tube, and a Tube Failure Detection System

that senses tube failure caused by conductive chemicals. The pump will automatically shut down until the problem is resolved. It also includes a brushless DC motor and a revolution count display and alarm. It is NEMA 4X (IP66), NSF Standard 61, CE and ETL listed. **714-893-8529; www.blue-white.com**

BOERGER BLUELINE ROTARY LOBE PUMP

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



Boerger BLUEline Rotary Lobe Pump



Fybroc centrifugal pump from CECO Environmental

CECO ENVIRONMENTAL FYBROC

The Fybroc advanced reinforced composite centrifugal pump from CECO Environmental is designed to handle corrosive liquids. Its fiberglass components use the Resin Transfer Molding, or RTM, process, which allows for the controlled placement of continuous-strand fiberglass mat

in high-stress areas. An irreversible chemical reaction during a curing process creates cross-links between a material's molecular chains, giving the cured polymer a 3D structure as a higher degree of rigidity than it possessed prior to curing. The carefully oriented continuous-strand fiberglass mat provides components with excellent physical strength and properties. Thermoset materials do not remelt.

The RTM technique optimizes both strength and corrosion-resistance. Critical components such as the single-piece casing permits the handling of normal pipe loads under full working pressures, extends the life of this component and provides strength without degradation in corrosive environments. **800-333-5475; www.cecovienviro.com**



**Concortor pumping system
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FLYGT - A XYLEM BRAND CONCERTOR

The Concortor smart, interconnected wastewater-pumping system from Flygt - a Xylem Brand senses the operating conditions of its environment, adapts its performance in real time, and provides feedback to pumping station operators. It offers energy savings of up to 70 percent compared to a conventional pumping system; it also reduces inventory by up to 80 percent due to flexible performance. Clog-free pumping operation and clean wet wells can save up to 80 percent in vacuum cleaning costs, according to the maker. Its compact design

reduces cabinet size by up to 50 percent. It offers a wide performance field to choose the right operating point, making performance fine-tuning simple. **855-995-4261; www.xylem.com**

FRANKLIN ELECTRIC INLINE 1100 SPECPAK

The Inline 1100 SpecPAK pressure-boosting system from Franklin Electric provides a simplified way to select a packaged system for boosting water pressure in applications requiring more than one pump. It connects easily to nearly any commercial, industrial, or large residential plumbing configuration, so instead of choosing individual components within the system, contractors simply determine how much water flow is required to be boosted to the desired constant pressure output. The system arrives ready for installation virtually anywhere with a product footprint small enough to be hung in a small utility closet. The pump itself, the Inline 1100, is a quiet, all-in-one constant water pressure system that contains the pump, motor, and drive in a compact package for easy and versatile system integration when designing water systems. Each unit provides up to 60 pounds of additional pressure. **866-271-2859; www.franklinengineered.com**



**Inline 1100 SpecPAK
pressure-boosting system
from Franklin Electric**



**6500 Series line of centrifugal
pumps from Gorman-Rupp**

GORMAN-RUPP 6500 SERIES

The 6500 Series line of solids- and clean liquid-handling end suction centrifugal pumps from Gorman-Rupp includes sizes from 3 to 16 inches, flows to 15,000 gpm, total dynamic head to 530 feet, and solids-handling capabilities up to 4 inches for applications in wastewater treatment plants, industrial facilities, construction, mining, and agricultural uses. The line comes standard with oversized bearings,

atmospheric vent, side-access inspection port (on solids-handling models), and an indexable Smart Scroll discharge locator. **419-755-1011; www.grpumps.com**

HYDRA-TECH PUMPS S4CSL

The S4CSL submersible, 4-inch, hydraulic-driven sand slurry pump from Hydra-Tech Pumps includes a built-in agitator used for stirring

up solids. It has hardened-alloy wear parts and is designed to be used in applications where settled solids must be put into suspension and pumped away with the discharge water. Primary applications include desilting ponds, lakes, and streams; other uses include filling sandbags to prevent beach erosion, performing tank and digester cleaning, or pumping sediment from caissons. It requires hydraulic inputs of up to 17 gpm at 2,800 psi, and when combined with HT20 to HT35 open and sound-attenuated power units, it is capable of output flows of up to 750 gpm. **570-645-3779; www.hydra-tech.com**



**S4CSL sand/slurry pump
from Hydra-Tech Pumps**



**EZstrip progressing
cavity pump from NOV**

NOV EZSTRIP

The EZstrip maintain-in-place progressing cavity pump from NOV has quick and safe removal of the full drivetrain including rotor, stator, shaft, rod and seal in minutes without electrical disconnection. The access covers provide 360-degree access to the coupling rod and drive shaft for easy inspection. With its smooth-profile positive torque split coupling rod, maintenance and assembly times are reduced. The tie bar-free design allows the EZstator clamps to lock the stator securely in

place, further reducing stator removal time by over 50 percent and improving safety of common maintenance operations. In addition, the fixed support foot and stator clamp assembly further aids rotor and stator removal. It is available in cast iron or stainless steel with a choice of rotor and stator materials to suit individual applications. **832-424-7300; www.nov.com**

PULSAFEEDER PULSATRON

PULSATron electronic metering pumps from Pulsafeeder have a guided check valve system with a seat-and-ball design that ensures reliable and accurate metering. Their fin-cooled solenoid enclosure dissipates heat, ensuring that the pressure-handling capability of the pump can be maintained. The thermally protected solenoid protects the pump from seizing up in extreme heat conditions with an automatic reset feature, allowing the pump to resume operation upon cool-down. Units are tested and rated under hot conditions so flow and pressure ratings meet specifications. They offer flows up to 600 gpd and pressures up to 300 psi, with a range of flows and pressures. Agency approvals include CE, ETL, ETL san. and NSF 61 approval on polyvinylidene fluoride material and degassing head models. **800-333-6677; www.pulsatron.com**



**PULSATron electronic metering
pumps from Pulsafeeder**



**Patz Shaft Drive Pumps,
distributed by ScreenCo Systems**

SCREENCO SYSTEMS PATZ SHAFT DRIVE PUMPS

Patz Shaft Drive Pumps, distributed by ScreenCo Systems, are vertical pit pumps that can be used in aboveground or underground storage tanks and include choices of single- or three-phase electric motors. They have high solids and grit capacities with large centrifugal pumps and hardened steel impellers. High capacities include the 3333 Series up to 500 gpm, and the 4444 Series up to 1,580 gpm. They can be deployed in depths from 3 feet to 12 feet 8 inches. The 6000 and 8000 series have a three-point hitch with PTO drive and can offer up to 3,500 gpm at depths from 6 to 12 feet. They can be used with

an agitator nozzle to mix and pump fast. The 616 vertical prop agitator is capable of mixing at 9,000 gpm, keeping grit and solids mixed at pit depths of 6 to 16 feet. **208-790-8770; www.screencosystems.com**

SEEPLEX SMART CONVEYING TECHNOLOGY

SEEPLEX progressive cavity pumps equipped with the Smart Conveying Technology design offer easy access to the specially engineered stator and rotor for quick maintenance, short downtimes, more energy efficiency and low life cycle costs. Repairs can be done by one person without special tools and without the need to remove the pump from either suction or discharge piping. They have convey capacities up to 500 gpm and handle pressures up to 120 psi in a wide variety of wastewater applications. **937-864-7150; www.seepex.com**



SEEPLEX progressive cavity pumps

VERTIFLO PUMP SERIES 800



Series 800 sump pump from Vertiflo Pump

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

Valves

BONOMI NORTH AMERICA NSF BUTTERFLY VALVE

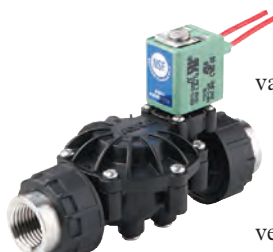
NSF butterfly valve packages from Bonomi North America combine valves with Valbia-brand actuators for optimal performance, long life and quiet operation. Actuator choices include aluminum-body pneumatic actuators, UL-listed VB Series electric actuators with thermoplastic housing or VBM Series electric actuators with metal enclosures for industrial or commercial applications. N500 Series wafer and N501 lug body butterfly valves have ductile iron body construction with EPDM rubber seats. They are available with stainless steel disc or nylon-coated disc. All are approved to NSF/ANSI 61,372. Sizes range from 2 through 12 inches. Their long-lasting two-piece stem is designed for critical automation applications. They are rated for 200 psi working pressure with high flow coefficient. **704-412-9031; www.bonominorthamerica.com**



Butterfly valve packages from Bonomi North America

EMERSON ASCO 212 SERIES

The ASCO 212 Series composite solenoid valve from Emerson combines lead-free construction proven up to 1 million cycles with high temperature and pressure ratings, plus testing and certification by NSF International. It provides a fast, cost-effective assembly via its FasN universal valve connection system. A water treatment system's piping can be quickly connected to the NPT threads on the valve's connection system, saving installation cost and time. **888-637-7333; www.emerson.com tpo**



ASCO 212 Series composite solenoid valve from Emerson

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

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- ☐ Howden Roots 827 DVJ dry vacuum blower
- ☐ Sulzer Pumps Solutions HST turbocompressor

Drives

- ☐ Schneider Electric / Square D Altivar Process 680

Motor and Pump Controls

- ☐ DSI Dynamatic EC-2000 digital controller
- ☐ Greyline Instruments PSL 5.0 Pump Station Level Controller
- ☐ Weil Pump PLC control panels

Pipe/Parts/Components

- ☐ Halogen Valve Systems Terminator Actuator
- ☐ Peabody Engineering & Supply PCS Pump Containment Enclosure
- ☐ PRIMEX Arc Armor enclosure system

Pumps

- ☐ Blue-White Industries ProSeries-M M-3 peristaltic metering pump
- ☐ Boerger BLUEline Rotary Lobe Pump
- ☐ CECO Environmental Fybroc centrifugal pump
- ☐ Flygt - a Xylem Brand, Concertor pumping system
- ☐ Franklin Electric Inline 1100 SpecPAK pressure-boosting system

- ☐ Gorman-Rupp 6500 Series line of centrifugal pumps
- ☐ Hydra-Tech Pumps S4CSL sand/slurry pump
- ☐ NOV EZstrip progressing cavity pump
- ☐ Pulsafeeder PULSAtron electronic metering pumps
- ☐ ScreenCo Systems (distributor) Patz Shaft Drive Pumps
- ☐ SEEPLEX progressive cavity pumps
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TPO0718

By Craig Mandli

Chopper pump solves clogging by macerating solids from screens at treatment plant

Problem

The wastewater treatment plant in Hamilton, Alabama, has a solids handling pump station that discharges onto screens to trap solids. Since the station has high solids content, the city had to de-rag the solids handling pumps every month as they could not handle mopheads, rags, greasy hair-balls, plastics and debris.

Solution

Pump & Process Equipment, a municipal distributor of **Crane Pumps & Systems**, provided a 4-inch **Barnes Sithe submersible chopper pump** with a monovane impeller and 7.5 hp motor.



RESULT

The pump had not clogged after nearly a year after installation. During its routine six-month inspection, the pump's stainless steel heat-treated blades were found in pristine condition and had retained sharpness. The pump continues as the lead pump in the station. **937-778-8947; www.cranepumps.com**

City retrofits existing control valve with automation for water efficiency

Problem

The city of Sheridan, Wyoming, wanted to add automation and instrumentation to bring part of its system online, enhance control over the water system and provide system redundancy.

Solution

The team repurposed an existing pressure-reducing valve to leverage gravity flow from an upstream treatment plant to fill a water storage tank. By reconfiguring the valve operation with instrumentation and automation (in combination with a realignment of buried valves in the yard), they brought this otherwise hidden valve live into the control system. The project saved power as the booster station would not have to be used to fill the tank, although that options remained as redundancy when needed. The existing Singer Model 106-PR was repurposed to a **Singer Model 106-2SC-PCO**. The new valve will be controlled by a control panel via new valve-mounted solenoids that replaced the hydraulic controlled mechanical pilots. An electronic valve position indicator and differential pressure transmitter were also added. To control the reconfigured valve for both flow and level control, a Singer industrial control panel was added.



RESULT

With two options to fill the tank, the city can use real-time data to choose to run the most advantageous option at any time. This can be done remotely from the control room at the head office. **888-764-7858; www.singervalue.com**

Packaged pump system used in switch to sodium hypochlorite

Problem

The city of Camden, Tennessee, was changing its disinfection system from chlorine gas to sodium hypochlorite. The city needed a metering pump to fit in a limited space.

Solution

The city selected two **Flowrox Packaged Pump Systems** with two pumps each. The peristaltic pumps do not vapor lock when sodium hypochlorite becomes unstable and do not fail whether the state of the sodium hypochlorite is gaseous or liquid. They have 4-20mA input and output, a NEMA 4X enclosure, 2,500-1 turndown and internal tube leak detection. They are on a wall-mount base within a containment basin. In case of malfunction, the sodium hypochlorite is captured in the base. The assembly includes pulsation dampeners, safety shut-off, and drain valves, pressure relief valves, and gauges. The base can be equipped with an alarm and drain valve.



RESULT

The systems saved the city space and created a safer working environment. **410-636-2250; www.flowrox.com**

Septage plant helps pump station achieve biosolids quality goal

Problem

In Newark, Ohio, a pump station was struggling with rags and hair. Despite having a grinder, debris such as plastic were getting into the digesters and adversely affecting biosolids quality at the plant, which treats 2.75 million gallons per year of septage waste.

Solution

A self-contained, fully automatic **Raptor Septage Acceptance Plant** from **Lakeside Equipment** was installed. With a heavy-duty three-plane fine screen, it employs a rotating rake that passes through the full depth of the basket bars to remove debris from the screening area. The rake deposits screenings in a central screw conveyor hopper that leads to a transport tube. Screenings are spray-washed in two stages to return organic materials to the liquid stream.



RESULT

The unit's smaller footprint made it easy to use and economical, according to Darin Wise, plant superintendent. "I fully expect our unit to give us a good 20-years-plus of dependable duty," he reports. **630-837-5640; www.lakeside-equipment.com**

Rural collections system simplifies lift station maintenance with aboveground systems

Problem

The city of Perryville, Missouri, employs a small staff to manage its lift station network, spread over many miles. The submersible pump lift stations were unreliable and required time-consuming confined-space entry and frequent pump replacements.

Solution

The city now operates six **Wet Well Mounted Pump Stations** from **Smith & Loveless**. All pumps, valves and controls are housed above ground-level and outside the wet well. “You don’t have to be in the wastewater and dealing with all the hazardous situations,” says Linda Chappius, maintenance technician.

RESULT

Chappius inspects each station daily without confined-space entry. This has helped the city achieve continuity of maintenance, simplify its pump station maintenance program, and achieve superior station longevity. The first station, installed in 1995, is still in operation. “It’s been a tremendously good lift station,” Chappius says. “For where it’s located and what it goes through for day-to-day use, it’s an excellent piece of equipment.” 800-898-9122; www.smithandloveless.com



Biogas blower systems enable renewable energy for specialty foods plant

Problem

Kroger’s K.B. Specialty Foods wastewater treatment system in Greensburg, Indiana, was inefficient and was not harnessing the energy potential from the biogas output of food byproducts. Suzanne Lindsay-Walker, director of sustainability, announced a goal of “moving toward becoming a zero-waste company by 2020.” Plans for upgraded systems became essential to improving efficiency and capturing renewable energy for the plant.

Solution

Universal Blower Pac provided two **biogas blower systems** to extract the gas created in the anaerobic reactor and discharge it to a 60 kW generator. The company also provided two 3C-Hybrid blower systems to increase aeration efficiency in the sequencing batch reactor.



RESULT

The biogas and hybrid blowers improved efficiency, providing long-term energy and maintenance savings. The facility is expected to eventually generate 40 percent of the plant’s electrical needs. 317-773-7256; www.universalblowerpac.com

Submersible chopper pump stands strong through tropical storm

Problem

The main lift station serving the wastewater treatment plant in Morgan’s Point, Texas, experienced problems with its three standard nonclog pumps. The pumps frequently clogged with shop rags, pieces of lumber, plastic bottles, gloves and wet wipes when rainfall reached or exceeded 2 inches. Over seven years, these issues required the city to spend \$100,000 for pump maintenance and service.

Solution

The city approved a **Vaughan SE-Series Submersible Chopper Pump**, along with a complete guide rail system to solve the clogging problem.

RESULT

After the pumps were installed in July 2016, the city experienced more than 100 inches of rain with no plugging incidents or other issues. During Hurricane Harvey in 2017, the pumps ran continuously for 72 hours without incident while pumping more than 2.5 million gallons of unscreened sewage through the lift station. “I just wish we had purchased these pumps years ago to eliminate the maintenance headaches we endured and the costs we incurred keeping our previous pumps in operation,” says Brian Schneider, city administrator. “If the former pumps were still installed, all of the residents would have had sewage in their homes.” 888-249-2467; www.chopperpumps.com tpo



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Jane Moore
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PRODUCTION SUPERVISOR
Philipsburg (Pa.) Water Treatment Plant



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1. BLUE-WHITE INDUSTRIES F-461 FLOWMETER

There are no metals in the fluid path of F-461 Series in-line Variable Area Flowmeters from Blue-White Industries, making the units well-suited for use in many ultrapure applications. Constructed of chemical-resistant polysulfone, the flowmeters offer better resistance to high temperatures, pressures and a broad use of harsh chemicals. The high-capacity F-461 utilizes precisely engineered ridges molded into the meter body, which guide polytetrafluoroethylene floats. Maximum fluid temperature is 210 degrees F at 0 psi with polyvinylidene fluoride adapters and 130 degrees F with polyvinyl chloride adapters. Maximum working pressure is 150 psig at 70 degrees F. An optional splash shield is available. **714-893-8529; www.blue-white.com**

2. KRAUSZ USA HYMAX 2 COUPLING

The HYMAX 2 Coupling from Krausz USA features a flip gasket that easily flips in or out to accommodate different pipe O.D.s, allowing for faster and more efficient installations. The gasket also eliminates gasket removal mistakes since there is no need to tear out gasket layers to accommodate larger pipe O.D.s. The coupling's two top-facing bolts eliminate the need for extensive under-pipe digging, minimizing installer time in the ditch and maximizing worker safety. The HYMAX 2 features a T-handle to make it easy to carry and adjust on the pipe and is a durable, long-term repair solution that can reliably withstand harsh ground conditions. **855-457-2879; www.krauszusa.com**

3. SUEZ MODULETRAC MOBILE APP

SUEZ's mobile app, ModuleTrac, tracks, monitors and analyzes ZeeWeed ultrafiltration membranes. Through a user's mobile device, the app scans and tracks the location and maintenance history of ZeeWeed membranes using a unique bar code placed on each module. The information is then fed into InSight, which analyzes, archives, and reports on

the data at a train, cassette, or module level. From there, users can view data, run reports, and create graphics and charts to monitor and optimize their water treatment systems. **www.degremont-technologies.com**

4. XYLEM FLYGT 4220 ADAPTABLE WASTEWATER MIXER

The Flygt 4220 from Xylem is a compact submersible wastewater mixer featuring easily adaptable output capabilities and can be controlled to deliver only the output required, saving on energy consumption. The mixer fits all common installation systems and is ideal for retrofits, slotting easily into an existing installation. It is based on Xylem's Flygt Dirigo platform of integrated power electronics, including an IE4 super premium efficiency motor available in 1.5, 2, 3 and 4 hp versions. **855-995-4261; www.xylem.com**

5. WILCO USA PUMP PARTS REPLACEMENT KIT PROGRAM

Wilo USA's kit program features two types of standard kits for both oiled and oilless motors, the Power Kit and the Hydraulic Kit, for select FA pumps ranging from 2.8 to 25 hp. The Power Kit has the pump motor and necessary cables, while the Hydraulic Kit includes a volute kit, suction cover (if applicable) and an impeller kit, which has a full-sized unbalanced impeller that can be trimmed and balanced per the necessary specifications. The program was designed to allow locally authorized distributors to configure complete pumps within 24 hours, reducing lead time. **888-945-6872; www.wilo-usa.com**

6. UTICOM SYSTEMS U1864 CONFINED-SPACE COVER SIGN

The U1864 confined-space cover signs from Uticom Systems are durable and easy to install and store. The signs increase confined-space safety and reduce the risk of falling into or entering an uncovered manhole. They comply with OSHA 1910.146, 1910.121 and ANSI Z535.1, Z535.2 and Z535.3. The signs have a nonskid overlamine and are made



of 0.125-inch reflective polycarbonate material. They are also available in an 18-by-36-inch label, backed with a high-strength adhesive to apply to plywood. **800-548-5321; www.uticom.net**

7. SCOT PUMP STAMPED 304 STAINLESS STEEL PUMPS

The expanded line of Scot Pump's stamped 304 stainless steel pumps with NPT connections includes nine new ANSI flanged center-line discharge models. The new 320-328 series covers up to 385 gpm and 275 feet of head. The pumps feature a slip-fit O-ring/flinger design, which prevents leaks caused by deformation as a result of overtightening. They are mounted on a JM frame and incorporate a back pullout design and weep holes in the impeller. The weep holes extend seal life by creating fluid movement in the seal cavity, which aids in venting of air at startup. **888-945-6872; www.scotpump.com**

8. ASAHI/AMERICA SERIES 17 ELECTRIC ACTUATOR

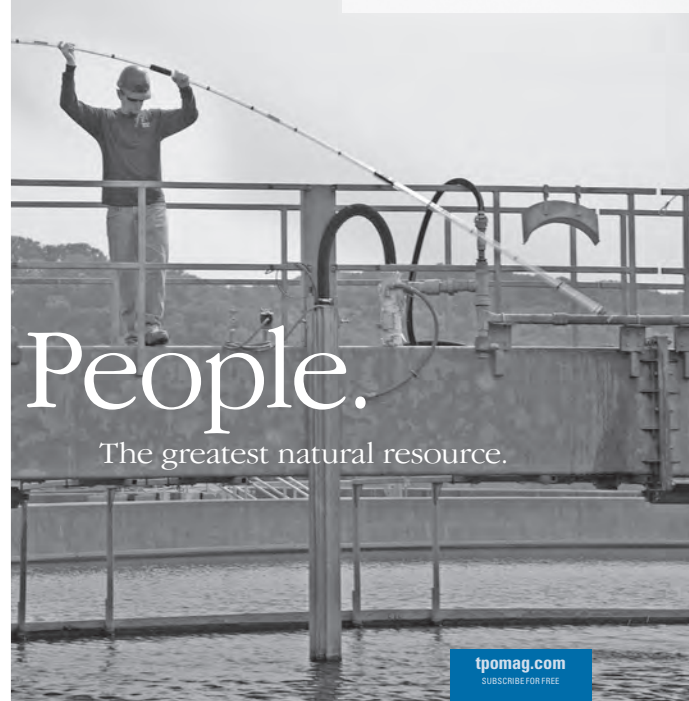
The compact and lightweight Series 17 electric actuator from Asahi/America features a reversing motor with multivoltage capabilities, an internal heater, auxiliary switches and two LED position indicators. Internally, the actuator includes a permanently lubricated steel gear train and declutchable manual override. They come with the company's Type-21 ball valve and Type-57P butterfly valve. **800-343-3618; www.asahi-america.com**

9. FLOTTWEG SEPARATION TECHNOLOGY XELLETOR CENTRIFUGE SERIES

Flottweg Separation Technology's Xellektor series of decanter centrifuges uses a new intake configuration to reduce the consumption of polymers and increase throughput, saving on sludge disposal costs while maintaining a separation efficiency greater than 99 percent. It reduces the volume of biosolids by producing a drier cake. It offers fully automatic control of the bowl and differential speeds, even when there are

// What makes it all work is the people. I am really proud of our team. We look for responsibility and a good work ethic. We can teach wastewater operation or lab technique, but we can't teach character. Each person brings that with them the first day."

James Pendleton
Plant Superintendent
Harpeth Valley Utilities District Wastewater Treatment Plant
Nashville, Tenn.



fluctuations in the feed, using the Flottweg Simp Control. Optional automatic flocculant dosing with real-time monitoring also helps reduce polymer consumption. It has closed construction, providing a shield against noise and sewage sludge aerosols. **859-448-2331; www.flottweg.com**

10. MUELLER WATER PRODUCTS ME-8 ENCODER

The Mueller Encoder Eight (ME-8) register combines reliable mechanical components with a new automated data acquisition system that improves meter accuracy and functionality for utilities. Using a heat-treated tempered glass lens and corrosion-resistant copper can to house the register light tubes, electronics, self-lubricating gearing, and drive magnet, the ME-8 is designed to provide dependable service with no maintenance required. It is available for use on all current Mueller Systems positive displacement meters from 5/8- through 2-inch sizes. **800-523-8618; www.muellersystems.com**

11. ENDRESS+HAUSER PROSONIC FLOW E 100 ULTRASONIC FLOWMETER

The Proline Prosonic Flow E 100 ultrasonic flowmeter from Endress+Hauser measures flow, temperature, and volume of process water regardless of conductivity, pressure, density or temperature. It can measure flow in both directions, as well as water temperature, making it ideal for measuring demineralized water in boiler condensate return lines or monitoring controlling feedwater temperature. The all-stainless steel Prosonic Flow E 100 works in process pressures up to 363 psi and in temperatures from 32 to 302 degrees F. It is available in line sizes from 2 to 6 inches for measuring flows up to 1,680 gpm with accuracy of plus or minus 0.5 percent fs. **888-363-7377; www.us.endress.com tpo**

(continued)

water: product spotlight

Versatile sampling

By Craig Mandli

What if the same sampling unit could be used to spot-check a tank or conduct long-term monitoring at remote sites? The **Aqua TROLL 500** from **In-Situ** can do both.

This multiprobe enables wireless data collection when used as a handheld, plus easy integration with control systems and telemetry for long-term installation. With interchangeable sensors, it replaces multiple instruments and saves time in the field to reduce overall monitoring costs. Highly stable sensors need minimal maintenance and calibration, streamlining reliable data collection.

“Our goal with the Aqua TROLL 500 is to help bring sampling and monitoring into the mobile era,” says Ashley Steinbach, In-Situ product manager. “For us, it’s about helping people waste less time on data collection, so they can spend more time actually making decisions with their data.”

Autoconfiguration and fast sensor response speed up sampling, while automated data collection eliminates the need to record data in field logs. The VuSitu Mobile App records data directly from the probe to a mobile device when using the instrument as a handheld. For long-term monitoring, the HydroVu platform provides constant online data access. Whether a project requires short- or long-term monitoring, the Aqua TROLL is suited for the job.

“It connects right into telemetry systems for long-term monitoring,” Steinbach says. “Also, it comes with wireless-enabled data collection for surface water spot-checks.”

The sonde is designed with ultrastable, interchangeable wet-mateable sensors, for lower total cost of ownership. Like all of In-Situ’s high-performance probes, the Aqua TROLL 500 is built for reliability and ease of use. A convenient anti-fouling wiper and corrosion-resistant housing help

Aqua TROLL 500 from In-Situ



protect data quality in harsh conditions, with simplified calibration and setup to minimize user error. Streamlined data collection and automatic environmental compensation mean zero post-processing. The probe easily integrates with control systems and telemetry, as well as our online HydroVu data management platform for remote monitoring.

The Aqua TROLL 500 works in a wide range of applications such as surface water spot sampling and profiling, remote monitoring via telemetry, long-term drinking water, wastewater or stormwater monitoring, aquaculture and for wired or wireless water-quality networks. The product family is designed to give scientists and engineers more flexibility to formulate sampling and monitoring programs that fit their specific needs and budget requirements.

“It’s one of the most flexible probes we make,” Steinbach says. “It is designed to help trim monitoring costs and time in the field.”

800-446-7488; www.in-situ.com

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- ☐ 5. Wilo USA pump parts replacement kit program
- ☐ 6. Uticom Systems U1864D confined space cover sign
- ☐ 7. Scot Pump stamped 304 stainless steel pumps
- ☐ 8. Asahi/America Series 17 electric actuator
- ☐ 9. Flottweg Separation Technology Xelletor centrifuge series
- ☐ 10. Mueller Water Products Encoder Eight (ME-8) register
- ☐ 11. Endress+Hauser Proline Prosonic Flow E 100 ultrasonic flowmeter
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wastewater: product spotlight

Effective wet-weather treatment

By Craig Mandli



AquaPrime from Aqua-Aerobic Systems

The idea of cloth-media filtration is nothing new for tertiary treatment. However, the technology is now available for primary treatment, as well as for assistance in high wet-weather flows.

According to **Aqua-Aerobic Systems**, the **AquaPrime cloth-media filtration system** can perform reliable primary treatment in a fraction of the footprint of conventional primary settling basins while also reducing load on biological treatment systems, according to John Dyson, the company's AquaPrime product channel manager.

"Our technology is different from other solutions because it is based on the proven tertiary filtration solutions but combines filtration with settling of solids and floatable removal into one treatment solution," he says. "Because of the three combined methods of solids removal, we are capable of achieving greater than 80 percent removal of TSS and 50 percent removal of BOD in primary applications without chemical addition."

The system can be an effective solution for combined sewer overflow, sanitary sewer overflow, and stormwater applications due to its proven removal efficiencies and high-quality effluent, even under varying influent conditions. It uses a disc configuration and the OptiFiber PF-14 pile cloth filtration media to effectively filter high solids waste streams without the use of chemicals. That makes it ideal for primary wastewater treatment and wet-weather applications due to its proven removal efficiencies and high-quality effluent, even under varying influent conditions.

"It actually treats excess wet-weather flows by splitting flow around primary/secondary processes, then blending the secondary clarifier effluent with the raw wastewater to achieve low level TSS and BOD effluent," Dyson says.

The system's three zones of solids removal include floatable, settled solids and filtration zones to effectively filter wet-weather flows with or without the use of chemicals. The system's flexibility allows for dual use for tertiary and/or wet-weather treatment based on a facility's daily treatment needs. According to Dyson, several years of research and development went into this sustainable treatment solution.

"The AquaPrime was in development and testing for 4 1/2 years before it was introduced to the market at the end of 2016," he says. "The technology is specifically developed to provided advanced primary treatment, which is targeted to the trend of wastewater facilities to be green, sustainable and energy neutral. Advanced primary treatment provides reduced solids and carbon to the secondary process resulting lower aeration and reduced energy cost."

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BCR announces rebranding rollout

BCR announced it will roll out a repositioning and brand refresh this spring, which parallels a recently announced expansion to provide its biosolids treatment technologies across North America. Beyond the Southeast, where BCR has a number of installations, many customers will be hearing about BCR for the first time. The company's new branding will continue roll out across all touch points in the coming months, including a new website launched in early May.

Asahi/America releases new valve catalog

Asahi/America released a new version of its Thermoplastic Valves, Actuation and Controls catalog. The 232-page catalog contains comprehensive technical information and drawings of the company's complete line of thermoplastic valves and actuators, including the new Type-57P butterfly valve, the new Series 17 electric actuator, and the new Omni Type-27 ball valve. The catalog provides customers with product specifications, dimensional information, Cv values, and pressure versus temperature ratings. Additional information includes detailed parts lists, features and benefits, and troubleshooting tips.

DDI Heat Exchangers announces first order for aerobic market

DDI Heat Exchangers announced that Triplepoint Environmental placed its first order for the company's heat exchanger to be used in the aerobic lagoon market.

Trihedral Engineering announces new sales offices, team members

To meet increased demand and to continue to expand VTScada use beyond its traditional areas, Trihedral Engineering announced new sales offices in Long Beach, California, and Chicago. This brings the total to eight offices in three countries, serving customers in over 100 countries.

To anchor these new offices, the company added two new sales team members. In Long Beach, Adam Bush has a degree in computer science and over 13 years of direct experience in the control systems industry. In Chicago, Dan Naughton is a mechanical engineer with years of experience selling industrial computers to monitoring and control customers in a variety of industries. He will be responsible for VTScada sales across the Midwest. **tpo**



Adam Bush



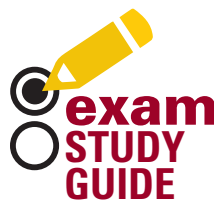
Dan Naughton



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By Ron Trygar

WASTEWATER

An advanced wastewater treatment plant is designed and built to remove BOD, TSS, total nitrogen and total phosphorus to very low levels before discharging effluent to a river. The unit processes are arranged in the following order: primary clarification, anaerobic zone, pre-anoxic zone, aerobic zone, post-anoxic zone, re-aeration zone, final clarifiers, filtration, disinfection. What process is described here?

- A. Modified Ludzack-Ettinger, or MLE, process
- B. Wuhrmann process
- C. Kraus process
- D. Bardenpho process

ANSWER: D. The other processes used as distractors (incorrect choices) are modifications of the activated sludge or nutrient-removal processes, only the Bardenpho uses the processes listed in the order shown. Keep in mind that we are really only discussing biological nutrient removal in this question: Some Bardenpho facilities do not have primary clarifiers or filters.

The placement of the anaerobic, anoxic and aerobic basins and the internal recycle streams give the Bardenpho process its characteristics. Many other processes use these types of basins but in a different order, or by varying the number of basins. Processes similar to Bardenpho are Johannesburg, Virginia Initiative, and University of Cape Town, to name a few.

DRINKING WATER

What role does adding a dosage of 2 to 5 mg/L of sodium hexametaphosphate, or SHMP, play in reverse osmosis water treatment?

- A. SHMP inhibits the precipitation of calcium sulfate on the membrane.
- B. SHMP will reduce the amount of dissolved hydrogen sulfide gas that must be degasified.
- C. SHMP will eliminate the need for degasification after membrane treatment.
- D. SHMP will eliminate the need to provide corrosion prevention in the distribution system.

ANSWER: A. The source water to a reverse osmosis water treatment plant can contain dissolved calcium carbonate and calcium sulfate. These can cause significant scaling on the membrane if not controlled. Reducing the pH with an acid helps keep the calcium carbonate from becoming a problem by keeping the alkalinity in the more soluble bicarbonate form. The calcium sulfate, however, can continue to precipitate (form scale) over a wider pH range. The SHMP inhibits both calcium carbonate and calcium sulfate from becoming crystallized and forming the scale on the membrane surface.

ABOUT THE AUTHOR

Ron Trygar, a certified environmental trainer, is the senior training specialist for water and wastewater programs at the University of Florida TREEO Center. He has worked in the wastewater industry for more than 30 years and holds Class A wastewater treatment operator and Class B drinking water operator licenses in Florida. **tpo**

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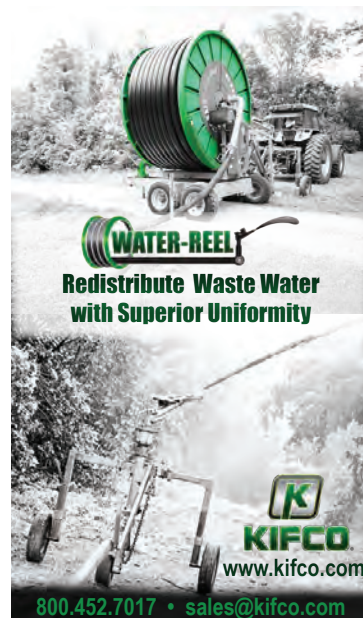
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people/awards

The **Pollution Management** engineering firm, which designed upgrades to Riviera Utilities' wastewater works, won an American Council of Engineering Companies of Arkansas Excellence Award.

The **City of Braham Wastewater Treatment Facility** received a 2017 Certificate of Commendation from the Minnesota Pollution Control Agency.

The Florida Department of Environmental Protection presented 2017 Plant Operations Excellence Awards to the **Military Point Regional Advanced Wastewater Treatment Facility** and the **Rivercamps on Crooked Creek Wastewater Treatment Plant**.

The **Northeast Ohio Regional Sewer District Southerly Wastewater Treatment Plant** in Cleveland received an Envision Silver Award for sustainable infrastructure.

Diana Golt was hired as public works director for Kent County, Delaware.

Tom Axsom was hired as the assistant director of operations for the City of Bloomington (Indiana) Utilities. **Joseph Potts** was hired as superintendent of the Blucher Poole Wastewater Treatment Plant.

Michael Ramsey, public works director in Westmont, Illinois, received the George Warren Fuller Award from the Illinois Section, American Water Works Association for distinguished service to the water supply industry.

The **Lithia Water Treatment Plant** was one of 14 facilities recognized by the Florida Department of Environmental Protection with the 2017 Plant Operations Excellence Award.

The **City of Grand Junction** received the Colorado Award for Excellence in Water Fluoridation.

The **Portland Water District** received the 2018 Espy Land Heritage Award from the Maine Coast Heritage Trust for its commitment to protecting forestland in the Sebago Lake watershed and so maintaining the lake's high quality as a source of public drinking water.

Nathan Lavalley of Burlington, Vermont, received a 2017 Regional Wastewater Treatment Plant Operator of the Year Excellence award from the EPA.

Bruce Rittmann of Arizona State University, and **Mark van Loosdrecht** of Delft University of Technology in the Netherlands, were named 2018 Stockholm Water Prize laureates for their work in pioneering biotechnology-based water and wastewater treatment processes.

The **Padre Dam Municipal Water District** received the 2018 Recycled Water Community Outreach/Public Education Program of the Year award from WaterReuse California.

The South Orange County Wastewater Authority's **J.B. Latham Wastewater Treatment Plant** was named Plant of the Year by the local chapter of the California Water Environment Association.

Spartanburg Water's **Syndee Poteat** received the Laboratory Analyst Excellence Award from the Water Environment Association of South Carolina.

events

July 8-11

Kentucky/Tennessee Section AWWA Annual Conference, Music City Center, Nashville, Tennessee. Visit www.kytnwpc.org.

July 15-18

Georgia Section AWWA Annual Conference, Savannah International Trade & Convention Center. Visit www.gawp.org.

July 19-20

Nebraska Water Environment Association Heartland Operators Conference, Holiday Inn, Kearney, Nebraska. Visit www.nebwea.org.

July 24-26

AWWA Summer Workshop 2018, Holiday Inn Denver-Cherry Creek, Colorado. Visit www.awwa.org.

July 29-31

Water Environment Federation Disinfection and Reuse Symposium, Portland (Oregon) Crowne Plaza. Visit www.wef.org.

July 30-31

Virginia Water Environment Association Good Lab Practices Conference, Omni Charlottesville. Visit www.vwea.org.

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