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let's be clear

On the Other Hand ...

A PUBLIC WORKS DIRECTOR READ MY COLUMN ABOUT A SLOW PACE OF WORK IN THE PUBLIC SECTOR. HIS RESPONSE WAS A POINT VERY WELL TAKEN.

By Ted J. Rulseh, Editor



Last August in this space I wrote about the difference between the pace of work in the private sector and the public (and utility) sector.

I noted based on experience in both worlds that people in the private sector do things at a quicker pace, with more urgency, with more responsiveness to customers.

About two months after the column appeared I got a response — the only one I received — from a public works director, and it made me, figuratively, slap the side of my face. Here is some of what this gentleman,

Jim Massengill from Deming, New Mexico, had to say.

He first asked whether I'd recently had some sort of "less than desirable experience at a city or county office" and used that as a reason to disrespect public workers (that wasn't the case). He went on to mention his own experience in the public and private sectors.

"Each has their own set of problems, but for the most part, each has good employees who care. For 10 years I've watched employees go out in the middle of the night to fix water leaks and sewer backups to ensure natural gas was flowing when cold snaps hit in the middle of the winter and, yes, in the middle of the night."

STANDING CORRECTED

Point extremely well taken. Failing to mention that part of utility life was a serious omission on my part. Sure, there are times my wife and I have received less than stellar service from the government in the township where we live — like the time it took two months and three phone calls to secure a dog license.

But then there was the time I observed a large pothole in our town road, called the town to politely report it and saw that it was filled in the very next day. As for the plant operators who read this magazine, in almost every issue there's an anecdote or two about a team who reacted to an emergency with skill and speed, in just the way Massengill described.

TPO has reported on operators working ridiculous hours and sleeping at their plant during floods or other weather events to keep drinking water flowing and wastewater effluent within permit limits. Operators made huge sacrifices and dealt with substantial personal inconvenience during the COVID pandemic.

We've described how at plants not typically staffed overnight, operators rotate being on call and respond to alarms at all hours if need be. A future edition describes how a team at the Greater Lawrence Sanitary District in Massachusetts reacted to a problem with overflow — a messy and time-consuming job that they tackled willingly, and successfully.

EXTRA MILES

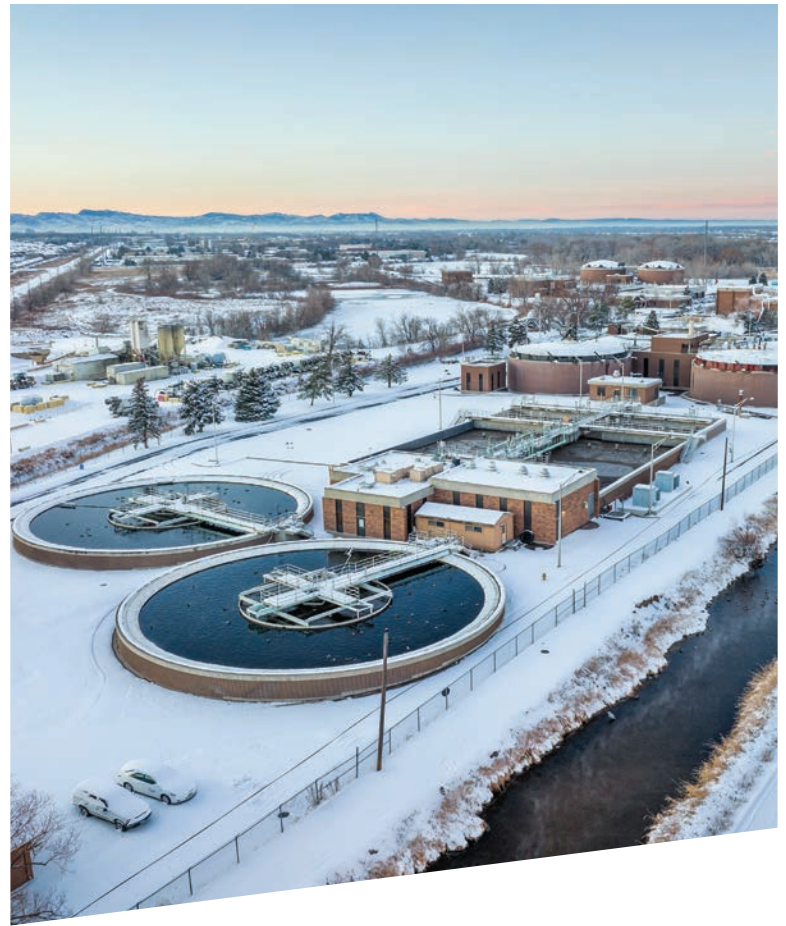
Again, from my own life, I recall the time when a storm brought a huge tree limb down on our neighbor's screen porch. The husband was hacking away at it with a small electric chain saw, when along came a crew from the



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“ For 10 years I've watched employees go out in the middle of the night to fix water leaks and sewer backups to ensure natural gas was flowing when cold snaps hit in the middle of the winter and, yes, in the middle of the night.”

JIM MASSENGILL

power utility with an industrial strength gasoline-powered Stihl model with a bar about three feet long.

Although it wasn't their job to clear trees away from private homes, they attacked that limb and made the sawdust fly. Plant operators go the extra mile like that all the time.

So, what in fact was I thinking when I wrote that column back last summer? What triggered it? I'm not sure. I meant no disrespect but, as Massengill astutely pointed out, I left out a very big part of the picture.

Metaphorically, I painted with much too broad a brush. Or, more to the point, I preached about “riding the motorcycle through the flaming hoop” to people who know very well how to do it. And so I'll simply close with two non-English words that seem appropriate: *Mea culpa.* tpo

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SCOTTISH WATER FACILITY

New Biogas Production Landmark

If we took a short trip forward in time to 2040, and then looked back at how some organizations in the water industry successfully achieved carbon net zero, it's likely you'll see The Nigg Wastewater Treatment Works in Scotland. This Scottish Water treatment center in Aberdeen is currently leading the way as a center of excellence for biogas production.

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OVERHEARD ONLINE

“Young people need to be involved with water because this is our future, our planet. What inspires me is ... that people are becoming more and more aware of water issues.”

Youth Innovators Step Up to Help Communities Around the World Solve Urgent Water Challenges

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PIONEERING BREWERY

San Francisco Unveils Reuse Project

San Francisco Mayor London Breed recently joined actor and activist Edward Norton, SFPUC Vice President Newsha Ajama, and SFPUC staff Paula Kehoe and Taylor Nokhodian in front of a bank of TV cameras to celebrate the city's largest commercial water reuse project at Anchor Brewing in Potrero Hill.

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WATER INNOVATION INITIATIVE

Ensuring a Future Water Supply

Arizona State University and Gov. Doug Ducey announced that the university will lead a multiyear Arizona Water Innovation Initiative to provide immediate solutions to ensure a secure future water supply. ASU will work with industrial and municipal partners to accelerate new approaches for water conservation, augmentation, desalination, efficiency, infrastructure and reuse.

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Michael Reghitto, chief operator of the Long Pond Water Treatment Facility, and Mark Moitza, assistant chief operator, in the ozone generator room (WEDECO).

On Autopilot

HIGH-QUALITY SOURCE WATER, A CROSS-TRAINED TEAM AND SOPHISTICATED AUTOMATION SPELL SUCCESS FOR THE WATER TEAM IN FALMOUTH, MASSACHUSETTS

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Scott Eisen**

For most of each day, the Long Pond Water Filtration Facility hums along with no operators present and only one team member on call.

The 8.4 mgd (design) surface water treatment plant in Falmouth, Massachusetts, relies on extensive automation and a team of five operators who, when on site for one daily shift, keep everything meticulously maintained and use lab testing as the basis for process fine-tuning.

The plant is the lynchpin of a water system that serves a coastal town on Cape Cod with 33,000 year-round residents and a population that balloons to more than 100,000 during the summer tourist season. The Long Pond plant uses a dissolved air flotation process with ozone treatment, deep-bed filtration and disinfection.

The \$45.6 million plant, commissioned in 2017, has received a 2017 Excellence in Construction award from the Associated Building Contractors of Massachusetts, a 2017 Engineering News Record Regional Best Project Award, and a 2018 Silver Award for design and construction from the American Council of Engineering Companies.

The water system also includes a 3 mgd (design) greensand plant and four groundwater wells. All told, the system delivers up to 12 mgd to meet summer peak demands and 2.5 to 3 mgd in winter, says Michael Reghitto, chief water treatment operator.

UNIQUE SOURCE

Falmouth Township is home to wealthy homeowners as well as working-class residents. It is the site of the Falmouth Road Race, a qualifier for the Boston Marathon.

The primary source water, 150-acre Long Pond reservoir, has provided water since the 1890s, originally to supply steamships at Woods Hole, a neighborhood on the town's south side. Long Pond is essentially a ground-level representation of the Cape Cod aquifer. It is spring-fed; the land around it is undeveloped and mostly owned by the town.

While pond water quality is generally good (typical turbidity 0.2 to 1.0 NTU), it is subject to seasonal issues. Pond turnover in the spring and fall can increase turbidity and organics, leading to color, taste and odor issues. Bacteria and algae counts rise in warm weather.

Until 2017, the water supply from the pond was unfiltered, dosed with chlorine gas for disinfection and sodium hydroxide for corrosion control. In 2008 the U.S. EPA issued its

“We are the only Grade 4 facility in Massachusetts not manned 24/7/365.”

MICHAEL REGHITTO

Long Term 2 Enhanced Surface Water Treatment Rule. That was the impetus behind designing and building the DAF treatment plant.

The greensand plant, opened in 2005, was paid for by the U.S. Air Force because of contamination from neighboring Joint Base Cape Cod. That plant is fed by two of the town's four wells. An air stripping tower for VOC removal is followed by three GreensandPlus filters (Roberts Filter Group).

After two carbon contactors (also Roberts) and addition of sodium hypochlorite and sodium hydroxide, the water enters the distribution system. The remaining two wells pump directly to the distribution system after disinfection and pH adjustment.

Water from one of those wells is first treated in an ion exchange system (Evoqua Water Technologies) deployed in summers for removal of perchlorate and PFAS. This was also supplied by the Air Force to address PFAS contamination from the base.

Enhancing supply reliability for Falmouth and three other towns is an interconnect with a set of wells on the military base. "We and the towns around us draw water from it," Reghitto says. "If for example we should have an emergency, the others would stop drawing from the interconnect and we would take all the water, up to 2,000 gpm. We have a good relationship with our neighbors, and it works out really well."

EFFICIENT TREATMENT

The Long Pond plant is fed from two 24-inch gravity intakes that deliver to a raw-water building on the shore of the reservoir. From there three pumps (Goulds Water Technology, a Xylem Brand) send the water to the plant about 1,000 yards away. In a pre-oxidation basin, potassium permanganate can be added if necessary to address seasonal influxes of soluble iron and manganese.

The water is then dosed with polyaluminum chloride and sent to rapid-mix and flocculation chambers, and then to three Leopold DAF units (Xylem), where most of the impurities are removed. DAF is effective for treating low-turbidity, highly colored waters.



Michael Reghitto leads an experienced and cohesive group, extensively cross-trained. (Laboratory equipment from Hach)



Long Pond Water Filtration Facility Falmouth, Massachusetts

BUILT:
2017

POPULATION SERVED:
33,000 winter, 100,000+ summer

SERVICE AREA:
own of Falmouth

EMPLOYEES:
5

FLOWS:
Design 8.4 mgd, average 6 mgd summer, 1 mgd winter

SOURCE WATER:
Long Pond Reservoir, four wells

TREATMENT PROCESS:
Dissolved air flotation

SYSTEM STORAGE:
8 million gallons

DISTRIBUTION:
200 miles of water mains

ANNUAL BUDGET:
\$3.3 million (operations)

KEY CHALLENGE:
Seasonal variation in demand

WEBSITE:
www.falmouthma.gov/314/water



The Long Pond facility has a design capacity of 8.4 mgd. Summer flow averages 6 mgd; winter flow 1 mgd.

Conventional sedimentation requires large particles, typically hundreds of microns in diameter, to efficiently settle. DAF, on the other hand, uses air bubbles and floc particles only tens of microns in diameter to achieve flotation and solids removal. DAF can also use a lower volume of chemicals than gravity settling.

"I've worked on both," Reghitto says. "In my experience DAF is much easier to operate and maintain, and it removes algae and other materials that do not settle well. In a sedimentation process, if your chemistry isn't perfect, you can get carryover pretty easily. With the amount of air we add, it doesn't matter if particles get a little too heavy. They're always going to float. Turbidity fluctuations are a lot less than we've found with sedimentation."

PRODUCTIVE CYCLE

The Long Pond plant is the first Grade 4 DAF facility in the state that is staffed for only one shift and operates fully remote overnight. The DAF units

“ Every time the plant shuts down, everything in it auto-rotates. We retain the ability, if we need to do maintenance, to set the order we want.”

MICHAEL REGHITTO

function as closed-loop systems. Water exiting the units is delivered to a lower level where pumps send 10% of it to air saturators that add air at 90 psi. That water returns to the start of the DAFs.

“We have baffled walls,” says Reghitto. “The flocculated water comes in, and nozzles inject the super-air-saturated water. It rides up the baffle walls and gives the air a chance to bind to the floc, which then floats. The clean water goes to the underdrains, which are 12-inch perforated PVC pipes.

“Instead of a chain-and-flight system to remove the floated material, we use a paddle wheel that’s fixed at the end. Spray nozzles along the walls turn on and push the blanket off the walls; then the paddle wheel turns and pulls the blanket off.”

Each DAF can treat 3,000 gpm; no more than two of the three units run, so that a spare is always available. DAF effluent is directed to an ozone building with two WEDECO EVO ozone generators and two ozone contactors for removal of taste and odor.

Ozonated water returns to the main treatment plant and passes through four Leopold deep-bed filters (Xylem) with four feet of granular activated carbon, one foot of sand, and one foot of gravel. The water then goes to a clear well where sodium hypochlorite and sodium hydroxide are added before distribution. Finished water turbidity averages about 0.05 NTU.

EYE ON RELIABILITY

A key feature of the plant is redundancy. The DAFs and other critical equipment operate with spares in place and are programmed to auto-rotate, distributing wear and tear evenly. “Every time the plant shuts down, everything in it auto-rotates,” says Reghitto. “We retain the ability, if we need to do maintenance, to set the order we want.”

Another reliability initiative is identifying and engineering out what Reghitto calls “single points of failure.” In one case, a combined filter effluent flowmeter that paces chemical dosing failed, “so then we weren’t able to pace our chemicals,” he says.

“In response we had our SCADA engineers (R.E. Erickson Company) install a toggle switch, enabling us to use readings from the four individual filter effluent meters. Now, if the combined filter effluent flowmeter fails, we can toggle that switch and use the total readings from the individual flowmeters to pace the chemicals.”

MAKING IT AUTOMATIC

The plant’s high level of automation makes it unique, says Reghitto: “We are the only Grade 4 facility in Massachusetts not manned 24/7/365.” R.E. Erickson and the Tata and Howard engineering firm were the system integrators. PLCs were supplied by Allen-Bradley (Rockwell Automation).

“We were able to prove at startup that we could run fully automated overnight,” says Reghitto. “All our water sources including the surface water are turned on and off automatically by tank level. All the

sources have fixed flow rates that we set, with the exception of the surface water supply. That plant ramps up and down between 1,800 gpm and 5,850 gpm, depending on demand out in the system.

“Even when we’re here during the work day, we’re not necessarily adjusting when things come on and off. We do change setpoints to make sure we have adequate pressure and storage.”

Chemical feeds are also fully automated. “We rely heavily on our analyzers because everything is alarmed to shut down if something goes wrong,”

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LET'S TALK

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Finished water pumps (top photo) and air/water saturation pumps (lower photo), both from Goulds Water Technology, with motors from US Motors (Nidec).

Reghitto says. “It’s critical that our analyzers work right and are as accurate as they can be. So we do a lot of analyzer maintenance and calibration.

“We do maintenance on all our equipment, and we also do our daily general rounds and reporting. Then there is a lot of in-plant testing. We jar test once a week. We have a jar tester (Platypus) that mimics the DAF in the lab.”

While not state certified, the lab provides data essential to process control. Hach supplied, certified and calibrates all the lab instruments. The lab recently converted to reagentless Hach CL10sc amperometric chlorine analyzers.

“All our analyzers are in the lab,” Reghitto says. “We have pumps all over the plant that deliver samples to the lab. Waste from the analyzers can be recycled to the head of the plant because there is no reagent in it.”

RIGOROUS MAINTENANCE

On the maintenance side, the Long Pond team has begun entering assets into the VieWorks software used town wide: “We’re importing all our facilities and equipment and will be able to auto-generate work orders.”

The team performs planned maintenance according to manufacturer recommendations, supplemented by predictive tools like thermal imaging, bearing temperature sensing on motors and vibration analysis.

While seasonal variability in demand for water presents challenges, the off-peak times provide opportunities for maintenance and repairs. “In winter

JACKS OF ALL TRADES

There are no specialists at work in the Falmouth Department of Public Works Water Treatment Division.

“I’ve worked at places where there are almost shift rivalries,” observes Michael Reghitto, chief water treatment operator. “Here we have a really cohesive group that works well together. With us all working the same shift we’re able to get tasks done as a group.

“Everyone here does every job: lab, maintenance, operations. We all rotate through the jobs and help each other out. That way all the operators are extremely valuable because they know how to do everything.”

The Falmouth Department of Public Works is led by Peter McConarty, director, and Steve Cadorette, deputy director. The water team in addition to Reghitto includes Cathal O’Brien, water superintendent; Mark Moitoza, assistant chief water treatment operator; Brian Gardiner and Manny Pacheco, treatment plant operators; and Patrick Laffan and John Jensen, operators in training.

“It’s critical that our analyzers work right and are as accurate as they can be. So we do a lot of analyzer maintenance and calibration.”

MICHAEL REGHITTO

everyone thinks we’re slow at the plant,” Reghitto says. “It’s actually our busiest time of year because we’re able to shut down and do maintenance. In summer it’s just full speed ahead with all our sources, and we make sure they stay running to meet the demand.”

Reghitto and his team enjoy operating the Long Pond plant and working in the special environment of Cape Cod. Last May an osprey tried building a nest atop the plant’s liquid oxygen vaporizer.

“We brought in Kevin Friel, an expert from The Osprey Project,” says Reghitto. “With their generous donation of a telephone pole and plans they provided, we were able to build a nest platform. Within a couple hours of installing the pole, the birds left our vaporizer and moved to their new home. One day we’re doing that, the next day we’re fixing a chemical feed leak, the next day we’re sampling. It’s a unique job. It’s pretty cool.” **tpo**

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1. BIOMETHANE analyzers have auto-calibration and can send data constantly to plant SCADA systems.
2. The analyzers help clean-water plants achieve high biogas operation efficiency by optimizing anaerobic digestion.

1



Measuring Methane

A BIOGAS ANALYZER IS DESIGNED TO HELP CLEAN-WATER PLANTS KEEP RENEWABLE NATURAL GAS ON SPECIFICATION AND RUN ON-SITE GAS-TO-ENERGY PROJECTS EFFICIENTLY

By Ted J. Rulseh

B iogas is a growing source of renewable energy for clean-water plants, whether for on-site heating or combined heat and power, for vehicle fuel, or for renewable natural gas fed into natural gas utility pipelines.

But what's the content of that gas? How much methane? Knowing the answers can help facility staff optimize gas production and consistently meet vehicle fuel or renewable natural gas specifications.

QED Environmental Systems now offers a fixed analyzer designed for high-accuracy methane, carbon dioxide and oxygen readings for biomethane applications. Users can select a fourth gas reading for hydrogen sulfide at various levels to optimize accuracy.

The BIOMETHANE 3000 analyzer helps clean-water plants achieve high biogas operation efficiency by optimizing the anaerobic digestion process. It provides reliable readings above the 95% methane level and below the 1% oxygen level at first-stage production.

The unit is customizable to site requirements. With an IP65-rated enclosure, it is certified for use in potentially-explosive atmospheres. The device is easy to install and operate and has a color visual display. Its fully automated calibration function maintains methane testing accuracy. Belinda Shuler, biogas product manager with QED, talked about the technology in an interview with *Treatment Plant Operator*.

tpo: What was the reason for bringing this technology to the wastewater treatment market?

Shuler: Our methane measurement technology was first used in landfill gas applications to manage methane, CO₂, oxygen, carbon monoxide and H₂S. With growth in anaerobic digesters for biogas production, it fits perfectly into that market.

tpo: Why is it important to measure methane concentration accurately?

Shuler: The main reason for monitoring the concentration of methane is to document that the methane content meets a specification for renewable natural gas. The developer or facility owners get paid by the volume of methane that is sent through the line. Another reason is that the facility or developer can get carbon credits for capturing and using the gas or flaring it.

tpo: Are there other applications where it is beneficial to monitor methane content?

Shuler: Yes. We use our analyzers at food processing plants, slaughterhouses, breweries, and paper mill water treatment plant digesters. The importance is to be able to track what is happening inside the digesters. The concentrations of methane, CO₂ and oxygen all are intertwined. If the oxygen content starts going up in an anaerobic digester, the methane content will go down, and the anaerobic process will not perform optimally. If they have oxygen intrusion, they may have a crack in a pipe connection, or a valve has been left open. It's an indication of some damage that needs repair.

tpo: Is it valuable to know the precise methane content in a process like combined heat and power?

Shuler: Yes. Generator sets require a certain percentage of methane in the fuel. If the methane content falls too low, it may be necessary to pipe in supplemental natural gas to keep the engines running at peak output.

tpo: Can this device measure digester gas impurities like siloxanes or acids?

Shuler: We don't measure those, although with our portable biogas instruments we can measure ammonia.



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“If the oxygen content starts going up in an anaerobic digester, the methane content will go down, and the anaerobic process will not perform optimally.”

BELINDA SHULER

tpo: What methods do these devices use to measure the different gases?

Shuler: For methane and CO₂ we use nondispersive infrared technology. For oxygen and for H₂S or one of the other additional gases, we use electrochemical cells.

tpo: How is the information captured and reported to the end users?

Shuler: Our communications can be a 4-20 mA output or Modbus RTU. Facilities can also choose Ethernet communication, Profinet or Profibus. Most clean-water facilities have a SCADA system, and they will see the actual percentages of gases on their screens as numeric displays. Sometimes they have the entire process laid out on the screen showing the different points where the gas concentrations are being read. In that way they can see how the concentrations are changing throughout the process.

tpo: At what points in the process are these analyzers typically installed?

Shuler: Many facilities will deploy them before an H₂S scrubber. That way they can see how much H₂S is going in and how much is coming out. If they see the H₂S readings after the scrubber increasing, they know it's time to change the scrubber media. We can measure H₂S at levels as low as zero to 50 ppm, or as high as zero to 40,000 ppm.

tpo: Where else in the process are the analyzers beneficial?

Shuler: A critical point is before the pipeline, engine or boiler, so they can see the result of their processes and methane production. We also see users connect them to a flare, so they know how much methane is being burned off. For some facilities, that is for air emission reporting regulations. In other cases, utilities receive credits for methane destruction.

tpo: How does this technology provide a return on investment?

Shuler: The most significant way is in prevention of unplanned downtime. To that end, we offer a hot swap, where if an analyzer fails, we can overnight ship them a new module that they can switch out. We hear time and again how many thousands of dollars are lost because of lost readings. The methane is what pays their bills, and if they can't prove the methane content, they are not getting paid.

tpo: Do any facilities keep extra modules on hand as essential spares?

Shuler: Some facilities do buy their own spare analyzer to have on site, especially if they have multiple units.

tpo: How much operator attention does this technology

Shuler: The BIOMETHANE 3000 has auto-calibration, so it's very user-friendly. Users don't need to have someone on site to watch it because it sends the data constantly to their SCADA system.

tpo: How flexible is this technology to meet individual user needs?

Shuler: We don't have units sitting on a shelf. We send the users a form to complete to tell us what they need. If they don't need all the bells and whistles, they don't have to buy them. If they want to measure from four different points within their system, we can do that. If they want to measure continuously and have over-the-top accuracy, we can do that. We build our units specifically to suit each project. **tpo**



Tiffany Poole, supervising environmental chemist, Metropolitan Water Reclamation District of Greater Chicago

Never One to Settle

CHICAGO METRO'S TIFFANY POOLE SETS AN EXAMPLE OF WORK-LIFE BALANCE FOR HER STAFF WHILE ESTABLISHING AWARD-WINNING STANDARDS OF EXCELLENCE IN LAB ANALYTICS

STORY: Mary Shafer | PHOTOGRAPHY: Rob Hart

In 2022, Poole received the Illinois WEA Laboratory Excellence Award.



Tiffany Poole holds a personal credo of paying it forward.

“My favorite task is mentorship and empowerment of employees,” says Poole, supervising environmental chemist for the Industrial Waste Analytical Laboratories at the Metropolitan Water Reclamation District of Greater Chicago.

“I feel like when people can rest in their authority, they produce better. They’re eager, they’re outgoing. They want to do a good job when they know that what they’re bringing to the table is evaluated, is accepted, is honored. It just makes for a better work environment.”

Her current role, which she assumed in May 2020, is just the latest step in a career with unlikely beginnings and a growing sphere of influence. Poole earned a bachelor’s degree in biology from Northeastern Illinois University. After that she worked at a contract research organization on a variety of projects. Now she deals specifically with municipal and industrial entities.

CASTING THE DIE

In 2005, the contract research company was seeing massive slowdowns in orders, a harbinger of the 2008 recession. Seeing the writing on the wall, she started putting out feelers. A colleague introduced her to the public sector and asked if she would consider working at the Chicago district.

She applied and took an exam for a lab assistant position, and then had to wait. “I just kind of waded through that system, not really knowing how

“I always ask people how I can help get them to their next level, even if it doesn’t include my department. That means they’re going to work hard in my department as long as they’re here.”

TIFFANY POOLE

it would go,” she recalls. “I was used to the private sector where you apply, you interview and they let you know within a week.”

In 2008, toward the end of her third year after taking the exam, she was called up for the entry level job with the district: “I’ve been here ever since.”

As a lab assistant, Poole was responsible for sample receiving: cleaning and prepping sample bottles for field use by pollution control officers at their

Tiffany Poole,
Metropolitan Water Reclamation District of Greater Chicago,
Industrial Waste Analytical Laboratories

POSITION:
Supervising Environmental Chemist

EXPERIENCE:
14 years municipal sector,
7 years private sector

EDUCATION:
Bachelor’s degree, biology,
Northeastern Illinois University

CERTIFICATIONS:
Senior Environmental Chemist

AWARD:
2022 Illinois WEA Laboratory
Excellence Award

GOALS:
Diversity, inclusion,
empowerment, promoting
opportunity for young people
in the field

companies, or for treatment plant operators. She also distributed the returned sample to the appropriate lab subdivision.

LOOKING TO RISE

Ambitious from the start of her career, Poole watched and learned. “I realized how the tests flowed, how things actually worked and how different they were from private sector,” she says. “I realized then that I could jump levels.” She took exams offered in order to open doors for promotion.

Now, in her leadership position, she counsels employees to take a streamlined, intentional tack. “I encourage them to sit for the test they actually want because there is a lot of paperwork and a lot of resources used to offer these tests,” she says. “So, if you know you want to be an environmental chemist, you would sit for that test. But if they offer the laboratory technician test before they offer the EC, you can take that one, because that’s still a bump.”

Poole worked her way up the ranks through levels of lab technician and environmental chemist before stepping up to her supervisory position. She has 21 direct reports covering all the positions she previously held. The team includes:

- Senior environmental chemists Anjana Patel and Paula Michels
- Environmental chemists Malgorzata Kokoszka, Zhenwei Zhu, Paul Poshyvanyk and Stegy Thomas
- Senior lab technicians Rachana Desai, Margaret Peacock and Colleen Joyce
- Laboratory technicians Corina Fitzpatrick, Shamir Fuller, Lashonya Phillips, Brett Heiland, Jacob Hunt, Dayana Reyes, Craig Shingles, Craig Washington, Jeremiah Campion and Matthew Witzak
- Lab assistants Jorge Abreu and Kina Denton

“I provide information for them on what we analyze for so that we kind of marry; because they have their own tests. Contract labs test for them to make sure they are in compliance before our IWD goes out to ensure they’re discharging correctly. Sometimes their contract lab is using a different method than we are; then they’re trying to compare apples to oranges.”

The lure of private sector compensation hasn’t turned Poole’s head: “I feel like there are more opportunities for growth here, and mainly stability. Once you have your civil service status, you can pretty much set your destiny.”

Each time she got a promotion, she set another goal: “And before I knew it, I was sitting at this desk. It was just like, OK, I’m here. I want to be proficient in this. I want to become an expert in this position. But what is my next step? Where do I see myself in two, three years?”



With each promotion, Tiffany Poole sets her next goal. She insists on being proficient in every role she takes on.

MAKING A DIFFERENCE

In mentoring, Poole is convinced that everyone has value. “It’s not about the ‘shining star’ employee,” she says. “It may be someone who’s quiet, but I know they really love it here and are just ticking away and working in our laboratory information management system.

“So I try and nurture that, nurture what they bring to the table naturally, as opposed to just noticing the more obvious achievers. Of course, the squeaky wheel gets the oil. But sometimes there are people who aren’t so noisy, yet still have great things to offer. I try to meet everyone at their level, to encourage their strengths and work on their weaknesses.”

The secret, she says, is providing support to team members because not everyone will ask for help, even if they need it: “You have to have a bird’s-eye view of what’s happening in your lab, what your lab is made up of, and just work on those individuals.

I always ask them, ‘What are your individual professional goals?’

“I had my goals when I was coming along, the ones I knew I needed to make to be within the department. Once you can marry those, you have an excellent employee and you develop that relationship. You build that morale. I always ask people how I can help get them to their next level, even if it doesn’t include my department. That means they’re going to work hard in my department as long as they’re here.”

She tries to take advantage of team members’ characteristics to point them in a direction where they’re most likely to be happy and succeed. “If I know you have your eyes set on an engineering track, that’s fine. But I can home in certain things that are going to work for you and better you, regardless of the track. You can be trained to do a task. That’s why we have standard operating procedures. But I want to show you how to be a great employee.”

COMING BACK AROUND

Poole’s effort and attitude haven’t gone unnoticed. In 2022, she received the Illinois WEA Laboratory Excellence Award. She doesn’t know who nominated her, but the effect of the recognition has been palpable.

“Even being considered, it kind of revved me up,” she says. “It got my engines going again. Sometimes you can get a little complacent, especially with what we’ve just gone through with the COVID virus. Having that award just rejuvenated me. We were in survivor mode for two years, but now it’s time to hit the ground running. It’s time to do what we love to do, which is empower people, which is efficiency and innovation.”

“For me, it’s about knowing your worth and never accepting anything less.”

TIFFANY POOLE

MINDFUL MAPPING

Her lab handles both municipal and industrial samples. Tests for the industrial side include cyanides and total organic carbon, BOD and COD. Her crew runs those same tests on regulatory samples of wastewater treatment plant discharges and various process stages.

The district has a separate Industrial Waste Division, where environmental specialists and pollution control technicians oversee individual users. “They collect the samples for us, and we analyze them,” Poole says.

The lab reports its analysis results to the industrial division, which then determines either that the company is compliant or provides information on how to bring their streams into compliance. “If they’re not in compliance, they would have to complete some corrective action items,” Poole says. “There will be a charge assessed if they’re discharging things that have not been cleaned to the standards of our current ordinances.”

A DAY IN THE LIFE

With four layers of employees beneath her, Poole deals more with administration than lab work. “A lot of my day-to-day is dealing with ordinances,” she says. That might mean replying to industrial users asking, for example, what reference method to use in testing for hexavalent chromium.

“One of the first questions we ask [children] is, ‘Where do you think the water goes when you wash your hands?’”

TIFFANY POOLE

In 2017, Poole was invited by the district to give a talk during Women’s History Month about her career path and what her takeaway is. “For me, it’s to know your worth and never accept anything less,” she says. “Everyone has to pay dues, but you know what you’re capable of.

“You know what you bring to your table. Sometimes people make decisions based off what their family needs financially, what they need if they’re a mom or a dad. I’m not saying don’t take those into consideration.

“But sometimes you have to go out on a limb and say, ‘I value me before anything. So this is what I want.’ And if that means you have to work a little bit harder, or you have to be a little louder so they can recognize you, then that’s what you have to do.

She refers especially to the culture among millennials who, with The Great Resignation, may think about changing jobs. “There’s something to be said for that,” she says. “It’s like knowing that you’re good enough somewhere, it just may not happen to be here. And where you started isn’t necessarily indicative of where you end up.

“So you may have thought, ‘I did plan A. I’m going to do X, Y, and Z.’ But sometimes, your path takes you out of all of those positions, out of the company, out of the state. And you just have to be willing to take that leap of faith for yourself.” tpo



Poole encourages a group of visiting middle school students to be brave and choose a career they will love.

HELPING AND BEING HELPED

Tiffany Poole smiles as she recalls mentors who have helped her along the way.

“One person who stands out for me is Toni Glymph. She wasn’t my official mentor, but she showed interest in helping me grow within the company, and that went a long way. Then, later on, we worked together to provide our community with education on water reclamation.

“We would go to schools or community events and expose audiences to what the district does. Toni was on the microbiology side, while I was on the industrial waste or analytical chemistry side. So we teamed up and give that educational outreach.”

Poole loves the educational work; it’s one of her favorite parts of the job, next to empowering her subordinates. “I feel like that goes a long way,” she says. “When I first applied for this job, I had no idea that water reclamation even existed, let alone its significance to our environment. So anything I can do to push that agenda, I’m happy to do, especially with children.”

Her main goal is to expose children to STEM fields. “They know about engineers, doctors, things of that nature. But maybe they aren’t familiar with environmental chemists. One of the first questions we ask is, ‘Where do you think the water goes when you wash your hands?’

“And the answers they come up with! Then they’ll understand, ‘Okay, so that goes to the water reclamation.’ Then we ask, ‘What about the shower?’ And they’re looking for another answer.”

Poole also imparts a different type of learning in interactions with kids: “Having little boys and little girls who look like me, see me in this position, lets them say, ‘Hey, if she can do it, I can do it.’ I know it’s significant just being that representation for them. That’s beautiful to me.”

She sees equitable, diverse representation as one of the industry’s biggest challenges. “The higher I move up into the management track, the fewer women and the fewer Black women or other minority groups I see,” she says.

“I know this industry is undergoing a huge shift, because when I started going to seminars, webinars or conferences, it looked a lot different. I see that we’re progressing in the right way, but we still have a lot of ground to cover.”

She feels strongly that representation matters: “When you have people who look like you around you, it’s easier to give those great ideas up, whereas when you feel isolated and singled out, it’s hard to step into your truth, your worth, your greatness. You know it’s there, but it’s like, ‘Are they going to listen to me?’”

She believes that the more diverse the boardrooms and conferences become, the better the industry will be: “That’s the thing. Diversity is not a handicap or a handout. People need access and opportunity. Then they’re going to shine.”



Boston Public School students fill their BWSC water bottles at an end-of-year field day.

Fill. Drink. Repeat.

BOSTON'S WATER UTILITY DEPLOYS A WATER TRUCK THAT SATISFIES THIRSTY RESIDENTS AT EVENTS WHILE HELPING THEM APPRECIATE AWARD-WINNING TAP WATER

By Sandra Buettner

The Boston Water and Sewer Commission's water truck has been putting on a lot of miles for nearly 10 years, going to events and providing hydration to attendees.

The Massachusetts Water Resources Authority provides award-winning tap water to the 650,000 residents of Boston. Sewage from the community goes to the Deer Island Wastewater Treatment Plant.

KEEPING THE CHILL

John Sullivan, chief engineer for Boston Water, attended an AWWA show where a water truck was on display. He thought the commission could use something like it to showcase the utility's great tasting tap water.

Sullivan came back from the conference and presented his idea to the executive team, who approved it. The staff then hunted for a supplier and found a company in Florida that retrofitted a beer trailer unit into what would be known as, simply, The Water Truck.

The unit creates opportunities to tell event attendees where Boston tap water comes from and how it is processed. It includes four drinking fountains, six taps, and two pet bowls and is handicap accessible.

It is self-contained with its own generator, but staff members like to park it near an electrical outlet if possible. The water is chilled to 38 degrees, and the tank can hold the chill for up to eight hours. The 725-gallon tank rarely runs dry at an event.

TRAVELING TEACHER

The unit appears in up to 200 events per season and is staffed by two to three utility team members, depending on event size. Typically, staff members bring a canopy booth and hand out flyers on where the Boston tap water comes from. They also distribute reusable water bottles and other items.

"We have a high-quality product, and it's a convenient, affordable option for our citizens," says James Faretra, deputy director of communications. Boston's water is tested daily by the MWRA laboratory for more than 120 contaminants.

“At the children’s events, the kids run up to the truck and we tell them about our water and what they can do to be good environmental stewards.”

TOM BAGLEY

The utility estimates that at an event when the tank is used up, 5,400 single-use plastic water bottles are eliminated. The truck shows up at events that include food festivals, parks department activities, senior events, Boston Housing Authority events, camps for kids, and concerts on City Hall Plaza. It also appears at the city's large July 4 celebration.

Besides teaching attendees about Boston's water and its treatment, the staff uses events to present the commission's four main messages:

- Keep fats, oil, and grease out of drains.
- Keep wipes out of pipes.
- Do not put waste into catch basins.
- Scoop the poop — pick up after your pet.

"We use the truck as a teaching tool," says utility spokesperson Tom Bagley. "At the children's events, the kids run up to the truck and we tell them about our water and what they can do to be good environmental stewards. They are attentive listeners. They go home and teach their parents about our four main messages."

KEEP ON TRUCKIN'

In addition to events, the truck is deployed around the city when water mains break and residents are temporarily without tap. The truck pulls up and stays until the break is repaired; people bring plastic containers, fill them up and take the water home. The truck also helps homeless people



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Children receive educational materials and water bottles at a Boston parks department event.



The Water Truck is deployed in the Chinatown section of Boston during a heat emergency.

by showing up on hot days and during heat emergencies to keep those residents hydrated.

A sandwich board next to the truck displays graphics that tell where the city’s water comes from so that residents can learn about the urban water cycle. The Water Truck’s motto is: “Fill. Drink. Repeat.”

Because of the unit’s popularity, the commission has plans for another, called The Buggy and designed for smaller events. It will hold about half as much as The Water Truck and will be more practical to transport around the city.

The utility provides paper cone cups for people who don’t have a water bottle, and at some events staff members hand out reusable plastic bottles with the utility’s logo.

“Residents appreciate the unit,” says Faretra. “Younger people carry reusable plastic water bottles wherever they go, so they love the convenience.” Those who see the unit comment what a great idea it is: “We have gotten a very positive interaction with the community.” **tpo**

Recycling Catch Basin Sand

A NEW HAMPSHIRE CITY BLAZES A TRAIL WITH A SWEEPINGS CLEANING SYSTEM, ENABLING REUSE OF TRACTION SAND THAT KEEPS STREETS SAFE FOR WINTER DRIVERS

By Tim Dobbins

A wastewater treatment facility in New Hampshire is taking the streets by storm with a brand-new environmental catch basin cleanings system.

In a region where difficult winter driving conditions are routine, the City of Dover commonly uses traction sand. Until now, that sand was primarily collected in the city's stormwater catch basins and forgotten.

Now, on the same ground as the city's wastewater treatment plant is a new facility housing that recycles traction sand for reuse. There are three distinct operating zones: a catch basin pretreatment and storage area, an automated catch basin cleanings treatment system, and a set of dewatering boxes. The three work together to make traction sand reuse the new standard.

"We are cleaning catch basins on the stormwater side, washing that material, separating the trash out of it and making a reusable product," says Raymond Vermette Jr., treatment facility supervisor. "We believe it's the first catch basin street sweepings cleaning facility in the U.S."

INSPIRATION OVERSEAS

Vermette saw a similar facility in 2009 while evaluating screw press dewatering technologies in Germany. Inspired by what he saw, and in concert with the city's overall effort to improve sustainability and reduce disposal costs, he and city leaders decided to make a move.

The city began by hiring Wright-Pierce Engineering to help design the system. When plans were finalized, the facility was built by T-Buck Construction in an existing, partially enclosed canopy structure formerly used to store amendments for biosolids composting.

The process starts in the streets. Sweepers roam the highways, avenues, and back roads of Dover, collecting sticks, trash, sand and debris. Meanwhile, vacuum trucks empty the stormwater catch basins.

CLEANING THE LOAD

The collected assortment is brought to the sweepings facility, where it is unloaded into the pretreatment area, consisting of a sloped concrete pad, a concrete push wall, and a large trench drain. The area acts as temporary storage, allowing the material to dry via gravity before it is moved for further treatment.

Operators move the material from the pretreatment area using a JCB 505-20 telehandler loader equipped with a rock bucket. Then the cleaning process begins. The sand and debris go directly into a grit dosing screw and hopper (HUBER Technology model RoSF7, size 5).

That is followed by a wash drum (HUBER model RoSF9, size 2), which uses facility water to rinse and separate the coarse material; anything smaller than 10 mm is filtered out. A HUBER conveyor moves the debris to a hook body for hauling to landfill.



Raymond Vermette (left) and Dale Houde with the grit cleaning system (HUBER Technology).



The catch basin sand cleaning process includes a grit dosing screw and hopper, wash drum and conveyor, all supplied by HUBER Technology.

Finer solids drain from the wash drum as a slurry into a sump containing a grit pump. The pump transfers the slurry to a HUBER Coanda grit washer, where organics and contaminants are further washed from the sand. Rinsed grit is removed from the washer via screw conveyor into a second hook body.



The cleaning process yields washed street sweepings that can be reused.

“Our goal is obviously to reuse the washed sand as traction sand year after year,” Vermette says. “Reusing it is great, but what it’s also doing is keeping it from running into the catch basins and out into the environment.”

The larger materials like sticks, trash and rocks are also cleaned after they are separated and end up in a stainless steel hook body. The debris is eventually mixed with heavier sediment filtered out in the facility’s four dewatering boxes before going to the landfill.

SHAVING WEIGHT

Though used separately from the traction sand reuse technology, the dewatering boxes complement the facility’s effort to reduce landfill tipping fees and provide sustainable practices. Park Process GeoCat dewatering boxes used for sewer jetting waste and wet well cleanings sit at the end of a drive-up ramp large enough to fit two vacuum trucks at the same time.

“When the vacuum trucks come in with the wet-well cleanings, it can be heavy with sediment and water,” Vermette says. “By dewatering, the goal is to minimize what’s going to the landfill. We are saving on tonnage fees and conserving more water by putting it through treatment and back into use.”

Through a series of trench drains and pumps, the separated water is moved to the head of the treatment plant. The leftover debris is eventually brought to the landfill, weighing significantly less than when saturated with water.

“Our goal is obviously to reuse the washed sand as traction sand year after year.”

RAYMOND VERMETTE JR.

“We’re actually taking the trash from the street sweepings and catch basin cleaning, which is on the lighter side, and putting that in with the heavier dewatering debris to get a full box while maintaining the right weight for travel,” Vermette says.

GAINING TRACTION

The sweepings facility began operation in 2021, and about 60 cubic yards of sand was recovered, cleaned and stored for reuse, Vermette is certain that amount will only go up: “The volume of grit-laden street waste from the city’s 3,200 catch basins and hundreds of miles of streets has increased over the years. This is still all new, so we are working the bumps out of it.”

He also believes efforts like Dover’s will gain popularity with communities across the country as regulations tighten over time. The city is regulated as part of the U.S. EPA’s Municipal Separate Storm Sewer System General Permit Program, also known as MS4, which requires routine cleaning of catch basins to ensure that they are never more than 50% full of debris.

“Our goal is to sustainably process and remove that waste as part of the city’s MS4 compliance efforts,” Vermette says. “I think more cities will begin to realize the sustainability of these methods while complying with the regulations.” Developing the sweepings facility took time and determination, but for Vermette and his team, the outcome has been well worth the effort. **tpo**



GeoCat dewatering boxes (Park Process) are used to process wet well and sewer cleanings.

PARK PROCESS DEWATERING BOXES

Dewatering boxes provide the finishing touch on Dover’s traction sand recycling and reuse process. A large piece of that puzzle is reducing waste weight while recovering water, using GeoCat dewatering boxes (Park Process) for wet well and sewer cleanings.

“The goal here is to efficiently minimize what’s going to the landfill and conserve water,” says Raymond Vermette Jr., treatment facility supervisor. The boxes use a stainless steel removable basket and disposable liners for debris separation.

The boxes are built from carbon steel and the internal basket is made using expanded metal and perforated plates. The basket, fitted with disposable liners, sits away from the side walls and floor, creating a small void for water to drain to before exiting the drain ports on box bottoms.

“At the far end of the facility is where we use the boxes,” Vermette says. “We have a 50-foot-wide, 90-foot-long ramp that goes to the containers, so it can accommodate two trucks discharging contents at the same time.”

The city uses 30-cubic-yard models, but Park Process supplies 15-, 20-, 25- and 40- cubic-yard models. Customers have options for liners as well; Park Process offers filter media fabrics in multiple weights for various applications.

At Dover, waste is dumped directly into the boxes, and the solids are held in the lined basket. Water flows out the bottom into a series of trench drains that lead to the yard waste pump station. From there, the water is conveyed to the head of the primary sedimentation basins.

GeoCat dewatering boxes are designed with a gasketed, hinged water-tight rear door for simple debris dumping. Opening the door sends the liner and all debris out the back. On average, the containers are emptied and liners replaced about once every other month.

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Three digesters at the Montpelier Water Resource Recovery Facility were fitted with new covers, two with Ovivo linear motion mixers, and the third with an Ovivo dual-membrane cover to store biogas produced from high-strength organics.

“The simplicity of burning gas with no conditioning is pretty nice. Once you start cleaning the gas, you have a whole other process.”

CHRISTOPHER COX

An Energy Boost

SEPTAGE AND HIGH-STRENGTH FOOD PROCESSING WASTE PROVIDE A SUBSTANTIAL SOURCE OF RENEWABLE ENERGY FOR THE CLEAN-WATER PLANT IN VERMONT'S CAPITAL

By Steve Lund

Taking in food waste has enabled a Vermont clean-water plant to upgrade its biosolids dewatering equipment and produce enough biogas to nearly eliminate fuel oil for heating buildings and digesters. It also helps the host city toward its goal of net-zero energy.

The project at the Montpelier Water Resource Recovery Facility also included the addition of a receiving station for high-strength organics.

The three digesters were also upgraded. One was converted to a blend tank to feed internally generated sludge and high-strength organic waste to the two other digesters. The blend tank and one of the digesters were fitted with new steel covers and linear motion mixers (Ovivo) and the third digester received a dual-membrane cover (also Ovivo) and a Vaughan Rotamix mixing system.

In 2021 the American Public Works Association honored the project as the Rural Communities Project of the Year/Environment.

LOTS OF SOLIDS

Even before it started accepting food waste, the Montpelier facility was handling a lot of solids. The plant takes in about one third of all septage in Vermont, which has a high percentage of its population on septic tanks. It also takes in sludge from other municipal treatment plants as well as landfill leachate.

“Our average flow is about 2 mgd, but because of the solids we take in, we actually operate like a 10 mgd facility if you look at how much solids we produce each day,” says Christopher Cox, chief operator.

The septage and imported sludges go directly to two new incline screw presses (BDP Industries) for dewatering. The old belt presses produced material 16-18% solids; the new ones achieved 26% solids.

BOOSTING BIOGAS

“We really pushed to have the presses be fully automatic,” says Cox, whose plant operates with a staff of four. “It’s like a push of a button. We can run them into the night. Whoever is on call checks them once a night. We were running both belt presses eight hours. Now we’re running two screw presses 12 to 16 hours a day.”

The dewatered material goes to landfill, and the filtrate returns to the headworks. The digesters are reserved for the high-strength organic waste and the sludge produced on site.

“There’s not a lot of organics in septage compared to FOG, dairy waste or brewery waste,” says Cox. “Those have much higher organic concentrations. We’re trying to make gas to offset fuel oil, so we don’t want to waste any of that space digesting septage. It dewateres very well. It’s a very fibrous material.”

Tipping fees for receiving septage, sludges and leachate bring significant revenue, which increased from about \$1 million a year to \$1.25 million in the first full year of taking in waste from food processors, dairies, breweries and ice cream plants. The material boosted biogas production significantly. Previously the plant produced only enough to heat the digesters. Now it heats all the buildings as well.

The biogas goes directly to two dual-fuel boilers without refinement. “There’s no treatment in between,” says Cox. “All it needs is pressure and a good concentration of methane, which comes from a well-run anaerobic digester. We’re not trying to strip out siloxanes or other things you normally remove when trying to make power.

“The simplicity of burning gas with no conditioning is pretty nice. Once you start cleaning the gas, you have a whole other process. The break-even point for a generator didn’t make sense for the city.” In winter all the gas is used to heat the digesters and buildings. In warmer weather the digesters produce excess gas, which at present is flared.

NEXT PHASE IN SIGHT

Montpelier has committed to becoming a net-zero energy city by 2030, so flaring excess methane is not in the long-range plan. The aim is to add a new process to use the methane but also to be flexible, in case methane production should drop.

“Not flaring is a huge priority,” Cox says. “But if we can’t figure out how to not flare, do it economically and have the correct payback, it’s not worth doing. We’re not going to do it and lose tons of money.”

The city considered using the excess methane to fuel additional biosolids drying and make a fertilizer product, but land application is difficult now because of regulation of emerging contaminants, such as PFAS.

“At first we were all excited,” Cox says. “We thought farmers could use it and maybe we could sell it. But that was a few years ago. The climate of

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The biogas goes directly to dual-fuel boilers. The Montpelier plant produces more biogas than it can use in summer. The excess is flared (lower right of the photo), but the staff is developing a project to use more of the gas.

managing biosolids in New England is just crazy now because of PFAS. Land application sites are going away.”

Now the city is considering a process to gasify the sludge. The excess methane could preheat the dryer for that process, which would significantly reduce the volume of solids landfilled. “Everyone’s competing to get material into the landfills,” Cox says. “Anything we can do to reduce the amount of solids we produce will be a huge benefit.”

Cox, who has a degree in environmental science from Colby-Sawyer College in New London, New Hampshire, has worked in the wastewater treatment industry for 10 years: “I got into the field thinking my job was to protect the environment by keeping the water clean, which is the main goal. But a lot of my job is figuring out how to get all the energy out of the waste we take in. It’s exciting.” tpo



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From One Extreme to the Other

STORY: **Ted J. Rulseh**

PHOTOGRAPHY: **Lynda Lybeck-Robinson**

MARK DESCOTEAUX HAS OPERATED THE EASTERNMOST AND WESTERNMOST CLEAN-WATER PLANTS IN THE U.S. HIS CURRENT FACILITY LIES ON AN ALEUTIAN ISLAND IN THE BERING SEA.



“Compliance is what this team has a passion for, and we do it 24/7/365.”

MARK DESCOTEAUX

Mark Descoteaux, left, shown with operator Trever Shaishnikoff, faces challenges that include challenging logistics in delivery of supplies to his plant's remote location.

Not many clean-water operators can watch orca and humpback whales while doing plant rounds.

That privilege belongs to Mark Descoteaux and his five-member team at the Unalaska Wastewater Treatment Facility, on an Aleutian island in the Bering Sea some 800 miles west of Anchorage, Alaska.

Their chemically enhanced primary treatment plant (1.0 mgd design, 0.4 mgd average) handles wastewater from some 4,200 residents and four major fish and seafood processing facilities in what Descoteaux calls the largest fishing port in the nation.

Commercial fishing enterprises capture king crab, halibut and cod from the Bering Sea; the king crab boats featured on the Discovery Channel TV show *The Deadliest Catch* operate out of the island's Dutch Harbor.

Descoteaux has been supervisor of wastewater for the City of Unalaska since June 2019. Earlier in his career, he operated the clean-water plant in the town of Lubec, Maine, the easternmost plant in the country, facing the vast expanse of the Atlantic Ocean.

WELL TRAVELED

Descoteaux grew up in a small town in Massachusetts. After graduating from Berkshire Community College in Pittsfield with a degree in environmental science, he went to work at clean-water plants in Concord and Leominster.

In 1995, at age 35, he heard a call from Downeast. "I wanted to move to Maine, and a friend who was born there said, 'If you like the ocean, stop by Lubec. You might like it.'"

He became the sole operator, "chief cook and bottle washer," at Lubec's 30,000 gpd Imhoff tank primary treatment plant. The Imhoff tank process uses a V-shaped settling compartment over a tapering compartment with gas vents where settled solids are anaerobically digested, generating biogas.

"I was in Lubec for about five years," Descoteaux recalls. "It was beautiful. I lived in the easternmost house in the country at a place on the ocean called Quoddy Head. My dog loved it, and I loved it."

After leaving Lubec, Descoteaux worked at a 1 mgd secondary treatment plant on the Loring Air Force



Mark Descoteaux

Unalaska, Alaska

POSITION:
Supervisor of Wastewater

EXPERIENCE:
40 years in the industry

EDUCATION:
Bachelor's degree, environmental science, Berkshire Community College, Pittsfield, Massachusetts

CERTIFICATIONS:
Wastewater Grade 5 Massachusetts, Grade 4 Maine, Grade 3 New Hampshire, Grade 2 Alaska; Grade 2 collections Alaska; Grade 2 Water Maine

GOAL:
Continue producing clean water in line with Alaska's deep environmental ethic

Base in Northeast Maine, and spent 2016-17 in water and wastewater operations for the U.S. military installation on Wake Island, in the Pacific Ocean some 2,300 miles west of Hawaii.

Later he wanted to experience Alaska. Browsing the Indeed job website, he noticed an opening in Unalaska and applied. "They flew me out here for a week for an interview and to see if I would like the area," he recalls. "I came back with an offer letter."

He soon found life on the remote island to his liking. The weather at 54 degrees latitude is not as extreme as one might imagine — he remembers Maine as being colder. Ocean currents tend to moderate the cold; temperatures stay around 30 degrees in winter and reach the 50s in summer. Winds as strong as 100 miles per hour do arise; the treatment plant facilities are hardened against them and all processes are enclosed.

EFFECTIVE TREATMENT

The Unalaska Wastewater Treatment Facility came on line in 2015. The state license requires a minimum BOD and TSS removal of 30% for each parameter.





Spectacular scenery is one of the perks of working at the Unalaska Wastewater Treatment Facility.

“I wanted to move to Maine, and a friend who was born there said, ‘If you like the ocean, stop by Lubec. You might like it.’”

MARK DESCOTEAUX

compactor (SEW EURODRIVE), an aerated influent channel for chemical dosing and a Grit Snail cyclone (Hydro International).

The two enclosed primary clarifiers, each with 200,000-gallons capacity, provide enhanced settling with aluminum chlorhydrate as the flocculant. “The other chemical used to aid settling is a plant-based polymer,” says Descoteaux. “The two chemicals are dosed according to flow. Dosage can also be formulated in the lab.”

Separate chlorine contact chambers provide disinfection with sodium hypochlorite produced on site by MIOX generators. Sodium bisulfite is used for dechlorination. “This is very important because the city has strict chlorine limits imposed by the DEC,” Descoteaux says. “The chlorine limit is 0.34 mg/L.”

In the pump gallery, double-disc pumps (Penn Valley Pump), centrifugal pumps (Gorman-Rupp Co.), FLEXFLO peristaltic pumps (Blue-White Industries) and diaphragm pumps (Lutz-JESCO America Corp.) operate around the clock and are constantly monitored for process control.

A 75,000-gallon glass-lined storage tank holds and thickens biosolids. Two pneumatic Fournier presses dewater the material. Hydrated lime is added during dewatering to raise the pH, kill pathogens and limit vector attraction.

“Typical solids content from the presses is 40%, a lot higher than from other dewatering equipment,” Descoteaux reports. “Solids are automatically bagged and hauled to the landfill.”

The plant has a state-of-the-art lab complete with deionized water production for analysis. It is staffed by a lab manager constantly monitoring the process. The facility has a \$4 million annual budget. New in 2022 is a Vactor truck used to maintain the collection system.

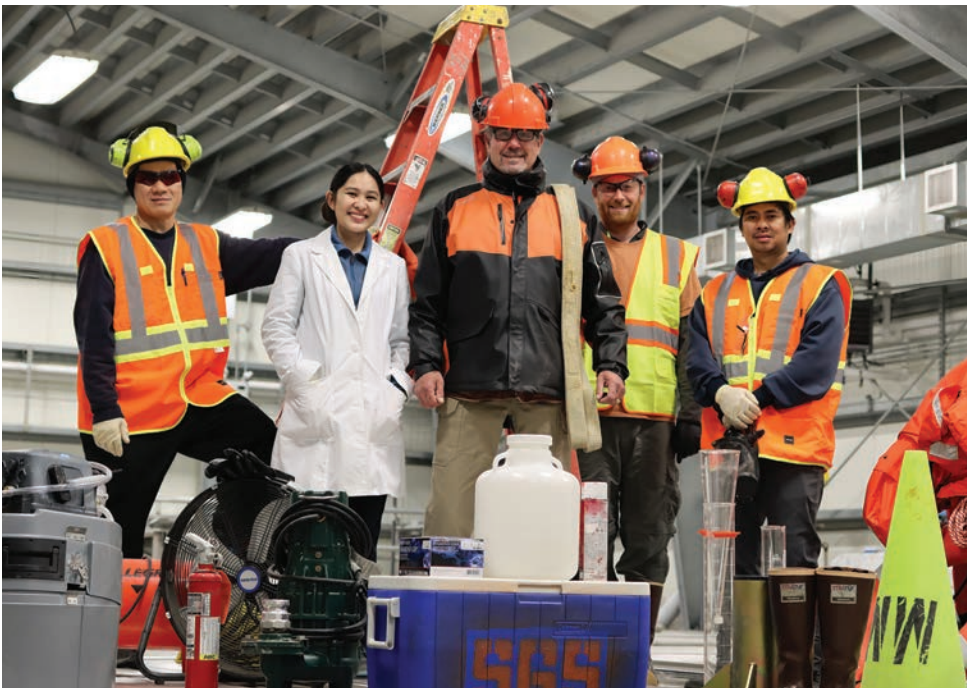
“Compliance is what this team has a passion for, and we do it 24/7/365,” says Descoteaux. “Our operators have achieved awards from the city for their performance.”

PROTECTIVE PHILOSOPHY

That’s in keeping with the state’s strong environmental ethic, which extends to the state government and its regulatory approach. Descoteaux isn’t sure why the state requires only primary treatment for Unalaska.

“Nobody nowadays builds a primary plant; they’re all secondary activated sludge or something similar. The plant that was here before was very primitive. This new place is technically more advanced and has a lot more bells and whistles for getting to the point of clean effluent.

Helping to sustain effective treatment are team members Lauren Sevilla, lab manager and holder of a chemical engineering degree; and operators Brian Brown, James Esnardo and Miguel Cristobal, holder of an electrical engineering degree. In most years, engineering students fill a temporary summer position.



The team at the Unalaska plant includes, from left, Miguel Cristobal, operator; Lauren Sevilla, lab supervisor; Mark Descoteaux, plant supervisor; and Trever Shaishnikoff and James Esnardo, operators.

Unalaska Wastewater Treatment Facility PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	ACTUAL % REMOVAL	PERMIT % REMOVAL
BOD	~200 mg/L	70 mg/L	65%	30%
TSS	~125 mg/L	20 mg/L	84%	30%

Chemical flocculants, process control and constant SCADA monitoring (Boreal Controls) help meet those standards consistently.

The plant discharges to the Bering Sea. The fish processors have their own outfalls for process water regulated by the state Department of Environmental Conservation, but their domestic wastewater makes up a meaningful share of treatment plant flow.

The plant is fed by 10 duplex pump lift stations (Flygt, a Xylem brand). The headworks has two mechanical bar screens (Kusters Water), a rag

Challenges do exist. For one thing, supplies of all kinds, for the plant and for island life in general, must arrive by barge, most often from Seattle, or by small plane. “Everything I order comes in by barge,” Descoteaux says.

“It takes about 10 weeks to get anything. If the barge is delayed by bad weather, or if a tug breaks down pulling a barge, the plant can be out of state compliance. And then we have to hope the generator stays on that produces the electricity for the island.” Descoteaux notes that the city is exploring the capture of geothermal energy by tapping into the heat source of a nearby active volcano.

THE GOOD LIFE

All in all, Descoteaux is happy with the choice he made to move as far west as anyone in his position can while remaining a United States resident. “It’s God’s country,” he says. “It’s beautiful. My dog catches two-foot salmon in the stream when the salmon are running.

“There are plenty of hiking places. If you have a little dirt bike like I do, that opens up other avenues. I’ve got a boat, and I go out whale watching. Once you’re on the water, it’s a whole different perspective. It’s like you’re on vacation.”

At the far northern latitude, the lengths of day and night require some adjustment. “During the winter, the sun usually comes up at about 10 a.m.,” Descoteaux says. “You don’t go home in the dark after work, but you come to work in the dark for about three months. In summer the sun sets about midnight.”

The island is remote enough to discourage tourism. Occasionally a cruise ship stops by for a visit of a couple of days before steaming off to another location. “As for this being on a tourist brochure or a travel agency’s destination list, probably not, but I kind of like it that way,” Descoteaux says.

“I feel very fortunate to live and work here. I feed Arctic fox and eagles by hand right out of my mud room. The eagles land right on the whiskey barrel. I hold out a piece of raw-boned chicken, and they’ll take it right out of my hand.”

As for retirement, “Nothing set in stone. I think I’ll retire here. I like the water, the mountains, the lifestyle, the people. It’s just beautiful here. When the sun is out on a winter day, the snow-capped mountains are the whitest white you’ve ever seen, and the sky is the bluest blue. I’ve been in a lot of beautiful places in Maine, but this is a totally different chapter on beauty.” **tpo**



Lauren Sevilla and Descoteaux review data from laboratory analysis.

INSIDE THE RING OF FIRE

Unalaska is the biggest city in the Aleutian Island chain, known as the Ring of Fire for the many active volcanoes in the area. The island of Unalaska, 73 miles long and four miles wide, lies halfway down the chain. The island has only seven miles of paved roads. The main access is by seaplane or boat.

“It’s not unheard of to have a tsunami warning,” says Mark Descoteaux, supervisor of wastewater for the City of Unalaska. “The island has no trees but is covered in a tundra plant that has an interconnected root system.” A century ago, fox fur was a prized commodity.

The island’s standard of living is quite high because the local fishing industry is lucrative.

Unalaska played an important role during World War II, when the military used the island as a strategic outpost. “Over a million cubic yards of cement was poured,” says Descoteaux. “The runway still used today was built in seven days. Fort Meyers was only one of the large encampments that burned to the ground during a Japanese air raid.

“Large cannons were hauled up the mountains and mounted on Panama 360-degree platforms. They could shoot 20 miles. The military had an underground hospital, several tunnel networks, and a communication system where telephone poles supported the wires.” USO celebrities including Bob Hope entertained the troops. Remnants of the war cover the island and can be observed on foot or by car.

All this history and more is preserved in a local museum. On a wall in the museum is a copy of the check the U.S. wrote to Russia for the purchase of Alaska. Years ago, Russians came over and formed close ties with island natives. Today many locals have Russian last names.

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It Doesn't Have to Cost a Fortune

A STATEWIDE OPTIMIZATION PROGRAM HELPS MONTANA CLEAN-WATER PLANT OPERATORS FIND LOW-COST WAYS TO DRIVE DOWN NUTRIENTS IN EFFLUENT

By Ted J. Rulseh

It's a challenge for small clean-water plants to reduce nutrient discharges affordably, especially if they weren't originally designed for that capability.

In 2012, the Montana Department of Environmental Quality began providing mechanical and lagoon treatment plants with no-charge training in nitrogen and phosphorus optimization and on-site assistance. The program gave operators a safe harbor to try various operational changes to reduce nutrient releases, with the understanding that while there could be short-term setbacks, the long-term payoffs would be worth the risk.

The initiative has been highly successful. The 34 participating mechanical plants included 14 that underwent facility upgrades to improve nutrient removal, and 20 that relied on process optimization alone. Eighteen of the 20 optimized plants saw significant reductions in nutrient discharges — a combined 127 tons per year of nitrogen and 19 tons per year of phosphorus.

Of particular interest, total nitrogen was reduced by 40% and total phosphorus by 25% at facilities not designed to remove nutrients, at a cost of less than \$25,000 per plant. Achieving similar results through conventional upgrades typically would cost in the millions of dollars.

The optimizations at plants that were not upgraded reduced nitrogen and phosphorus at a cost of about 14 cents per pound, versus conventional costs of \$4.19 for phosphorus and \$1.85 for nitrogen. The initiative also showed that most plants designed for nutrient removal can do even better with low-cost process optimization. The program also provided optimization advice to 50 lagoon facilities.

DEQ staffers Josh Viall and Pete Boettcher, wastewater technical advisors, and Darryl Barton, section supervisor for compliance, training and technical assistance, talked about the optimization program in an interview with *Treatment Plant Operator*.

tpo: What was the motivation behind the optimization initiative?

Barton: The main concern was phosphorus discharges. In many cases phosphorus is the limiting nutrient for algae growth in surface waters. When you get excessive algae growth, eventually you get oxygen depletion, and that hurts trout survival in the streams.

tpo: Why were lagoon systems a significant part of the initiative?

Barton: Nutrient standards were becoming very difficult for lagoon systems to meet, especially for phosphorus. And we knew that many smaller communities wouldn't be able to afford a mechanical treatment system. So the U.S. EPA and the Montana DEQ got together to develop a way to help lagoon systems do better with nutrient removal.



Pete Boettcher (left) and Josh Viall prepare to take samples from a lagoon treatment system in Montana.

tpo: How were the facilities chosen to be part of the optimization program?

Boettcher: We're only working on lagoon systems that discharge with a permit. A number of lagoons are 100% retention or do land application. As of now we're not working to optimize those systems. We also included all the mechanical plants that are publicly owned treatment works. We didn't look at any private facilities.

tpo: What was the role of consultants in the optimization process?

Boettcher: We worked with Steve Harris from H&S Environmental on the lagoon systems and with Grant Weaver from Grant Tech Solutions on the mechanical plants. They worked with us on providing training for the operators and in visiting the treatment facilities. We sent them data on the plants so they knew what they were looking at before they got there. They provided reports on their findings and recommendations for each facility. The consultants were great to work with. They were willing to teach us what they knew so we could continue with the work after they were gone.

tpo: What was the range of flows for the mechanical lagoons facilities that were optimized?

Boettcher: Most of the mechanical systems we worked with were right around 1 mgd or less. Most of the lagoons were 100,000 gpd or less.

“Optimization only works if the operators are on board. If they're not willing to go the extra mile to make it work, then ultimately they end up getting a plant upgrade.”

JOSH VIALL

tpo: Was there federal, state or other funding for this optimization program?

Barton: The optimization program is funded through the State Revolving Fund. What's great about that is we also have access to that fund to help them with their improvements.

tpo: What kinds of issues were found with the lagoon systems?

Boettcher: When you have high levels of solids in the bottom of a lagoon, you can get nutrient feedback. If they have over 16 to 18 inches of sludge, they should consider removing it because the nutrients it feeds back into the system will show up in the effluent. It also promotes algae growth. They can end up with algae in the final effluent, which will kick TSS way up.

tpo: Did the lagoon optimizations involve sludge removal?

Boettcher: Getting sludge out is pretty tough just for the cost, which can range from \$250,000 to \$1 million depending on how much they have, and then they have to figure out what to do with it when it does come out. Communities with lagoons typically don't have much money. Just getting them to have the equipment they need to run for permit compliance is tough.

tpo: In that case, what are some measures that can be taken to optimize lagoon systems?

Viall: One thing we recommend is a headworks so they can remove the rags and debris, which will build up the sludge layer much faster. Without a headworks they may only be able to operate for 15-20 years before they have to remove sludge. Some systems add enzymes and they're having good luck.

Boettcher: We also work with operators on actually operating the lagoons instead of just turning them on and forgetting about it. We suggest they run DO analysis on each cell a couple of times a week. We've found that anything over 2 mg/L DO in the cell is really not needed. So they can dial the air down, or not run it at all during the day in summer, because the algae in the water will produce enough oxygen. They can turn the air on at eight or nine at night and turn it off at 8 in the morning, and that's a huge cost savings on running the blowers. In winter they don't have that option, but in spring, summer and fall they can save a lot of money that way.

tpo: What other kinds of steps can lagoon operators take?

Boettcher: Sometimes it's a matter of sampling between the cells to see how each cell is doing. If they sample the influent and discharge from the first cell, they can see if that cell is actually removing BOD. If they do it between the second and third cell, they can see if the second cell is taking the ammonia out. Or instead of discharging out of cells 3 or 4, they can discharge out of Cell 2 if the water quality is better there. Or they can use a trash pump to send water from Cell 3 back to Cell 1, because it's cheaper to pump aerated water back than to use a blower to push air into the system.



The Montana nutrient optimization program is built around extensive laboratory and in-the-field testing.

tpo: In general, how effective can lagoons be in removing nutrients?

Viall: We find that we can get ammonia knocked out, although that's only during the warm weather. In facultative lagoons, it's difficult to get total nitrogen low because the bacteria don't have the proper mixing to come in contact efficiently with the nitrate. Lagoons don't have the option of removing phosphorus unless they treat it chemically, and then they would also need some sort of clarification.

tpo: On the mechanical plant side, what basic measures did operators take to optimize nutrient removal?

Viall: We've found that mechanical plants are able to incorporate a variety of steps. With an oxidation ditch, or even just a conventional activated sludge process, a lot of it is just finding an area for denitrification, or an anaerobic zone for phosphorus release followed by uptake in an aerobic zone. If they just cycle the air off for an hour every two to three hours, that often will

knock a lot of nitrate out. So for example, if they shut an aerator off and install a mixer for \$40,000 or \$50,000, that's going to take some power to run but they're going to save in the long run because of how much energy the aeration costs, whether it's powered by a rotor or a blower. They might not even have to add a mixer; they just have to shut the air off. Then they're saving money immediately and at the same time getting better nutrient numbers.

tpo: In essence, what is the key to making optimization work in a plant not designed for nutrient removal?

Viall: Optimization only works if the operators are on board. A lot of times it takes a little bit of extra work. Maybe they're nitrifying but there's no way to denitrify with a lack of air. Then they need to rotate blowers, and often they're not set up for that. They don't have SCADA, and so they have to go out and manually shut a blower off for a few hours, and then turn it back on. A lot of it falls onto the operators' shoulders. If they're not willing to go the extra mile to make it work, then ultimately they end up getting a plant upgrade.

tpo: In general, how would you characterize the results of the optimizations in the mechanical plants?

Viall: As long as the operators would jump on board, it was pretty amazing. There were significant decreases in total nitrogen, and in some cases in phosphorus. This project shows the importance of operations, of actually paying attention. When operators care, you can see it in the numbers. We have some plants that are really run down and yet are putting out numbers where the engineers say, "I don't know how they're doing it." They're not running as designed, but the operators understand how the process works. They know where to test for ammonia or nitrate, and they can really dial it in and figure out where their air needs to be.

tpo: What levels of nitrogen and phosphorus removal have the optimized mechanical plants been able to achieve?

Viall: If they had been running at 2 or 3 mg/L phosphorus going out, and they can stay consistently under 1 mg/L, that's pretty good, especially if the plant was not designed for phosphorus removal. On total nitrogen, we like to shoot for 6 or 7 mg/L, but if we can keep them under 10, or right around 8, that's acceptable, and it's pretty doable for most plants.

tpo: What lessons can operators in other states take from this experience?

Boettcher: The big thing is that operators need to be engaged. They can't be afraid to try something. Instead of saying, "Everything is running good, let's not mess with anything," we say, "Everything is running good, but you can make it run better." Turn the air off for a length of time. Kick up the internal mixed liquor return. Change the mixed liquor concentration. And they need to run analysis. The more analysis they do, the better off they will be.

tpo: What has this program done for the relationships between plant operators and the regulatory agency in Montana?

Viall: It has helped the whole operator-to-government relationship. A lot of times operators picture the regulator saying, "You need to pay a lot of money and upgrade your facility because we're telling you to." Instead, we're saying, "There are reasons for this; there are water quality issues going on, and we have staff who are here to help." We'll help diagnose their system. We'll help them come up with ideas. We have extra heads to throw into the mix. So we've been able to build up a rapport with many of these operators.

Barton: When the DEQ was first enacting numerical discharge standards, there was a lot of desperation among small systems. They knew their lagoons probably couldn't handle those limits. They just didn't have the money. This program has served those small systems well. It's a really useful tool that's free of charge. If you look at the relationship between those systems and the state now, versus when the standards were being enacted, it's like night and day. **tpo**

Aerzen USA purchases Aquarius Technologies

Aerzen USA announced it has acquired Aquarius Technologies, a municipal and industrial wastewater treatment solutions provider based in Saukville, Wisconsin. Established in 2006, Aquarius engineers and manufactures diffused aeration products and systems, including its Nebula MultiStage Biofilm technology and Quantaer diffused aeration systems.

MentorAPM selected to provide EAM for City of Santa Monica plant

Supporting the City of Santa Monica, California, on its mission to water self-sufficiency by 2023, MentorAPM has been selected to provide an Enterprise Asset Management system for the City's Water Resources Division and the Sustainable Water Supply Program. Included in the \$200 million One Water initiative, MentorAPM will deliver a comprehensive computerized maintenance management system and asset performance management to optimize plant performance and extend asset availability across new and existing infrastructure.

Atlas Copco acquires Mesa Equipment and Supply

Atlas Copco has acquired the operating assets of the compressor business of Mesa Equipment and Supply. The purchase price was not disclosed. Headquartered in Albuquerque, New Mexico, 19 of Mesa's staff will join Atlas Copco as a result of the acquisition. Mesa has been a distributor for Atlas Copco Compressors for several decades and will be integrated into Atlas Copco Compressors' West region.

Syrinx expands senior leadership team

Syrinx welcomed Nicole Kaiser to its executive team as vice president of business development. Based on the West Coast, she will work on the company's expansion efforts, bringing more than 10 years' industry expertise to optimize water and wastewater monitoring nationwide. For the last two years, Kaiser owned a marketing and communications consulting firm where she managed a portfolio of technology companies, water utilities and accelerator programs. Prior to that was a senior staff member at Isle Utilities, a technology and innovation consultancy specializing in water sector technologies.



Nicole Kaiser

LANXESS selects Emerson for advanced automation technology

LANXESS has selected Emerson as a Global Alliance Partner for automation technology, enhancing its existing long-standing relationship. By upgrading its control and safety systems, and digitally transforming its production facilities, LANXESS aims to optimize operational performance and support sustainability targets.

Jenkins Electric acquires Wheeler

Jenkins Electric has acquired Wheeler, a sleeve and fluid film bearing manufacturer based in North Charleston, South Carolina. Wheeler manufactures babbitt-lined bearings, aluminum alloy bearings and labyrinth seals and also offers reabbtting services on motor, turbine, fan and gearbox bearings.

Asahi/America's actuators included in MasterSpec

Asahi/America announced that its electronic and pneumatic actuators have been added to the control valves specification section 230923.11 of MasterSpec. The Series 19 electric actuator and Series 79 pneumatic actuator specifications have been vetted and formatted by MasterSpec to fit the Product MasterSpec format. Engineers who use MasterSpec will now be able to incorporate Asahi/America's these actuator specifications as the basis of design for various municipal and industrial projects.

PRIMEX holds second annual customer training

PRIMEX held its second annual customer training on Sept. 27 and 28 at its facility in Ashland, Ohio. The training included sessions on quoting capabilities, the ACCEL Panel Program, panel characteristics, understanding incoming power, level sensing, electrical troubleshooting, VFDs, configured controllers, Pump Watch Express, iON, iControl/SCADA, Arc Armor, Rapid Set and more. All attendees experienced hands-on product training with control panels, controllers and the KwikSwitch system, as well as a tour of the 50,000-square-foot facility.



Aquatic Informatics awards Ripple Effect grant

Aquatic Informatics awarded its Ripple Effect grant to Stroud Water Research Center. Ripple Effect is a software and service donation program that will enable the Stroud Center to acquire, process and model data using Aquarius software, and share insights with stakeholders to advance knowledge and stewardship of freshwater systems. Stroud Water Research Center is a not-for-profit organization headquartered in Avondale, Pennsylvania, that seeks to advance knowledge and stewardship of freshwater systems through global research, education and watershed restoration.

Flowserve part of new film series

Flowserve is participating in a new online film series, *Beneath the Surface*, presented by the International Water Association and produced by BBC StoryWorks Commercial Productions. The film series showcases innovations taking place across the world of water, highlighting technological advancements and ways communities are coming together to protect it.

Operators Unlimited hires new sales director

Operators Unlimited hired Bill Thompson as director of sales. With more than 40 years' experience in the water treatment industry, Thompson has a background in both sales marketing operations and management. In his new role, he will develop marketing strategies, grow target sales and establish and maintain strong client relationships while overseeing all sales efforts.



Bill Thompson

Envirosuite and SGS enter into partnership agreement

Envirosuite and SGA have entered into a strategic alliance partnership agreement for global business development of joint market opportunities. The collaborative relationship will include promotion, marketing and selling of bundled services to accelerate market opportunities across each business' focus sectors globally, including the mining, heavy industrial and oil and gas sectors. The bundled services will combine SGS's testing, inspection and certification services with Envirosuite's EVS Omnis environmental intelligence platform to provide compliance and operational optimisation solutions. Headquartered in Geneva, Switzerland, SGS employs 96,000 people across a network of 2,700 offices and laboratories globally. **tpo**

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Reuse, Recovery and Energy Management

By Craig Mandli

Asset Management

DUPERON FLEXRAKE IQ

The Duperon FlexRake IQ platform provides real-time smart screening for maximum resilience at the headworks. It tackles high peaking factors due to extreme weather and difficult debris like flushable wipes, first flushes and settled solids. This is accomplished by system improvements and a sequence of operations that automatically responds in real time to optimize the screen field. The reimaged design focuses on smart enhancements to the raking device to manage heavy solids loading events with four times increased debris removal capacity, improved grit and rock handling and greater solids capture. During peak flow conditions, it adjusts the bar screen opening itself to provide additional hydraulic capacity and safety factor, matching the best capture rate to the flow volume in real time. **800-383-8479; www.duperon.com**



FlexRake IQ platform from Duperon



Graver Powdex precoat filter demineralizer system from Marmon Industrial Water

MARMON INDUSTRIAL WATER GRAVER POWDEX

The Graver Powdex precoat filter demineralizer system from Marmon Industrial Water removes both suspended solids and ionic contaminants in a single compact unit. These proven high-performance systems are customized to any power plant design and quickly achieve target chemistry for fast online operation.

For industrial applications, it is used to maintain proper quality of water by removing impurities from return condensate for both water reuse and energy recovery. Treatment safeguards high-value plant assets by reducing damage and downtime, stabilizing steam cycle chemistry, and minimizes corrosion product transport, resulting in optimized operations. In addition, since condensate is returned to an ultrapure level, this reduces the need for fresh make up process water and respective generation costs. **888-353-0303; www.gravertech.com**

VALMET FLOW CONTROL FLOW-ROX FINFLEX CHECK VALVES

Flowrox FinFlex Check Valves from Valmet Flow Control help prevent sewage overflow, malodors and backflow of waterways. The cover and sleeve are designed to easily slip in to the existing pipe and are affixed to a pipe with heavy-duty stainless steel expandable clamps. They can be installed in either a vertical or horizontal application. They have a very low headloss and cracking pressures. This type of check valve uses a rubber flap that is molded internally to its thick rubber housing, which allows the



Flowrox FinFlex Check Valves from Valmet Flow Control

valve to be completely closed until a small water column discharges via gravity through the valve, and allows the runoff to occur until backpressure exceeds the inlet pressure. The rubber flap is manufactured to reduce headloss across the valve when compared to other designs such as a swing or ball check valve. When used for odor control, the valve will seal completely on itself compared to the duckbill styles that rely on increased backpressures to seal the duckbill lips closed. The check valve ranges in size from 3 to 72 inches, with backpressures up to 50 feet. **410-636-2250; www.valmet.com**

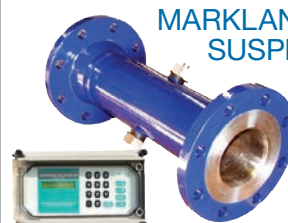
Automation/Optimization

INFINITII FACE PRO

Data-driven engineers with Python, Julia and R programming skills are keen on using predictive analytics and machine learning automation to tackle the challenges wrought by storm events. *infinittii face pro* is a streaming analytics application for data transformation that incorporates logic and algorithms for real-time processing. Users can deploy machine learning to manage and operationalize production-ready models for generating new data or output events such as predictions, and build analytic models that act on sensor data and other data sources. A built-in script editor uses existing scripts from open-source libraries or ones users create. Applications include forecasting, anomaly detection, predictive maintenance and failure prediction. The types of advanced calculations easily performed include Soil and Water Integrated Model and Evapotranspiration calculations. **778-379-0275; www.infinittii.ai**



infinittii face pro streaming analytics application



Suspended Solids Density Meter from Markland Specialty Engineering

MARKLAND SPECIALTY ENGINEERING SUSPENDED SOLIDS DENSITY METER

The Suspended Solids Density Meter from Markland Specialty Engineering measures, monitors and provides real-time continuous readings of total suspended solids in slurries and sludge (including silt, return-activated and backwash sludge) and even thick biosolids concentrations. The analyzer's ultrasonic non-nuclear sensor requires no permits and no approvals, and measurements are not affected by the color of fluid or particulates. It is available as a non-intrusive inline spool piece transmitter or throw-in style probe. Applications include pipes, recirculation loops, open-top tanks and clarifiers. It provides the added capability of automating pumps to help optimize dosing, feed density, underflow sludge density, and variables on thickening equipment for reduced material and energy costs and improved outflow available for reuse in water, wastewater and process industry settings. **855-873-7791; www.sludgecontrols.com**

PRIMEX ECO SMART STATION

The Eco Smart Station control system from PRIMEX provides a safe, energy-efficient solution for optimum pump control in municipal lift station applications. It uses the latest technology in VFD, microprocessor-based controller, data storage and communication capabilities available. It achieves up to 30% energy savings using an efficiency auto-



Eco Smart Station control system from PRIMEX

tune algorithm that searches for the pump speed that will consume the least amount of energy per gallons of liquid pumped. It is housed in a multiple-compartment Arc Armor Enclosure, reducing the risk of injury resulting from electric shock and exposure to arc flash. It features the Energy View controller powered by kW Logix software, an energy-efficient solution. The color touchscreen HMI provides level control, pump alternation, flow monitoring, data logging, alarm logging, historical trending and comes equipped with a SD memory card for data storage and download. It is available in 29 models, from 10 to 100 hp. **844-477-4639; www.primexcontrols.com**

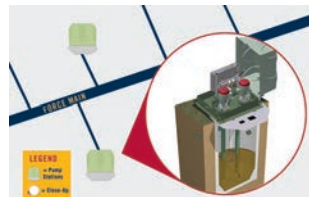
PULSAR MEASUREMENT DBI-MODBUS

Pulsar Measurement's dBi-Modbus intelligent ultrasonic level sensors are suitable for remote installations. These transducers include Digital Adaptive Tracking of Echo Movement signal processing for precise and repeatable results in challenging applications, with measurement range

options from 4.9 inches to 49.2 feet. It only takes one second to power on and make a measurement. When connected to a wireless telemetry device, power consumption is as little as 5 micro-amp hours. Alternatively, connect it to an existing Modbus network to take advantage of the performance full-time. It is ready for challenging environments with ATEX approvals, IP68 protection and an operating temperature range of -40 to 176 degrees F. **888-473-9546; www.pulsarmeasurement.com**



Pulsar Measurement's dBi-Modbus ultrasonic level sensors



Force Main Sync system from Smith & Loveless

SMITH & LOVELESS FORCE MAIN SYNC

Force main pressures vary; and without accounting for the variable conditions, reduced service life and a multitude of other issues arise. These phenomena result in impeller and volute erosion, reduced bearing and seal life, excessive pump noise and vibration. Force Main Sync from Smith & Loveless monitors hydraulics in the common force main to keep pumping at the required flow rate. Using a PLC touch-screen human-machine interface, a variable-frequency drive and a force main sensor, it constantly senses force main pressure and automatically adjusts the VFD to maintain a constant flow rate, no matter how many stations are online. **800-898-9122; www.smithandloveless.com**

Force Main Sync from Smith & Loveless monitors hydraulics in the common force main to keep pumping at the required flow rate. Using a PLC touch-screen human-machine interface, a variable-frequency drive and a force main sensor, it constantly senses force main pressure and automatically adjusts the VFD to maintain a constant flow rate, no matter how many stations are online. **800-898-9122; www.smithandloveless.com**

Drives

FRANKLIN ELECTRIC CERUS X-DRIVE

Designed for variable torque applications up to 600 hp, the Cerus X-Drive is Franklin Electric's all-inclusive drive solution for a variety of markets. Available as a standalone drive and in multiple enclosed configurations, these panels are built to last, according to the maker, with every detail and component centered around the application's specific requirements. It can be paired with a choice of motors and pumps to maximize the performance of the application. **866-271-2859; www.franklinengineered.com**

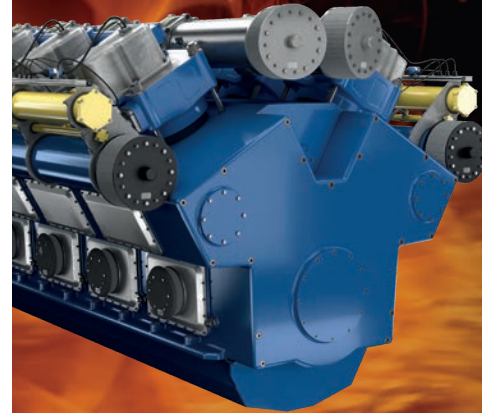


Cerus X-Drive from Franklin Electric

(continued)

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Sludge Heater and Exchanger System from JDV Equipment

High-Efficiency Motors/Pumps/Blowers



Heavy-duty effluent pumps from Ashland Pump

ASHLAND PUMP EFFLUENT PUMPS

Heavy-duty effluent pumps from Ashland Pump are available in multiple horsepower sizes for various performance requirements and have efficient, permanent split-capacitor motors. The oil-filled pumps have an upper and lower ball bearing design and

handle solids up to 3/4 inch. They are made of cast iron, with cast iron impellers and equipped with a piggyback switch (20-foot standard cord) or in manual configurations. They are offered in 3/10, 4/10, 1/2, 3/4, 1 and 1 1/2 hp models. 855-281-6830; www.ashlandpump.com

BOERGER BLUELINE NOVA ROTARY LOBE PUMP

The BLUEline Nova rotary lobe pump from Boerger sets new standards in pump technology and achieves ideal volumetric efficiencies. The newly developed DIUS rotors combined with a flow-optimized pump chamber ensure smooth running even at high pressures. It is available with or for the first time without a casing protection. 612-435-7300; www.boerger.com



BLUEline Nova rotary lobe pump from Boerger

EURUS BLOWER ZZ SERIES



ZZ Series blowers from Eurus Blower

ZZ Series blowers from Eurus Blower are drop-in replacements for competitor blowers. They have heavy-duty cast housings, machined impellers, alloy steel shafts with oversized bearings, hardened/precision machined steel forged gears, oil-lubricated gear and/or grease- or oil-lubricated drive sides, plus keyless locking assemblies for easier timing gear maintenance. The blowers provide up to 15 psig pressure and 2,350 cfm flow. 918-361-0285; www.eurusblower.com

KAESER ROTARY SCREW BLOWERS

Low-maintenance blower technology can help minimize power costs with load splitting, sequencing, and superior multiblower controls. KAESER Rotary Screw Blowers are turnkey systems, available in sizes up to 335 hp and flows to 5,650 cfm, using up to 35% less energy than conventional rotary blowers, while energy savings of up to 15% can be achieved in comparison with turbo blowers. All blowers come complete with noise-insulated cabinets, inlet and outlet silencers, motors and drives. The intelligent Sigma Control 2 on each blower optimizes machine performance via various control modes, and a full suite of sensors provides active condition monitoring to protect the machine. The combination of a blower air-end with high-efficiency SIGMA Profile rotors, flow-optimized components, efficient power transmission and drive components, ensures wire-to-air performance year after year. 866-516-6888; www.us.kaeser.com



Rotary Screw Blowers from KAESER



Self-priming Chopper Pumps from Vaughan

VAUGHAN SELF-PRIMING CHOPPER PUMP

Self-priming Chopper Pumps from Vaughan are designed to be easily accessed outside of the wet well while pumping waste solids at heavy consistencies, without plugging or dewatering of the solids. They eliminate the loss in production and mess, along with making it easy to service the pump to get it back in operation. 888-249-2467; www.chopperpumps.com

ZOELLER ENGINEERED PRODUCTS 72 HD SERIES

The 72 HD Series of 10 and 15 hp grinders from Zoeller Engineered Products offers 3,450 rpm, and is available in 208, 230, 460 or 575 volt, three-phase. Currently available in a high head model, the shut-off head for the 15 hp is 250 feet and the 10 hp shuts off at 215 feet of head. Both pumps have a max flow of 150 gpm at a minimum head requirement of 50 feet. Using a 3- or 4-inch ANSI flanged horizontal discharge will allow for easy adaption to competitor grinder or solids-handling rail systems. The legs are removable, reducing any obstructions being in the way of the debris going into the cutter assembly. The 440 SS cutter assembly with a Rockwell C hardness of 55-60 uses a scissor-like cutting motion that reduces solids down to 1/8 inch in size. 800-928-7867; www.zoellerengineered.com



72 HD Series of 10 and 15 hp grinders from Zoeller Engineered Products

Water/Wastewater Reuse

ALFA LAVAL AS-H ISO-DISC

Alfa Laval AS-H Iso-Disc cloth media filters provide tertiary filtration that with proper pretreatment can meet California Title 22 reuse standards, effluent turbidity of less than 2 NTU, and effluent TSS less than 5 mg/L. The design enables individual disk turbidity to be measured, and an operator can visually inspect the flow from each one. Also, if necessary, they allow an operator to isolate an individual disc for main-



AS-H Iso-Disc cloth media filters from Alfa Laval

tenance without disrupting the rest of the flow. The design can also be engineered to maximize the filtration area in the existing basin. **866-253-2528; www.alfalaval.us**

ANUA AIRASYMBIO

AiraSymBIO from Anua is an onsite, closed-loop odor treatment system that harvests raw wastewater, filters and then treats it for use as the irrigation water in the multistage biological odor treatment system. The system utilizes a water resource already present, thus reducing operating costs, uses no freshwater, and allows the biological odor control system to function as intended, as many areas around the country do not have potable water available at the lift or pump station site or have water conservation initiatives in place, which prohibits the use of biological treatment technologies. **346-225-8033; www.anuainternational.com**



AiraSymBIO odor treatment system from Anua

DE NORA WATER TECHNOLOGIES CAPITAL CONTROLS OZONE ADVANCED OXYGEN PROCESS



Capital Controls ozone generation systems from De Nora Water Technologies

Capital Controls ozone generation systems for advanced oxidation processes from De Nora Water Technologies are an appealing option for reuse. The powerful oxidant has a fast reaction time, requires no added chemicals and reduces disinfection byproducts. This helps customers meet their legal treatment requirements with an environmental approach, all while minimizing operating costs. System

capacities are available up to 6,000 lb/day, each using XTL dielectric to decrease maintenance costs and increase uptime. Skid-mounted and containerized systems are available for permanent, temporary and mobile systems that can be combined with other technologies, such as UV, to tackle challenging treatment concerns. **215-997-4000; www.denora.com**

EVOQUA WATER TECHNOLOGIES OSTARA PEARL

The Ostara Pearl system from Evoqua Water Technologies is a fluidized bed reactor that harvests nutrients from wastewater and transforms them into an eco-friendly fertilizer. This nutrient recovery solution converts wastewater treatment plants into true resource recovery facilities. The system is a fully customizable and modular treatment solution designed to recover phosphorus from pre- and post-digestion liquors, as well as industrial streams, through the controlled precipitation of crystalline struvite. Within the system reactor, the growth of struvite (magnesium ammonium phosphate) is facilitated by the addition of magnesium in a controlled pH setting. This allows nutrients to crystallize into highly pure fertilizer granules, which are harvested, dried and then distributed and sold as Crystal Green Fertilizer. Treated effluent is then discharged from the top of the reactor and returned to the plant with significantly reduced nutrient content. **800-466-7873; www.evoqua.com**



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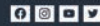


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ORENCO ADVANTEX AX-MAX

AdvanTex AX-Max wastewater treatment systems from Orenco are containerized, fully plumbed, plug-and-play units sized for larger commercial and municipal applications. Units come in a variety of configurations, measuring up to 42 feet long by 8.5 feet wide. Systems can be installed singly or in multi-unit arrays, either above ground or buried to grade. They use an attached-growth treatment method to produce clear effluent with significant nutrient reduction, suitable for reuse or surface discharge after disinfection (per local regulations). One unit can process up to 5,000 gpd of raw sewage or 15,000 gpd of primary-treated effluent. Units reduce nitrogen up to 90% or more, depending on configuration, and provide reliable performance with only a part-time operator. Units are easy to ship and set and have been installed in a variety of soils and climates all over the world. **800-348-9843; www.orenco.com tpo**



AdvanTex AX-Max wastewater treatment systems from Orenco

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www.tpomag.com

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Autonomous bioaugmentation technology delivers rapid and sustainable results

Problem

The wastewater treatment plant in Pennsylvania's Silver Spring Township (1.2 mgd design, 0.8 mgd average) serves a population of 18,000. The township wanted to save money while increasing plant efficiency and capacity to stay ahead of growing demand. Lower costs for aeration, biosolids handling and structure maintenance were also priorities.

Solution

The township chose a **bioaugmentation technology** from **Enbiorganic Technologies** for a 60-day trial. A single **EBS-Di** unit was set up by installer ABEL RECON in a lift station four miles from the treatment plant. The unit uses a customized active-state soil microbiology that is autonomously delivered into the collection system, in a process that generates and activates the microbiology. The microbes perform without oxygen and are highly adaptable.



RESULT:

Within 60 days, the technology achieved 23% biosolids removal, 63% total solids reduction, nearly 100% odor eradication and a significant reduction in FOG. The majority of the collection system downstream of the installation was cleaner; an existing biofilm was replaced with microbes in a very thin biofilm, which now treats the flow on its way to the plant. Issues with FOG and overflows in the treated section of the system disappeared. There was also a decrease in water consumption for biosolids handling. The township projected an \$18 per ton cost reduction for biosolids management. 888-356-8333; www.enbiorganic.com

Mixing maximized at energy and recycling facility

Problem

Yorkshire Water's energy and recycling Facility in Huddersfield, United Kingdom, needed to achieve total gas production of 22,192 normal cubic meters/day.

Solution

A **mixing system** from **Landia** was externally mounted on each of two 7,306-cubic-meter concrete digesters that contain thickened biosolids at up to 8% solids. The setup makes future servicing easy because there are no moving parts inside the tanks. Thick liquid is drawn from the bottom of the tank, where solids are chopped to accelerate digestion and prevent clogging of pipes and nozzles. Designed with a chopper pump and venturi nozzles, the digesters are comprehensively mixed to maximize gas production. The mixing system has low energy consumption and reduces health and safety issues such as working from height.



RESULT:

The sludge load to the digesters is now 24,000 total pounds dry solids per year or 65,753 pounds TDS of sludge per day, including up to a maximum of 11,880 pounds TDS per day of imported liquid sludge and 25,831 pounds TDS per day sludge cake. 919-466-0603; www.landiainc.com

Integrated solution implemented at new municipal drinking water treatment plant

Problem

The city of Wausau, Wisconsin, needed to address aging infrastructure at its water treatment plant. In 2017, the city hired a consulting engineer who contacted Kurita America for advice. Although the city's drinking water met all regulatory safety standards, a tint of color remained. The city's multiple wells varied in quality, requiring a robust solution.

Solution

The final filter design includes combined air/water backwash and **Kurita America's Simul-Wash** for water savings. The Organix process provides color removal at the lowest cost of ownership when considering resin regeneration frequency versus granular activated carbon media replacement over the life of the equipment. Both systems are fully automated and include PLC-based controls. The equipment includes natural draft cascade-type aerators for iron oxidation and packed stripping towers to remove trichloroethylene and perchloroethylene from select wells.



RESULT:

The method saves some 60,000 gallons of water per filter backwash versus conventional methods, cutting nonrevenue water by tens of millions of gallons annually. The color was also removed from the water. 866-663-7633; www.kuritaamerica.com

Blower replacement leads to 25% energy savings at West Coast wastewater facility

Problem

A West Coast wastewater treatment plant contacted Inovair about replacing its legacy positive displacement blowers for the sequencing batch reactor process. The plant needed blowers to handle frequent start/stops and deliver higher efficiency than the current blowers. Ease of installation was also important since plant staff members were managing the installation. The plant wanted to ensure availability of support and parts.

Solution

The **Inovair** team worked with the operator and a local energy company to help secure grant money based on the efficiency gains and energy savings. Installation of integrally geared **centrifugal blowers** was straightforward, including integration with the SCADA system.



RESULT:

The blowers delivering the desired efficiency and 25% energy savings, while handling multiple start/stop cycles. The plant experienced higher reliability and substantially lower operating costs. After running the blowers for a little over a year, the plant team purchased additional integrally geared centrifugal blowers to replace legacy high-speed turbo blowers. 855-466-8247; www.inovair.com



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Aeration system used to prepare water for discharge

Problem

The Sidney, Ohio, Wastewater Treatment Plant receives significant industrial flow. To meet current and future treatment objectives, the community launched a project to increase capacity, reliability and safety. The process consisted of primary clarification, biological treatment, secondary clarification, UV disinfection, and post-treatment aeration. After installation of the UV system, there was insufficient pressure head to accommodate cascade aeration.

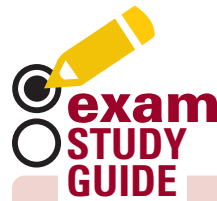
Solution

The staff looked for a solution with less maintenance, a smaller footprint, and a system to meet a desired level of redundancy and turn-down capability. They turned to a **Mazzei Injector Company aeration system**, which uses a pump to draw water from a small basin and recirculate it through a venturi injector. As the water passes through the injector, a vacuum is created, and atmospheric air is aspirated into the recirculation loop. This air/water mixture is discharged back into the basin through a nozzle manifold. Two venturi aeration systems were installed in parallel. The injectors are mounted above the water level, and the nozzle manifolds are secured to the basin floor.



RESULT:

After almost five years, the plant continues to meet its permit without adding to the daily staff responsibilities. The only maintenance has been hoisting the pump out of the basin once a year on its guide rail to replace its oil. There is no need to empty the basin for maintenance. 661-363-6500; www.mazzei.net tpo



Licensing exams can be challenging. Our **Exam Study Guide** helps you prepare by presenting questions similar to those on an actual exam. You can find many more sample questions on the *TPO* website at www.tpomag.com/study.

WASTEWATER

By Rick Lallish

When using sand beds to dry biosolids, what is the probable cause of excessive odor when the material is applied, and what is the best solution?

- A. Clogged wedge wires in underdrain, high pressure spray at discharge point
- B. Over-digested biosolids, change the digester temperature settings
- C. Inadequate digestion, correct the digestion problem
- D. Inadequate polymer mixing, allow more mixing before biosolids application

ANSWER: C. When operating a drying bed, proper digestion is very important before the material is applied. Inadequately digested biosolids will have offensive odors and will attract vectors, such as flies. Properly digested biosolids should have little to no odors when applied to the drying beds or taken to land application. More information may be found in the WEF textbook: *Wastewater Treatment Fundamentals II: Solids Handling and Support Systems*, Chapter 5.

DRINKING WATER

By Drew Hoelscher

Which of these is a characteristic of mechanical seals?

- A. Require water to pass through the stationary and rotating components.
- B. Have two stationary components that are sealed together by centrifugal force.
- C. Are used to couple the pump and motor shaft together.
- D. Typically have a shorter operating life versus packing because they don't drip water.

ANSWER: A. To prevent damage to a mechanical seal, there must be some water leakage across the two sealing faces. The amount of water allowed to wedge between the two sealing faces is determined by the stuffing box pressure, atmospheric pressure and spring tension of the seal. The amount of water that wedges between the two sealing faces should be sufficient for lubrication but not enough visually see. If the pressure in the stuffing box and/or spring overcomes the pressure from the water for lubrication, the seal will eventually be damaged. This is sometimes referred to as a hydraulically unbalanced seal.

ABOUT THE AUTHORS

Rick Lallish is water pollution control program director and Drew Hoelscher is program director of drinking water operations at the Environmental Resources Training Center of Southern Illinois University Edwardsville. tpo



OZ Lifting Aluma-Lite davit cranes

OZ Lifting Products announces the new Aluma-Lite davit crane for wastewater and water operators. The Winona, Minnesota-based manufacturer has released the ultra-portable davit crane in 500- and 1,000-pound capacities, each available with three bases: pedestal, socket (flush-mount) or wall-mount. The Aluma-Lite 500 weighs in at 24 pounds with a maximum capacity of 500 pounds and the Aluma-Lite 1,000 weighs in at 47 pounds with a maximum capacity of 1,000 pounds. Both fold flat for easy storage or transportation, and are made of aerospace/military grade aluminum. The cranes are available with a manual winch (including drill drive adapter), AC or DC electric winches. The Aluma-Lites have a durable, powder-coated finish, no tools are needed for assembly/disassembly, and they are made in the U.S.A.

800-749-1064;
www.ozliftingproducts.com



Flowserve FLEX isobaric energy recovery device

Flowserve's FLEX isobaric energy recovery device is a next-generation compact pressure exchanger for reverse osmosis plants. The FLEX pressure exchanger is designed to be one of the most efficient and compact energy recovery devices on the market. With its compact design, the FLEX pressure exchanger is able to recover more than 98% of hydraulic energy and can substantially

product spotlight

wastewater

Spectrometer employs X-ray technology for foreign contaminants

By Craig Mandli

As rules regulating the release of effluent into the environment become more stringent, the tools used to ensure treated effluent complies with those rules must also evolve to meet the demand. **Shimadzu Scientific Instruments** recently introduced the **EDX-7200 energy dispersive X-ray fluorescence spectrometer** that was designed to support new regulations and directives for consumer and environmental compliance.

Designed for fast, accurate detection and analysis of elements in various lab samples, the EDX-7200 is equipped with a high-resolution silicon drift detector to achieve a higher count rate and detection efficiency than its predecessor models. In addition, a high-speed circuit achieves highly precise analysis of the target in a shorter measurement time. In fact, it increases the count rate by up to 30 times compared to Shimadzu's former model, the EDX-720. Improved algorithms and performance also help to reduce measurement times.

This flexible instrument accommodates all types of samples — from small to large, from solids to powders to liquids. That means that not only can it be used in the environmental analysis of effluent, it can also be used on soil, combustion ash, filters and fine particulate matter. To measure a liquid sample, the user simply adds it to a sample cell with film on the bottom. This method makes the unit effective for the detection and quantitation of additive components



EDX-7200 from Shimadzu Scientific Instruments

and worn metals in aqueous solutions, organic solvents or oils.

A new automatic measurement time reduction function automatically switches to the next analysis channel if a controlled substance clearly has a high or low concentration, making evaluation possible while measurement is underway. This achieves more efficient screening analysis.

Four-stage automatic collimator switching capability enables the user to select the irradiation chamber from four values to suit the sample size: 1, 3, 5 and 10 mm diameters. The included sample observation camera is used to confirm the X-ray irradiation area on a specific position. Three optional screening analysis kits are available — an RoHS, halogen and antimony screening analysis kit; a phosphorus screening analysis kit; and a tin screening analysis kit.

It is compatible with Shimadzu's PCEDX Navi software, which simplifies X-ray fluorescence spectrometry for beginners, while providing the feature set and capabilities demanded by more experienced users. The user interface offers intuitive operation and provides a convenient operating environment for users regardless of expertise level.

800-477-1227; www.ssi.shimadzu.com

reduce the cost of desalination by lowering operating and capital costs. Its simple design has only four major internal components and is enabled for remote monitoring through Flowserve's RedRaven IoT platform. 872-443-6500; www.flowserve.com



Renewable Lubricants Bio-E.P. gear oils

Renewable Lubricants' biodegradable Bio-E.P. gear oils are ideal lubricating spur, helical, bevel and

worm gears subject to heavy loading or shock loading in heavy-duty applications. The environmentally friendly formulations meet or exceed the U.S. Steel 224, AGMA 9005-E02, DIN 51517 Part 3, ISO 12925-1 CKD, David Brown DB S1.53.101 and Cincinnati Machine performance requirements. Formulated from renewable agricultural bio-based resources, the gear oils are nontoxic, zinc-free formulations that contain no heavy metals. Bio-E.P. gear oils are an economical choice where leakage or contaminations are more prominent or on equipment with more frequent oil change intervals. 800-837-5823; www.renewablelube.com

Grundfos Utility Connect monitoring solution

Grundfos' Utility Connect is a new web-based remote monitoring solution for pump stations. An alternative to SCADA systems, Utility Connect is a real-time monitoring SaaS solution that allows operators to check station performance from anywhere and anytime and receive alerts via text or email when issues occur. They can use live and historical information to make data-backed decisions about maintenance of the station. Utility Connect offers simple-to-read graphic displays and no special computer hardware is needed. It is scalable to any size system and is applicable to any pump system. www.grundfos.com

product spotlight water

Software helps public water systems comply with EPA

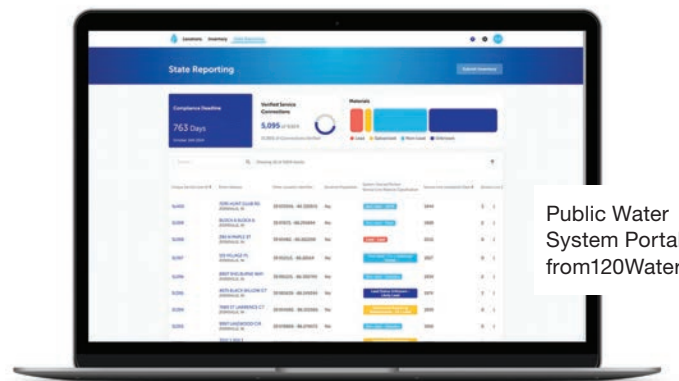
By Craig Mandli

As the EPA's Lead and Copper Rule Revision implementation continues to evolve, it's important that public water systems stay ahead of the curve. That's why **120Water** recently debuted an update to the way its software manages inventories in direct alignment with those EPA recommendations. The **Public Water System Portal** is designed to allow public water systems to manage their service line inventories in accordance with EPA and state standards, and easily report those inventories annually to their state drinking water regulator.

"The EPA recommends that these inventories be treated as living data sets that are continuously updated throughout the year by the public water systems," says Megan Glover, co-founder and CEO of 120Water. "These federal requirements present major new responsibilities for utilities in terms of time, manpower and financial resources, so there is a very real need for software tools that can help ease the burden in each step of the process."

Under the LCRR, utilities are required to compile a location-based inventory of service line materials by October 2024. However, according to Glover, a 2021 survey conducted by the company found that only 36% of utilities have records that will help them inventory their service lines, and only 25% said these records are available digitally in a central database.

To streamline and simplify the translation between inventory data and state reporting requirements, the PWS Portal is configured to each



state's reporting needs. It provides instant data validation to identify gaps in inventory submissions, and can communicate directly with any state agencies, state revolving funds, and other stakeholders who have procured the 120Water State Dashboard. Otherwise, it requires a one-click export to CSV or Excel file for submission to the state primacy agency. The portal also provides year-over-year progress toward identifying the material of unknown service lines.

Comprised of secure cloud-based software services and point-of-use kits, 120Water's solution provides tailored workflows for complying with lead and water quality programs to protect public health. Working with hundreds of utilities across 38 states, 120Water is in the process of inventorying over 3 million service lines that impact more than 10 million individuals.

"120Water is dedicated to empowering water professionals with tools like this to protect public health and ease the burden of new regulation," says Glover. **888-317-1510; www.120water.com**

"The more you do this, the more you're able to realize which bugs are present

when treatment is working well. If you see something other than that, something is incorrect.

Knowing what you need to look for — this is bad, this is good —

really helps you be the best operator you can be."

Kanahou Alana
Lead Operator
Layton Wastewater Treatment Plant, Long Key, Fla.



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Fluid Components International Model FLT93 flow switch

The Model FLT93 flow switch from Fluid Components International is ideal for wastewater treatment digester gas applications. With its no-moving parts design, there are no orifices to clog in dirty digester gas environments. The switch is SIL-2 rated for installation in safety-rated applications, and have been used globally in CH4 flaring, combined heat and power, and safety valve relief applications in numerous industries. The switch is available in a variety of process connections for ease of installation in most any pipe, vent or duct size. Its universal power supply supports powering by 115 volt AC, 230 volt AC, or 24 volt DC. Its trip-point/alarm points are easily user set in the field, and it comes standard with fail-safe, heavy-duty dual alarm SPDT or DPDT relay outputs, rated 6 amps at 115 volt AC, 240 volt AC or 24 volt SC.

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www.fluidcomponents.com



Industrial Test Systems Ascel Arsenic field test kit

Industrial Test Systems analytical field test kit, the Ascel Arsenic, was developed with considerations for safety, accuracy, ease-of-use and speed. All reagents are in powder form and have been weighed and carefully selected to minimize the hazards and inconveniences associated with conventional arsenic testing. Ascel has a detection range of 0 to 1,000 ppb. The kit yields accurate results in seven minutes. The easy-to-follow test procedure requires only two reagents that are clearly labeled to simplify testing. A matching color chart is included with extra

large color blocks for quick and accurate color matching, and the test kit can also accommodate different water temperatures.

800-747-9287; www.sensafe.com



Electro-Chemical Devices TC80 chlorine analyzer

With its reagent-less amperometric sensor design, the TC80 total chlorine analyzer from Electro-Chemical Devices eliminates consumables, simplifies installation and reduces maintenance to lower the total cost of instrument ownership. The analyzer is a panel mounted, ready-to-use instrument that's compliant with the U.S. EPA Method 334.0. It has a precision three-electrode amperometric sensor, which measures all chlorine species in the water, combined chlorine and free chlorine. It is available in either a standard high-range configuration measuring Cl2 from 0.05 to 20 ppm, or a standard low-range configuration of 0.005 to 2.000 ppm. The analyzer comes factory precalibrated to the chosen measurement range before shipment.

800-729-1333; www.ecdi.com



Kaman Precision Products Air Gap Tool

Kaman Precision Products' new Air Gap Tool offers simple, accurate measuring and data storage for hydroelectric turbines and more. The tool is designed specifically for static alignment of rotor/stator in large-scale hydrogenerators. It is an ideal tool for measuring air gaps in the field and can be used for initial installation and during reassembly after maintenance procedures. The Air Gap Tool can measure and store data with the tap of a finger, so no power

cords, pens or paper are needed. The tool can be easily positioned at predetermined locations between the stator core and rotor poles. Air gap distance is accurately measured and transmitted wirelessly to handheld Android or iPhone devices using the included app. Users can set limits for intuitive visual feedback while working.

860-687-5158; www.kaman.com

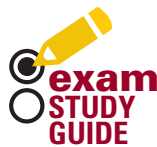


Russelectric Emergency Power Systems

Russelectric, a Siemens business, offers its reliable Emergency Power System which provides backup power during a utility power loss. The paralleling switchgear systems offer redundant programmable logic controller controls and manual backup

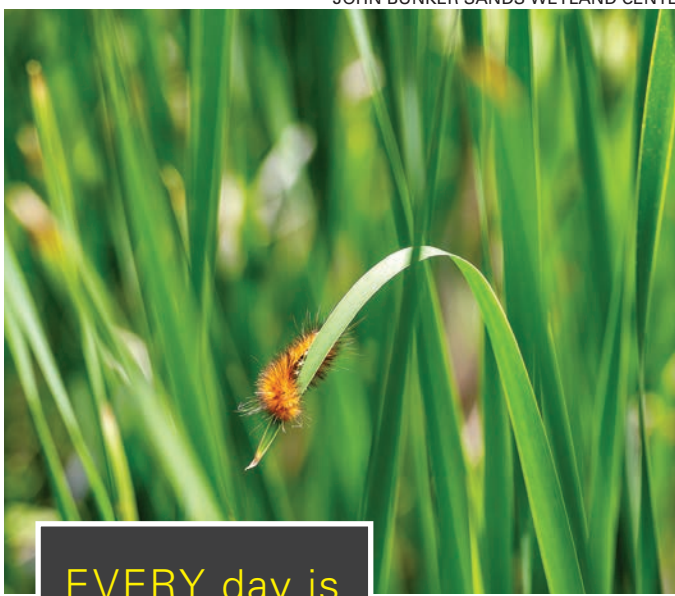
capability. All of the systems are custom-designed, UL-listed and can incorporate such sophisticated control functions as peak shaving and load curtailment. The paralleling systems incorporate dual, redundant, hot synchronized PLCs for system control. The system design allows manual start and synchronization of generator sets if automatic controls malfunction. Discrete switches, meters and control devices are standard to allow manual control capability in the event that both system PLCs fail. A 23-inch LCD HMI touchscreen display enables operators to view system one-line diagrams, alarms and setpoints.

800-225-5250;
www.russelectric.com tpo



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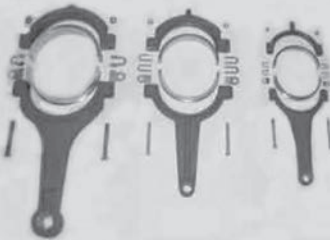
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worth noting

people/awards

The **Orange County (California) Water District** received the 2022 Groundwater Resources Association Kevin J. Neese award for its robust PFAS treatment program.

The **Waimea Wastewater Treatment Plant** won the 2022 award for Best Small Project from the American Society of Civil Engineers Hawai'i Section, for its optimization improvements.

Larry Peterson, wastewater treatment plant operator with the Chelan County Public Utility District won the annual Water/Wastewater Outstanding Employee of the Year award from the Washington Public Utility Districts Association.

The **Davies County Water District** received the Wooden Bucket Award from the Kentucky Rural Water Association for substantial and lasting improvements in customer service, drinking water quality and wastewater services.

Jennifer Perry, public works director in Exeter, New Hampshire, retired after more than two decades of service.

Tony Smith, director of public works for Mount Desert, Maine, retired after 21 years on the job.

The **Greenville Utilities Commission Water Treatment Plant** was among 66 plants to receive the Area Wide Optimization Program Award from the North Carolina Division of Water Resources for surpassing federal and state drinking water standards in 2021.

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events

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South Dakota Association of Rural Water Systems Annual Technical Conference, Ramkota Hotel & Conference Center, Pierre. Visit www.sdarws.com.

Jan. 19-20

Michigan WEA Wastewater Administrators Conference, Bavarian Inn Lodge & Conference Center, Frankenmuth. Visit www.mi-wea.org.


Jan. 31 - Feb. 2

2023 North Dakota Rural Water Systems Association Water Expo, Bismarck Event Center. Visit www.ndrw.org.

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