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Daniel Wurst
Wastewater Superintendent
Telford, Pa.

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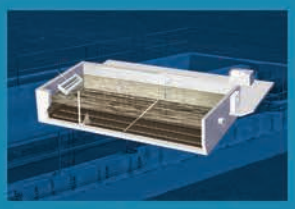

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ON THE COVER: At age 15, Daniel Wurst was running a wastewater treatment plant — at the orphanage where he lived. Today he is wastewater superintendent at the Telford (Pennsylvania) Borough Authority, and the contract operator of several small treatment facilities in his general area. (Photography by Kevin Blackburn)

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let's be clear

Fire Up for Biogas

CLEAN-WATER PLANTS HAVE A READY SOURCE OF RENEWABLE FUEL. A CONFERENCE IN MAY OFFERS EDUCATIONAL SESSIONS AND MORE ON HOW TO PUT IT TO USE

By Ted J. Rulseh, Editor

In conversations about clean energy and greenhouse gases, we hear a lot about solar, wind and nuclear, and a lot less about a renewable fuel well known to clean-water operators.

That of course is biogas, a product of anaerobic digestion. It's a fuel with excellent growth potential as part of the nation's energy picture. Biogas-to-energy has the added benefit of destroying methane, a potent greenhouse gas that otherwise could escape to the atmosphere.

In terms of biogas utilization, the United States lags far behind Europe, which has some 10,000 operating anaerobic digesters, some of which enable communities to be essentially fossil-fuel free.

The American Biogas Council reports that the U.S. has some 2,200 sites that produce biogas. They include 1,269 water resource recovery facilities with anaerobic digesters — but only 860 use the biogas they produce for heating or power generation. There are also 250 anaerobic digesters on farms, 66 standalone systems that digest food waste, and 652 landfill biogas-to-energy projects.

ROOM TO EXPAND

How big is the potential for growth in biogas? It's huge, and not just at clean-water plants. The ABC estimates that nearly 3,900 such facilities could support new biogas-to-energy systems. That includes those that produce biogas but are not using it.

In all the ABC counts nearly 15,000 sites ripe for biogas development, including 8,574 dairy, poultry and swine farms; 2,036 food-scrap-only systems; and 415 landfills that now flare their gas. If fully realized, says the ABC, these new biogas systems could produce 103 trillion kilowatt hours of electricity per year while reducing emissions equivalent to removing 117 million passenger vehicles from the road.

How big is the potential for growth in biogas? It's huge, and not just at clean-water plants.

In addition, the new systems would spur some $45 billion in capital investment, leading to about 374,000 short-term construction jobs and 25,000 permanent operations jobs.

A PLACE TO LEARN

If you are interested in biogas-to-energy for your facility, or if you want to enhance the performance for the system you already have, you might consider attending the BIOGAS AMERICAS conference, May 23-26 in Las Vegas.

The ABC touts it as the biggest gathering of the nation's biogas industry players. It's a venue for meeting industry professionals, leaders and deci-

sion-makers from across the country. It's focus on expanding the biogas market by offering information, training and networking.

Attendees will include project developers, equipment suppliers, service providers, operators, investors, utility representatives, policymakers and others with interest the growth of biogas as a valuable resource.

VARIETY OF EVENTS

The agenda includes five kinds of events. There will be more than 20 educational sessions covering the full range of issues facing the biogas and renewable natural gas industries. Alongside these sessions there will be an operator school where participants can earn up to 12 professional development hours toward acquiring or maintaining certification.

The conference will also include a biogas marketplace where exhibitors will display their equipment, describe their services and answer attendees' questions. The Biogas Industry Awards Dinner will recognize the past year's best projects and innovations. The ABC Golf Open on a desert course will launch the conference, helping attendees get acquainted through friendly competitions.

Biogas is a fuel of the future. The BIOGAS AMERICAS conference is a chance to discover its potential for your facility, or help you get the most from your biogas-fueled power, heating or cogeneration installation. tpo

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BIOFUEL CONTAMINANT REMOVAL

Hydrogen Fuel Generation

The holy grail of biofuel researchers is to develop a self-sustaining process that converts waste from sewage or other renewable carbon sources into fuels while keeping waste carbon out of our atmosphere and water. Now, a research team at the Department of Energy's Pacific Northwest National Laboratory has developed a system that does just that.

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OVERHEARD ONLINE

"While attention has largely been directed at carbon when tackling environmental issues, water is right around the corner."

The Water Council Launches WAVE To Accelerate Water Stewardship

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AUTOMATED BIOAUGMENTATION

Giving Lagoons a Helping Hand

Seeking solutions to effectively remove its lagoon sludge and reduce the associated costs, the City of Weyburn, Saskatchewan, opted to implement a new automated bioaugmentation service technology from EnBiorganic Technologies on a trial basis. Read about the city's experience in this online exclusive article.

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PRODUCT DEVELOPMENT

Innovative Engineer Retires

After 42 years with HF Scientific, engineer Mike Goodman recently announced his retirement. Goodman is recognized for his creative thinking and innovative product contributions to the company, including the development of two major product lines used in the production of clean drinking water.

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> "I was the daily man who did the grunt work. Fifteen years old, I was changing 150-pound chlorine cylinders."
> **DANIEL WURST**

Daniel Wurst received the Eastern Pennsylvania Water Pollution Control Operators Association's 2020 Daniel H. Treat Memorial Supervisory Award.

An Orphan Finds a Home

FROM THE HUMBLEST OF BEGINNINGS, DANIEL WURST BUILT A LONG, SUCCESSFUL AND AWARD-WINNING CAREER IN THE CLEAN-WATER BUSINESS

STORY: **David Steinkraus** | PHOTOGRAPHY: **Kevin Blackburn**

Daniel Wurst was young when he started his career. At 15 he was running a wastewater treatment plant. It was a door that opened because his parents died.

"I was the youngest in my family," he says. "I had a brother who was in his 30s when my parents died. All my cousins were out of the house. My aunts and uncles weren't ready to get back into raising a teenager. But God opens doors."

His door was Christ's Home orphanage in Warminister, Pennsylvania, where Wurst went to live at age 13. "I was the only true orphan there. Most of the kids at least had one parent alive, but there were issues like drug addict parents or drunks. If I hadn't been at Christ's Home, I probably wouldn't have been in wastewater. I never thought of it as a career. I thought of it as, oh, I get out of the dorm for an hour. And I was always wanting to learn something new."

Wurst eventually moved on to much bigger things. Today he is wastewater superintendent at the Telford (Pennsylvania) Borough Authority, and the contract operator of several small treatment facilities in his general area.

He's also the recipient of the Eastern Pennsylvania Water Pollution Control Operators Association's 2020 Daniel H. Treat Memorial Supervisory Award (facilities less than 2 mgd) for sharing his knowledge of the industry. In 2013 he received the association's the A.E. "Bud" Fricker Individual Service Award.

Daniel Wurst, wastewater superintendent, Telford Borough Authority

STARTING SMALL

The orphanage where Wurst grew up was served by a small treatment plant built in 1933. "It was an Imhoff tank, which most people have never heard of," Wurst says. "There are still some around, but they were popular back in the day."

Wastewater came into a central compartment, and sludge built up on the walls of a surrounding compartment. A fixed-nozzle trickling filter doused a bed of rocks. That was followed by chlorination and discharge to a small stream.

Unlike other students, Wurst didn't take technical school training: "I think my house parent saw that and said, 'Let's get him in and see if he'd be interested in wastewater.' So my job every day was to go down and clean the bar rack, do some quick testing — pH and dissolved oxygen.

"I was the daily man who did the grunt work. Fifteen years old, I was changing 150-pound chlorine cylinders. It's unreal the stuff I did that you couldn't do today. But back in the 1970s and early '80s, that wasn't an issue."

His house parent held a state wastewater license. A worker from a nearby plant took samples and filled out state reports. But twice a year, when the county inspectors came around, Wurst had time off school to show them the plant. In his senior year of high school, the orphanage sent him to nighttime licensing classes. He finished the classes but never took the license exam.

Daniel Wurst

Telford (Pennsylvania) Borough Authority

POSITION:
Wastewater Superintendent

EXPERIENCE:
39 years in the industry

DUTIES:
Oversee treatment, lab work, regulatory affairs, community outreach, and more

CERTIFICATIONS:
A1-4 Wastewater, A7-14 Drinking Water

GOALS:
Protect the environment, run the plant at peak efficiency

After reviewing recent testing results, Bill McCue (left) and Daniel Wurst make adjustments to the ProMix-S polymer mixing system (ProMinent Fluid Controls).

BUILDING A CAREER

When he graduated from school at the orphanage, he still didn't know what he wanted to do. There was a road crew job open at the Chalfont-New Britain Township Sewer Authority in Doylestown, and he had a cousin who was married to the brother of a township official. "I'm sure he put in a good word for me," Wurst says.

He was up against two men with much more experience, but he asked for less money and got the job. He started work in 1980 and did everything: helped set up equipment to televise lines, cleaned manholes, cleaned out debris, helped repair leaks. About two years later, he got a job in the wastewater treatment plant.

"I just saw no advancement at the road crew level," he says. "I knew eventually I wanted to be a leader. I didn't know how high I would get, but in those days, you didn't need all the college."

He worked at the activated sludge plant from 1984-89. At 3.5 mgd (design), it was larger than other plants in his past, and he learned a great deal.

Then he heard that nearby Buckingham Township was starting a sequencing batch reactor plant, the first in the area. At age 24, Wurst got a position there. It was great experience because the plant was still being built. Wurst sat with the contractor and wrote a few change orders.

FINDING A HOME

After the plant started, he wanted to move to a larger operation. So he sent out résumés and received three calls. Telford was first: "I went in for the interview. They threw me a set of keys." It was 50 cents more per hour and much closer to home. That was Jan. 8, 1990, and Wurst has been at Telford ever since.

At Telford, Wurst at first helped out in the water department, too. He and his colleagues would read wells, monitor the interconnection with another town, and pass the information on to the water division staff. State regulations tightened starting in the mid-1990s, and the state became interested in inflow and infiltration. The borough created more full-time water department jobs to handle increased state demands, and that meant Wurst and his colleagues stayed in the wastewater plant.

The Telford plant (1.23 mgd design, .550 mgd average) uses an oxidation ditch. As wastewater enters, a pair of comminuters (JWC Environmental) chop up debris. Next are two primary settling tanks. Pumps (Chicago) send water into the three-ring ditch.

If flows are heavy, such as during a rain, influent can be added in either of the outer two rings, usually the second, to provide as much treatment as possible. Two final clarifiers precede a pair of chlorine contact tanks, which are followed by sodium bisulfate for dechlorination. The final effluent discharges to Indian Creek.

MEETING THE PERMIT

The permit monthly average for chlorine is 0.01 mg/L, and the instantaneous reading cannot exceed 0.03 mg/L. "Basically, we have to chlorinate it and then discharge it with no chlorine in the water," he says. The permit limits for BOD and TSS are 30 mg/L.

"Even during rain events we still meet permit," says Wurst. "You could go to our effluent tanks right now, and they're clear enough. They're about 8 feet deep. You could drop a quarter in, and if you have good eyesight, you could pick whether it's heads or tails."

Wurst's team consists of operators William Mattson and William McCue. "I have a very conscientious crew here," he says. "We're like parents. We make sure the bugs have a good home, a good food source, and good air. They do the work, so I can't take credit."

Sludge is aerobically digested; the biosolids are then fed to a centrifuge (Alfa Laval) protected by another comminuter (Boerger). Timers periodi-

(continued)

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MADE IN AMERICA

The team at the Telford Borough Authority includes, from left, Warren Harris, collections foreman; Gary Yoder, public works director; William Mattson, operator; Daniel Wurst, wastewater superintendent; and William McCue, operator.

> "I have a very conscientious crew here. We're like parents. We make sure the bugs have a good home."
> **DANIEL WURST**

ON THE ROAD

When not working, Wurst enjoys driving. He is on his third Corvette, first a 1997, then a 2001, and now a lime rock green 2014 model he found through a Colorado dealership; he had always wanted a car in that color.

He and wife Maureen have driven the Corvette to Michigan to see a leader dog training center supported by Wurst's Lions Club, and they have driven to the Outer Banks in North Carolina.

Wurst has already given the borough his retirement date in 2025. At that point he'll have 35 years of service. "I don't know why I find this so satisfying," he says. "I love my job." **tpo**

cally shut off air to the digesters, allowing the solids to settle. Penn Valley Double Disc pumps return decant liquid to the headworks.

When Wurst came to Telford, the plant accepted septage from haulers. That stopped after haulers from outside the area brought contaminated loads. "We have no industry in town, and then we started getting heavy metals in our sludge," he says.

BEING NEIGHBORLY

Subdivisions grew around the plant, and there are occasional odor complaints. Minimizing those means paying strict attention to plant operation. When workers come in after the digesters have been decanting, they turn on blowers as soon as possible to reduce odors. Some odor complains likely come not from the pant but from pump stations in the subdivisions.

"The only time it's really big is spring and fall when it gets cool at night and hot during the day," Wurst says. "Then, even if we have the air on, we still have odors. And all plants have that. There's no way around it."

Wurst enjoys sharing information about the plant with community members. Among them are

Boy Scouts who come in for merit badge requirements. In one case, a neighbor was cutting grass one day to create a bike path for his children. He and Wurst talked, and Wurst invited him for a tour.

"About a month later, here come three housewives with four kids," Wurst recalls. "I took them for a tour. They were like, 'Wow, this is really interesting.'" He took the opportunity to explain that wastewater treatment plants keep people safe. Wurst has also trained people who needed experience credits for their state licenses, inviting them in on weekends to work with him.

THE PRIVATE SECTOR

Many townships near Philadelphia try to control growth, some by limiting the reach of municipal sewer, says Daniel Wurst, wastewater superintendent at the Telford Borough Authority. Builders adapt by putting in their own large onsite systems and then hiring someone like Wurst to run them.

"About 2004, I got started running some small treatment plants for my own business," Wurst says. From a septage hauler he learned that a small package plant was being installed for a restaurant in a nearby borough, and the owner was looking for an operator. He talked to the owner and got the job.

Then he learned of another small plant nearby that served a center to treat head trauma. "In about four or five years, I had picked up about three or four little plants," he says.

Bedminster Township needed more extensive help. "I did everything from four times a year reading 266 water meters on a Saturday, to setting up contractors, to going down to the DEP for consent order meetings, because they had a lot of I&I issues."

After 10 years, the borough built a new plant and hired a full-time operator. Wurst left the part-time job but picked up a few more customers. He now handles the needs of 10 small plants.

"They don't have to be done every day," he says. "Some are once a month, some are three times a week, some I do every day."

All of them are along a 10-mile stretch of the same main highway, so it's easy for him to service them during time off from Telford. "I work seven days a week most of the time unless it's vacation," he says. The keys to working this way are his understanding wife Maureen and daughter Maggie.

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Mary Jo Ramey (left) with Julie Hoover, administrative secretary for the Novato Sanitary District, believes strongly that public communication is about building relationships.

A Tireless Champion

MARY JO RAMEY STRESSES BUILDING RAPPORT WHILE ENGAGING RESIDENTS IN EDUCATION ON BEHALF OF THE CENTRAL MARIN SANITATION AGENCY

By Sandra Buettner

California's Central Marin Sanitation Agency teaches about water conservation one person at a time, through public events and by building rapport through fun learning ideas.

The agency operates a water resource recovery facility in Marin County that releases clean effluent to the San Francisco Bay. The plant reuses biosolids and burns biogas to produce renewable electricity. The service area population is roughly 257,000 and represents six clean-water agencies in the county.

RELATIONSHIP CHAMPION

Mary Jo Ramey, environmental compliance inspector and 14-year veteran with the agency, is the tireless champion who leads the education effort. She won the California Water Environment Association Community Engagement and Outreach Person of the Year award for 2018-19 and 2020-21. The key to her success is to build relationships.

"When you are recognized around town, even at the grocery store, those relationships are very important and worthwhile," she says. It helps get her message out when she explains what should and should not be flushed; promotes FOG programs; and tells what should not go down storm sewers.

She teaches residents about how good behaviors affect water and wastewater treatment and how that is critical to keeping the San Francisco Bay clean. In addition, she educates senior citizens and others about how to dispose of unused pharmaceuticals properly.

Along with her education efforts, she is the environmental inspector who visits dental offices, automotive garages, restaurants, San Quentin State Prison, and other sites to make sure they comply with regulations and do not send harmful substances into the sewer system.

> "When you are recognized around town, even at the grocery store, those relationships are very important and worthwhile.
> **MARY JO RAMEY**

MULTIPLE VENUES

Ramey educates residents through venues including the Marin County Fair, Fairfax Ecofest, farmers markets, senior fairs, K-12 schools, Earth Day fairs and home and garden shows. At her booth she educates attendees through clever and engaging activities. She estimates she has reached several thousand residents through these events.

A big hit at public events is a 10-question quiz that the utility changes up every year. According to Ramey, residents love being challenged on their knowledge about how to help the environment and how their actions can affect wildlife.

Every other year the agency gives out hats and T-shirts that feature an endangered creature in the Bay Area, such as sea otters, octopuses and leopard sharks. The T-shirt and hat are prizes for residents who answer all 10 questions answered correctly.

One attendee in his 80s comes every year and has taken the quiz since it began over 14 years ago. He has won all 10 T-shirts and always wears the shirt from the original fair when he took his first quiz. He brings the other T-shirts along all pressed and ironed to catch up with Ramey and her colleagues, and to take the current quiz.

Ramey spearheads public outreach events like the Fairfax Ecofest.

COVID CHALLENGES

Although COVID temporarily changed Ramey's approach to education, it did not stop or derail her. The agencies created Dotty the Water Drop and Tommy the Toilet Paper Roll videos and placed them on its website to help teachers virtually instruct students about wastewater treatment.

The agencies also posted a video of the Rock Steady Juggler, an environmentalist and performer who is popular with students. Before COVID, the juggler performed at school assemblies.

"It was critical we stay in touch with the residents throughout COVID," Ramey says. "Establishing and maintaining relationships became even more important in educating the public and getting our message out when we weren't able to meet in person." tpo

Ready for the Field

A SUSPENDED AIR FLOTATION PROCESS HELPS THE CALIFORNIA DEPARTMENT OF CORRECTIONS CONQUER AN ALGAE PROBLEM AND PRODUCE HIGH-VALUE TITLE 22 WATER FOR FARM IRRIGATION

By David Bachtel, PE, BCEE

The California Department of Corrections wanted to produce highly marketable Title 22 tertiary effluent from wastewater at its Pleasant Valley State Prison at Coalinga.

Meanwhile, a neighboring farmer wished to convert a 135-acre irrigated site from forage crops to higher-value pistachio orchards that require tertiary-treated effluent.

The district successfully produced the necessary water quality by adding a Suspended Air Flotation process (Heron Innovators) followed by dual-media filtration to its aerated lagoon secondary treatment facility on the prison site.

The skid-mounted Suspended Air Flotation unit (Heron Innovators) creates fine bubbles using a froth generator.

EXPLORING ALTERNATIVES

Wastewater from the prison is treated in a 0.65 mgd aerated pond; the disinfected secondary effluent was being stored on site and used for flood irrigation at the farm. The farmer's contract for receiving the effluent was up for renewal, and the department wanted to produce the Title 22 tertiary effluent to maximize its value in times of drought.

Initial studies recommended the use of cloth disc filtration followed by upgraded effluent chlorination. However, a review by the Regional Water Quality Control Board and the state Department of Drinking Water, responsible for permitting the facility, questioned the feasibility of direct filtration of the secondary effluent due to the possibility of algal growth in the aerated ponds during summer.

Subsequent studies indicated that up to 60 ppm of algae could be present in the pond effluent, so that a pretreatment step for algae removal before filtration would be needed to avoid a replacement of the ponds with activated sludge treatment.

SAF turbidity removal was extremely high; effluent consistently averaged 0.45 NTU for the first six days of the test, while the filter effluent turbidity averaged 0.78 NTU.

The department did not have the time or budget to perform pilot studies. A comprehensive review of algae removal technologies identified a facility in the small northern California town of Graton was successfully using Suspended Air Flotation (SAF) to remove algae from long-residence-time aerated pond secondary effluent. Accordingly, the department chose the SAF process in conjunction with dual-media filtration to produce the Title 22 reuse water.

BUILDING THE PROCESS

The prison influent had a BOD_5 of 70-410 mg/L with an average of 130 mg/L, TSS was 13-20 mg/L, and total nitrogen was 60-70 mg/L. Floating surface aerators provided a minimum dissolved oxygen of 1.0 mg/L, and the lined aeration pond detention time was up to 40 days at average design flow.

The four ponds, operated in series, were modified to allow storage by varying water levels to obtain up to seven days of storage in the event of process upset. The gravity flow from the last pond was modified for pumped flow, allowing continuous flow to the tertiary treatment process. This minimized equipment capacity and allowed the use of storage instead of redundancy to minimize capital cost.

The tertiary process included a pump station to feed a packaged SAF unit installed at grade at an adjustable, constant flow rate, gravity flow to a three-cell dual-media gravity sand filter, discharge of filtered effluent through a backwash storage well, and discharge to two chlorine contact tanks before to storage ponds.

Interruptions in the tertiary process affecting permit compliance (equipment failure, excess turbidity or inadequate chlorine residual) would result in shutdown of pumping to the process and accumulation of flow in the treat-

ment ponds. In case of an extended shutdown, on-site storage ponds provided 90 days of secondary effluent storage.

THE SAF PROCESS

The SAF unit is similar to dissolved air flotation, with one major difference. Instead of saturating a large return flow of water at high pressure and then releasing the pressure to form fine bubbles as the dissolved air is released from the solution, the SAF unit creates bubbles (aphrons <10 microns) using a froth generator.

The froth generator uses a small flow of water that, when combined with a frothing agent (surfactant), produces very fine bubbles with surface charge characteristics defined by the type and amount of surfactant added.

The froth, solids to be removed, flocculant and coagulant are combined in a flocculator to form a stable complex of fine bubbles and solids that is less dense than water and so concentrates on the surface of a separation tank (clarifier) for drainage and removal. The solids are skimmed from the clarifier surface and pumped for further thickening/dewatering.

The selection and use of the frothing agent allows the process to be optimized for the surface charge characteristics of the solids to be removed. Solids (primarily algae) collected by the SAF unit at the prison are further treated with polymer to enhance water release. The solids are then pumped to roll-off containers fitted with drainage grids supporting geotextile bags for gravity dewatering before landfill.

Multiple containers are used. Two containers are alternated daily, receiving solids from the SAF unit; a third container undergoes final drainage before landfilling. Solids removed during tertiary filter backwash are returned to the head of the aeration tanks.

START-UP AND PERFORMANCE TESTING

Title 22 for disinfected tertiary effluent requires:

- Effluent to tertiary filters not to exceed 5 NTU for more than 15 minutes at a time or 10 NTU at any time
- Effluent from the tertiary filters not to exceed 2 NTU 24-hour average, 5 NTU for 5% of the time within 24-hour period, or 10 NTU at any time

Performance testing was conducted continuously from Nov. 1-30, 2020, during which the facility was operated by prison staff without assistance. During testing, the facility met all discharge permit requirements.

SAF treatment 30-Day Performance Results

	Requirement	Actual
Effluent BOD_5 daily maximum	<20 mg/L	6.2 mg/L
Effluent BOD_5 monthly average	<10 mg/L	3.05 mg/L
Effluent TSS daily maximum	<20 mg/L	8.6 mg/L
Effluent TSS monthly average	<10 mg/L	2.95 mg/L
Effluent total N monthly average	<10 mg/L	3.1 mg/L
BOD_5 monthly removal	>90%	98.9%
TSS monthly removal	>90%	98.9%
Effluent total coliform >23 MPN *(30-day sampling period)*	<2	0
Effluent total coliform maximum *(any sample)*	240 MPN/100 ml	4.5 MPN/100 ml
Minimum chlorination value	450 mg-min/L	>450 mg-min/L
Minimum Cl modal contact time	>90 min	>118 min
24-hour average effluent turbidity	<2.0 NTU	1.07 NTU max
Time turbidity exceeds 5 NTU *(in 24-hour period)*	5%	0
Time turbidity exceeds 10 NTU	0	0

The Suspended Air Flotation process was used with dual-media filtration to produce the Title 22 reuse water.

On Nov. 7, the filter influent turbidity meter sensor failed, apparently because of exposure to concentrated hypochlorite solution from a filter prechlorination connection in the filter feed piping upstream of the sensor. The data from the period through Nov. 6, was consistent with the SAF effluent/filter feed turbidity regularly experienced before the test period.

SAF turbidity removal was extremely high; effluent consistently averaged 0.45 NTU for the first six days of the test, while the filter effluent turbidity averaged 0.78 NTU. It is suspected that the measured increase in turbidity after filtration may be the result of biological growth in the filter media.

Reviewing filter effluent turbidity from individual cells as well as the filter as a whole, consistent effluent turbidity from the individual filter cells and the tertiary process as a whole was consistently well below 2 NTU. When the system is operating continuously, the filter cells are typically backwashed every other day due to the low solids loading.

Share Your Ideas

TPO welcomes news about interesting methods or uses of technology at your facility for future articles in the How We Do It column.

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

ABOUT THE AUTHOR

David Bachtel, dbachtel@drbh20.com, is vice president of Bachtel Wastewater Engineers in Sisters, Oregon. tpo

The PO4 phosphate sensor takes samples at different depths and uses a colorimetric method to measure the concentration. It can be mounted on LG Sonic's legacy buoys at strategic locations in a water reservoir.

Profiling P

A SENSOR MEASURES PHOSPHATE IN REAL TIME AT DIFFERENT WATER DEPTHS, HELPING WATER UTILITIES UNDERSTAND CONDITIONS IN RESERVOIRS AND ANTICIPATE TREATMENT NEEDS

By Ted J. Rulseh

Algae blooms in drinking water reservoirs can require treatment on the spot, as well as adjustments at the water treatment plant to avoid taste and odor problems.

It's helpful if utilities drawing from reservoirs can anticipate algae blooms and so be prepared with the appropriate treatment regimens. For that and other purposes, LG Sonic has released the PO4 phosphate sensor.

The device monitors phosphate concentrations in real time and at different water depths. Being stable at highly variable temperatures and fully autonomous in operation, it provides accurate readings over a wide measurement range. Automatic calibration ensures consistently accurate measurements; regular self-cleaning reduces on-site maintenance.

The sensor is mounted on the company's legacy MPC-Buoy. It has a robust design and uses high-stability reagents. It delivers data to the company's MPC-View online software. Lisa Maria Brand, company co-founder and chief technology officer, talked about the technology in an interview with *Treatment Plant Operator.*

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

Brand: For more than 10 years we have been working on solutions to control algae in an environmentally friendly manner, specifically for lakes, reservoirs and other water bodies. We believe that to provide a good solution, it's necessary to look holistically at what is going on in the reservoir — why the algae are blooming. A big part of that is knowing where the nutrients are coming from.

tpo: How does this technology differ from traditional ways of monitoring nutrients?

Brand: Before, utility managers were looking merely at nutrients as a point-source problem. They weren't differentiating for whether nutrients were leaching in from the sediment or flowing in from a river or some other point-specific source. But the treatment method is completely different if you have nutrients coming from sediment. If you don't want to just throw chemicals into reservoir and kill everything in sight, you have to know where the problem is coming from.

tpo: What are the primary applications of the system for drinking water utilities?

Brand: We designed it for treating raw water reservoirs or for measuring phosphate in those reservoirs. Sometimes algae problems occur seasonally or periodically, and managers often don't know why at a given moment an algae bloom starts occurring. The sensor then can detect when nutrients are flowing into the reservoir. That gives managers a much better way to implement treatment strategies. If they know what water quality they are taking in, then they are better equipped to deal with it.

tpo: How is the sensing system deployed?

Brand: The sensor is deployed on our legacy MPC-Buoy, the same one we use to control algae and monitor water quality. Customers can easily add on the phosphate sensor. The buoy is solar-powered, and the data is transmitted to the software where treatment strategies are determined. That makes it much easier to use the data than with a standalone system.

tpo: How can the system detect where phosphorus is coming from?

Brand: It can take samples and measurements from different depths. So it can be placed at a site where you expect an inflow of phosphorus. Then by comparing measurements from the bottom and the surface, you get a good indication of where the phosphorus is coming from. Today most water companies take phosphorus samples once a month. Even if they take them once a week, they are missing a great deal of data. If they get a release from an agricultural facility, for example, they can miss it and think the phosphorus is leaching from the sediment.

tpo: Would a reservoir typically have multiple buoys?

Brand: Depending on the size of the reservoir, we usually have several buoys deployed. Some just use ultrasound to control the algae, while others monitor water quality. Clients who also want to measure phosphorus can add that capability on buoys in locations where they expect phosphorus to enter the reservoir.

tpo: How does the device actually take the samples and measurements?

Brand: It takes a water sample and mixes it with a reagent. In the presence of phosphate a chemical reaction generates a color, the intensity of which is then measured to determine the concentration. There are blue and yellow methods. We chose the yellow method because it is more accurate and uses a higher-stability reagent.

> "The sensor is deployed on our legacy MPC-Buoy, the same one we use to control algae and monitor water quality."
> **LISA MARIA BRAND**

tpo: How often are the samples taken?

Brand: Our clients can determine that, but we optimize the system for three samples per day; three times at different depths. The more samples they take, the sooner they have to visit the buoy and replace the reagent. At three samples per day, they would have to replace the reagent every three months. Before and after each reading the system calibrates itself.

tpo: What are the physical components of the technology?

Brand: There is a winch with a tube that can go to the different depths. There is a pump that draws the samples and a filter to exclude debris and heavy particulate matter from the samples. Then there is the sensor itself, a canister for the reagent and a canister for waste.

tpo: What happens to the data collected by the sensor?

Brand: Online software is accessible to us to provide the decision-making protocol for the algae treatment. It is also available to our clients with the option to forward it to their own PLC systems.

tpo: What other capabilities can the buoy-based technology provide?

Brand: It can act as a vertical profiler. So besides measuring phosphate, users can add other modules for water-quality parameters like chlorophyll a, phycocyanin (blue-green algae), pH, turbidity, dissolved oxygen and temperature, to provide a complete vertical profile of the water column. tpo

A Sharp Eye for Excellence

WHETHER DOING WASTEWATER MICROSCOPY OR OPERATING A MEMBRANE-BASED REUSE SYSTEM, ANDREW SHEPHERD ENSURES QUALITY PLANT PERFORMANCE

STORY: **Jim Force**
PHOTOGRAPHY: **Michael Schmitt**

When Andrew Shepherd looks into the microscope, he sees more than wastewater organisms.

He gets a picture of the entire plant operation and can tell how the process is performing out there among the pipes and valves and pumps and basins. "It crystallizes the whole process for me," says Shepherd, operator and regulatory specialist at the Newberg (Oregon) Wastewater Treatment Plant. "I can see how the microbiology works. It's a macro versus micro view. It's pretty phenomenal."

What he didn't see coming was the 2020 Operator of the Year award from the Pacific Northwest Clean Water Association. "It shocked me and humbled me," he says. "There are so many good operators up here in the Northwest. It was extremely special just to be nominated for the Lower Columbia Section award."

It was no surprise to colleague April Catan, regulatory compliance specialist: "He's been great. He has worked all over the plant. He's curious and tries new things. He's conscientious, works hard, and is always learning. He deserves the award and I'm happy he was the winner."

VARIABLE FLOW

The treatment plant Shepherd monitors is a Level 4, activated sludge operation with a pair of 2 million-gallon elongated racetrack oxidation ditches. Dry-weather design flow is 4 mgd, and average daily flow ranges from 2 to 15 mgd, depending on the season. Wet weather accounts for the differences in seasonal flows.

Andrew Shepherd, operator and regulatory specialist at the Newberg Wastewater Treatment Plant, received a 2020 Operator of the Year award from the Pacific Northwest Clean Water Association.

There are no primary clarifiers. Wastewater enters the ditches, each with four brush aerators (paddles from Evoqua Water Technologies). Four secondary clarifiers follow, and the overflow is disinfected with 0.8% sodium hypochlorite generated onsite. The dichlorination step uses sodium bisulfite (38%).

Effluent is discharged to the Willamette River about a quarter mile away. A Wonderware SCADA system (AVEVA) controls and monitors the treatment process. Waste activated sludge is pumped to a pair of 80,000-gallon storage tanks, then dewatered on a pair of screw presses (HUBER Technology) to cake at 16-20% solids.

REAPING REWARDS

Andrew Shepherd is fortunate in that he directly experiences the results of his work in his everyday life. He's a fly fisherman, and his hobby depends on clean lakes and streams.

He got started in the sport after his marriage as he got to know his mother-in-law and her father. "I was 22 when I got into it. I went on a guided trip in central Oregon with my mother-in-law and her 90-year-old father, who out-fished both of us and caught every species of trout in East Lake on that day! We've definitely formed a special connection through fly fishing."

He fishes mainly for rainbow and cutthroat trout, and while hesitant to give away tips, he prefers early morning fishing. "I love getting on the water early," he says. "I prefer casting a dry fly, but I'm certainly not above using nymphs and streamers."

His best catches include a 22-inch rainbow he hooked on East Lake, and a 16-inch redband trout, a type of rainbow native to the Northwest and known for brilliant red stripes on either side. It's all catch and release, of course. Shepherd is just as concerned with preserving the species as with the clean water habitat they depend on.

Shepherd handles a wide array of responsibilities that include lab testing, planning and scheduling, and day-to-day plant operation in his role as lead operator.

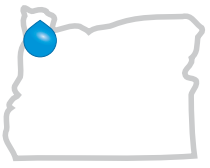
CLASS A COMPOST

The cake is composted with dried sawdust and recycled compost. Shepherd is familiar with the operation because that's where he started full time back in 2010, after working at the plant as a seasonal laborer for a year and a half.

"We operate an in-vessel composting system consisting of two 66-foot-long reactor tunnels," he says. In mid-tunnel, long probes monitor temperature and pressure; blowers provide aeration to ensure Class A material, and a hydraulic push door forces composted solids out the

Andrew Shepherd

Newberg (Oregon) Wastewater Treatment Plant



TITLE:
Operator III, Regulatory Specialist

RESPONSIBILITIES:
Operate the treatment system, handle lab analyses

EDUCATION:
Associate of Arts degree with a focus on English/writing, Clackamas Community College

EXPERIENCE:
12 years

CERTIFICATION:
Grade III Wastewater Operator (second highest)

AWARDS:
2020 Operator of the Year, Pacific Northwest Clean Water Association

GOAL:
Achieve Grade IV Wastewater Treatment Operator certification

> "He has worked all over the plant. He's curious and tries new things. He's conscientious, works hard, and is always learning."
> **APRIL CATAN**

Operator Jon Hodgkins (left) and Andrew Shepherd with the plant's Pall Aria AP6 water treatment system (Pall Water). The unit treats a portion of the effluent supplying nonpotable water to Chehalem Glenn Golf Course for irrigation.

end of the tunnel on a batch basis. If temperature conditions aren't met, the batch is recomposted.

A front-end loader takes the compost to a staging area. Branded as Newgrow, it is sold bulk at $10 per cubic yard or in 1½-cubic-foot bags that local gardeners and landscapers can purchase for $4.50. "They absolutely love it," Shepherd reports. The dried sawdust may be a unique wrinkle. It comes from a local wood products plant and is dewatered from 50-60% solids to 90-95% solids using a reconditioned alfalfa dryer.

Residents get even more benefit from their clean-water plant in the form of recycled water. During the spring and summer dry seasons, a portion of the effluent passed through Pall AP6 membrane filters. The high-quality water is then pumped to the Chehalem Glenn Golf Course and used for irrigation. Volume varies from 200,000 to 600,000 gpd.

The team at the Newberg Wastewater Treatment Plant includes, from left, Mike Fischer, plant mechanic; Jennifer Valdez, administrative support coordinator; Jon Hodgkins, operator; Andrew Shepherd, operator III/regulatory specialist; Ed Thomas, senior plant mechanic; and Connor Pomeroy, operator.

MEETING PERMIT

Shepherd starts his typical day around 7 a.m., calibrating the pH meter, collecting samples around the plant and then starting a rigorous testing program. "I log the samples and run several tests throughout the day, some for regulatory purposes, some for process control or both," he says. "Total chlorine residual, pH, TSS, SVI, ammonia, SOUR, alkalinity, $CBOD_5$, et cetera."

Newberg is required to report CBOD and TSS twice a week and to monitor twice weekly for nutrients — total phosphorus, TKN, ammonia and nitrate-nitrite — depending on the time of year. The composted solids are monitored for moisture content and tested quarterly for metals and nutrients. An outside lab tests for Salmonella quarterly.

Newberg's permit varies with the seasons. During the dry months of May through October, the monthly average limits are 10 mg/L CBOD and TSS; they are 25 mg/L and 30 mg/L for November through April. The plant meets those limits with relative ease.

"Usually our effluent TSS is less than 3 mg/L and our CBOD is under 2 mg/L," says Shepherd.

The lab has full suite of Hach equipment, including a DR 3900 spectrophotometer, a TitraLab AT 1000, a TU 5200 turbidity meter and a DRB 200 digestion block.

Shepherd becomes lead operator when plant manager Craig Pack is away, taking on responsibilities for plant operations and supervising a staff of eight. The team includes April Catan, regulatory compliance specialist; Jon Hodgkins and Travis Hyder, treatment operator II; Nick Moore and Connor Pomeroy, treatment operator I; Ed Thomas, senior plant mechanic; and Mike Fischer, plant mechanic. Pack also helps operate the recycled water process

during the dry season, looking after the membrane filters and making sure that reuse water standards are being met consistently.

Shepherd handles the various tasks capably. "He's someone I never have to worry about," says Wastewater Treatment Superintendent Craig Pack. "He's in charge of all our lab testing, planning and scheduling, and he can step in and direct the day-to-day operation at the plant in his lead operator's role. He's thoroughly reliable."

Shepherd says on-the-job experience is the key: "Really, nobody here went to school for formal wastewater course work. We've learned on the job and through certification training."

LAB REHAB

As with clean water professionals, the COVID-19 pandemic presented unique challenges to the Newberg plant and staff, including the lab operation.

"Since September 2020, along with about 40 municipalities, we have been providing Oregon State University with weekly influent samples to test for the presence of SARS-CoV-2 virus in the wastewater," says Shepherd. "It's part of the Oregon Health Authority's wastewater surveillance program for detecting COVID-19 in participating communities."

But the most difficult issue he's had to face recently is the renovation of the treatment plant laboratory. The lab equipment was moved to a new building while the old building was being remodeled. It was difficult work in new surroundings for an extended time, sharing space with other plant operations. But it needed to be done.

"We're 34 years old," he notes. "Some of the apparatus was beyond its useful life, and the old layout was not efficient. We didn't change the footprint all that much, but we made it better so the flow through the lab is improved."

A new drop-off area, more counter space, a microscope station and more open areas will improve efficiency. Dedicated hand-washing sinks will increase sanitation and personnel safety.

The lab was opened last fall, but that was several months beyond the planned completion date.

> "Really, nobody here went to school for formal wastewater course work. We've learned on the job and through certification training."
>
> **ANDREW SHEPHERD**

Shepherd notes that sourcing issues and the "worldwide shortage of everything" caused delays.

He enjoyed being the point person working with contractor: "It was a real opportunity to get involved. The improvements will position Newberg for new permit requirements in the future."

When those come along, it's a good bet that Shepherd and the Newberg staff take them on with professional pride and enthusiasm: "We're really proud of what we do here. We help keep our waterways clean. We like being part of the solution and not part of the problem." **tpo**

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From Cake to Crunchy

A NEW HAMPSHIRE RECYCLING COMPANY USES A LOW-TEMPERATURE DRYING PROCESS TO DELIVER 90% DRY CLASS A BIOSOLIDS FOR A VARIETY OF BENEFICIAL USES

By Steve Lund

Shelagh Connelly has some advice for biosolids producers: Stop hauling water.

Connelly is president of RMI, a company in Holderness, New Hampshire, with 25 years of experience helping wastewater treatment plants, food producers, paper mills and other facilities recycle their residuals that might otherwise go to landfills or incinerators. The company has 25 employees.

Shelagh Connelly, president of RMI

"We characterize materials that can be recycled and that have beneficial properties, either nutrients or physical characteristics, that make for a good soil material," Connelly says. We get hired to do all the permitting and regulatory oversight.

"Then we have the trucks that pick it up to recycle it for land application programs. Some facilities want to do improvements at the source. Some want us to pick up and process the material. Some have a product that's fine as it is, and we'll pick it up and deliver it."


A Shincci dryer transforms wet cake into a Class A biosolids in about four hours.

MAKING IT DRY

In 2018, RMI introduced a new drying technology that helps wastewater treatment plants dramatically reduce biosolids volume and improve quality. The company has run successful pilot projects in Hooksett, New Hampshire, and Brattleboro and Bellows Falls, Vermont.

In all three cases, the dryer produced biosolids at 88-92% solids, significantly cutting the volume that needs to be transported. The effort led to RMI being selected as the 2021 recipient of the Green Steps Award from the New England Water Environment Association.

"NEWEA's Sustainability Committee was thrilled to present RMI with the 2021 Green Steps Award, which recognizes innovation and sustainability in the clean water and stormwater industry," the association said in a statement.

"This honor recognizes RMI's sustainable biosolids recycling technology and their demonstrated commitment to the triple bottom line, including environmental stewardship, social well-being and economic prosperity."

LOW-TEMPERATURE DRYING

The new technology is a belt dryer manufactured in China by Shincci. RMI imported the first two full-scale dryers installed at U.S. treatment facilities. Although the company has experience managing dried biosolids from paddle dryers and drum dryers, Connelly prefers the Shincci technology because it operates at lower temperatures, uses less electricity, has a smaller footprint and is more cost-effective.

> "I see it as the wave of the future. I just want to stop hauling water. It's as simple as that. It doesn't make sense to truck water around."
> **SHELAGH CONNELLY**

"It's misleading to call it a dryer. It's more like an evaporator," Connelly says. "It dehumidifies the biosolids. It's not comparable to conventional dryers. My partner Charley Hanson likens it to a barbecue: It's low and slow. Low heat and slow-moving belts allow the water to evaporate. You're left with a 90% solids Class A product that is just beautiful."

The process takes about four hours. Connelly says the final product resembles Cracklin' Oat Bran cereal. "When you put the wet cake, into the unit, it goes through what's called a slitter, which is just like a giant pasta machine, and it literally turns it into long noodles.

The final product is about 90% solids and resembles cereal.

"The beauty of those noodles is it increases the surface area, so it's easier to evaporate the water. At the end you have these crunchy, dry, shorter noodles. It's very friable, very stable and doesn't have odor. It ends up being a very nice biosolids product."

TRUCKLOADS ELIMINATED

After a pilot project at Brattleboro, one of the dryers was moved to Bellows Falls, where the machine fit into the same space as the 30-cubic-yard dump container that had been receiving the biosolids from an anaerobic digester.

"We use a PWTech 302 screw press," says Rob Wheeler, chief operator at Bellows Falls. "We've done some fine-tuning, and we're getting 28-30% solids off that press. That goes into the drier, and the drier takes it to 88-92% dry product."

The press and the dryer were linked to communicate with each other. "When the dryer can't take any more product, it shuts the press off," he says. "They work in unison. You don't need somebody out there watching it all the time."

The plant (average flow 0.5 mgd) was landfilling 30 to 40 container loads of biosolids per year. Now the plant fills only one container per month of Class A product that can be applied to farm fields. Farmers are eager to take it. Although Bellows Falls delivers the product to fields, Wheeler envisions the biosolids being conveyed directly into a storage building where farmers could come pick it up.

BACK TO THE HEADWORKS

The water from the dewatered material is condensed, collected and sent back to the headworks. Connelly says that in different climates it could be suitable for reuse, such as for irrigation. "It's very clean, and it would be OK to put into receiving water," she says. "Probably it's a little cleaner than the effluent."

Helping biosolids producers with technology is a new direction for RMI. "Our company hasn't dealt with technology before," Connelly says. "We've done land application, but we saw the opportunity and value because this technology makes such a nice final product."

Although the pilot projects have used electricity for a heat source, Connelly says the dryer could also be set up to use waste heat from other processes. The pilots have been at relatively small plants, but it could be scaled up with larger machines or by connecting modules.

"This is really a simple technology to evaporate water out of whatever product you have," Connelly says. "I see it as the wave of the future. I just want to stop hauling water. It's as simple as that. It doesn't make sense to truck water around. We have about 19,000, wastewater treatment plants in the country. If we can shrink four truckloads down to one, that's huge." **tpo**

The team at the Richmond Wastewater Treatment Facility includes, from left, Aaron Krymkowski, lead mechanical operator; Kendall Chamberlin, plant superintendent; Dameon Young with Working Dog Septage Service; Allen Carpenter, lead process operator; and Bradley Snow, operator in training.

Saved by Septage

WHEN A CREAMERY CLOSED AND LEFT HIS TOWN'S CLEAN-WATER PLANT SHORT OF REVENUE, KENDALL CHAMBERLIN AND HIS TEAM DEVISED AN INNOVATIVE SOLUTION

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Carolyn Bates**

The Richmond clean-water plant was humming along just fine until the Vermont town's creamery shut down in 1999.

"With the creamery, our flows were about 150,000 to 200,000 gpd," says Kendall Chamberlin, plant superintendent. "When they left, our flows dropped to about 30,000 gpd. They took 67% of our revenue with them. There was a huge conundrum: What are we going to do?"

The answer was to take in septage. Chamberlin and engineers with the Hoyle, Tanner & Associates consulting firm devised a septage receiving and treatment system as part of a 2005 plant upgrade. That filled the gap in revenue, especially when the COVID-19 pandemic hit and most other facilities in the state shut down septage receiving, making Richmond the go-to place for Vermont's haulers.

The upgrade also positioned the facility to meet new, stricter effluent phosphorus limits. Today the plant operates on a solid financial foundation and with a collection system extensively rehabilitated in 2009. The facility earned the Green Mountain Water Environment Association's 2021 Facility Excellence in Wastewater Award.

'NOT POPULAR'

Richmond, in Vermont's northwest corner, lies in the foothills of the Green Mountains and on the east edge of the Lake Champlain valley. The Winooski River bisects the town, which is home to the Round Church, a 16-sided meeting house recognized as a National Historic Landmark.

The clean-water plant was built in 1970. Chamberlin started at the plant since 1985 and has been superintendent since 1988; he holds a Grade 5 Domestic Wastewater license (highest). "When the plant first came online, probably three-quarters of it was for the creamery, and the rest for the village," he says.

When Chamberlin proposed septage receiving as a way to make up for the loss of revenue from the creamery, "It was met with outright derision and was not popular at all," he recalls. "They had tried taking in a load of septage once, and it basically killed the plant. It was a big no-no, and the town select board remembered that.

> "These last couple of years we've brought in more revenue from septage than from all the other customers connected to the system."
> **KENDALL CHAMBERLIN**

"But we managed to make it work because we treated the septage differently. Instead of putting it through the process, we just dewatered it. Haulers arriving at the plant connect to the hose that runs into the building and gravity-feeds a septage acceptance unit (Lakeside Equipment) with rag removal capability.

The septage is mixed with waste activated sludge in a pair of 25,000-gallon aerated holding basins. From there the mixture is fed to an aerobic digester, after which it is dewatered to 33% solids on a Fournier rotary press. The cake is sent to a composting facility.

The Richmond treatment plant has a dry-weather design capacity of 222,000 gpd and treats an average of 70,000 gpd.

Richmond (Vermont) Wastewater Treatment Facility

www.rva.gov/public-utilities/wastewater-utility

BUILT:
1971 upgraded, 2005

POPULATION SERVED:
~1,000

FLOWS:
222,000 gpd design, 70,000 gpd average

TREATMENT PROCESS:
Extended aeration activated sludge, cloth disc filtration

TREATMENT LEVEL:
Tertiary

RECEIVING WATER:
Winooski River

BIOSOLIDS:
Sent to composting

AWARD:
2021 Facility Excellence Award, Green Mountain WEA

ANNUAL BUDGET:
$790,000 (operations)

REVENUE REVIVAL

"Septage really was a savior for Richmond," Chamberlin says. "These last couple of years we've brought in more revenue from septage than from all the other customers connected to the system." That's because the COVID-19 pandemic turned Richmond into a near-monopoly.

"When we did the upgrade in 2005, we planned on taking about a million gallons of septage per year, but with our tankage, and working around our low flows from the town, we were averaging before the pandemic probably 250,000 gallons a month, or 3 million gallons a year. We had thought we might be able to take more than that because it worked so well.

"When the pandemic started, the other facilities shut down almost without exception. Either due to reductions in staff or other reasons, they just were not taking septage.

Kendall Chamberlin (left) and Bradley Snow clean the bulbs in a TrojanUV3000PTP UV disinfection system.

> "I'm actually the old guy here at 57. And all of my crew members are under 30."
> **KENDALL CHAMBERLIN**

"We made sure all the haulers knew that Richmond was still open for business." Haulers came from all over Vermont and some from neighboring parts of New York and New Hampshire.

"I give a lot of credit to our crew," says Chamberlin. "They knew there was a huge demand for septage treatment in the state, and there really was no other option. So we took our precautions and stayed open, and our number went up to over a million gallons a month. Before the pandemic we budgeted a maximum of about $200,000 in revenue. Last year we had about $500,000, which is quite a bit more than we got from the creamery."

CUSTOMER SERVICE

Service to the haulers played a key role in the septage program's growth: "From the start we've really paid attention to customer service. They come into the office and we talk to them. We have coffee and snacks available. They're doing a job just like we are; we all have to work together. If we treat people that way, they're going to want to come to Richmond."

Billing is on the honor system. Before deciding how to charge, Chamberlin talked to staff at various facilities. "I spoke to some folks about metering

Kendall Chamberlin, superintendent of the Richmond Wastewater Treatment Facility, gives credit to his crew for the plant's success.

septage, and a lot them had some issues with it," he says. "I also talked to people who did not meter septage. They told me, 'Look, these folks are no different than you or I, and really, how many dishonest people do you know?'

"If they have 3,000 gallons on the truck, they're going to tell you they've got 3,000 gallons. Our numbers have shown that. We keep track of our waste sludge and the volumes we press, and invariably we're within maybe 1,000 gallons out of a million or more gallons a month. The haulers' slips are right on the money."

UPGRADE FOR PHOSPHORUS

Another main purpose of the 2005 plant upgrade was to comply with the state's new phosphorus rules. Eugene Forbes and Kirsten Depietro-Worden of the Hoyle, Tanner firm redesigned the entire facility, adding anoxic chambers for phosphorus removal, fine-bubble diffusers (Sanitaire, a Xylem brand) in the aeration basins, two Aerzen blowers, two cloth disc filters (Aqua-Aerobic Systems) and UV disinfection (Trojan Technologies).

In 2009, using federal stimulus funding, Richmond completed a $1.5 million rehabilitation of the collection system that included a system inspection and analysis led by Alan Huizinga and Peter Pochop of Green Mountain Engineering, cured-in-place lining of some five miles of pipe, and repair or replacement of 30 manholes.

Richmond Wastewater Treatment Facility PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	610 mg/L	2.4 mg/L	50 mg/L
TSS	747 mg/L	1.8 mg/L	50 mg/L
Phosphorus	22 mg/L	0.13 mg/L	0.8 mg/L

The collection system delivers wastewater by gravity to a wet well at the treatment plant. From there the facility's original lift pump brings it to the headworks to flow by gravity through the process. A Complete Plant (Lakeside Equipment) removes debris and grit; the flow proceeds to three anoxic chambers with Flygt (a Xylem brand) mixers and then to the aeration tanks.

After aeration the effluent enters two rectangular clarifiers, ahead of which sodium aluminate is added for settling and phosphorus removal. After the cloth disc filters and UV disinfection, the final effluent is discharged to the Winooski River.

KUDOS FOR THE TEAM

Making it all work, besides Chamberlin, are Aaron Krymkowski, lead mechanical operator; Allen Carpenter, lead process operator and Bradley Snow, an apprentice and operator in training. They handle both the wastewater and drinking water sides; drinking water is drawn from a well, chlorinated and delivered to a hilltop reservoir for gravity distribution.

"We are a little bit unusual in that most plants in this area have a lot of older folks and not very many young folks," Chamberlin says. "I'm actually the old man here at 57. And all of my crew members are under 30." Krymkowski (Grade 3) has been with the plant for three years; Carpenter (Grade 2) for six. (Tyler Booska, an operator in training, was a valuable contributor during the pandemic but has moved on to an operator position in Burlington.)

To maintain a capable staff, Chamberlin has turned what had been a problem into an asset. "It's no secret that small towns like ours don't necessarily pay a large amount," he says. "We're on the outskirts of Chittenden County, which is the most populated county in Vermont.

"I would hire folks, they would get a little bit of training in Richmond, and then they would get stolen away by surrounding towns. A fair number of operators in the county have gone through Richmond and worked for me. So rather than try to fight against that, we made it our strength.

"We have a very good training program here. When new team members come in, they get training in basically all the operations and systems of the

Trout live in effluent from the Richmond plant that's piped into an idle basin. They provide proof of the plant's effluent quality.

PROOF POSITIVE

Kendall Chamberlin had heard enough of people bad-mouthing wastewater treatment plants as polluters of streams.

"A lot of people were saying, 'You're destroying the river. You're putting sludge in the river. There are no fish left in the river," says Chamberlin, superintendent of the Richmond Wastewater Treatment Facility.

So he took action. The facility has two aeration basins but uses only one. So Chamberlin rigged up a system to pump a portion of disinfected effluent into that idle basin, and there he placed brown, brook and rainbow trout.

The trout live in the basin year-round; plant team members feed them commercial fish food pellets. There's no need to aerate the tank because the effluent is rich in oxygen. Midge flies prosper in the basin, and some duckweed grows on the surface.

"It's like a cold-water pond," Chamberlin observes. "It's a big hit with the people who tour the facility. A lot of people don't look at plants like ours as clean-water facilities. They think we're just polluting the river. It's pretty hard to make that argument when you're standing at the basin railing feeding trout that are a foot long."

Checking the Complete Plant system (Lakeside Equipment) are, from left, Kendall Chamberlin, Allen Carpenter and Aaron Krymkowski.

facility. They do tend to move on, but over the years we've gained a reputation that if you start your career at Richmond, a lot of people will be wanting to hire you. We turn that to our advantage as much as possible."

STRATEGIC HIRING

It works largely because of Chamberlin's approach to hiring: "We say, let's hire folks who maybe wouldn't be hired at some other facilities because they don't have any direct wastewater experience. A lot of the people I hire would be handy with HVAC, or they might have been in construction or landscaping or working for a school. They'll have a background where they know how to work.

"We've found that if we hire those people, they are very interested and hungry for training to break into a career. I mentor them and give them a taste of the facility from A to Z. They do everything. I'll send them to a select board meeting now and then. I'll have them answer direct customer calls and follow projects from start to finish.

> "Almost without exception, every operator who has come through this facility has remained my friend."
> **KENDALL CHAMBERLIN**

"After that, when they go to another facility, especially a bigger facility, they find it very easy because they've been exposed to all parts of it. The facilities are really interested in getting them because they haven't done just one thing. They'll say, 'You worked in Richmond; you did everything. We'll hire you as a dewatering operator, but we know that if you have to pump a manhole, you can do it.

"A lot of people have left here because of a pay increase they couldn't ignore. But one thing I regard as the highlight of my career is that almost without exception, every operator who has come through this facility has remained my friend. They speak well of me.

Biosolids are dewatered to 33% solids on this Fournier rotary press.

"I tend to be very collaborative. I'm the super, and things are expected of me, but I give the team members a chance to specialize and find out what they really like. We'll switch our duties around to let people shine where they like to shine. When they've left, I'm comfortable saying they all exceed my skill. They are fantastic people."

RECALLING A MENTOR

Chamberlin drew early-career inspiration from Willard "Bill" Conant, the plant superintendent who hired him at Richmond. Chamberlin was pursuing an environmental science degree at Johnson State College while working for a laboratory that did sampling at wastewater treatment plants.

"Richmond was one of the facilities that I sampled," he recalls. "I got to know the team here. The No. 2 guy got an offer he couldn't refuse to go to a surrounding town. So the next time I came to get samples, Bill said, 'Hey, we've got a job open. Here's an application; fill it out.' Lo and behold I got the job. Bill was a fantastic mentor, and he got me hooked on the potential for this career."

Twenty years later, Chamberlin went back to the college and finished his degree. He was humbled to see Richmond win the state award for facility excellence. "Every plant in Vermont did outstanding work through the pandemic," he observes. "I don't know how they picked us in a year when everyone was exceptional." **tpo**

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“I discovered I have an operator’s mind. I love seeing the big picture ... figuring out what’s wrong and coming up with creative solutions. This is the career of a lifetime, and I never knew it existed when I graduated from college. It makes me happy to see how we are protecting our community in a tangible way.”

Christen Wood
Operations Administrator
Upper Tuscarawas Wastewater Treatment Plant, Akron, Ohio

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A Driver of Innovation

THE WISCONSIN-BASED WATER COUNCIL'S PILOT PROGRAM LOOKS TO HELP SPEED PROMISING WATER TECHNOLOGIES FROM CONCEPT TO COMMERCIALIZATION

By Ted J. Rulseh

Karen Frost

Stresses on water supplies are increasing around the world. Supplies are constrained in many areas, and water quality is a persistent concern.

The Water Council sees innovation as a major component in answering water challenges already present and to come. The council is a global hub dedicated to driving innovation in freshwater technology.

The council has assembled one of the world's most concentrated water technology clusters from its headquarters at the Global Water Center in Milwaukee, and the council promotes water stewardship as a natural complement to water innovation.

Among its initiatives is a Pilot Program that provides funds to help companies move innovative water technologies from concept to commercialization with greater speed. Since its launch in 2015, the program has awarded grants of more than $822,000 to 17 companies. Four grant winners were announced at the end of 2021 (see sidebar).

The aim is to accelerate the deployment of technologies with potential to solve problems, create new business and improve water quality regionally and globally. Karen Frost, the council's small-business program manager, talked about the Pilot Program and other council initiatives in an interview with *Treatment Plant Operator*.

tpo: What is the basic focus of your organization?

Frost: The Water Council was formed more than 10 years ago as a nonprofit organization focused on three key areas. We foster economic development, working with and for our members to help them make meaningful connections for business opportunities. We support innovation through the Pilot Program and other initiatives. And we focus on stewardship, working with companies that want to better understand and address their water risk.

tpo: How would you describe the concept of water risk?

Frost: Water risk can take many forms. For example, companies operating in water-stressed areas like Arizona, Nevada and California have inherent water risk because of their location. Other companies may have water risk because a supplier is in a water-constrained area, or because their business is very water intensive, as in data centers, beverage and food manufacturers, chemical producers and microchip manufacturers. As water issues become more pronounced, we expect to see companies turning more attention to these risks.

tpo: Besides the Pilot Program, how does the council promote water innovation?

Frost: Our innovation programs touch companies at multiple ages and stages. We have a Tech Challenge that works with large corporate sponsors like Wachs Water Technologies, Xylem, A.O. Smith and Badger Meter. In that program we run an open innovation competition twice a year, inviting applications for specific topics of interest. Applicants include researchers, early-stage startups and mature startups, all the way up to established companies.

Our BREW 2.0 Water Technology Accelerator helps market-ready startups scale and grow. This virtual and in-person program focuses on expert-led sales and growth training tailored for water technology businesses. Afterward, participants have access to ongoing training to continue their growth trajectory. In the water space, it can be a long and difficult path to market for startups. Since it's a regulated environment, they may need certifications, they need to pilot. And many companies go through multiple accelerators before they reach the market.

tpo: What kinds of companies are the targets of the Pilot Program?

Frost: The Pilot Program targets companies that need to validate their technologies. Most of them are startups that need field-level data to be able to move their innovations forward. Some may be companies that have successfully deployed a technology elsewhere, but now they're bringing it to market in the U.S. and need to find utilities where they can demonstrate it here. They may need to pilot in multiple places and scenarios to validate that their technology will perform in diverse environments and weather conditions.

tpo: How did the Pilot Program get its start?

Frost: The Water Council has partnerships with similar water-focused groups in various parts of the world. One of those with which we are a longtime partner is a group in the Netherlands called The Water Alliance. They have sites where companies with emerging technologies can have almost plug-and-play pilot opportunities. We saw what they were doing and understood that there was a need here, too.

> "Innovation will only grow more important in terms of addressing issues around climate resiliency and water stresses, both quality and quantity." **KAREN FROST**

tpo: How are the Pilot Program projects funded?

Frost: We have several longtime funding partners focused on particular areas of interest. One of those is the Milwaukee Metropolitan Sewerage District. They provide funding on an annual basis for one or more pilot projects that fit with their mission, ultimately benefit their ratepayers and help the district keep current with innovation. Another longtime funder is the Fund for Lake Michigan. Their interest is in technologies that can ultimately improve water quality in the lake.

tpo: How does the council recruit companies to compete for Pilot Program funds?

Frost: We reach out to partner groups in the U.S. and to networks we've established elsewhere. We have a representative based in Ireland who is well connected to 20 to 25 groups across Europe. When we have an open competition, she helps our partners learn about that opportunity and share it with their networks. The Water Environment Federation is a great channel for us, and so are the Water Research Foundation and the National Renewable Energy Laboratory Innovation Incubator Network. We reach out to a long list of groups when we have a Pilot Program competition or other funding opportunities.

tpo: What criteria are used to select the winners of Pilot Program grants?

Frost: We have a Pilot Advisory Committee made up of representatives from the funding partners and other individuals who have technical insight. We look at who is in alignment with the funders' objectives and which applicants have technologies most likely to benefit from the funding.

tpo: In the big picture, what impact do you see The Water Council having on global water issues?

Frost: Innovation will only grow more important in terms of addressing issues around climate resiliency and water stresses, both quality and quantity. It's a huge opportunity and challenge at the same time. Helping companies validate their technologies, and helping identify problem-solvers who have solutions a particular areas will be critical in bringing solutions to the market.

On the flip side of that is sustainability and addressing water risk. It's a two-sided coin. Companies will need to understand their water risk, and innovation will be critical in terms of addressing the pressing issues they face. As the world gets thirstier and more climate-strained, water will be at the forefront, and innovative solutions are going to be more and more necessary.

tpo: How can companies or people interested in these programs get more information?

Frost: There is a lot of good information at thewatercouncil.com website.

There is a tab about our innovation programs. If someone has a special interest, they can reach out to me. I would be glad to share information about any of our programs and how they could become involved. **tpo**

THE WINNERS

The Water Council named four 2021 winners in its Pilot Program. They addressed several water-related challenges. The winners were chosen by the Fund for Lake Michigan, the Milwaukee Metropolitan Sewerage District, and Wells Fargo, from a diverse global field of applications. They are:

- **Bloom Optix/HABAlert.** HABAlert would be the first cost-effective technology for identifying and counting cyanobacteria, which cause harmful algal blooms.
- **Tomorrow Water/Proteus.** The Proteus up-flow media filter aims to improve carbon diversion, energy efficiency and the tolerance of wastewater treatment plants to peak flow events in the face of aging sewer systems and erratic weather caused by climate change.
- **Water Resources Monitoring Group.** WRMG will field-test a low-cost system called the Turbidity Tracker, designed to estimate soil loss from farm landscapes in real time.
- **Water Warriors.** This project will demonstrate the effectiveness of Poseidon Pellets in reducing phosphorus concentrations by addressing runoff and stormwater nutrient pollution in early stages, with minimal infrastructure.

Torrey Pines EchoTherm digital stirring hot plate

Torrey Pines Scientific's new EchoTherm programmable digital stirring hot plate is designed for use in chemical, pharmaceutical, environmental, biochemical and other laboratories where reproducible, accurate chemical reaction control and sample preparation are a must. With the easy-to-use EchoTherm Model HS40, programming is done through the front panel membrane switch and full-functioned custom liquid crystal display. The unit can store 10 programs in memory of as many as 10 steps each, including temperature, temperature ramp rate, stirring speed and time. Each program can be made to repeat itself automatically from 1 to 98 times, or infinitely. All programs are stored electronically.
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NETZSCH Pumps N.Mac twin shaft grinder

NETZSCH Pumps North America's new N.Mac twin shaft grinder is designed to fragment a variety of materials, and is ideal for wastewater treatment, biogas and biomass plants, food, animal processing and other waste and industrial applications. The grinder is available in both open channel and flanged housing construction, and it can be installed into influent channels, pump stations, upstream from a pump or whatever processing is needed. It can also be used vertically or horizontally for hopper applications. The N.Mac features modular assemblies and interchangeable components that allow for universal parts servicing. Dual-recessed and self-collapsing lifting tabs make maintenance removal simple. The flanged versions include clean-out and inspection ports. Dual-tempered hex shafts are designed for pre-indexed assembly and even transfer of shock loading. An exclusive shock absorption system guarantees quiet and trouble-free prolonged operation and assists with maintenance.
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product spotlight water

Mobile cranes a fit for municipal treatment plant and utility work

By Craig Mandli

Wrestling heavy equipment or other objects alone from box of a pickup truck is not only hard on employees, it can also be dangerous. For these jobs, davit cranes can prove exceedingly useful in municipal environments. Be it a pump, trash basket, manhole cover, UV panel, mixer or any other equipment, **davit cranes** from **Patterson** can lift virtually anything weighing up to 2,000 lbs. The versatile tools can even be installed easily without any external assistance.

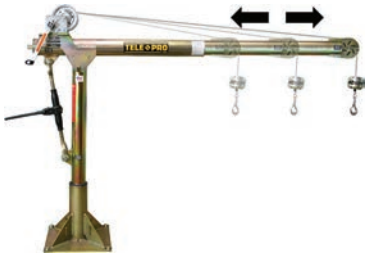
"Having made many custom lifting products in the past, we felt that it was a natural extension to our product line," says Patterson President Taylor Grapes. "From both a functionality standpoint and our experience developing durable products for use in wet and corrosive environments, we knew our expertise was a match for the market's need."

The cranes were designed from the ground up for ease of use, durability and reliability. According to Grapes, the unit's brake mechanism, main body and winch are made to Patterson's standards of highest quality and consistency to ensure safety and reliability for the entire life of these products. A fully galvanized body means there is no concern of scratched paint or flaking powder coats, which can lead to corrosion and eventually, failure. Steel sheaves, as opposed to plastic, offer significantly longer life and extended duty cycles between replacement.

"The mobility of these units also allows customers to service multiple locations with a single crane, which minimizes upfront investment and makes the Patterson Davit Crane an easy choice for operators and purchasing agents alike," says Grapes. "The simple design, durability, and overall quality lead to minimal maintenance and downtime, which reduces cost and increases efficiency making operations faster and easier."

According to Grapes, all cranes are rigorously tested the design both digitally and physically. Using ANSYS for digital finite element analysis, engineers can see where problems may surface due to focused stress — in a part or assembly — before the product is physically built.

"From a functionality standpoint, customers are happy with the product, as it does what it is supposed to," says Grapes. "The more important part for us is that when customers first unbox and assemble and install the unit, we are constantly told that they can see and feel the quality of the unit right off the bat. This is important to us because it means the customer knows immediately that they have purchased a high-quality product that will last them for years to come."
800-322-2018; www.pattersonmfg.com



OZ Lifting Products Tele-Pro davit crane

OZ Lifting Products' patented Tele-Pro davit crane features an industry-first telescoping boom adjustment that can be moved in and out while under load. A ratchet screw jack allows the user to adjust the boom from horizontal to 45 degrees while under load and the 360-degree rotation of the crane allows a full range of motion. Smart latch technology at the boom/mast means no tools are required for assembly. A zinc-plated finish provides added corrosion protection. The Tele-Pro is available in 500-, 1,200- and 2,500-pound capacities. AC and DC electric winches are optional on the 500- and 1,200-pound models, or manual winch with drill drive adapter is available for all three models. The cranes are made in the U.S. and each one is individually tested and certified at 125%.
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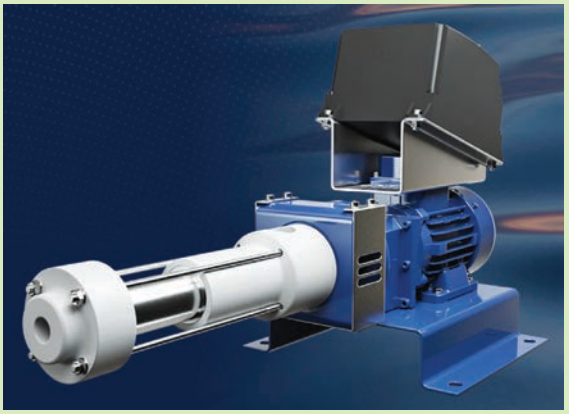


Companies partner to effectively treat oily industrial wastewater

By Craig Mandli

The oily wastewater produced in industrial oil and gas operations can be especially difficult to treat. CarboNet recently introduced a chemical additive — **NanoNet Fe** — specifically designed to target those specific contaminants in produced and wastewater streams, and can be dosed in combination with oxidizers, coagulants or flocculants. And now **SEEPEX** has partnered with CarboNet to supply pumps to accurately apply the additive.

NanoNet Fe concentrate is delivered as a powerful, cost-effective, safe solution for onsite, industrial produced water treatment, greatly reducing the amount of chemicals and time required to safely treat water. Special mixing is not required as CarboNet provides a SEEPEX Intelligent Metering Pump to accurately meter the concentrate into the water stream. Installation takes as little as 4 hours, and the payback starts on day one.

"Offering a differentiated customer experience has been instrumental in CarboNet's initial success in the Permian Basin and on a customer service scale, SEEPEX is a 10 out of 10," says Amielle Lake, CarboNet chief commercial officer. "The support they have provided, their responsiveness, and their ability to deliver pumps with incredibly short lead times is outstanding."

CarboNet relies on the flow performance of SEEPEX IMPs for the stable and accurate delivery of the NanoNet Fe concentrate. According to Lake, hours of research, trial and testing were put into selecting the best pump that could provide consistent laminar flow and withstand changes in processing conditions. SEEPEX IMPs were determined to be the optimum solution, as the design incorporates a gear reducer and a programmable vector drive in a compact design for precise metering. Metering parameters can be preconfigured on an Electronic Programming Module memory chip, making conversion from a previous drive to a new drive or a change in parameters as easy as inserting the EPM chip. In addition, the IMPs offer simple and predictive maintenance due to minimal wearable components.

"We are delighted CarboNet has trusted SEEPEX to deliver their groundbreaking water treatment solution that will radically transform how chemicals are developed, used, and impact the planet," says Bill Martiniere, SEEPEX chemical market manager. "Our companies' expertise complements each other in regards to reputation, innovation, and service to create an unparalleled partnership to service the water treatment industry."

937-864-7150; www.seepex.com

Envirosuite wins 2021 Water Entrepreneurial award

Envirosuite announced it received an award for entrepreneurial company of the year from Frost & Sullivan for the 2021 Global Digital Twin Technology for Water. Frost & Sullivan applies a rigorous analytical process that involves a detailed evaluation of the best practices criteria across two dimensions for each nominated company. Envirosuite was recognized for entrepreneurial innovation criteria in the digital twins for water space, including market disruption, competitive differentiation, market gaps, leadership focus and persistence. Envirosuite also scored highly for customer impact criteria, particularly in price and performance value, customer purchase experience, customer ownership experience, customer service experience and brand equity.

The Water Council, SCS Global Services partner

The Water Council has partnered with SCS Global Services to meet water and sustainability challenges by improving corporate water stewardship outcomes and reporting. The new partnership will include development and rollout of programs to help companies move beyond traditional water management to credible and verified water stewardship that addresses enterprise-wide challenges and opportunities. SCS Global Services offers third-party verification of environmental, social and sustainability performance, helping organizations demonstrate and communicate their corporate responsibility and sustainability success stories.

Endress+Hauser bundles analysis expertise

Endress+Hauser subsidiaries SpectraSensors and Kaiser Optical Systems have joined forces to form a new company, Endress+Hauser Optical Analysis. By consolidating its expertise in the field of laser-based measurement technology, the group is strengthening its focus on laboratory and process analysis and positioning itself to provide customers with better support for analysis tasks in the future. SpectraSensors and Kaiser Optical Systems merged under the new name Jan. 1.

SJE's Julian Atchia joins Hydraulic Institute board

Julian Atchia

SJE's Julian Atchia, vice president of research and development, was selected to serve as a Hydraulic Institute board member. He and two other new members will begin their three-year term at the Hydraulic Institute Annual Conference in Orlando, Florida, in March 2022. Board members are responsible for maintaining the missions, goals and key strategies of the Institute; ensuring adequate financial, staff and volunteer resources; and providing leadership support to key committees to accomplish Institute goals.

Watson-Marlow breaks ground on new facility

Watson-Marlow broke ground on its new manufacturing facility in Devens, Massachusetts. The new building will be dedicated to production of Watson-Marlow's range of products, including peristaltic pumps, tubing, fluid path solutions and BioPure components. The 150,000-square-foot facility will incorporate a suite of eight ISO14644-1 Class 7 cleanrooms, warehousing and offices, with space for two further cleanrooms within the initial footprint. With segregated cleanroom and non-cleanroom production capabilities, Watson-Marlow's new facility will strengthen the support it provides to customers across its core sectors of pharmaceutical and biotechnology, medical diagnostics and process industries.

Vogelsang USA hires Aaron Renick as VP of sales

Aaron Renick

Vogelsang USA welcomed Aaron Renick as vice president of sales. Renick, formerly of SEEPEX, will be working under Vogelsang President Russ Boring, and will oversee the sales staff. He has experience in business development, territory management and team growth, and also has depth in providing engineering and technical support.

Anue Water and D & H Water Systems expand coverage

D & H Water Systems, a rep for Anue Water Technology, expanded their coverage to all of California, and also added coverage in Arizona and Nevada.

Thompson Pump announces executive retirement and promotions

Thompson Pump and Mfg. announced the retirement of John Farrell, the company's vice president of sales and marketing. With Farrell's retirement, the promotion of Bobby Zitzka to vice president of sales and marketing and of Pat Broderick to national sales manager were also announced. Over his 38 years at Thompson Pump, Farrell helped establish and grow partnerships with national rental companies, distributors and vendors. He also travelled the world meeting with customers, attending tradeshow and growing Thompson Pump's international and municipal business as well as its dealer and distributor network to more than 40 business partners across the U.S. and Canada.

CarboNet and SEEPEX enter into partnership

SEEPEX entered into an agreement to supply clean technology company CarboNet with pumps for its water treatment solution, NanoNet Fe. The NanoNet Fe concentrate is a cost-effective, safe solution for onsite, industrial produced water treatment. tpo

exam STUDY GUIDE

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

Which classification of anaerobic digester is the most efficient at pathogen reduction, increased volatile solids reduction and decreased detention times?

A. Heterophilic
B. Mesophilic
C. Thermophilic
D. ATAD

ANSWER: C. Anaerobic digestion is done typically with either mesophilic (85-100 degrees F) or thermophilic (122-130 degrees F). The goal of thermophilic digestion is increased pathogen destruction, but also volatile solids reduction and decreased detention times when compared to mesophilic digestion. One drawback of thermophilic digestion is the increased energy requirement and cost. Because of this, mesophilic digestion is more common. More information may be found in the WEF textbook, *Wastewater Treatment Fundamentals II – Solids Handling and Support Systems*, Chapter 4.

DRINKING WATER

By Drew Hoelscher

2-methylisoborneol:

A. Will cause a water to smell like chlorine
B. Will cause a water to develop a strong metallic taste
C. Is regulated by the U.S. National Primary Drinking Water Regulations
D. Will cause a water to develop an earthy-musty odor

ANSWER: D. 2-methylisoborneol (MIB) and geosmin are usually the primary cause of biological taste and odor complaints. Depending on the seasonal temperatures, source water nutrient level and other variables, summer and early fall are usually the most problematic. The most common approach in reducing the taste- and odor-causing compounds is feeding powder activated carbon as a slurry in the treatment process or installing granular activated carbon as a media in the filter bed. MIB is produced by bacteria *(cyanobacteria* and *actinomycetes)* and is released from the cells as the microorganisms die off. MIB and geosmin are problematic because their earthy or musty odor can be detected at very low levels (0.002 to 0.02 ug/L).

ABOUT THE AUTHORS

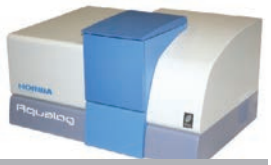
Rick Lallish is water pollution control program director and Drew Hoelscher is program director of drinking water operations at the Environmental Resources Training Center of Southern Illinois University Edwardsville. tpo

Monitoring and Instrumentation

By Craig Mandli

Analytical Instrumentation

HORIBA SCIENTIFIC AQUALOG A-TEEM



Aqualog A-TEEM fluorometer from HORIBA Scientific

The Aqualog A-TEEM from HORIBA Scientific is a fluorometer that simultaneously scans for absorbance and fluorescence excitation and emission matrix (A-TEEM). Unlike traditional scanning spectro-fluorometers that take hours, its optical technology with multichannel CCD detection allows for rapid A-TEEM scans from seconds up to minutes per sample. A-TEEM provides true, traceable molecular fingerprints as well as precise quantification for compounds of interest. Its ability for automatic inner-filter effects correction not only ensures the accuracy of the fluorescence spectra but also extends the sample's concentration linearity range. With the combination of multivariate analysis, it complements an organics lab as an advanced tool for organic matter characterization. It is a simple, fast and powerful analytical tool that in some cases displaces laborious and expensive chromatography-based techniques. **866-562-4698; www.horiba.com/scientific**

Fourier Transform Infrared Spectrophotometer from Shimadzu Scientific Instruments

SHIMADZU SCIENTIFIC INSTRUMENTS FOURIER TRANSFORM INFRARED SPECTROPHOTOMETER

Shimadzu Scientific Instruments' Fourier Transform Infrared Spectrophotometer plastic analysis system includes UV- and thermal-damaged plastics libraries to facilitate highly accurate qualification and determines the state of deterioration when analyzing foreign substances, contaminants and microplastics. The system features an IRSpirit FTIR spectrophotometer, QATR-S single-reflection ATR attachment and the plastic analyzer method package. The plastic analyzer method package includes FTIR spectral libraries for plastics degraded by UV rays and heat. The UV-damaged plastics library includes more than 200 spectra from the UV degradation of 14 types of plastics, unirradiated and UV irradiated for one to 550 hours. The thermal-damaged plastics library includes more than 100 spectra from the degradation of 13 types of plastic heated to between 392 and 752 degrees F. **800-477-1227; www.ssi.shimadzu.com**

Controllers

ADEDGE WATER TECHNOLOGIES INGENIUS

InGenius control panels from AdEdge Water Technologies are custom-engineered programmable logic control panels designed to meet site specifications for monitoring and integrating treatment systems with auxiliary equipment and controls for water systems. The panels integrate the process in one place for safety, monitoring, ease of service and installation. They are NEMA 1-4, 4X, 12 and 13 certified and constructed from thermoplastic, stainless steel, painted steel and fiberglass. They have a hand on/off selector, backwash indicator, LED lamps, a security key latch and probe-mounted displays for flow, pH, chlorine, TDS and turbidity. They include level and relay controls, auxiliary power supplies, power converter (110- to 24-volt or 12-volt and AC to DC), surge protection, Ethernet networking, audible/visual alarm indicators and a SCADA interface. **866-823-3343; www.adedgetech.com**

InGenius control panels from AdEdge Water Technologies

DE NORA WATER TECHNOLOGIES MICROCHEM 450

MicroChem 450 controller from De Nora Water Technologies

The MicroChem 450 controller from De Nora Water Technologies was designed with decades of chlorine management and analysis experience. Easily tailored to meet unique instrumentation needs, process input signals like water flow and residual concentration are applied to user-adjustable preprogrammed control strategies to automatically adjust disinfection feed rates. Automatic process control with ability to fine tune to site conditions assures the process remains in control as water conditions change. It is compatible with De Nora gas feed equipment or other systems that utilize a mA control output signal. Its large color LCD display shows process inputs at a glance. It gives fingertip access to most common controller settings of ratio and setpoint. Smart software only shows tuning parameters related to the selected control scheme. It has an intuitive software layout and touch screen display, with 28-day internal datalogging built in, along with six language options. **215-997-4000; www.denora.com**

GORMAN-RUPP INTEGRINEX ADVANCED

Integrinex Advanced lift station controls from Gorman-Rupp

Integrinex Advanced controls from Gorman-Rupp are custom-engineered to meet unique system requirements. When equipped with FloSmart technology, the control system can detect a pump obstruction and run a cleaning cycle until the debris clears, according to the maker. Upon detection, the device initiates a cleaning operation without interfering with the operation of the pump station. When the cycle is complete, the pump is ready to return to normal operation. If the clog remains, the cleaning sequence repeats until the blockage is cleared. FloSmart is designed to help maximize uptime while reducing maintenance costs. **419-755-1011; www.grpumps.com**

OLS Control Panels from Orenco Controls

ORENCO CONTROLS OLS CONTROL PANELS

OLS Control Panels from Orenco Controls come with the choice of either integrated starters or variable-frequency drives that optimize system operation. These panels are suitable for a variety of pumping applications, such as lift stations, stormwater pump stations, water boosting, dewatering or sludge pumping. They can also be used as a SCADA patch, connecting peripheral equipment to future or existing SCADA systems. Parameters can be configured via

a human-machine interface and include a user-friendly startup wizard. Engineers can preprogram user interfaces to the site-specific needs of an installation, making the panel virtually plug-and-play. Maintenance staff can easily adjust settings and monitor the system remotely. These weatherproof control panels are UL 508A listed and include service-rated circuit protection, phase and voltage protection, and level controls. **877-257-8712; www.orenco.com**

PRIMEX ECO SMART STATION

Eco Smart Station control system from PRIMEX

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-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, datalogging, 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**

SMITH & LOVELESS SHADE AIDE

SHADE AIDE interface screen protector from Smith & Loveless

The SHADE AIDE from Smith & Loveless is a human-machine interface screen protector that easily installs onto a variety of control panels so that operators can see their HMI no matter how sunny of a day. It collapses when not in use and is fully lockable. It also protects the display from the harmful effects of constant UV ray exposure, saving the maintenance budget from replacement HMI costs due to excessive sun exposure. The product is compatible and customizable to fit every HMI screen sold today, with custom sizes available. **800-922-9048; www.smithandloveless.com**

Flow Control and Software

ALLMAX SOFTWARE OPERATOR10

Operator10 from AllMax Software

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

BADGER METER MODMAG M2000

ModMAG M2000 flowmeter from Badger Meter

Water treatment and distribution applications can be complex and result in limited pipe runs to install flowmeters. When space runs out, the ModMAG M2000 electromagnetic flowmeter from Badger Meter is a solution, delivering accuracies of ±1% with zero straight run required or ±0.2% with appropriate straight run. It effectively measures water, wastewater, water-based fluids and other liquids that meet minimum electrical conductivity. It has a full-bore design, which means there is no size reduction resulting in undesirable pressure drops. **877-243-1010; www.badgermeter.com**

FCI - FLUID COMPONENTS INTERNATIONAL ST80 SERIES

ST80 Series flowmeters from FCI - Fluid Components International

ST80 Series thermal mass flowmeters from FCI - Fluid Components International are reliable solutions for measuring methane and providing emissions data to meet environmental regulations. The thermal mass flow meters using Adaptive Sensor Technology, with their robust, open and cleanable, no-moving parts sensor design, provide an ideal methane gas application solution in demanding processes. Furthermore, their international approvals for Div.1/Zone 1 ensure safe installation in hazardous gas processing areas. They are suitable for pipe diameters from 1 to 99 inches and air/gas temperatures up to 850 degrees F. They feature accuracy of ±1% of reading, ±0.5% of full scale and repeatability of ±0.5% of reading with flow rates as low as 0.25 up to 1000 SFPS and 100-1 turndown. **760-744-6950; www.fluidcomponents.com**

HOWDEN UPTIME

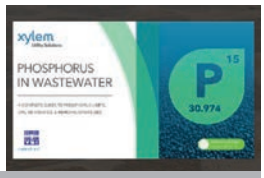
Uptime cloud-based subscription service from Howden

Howden Uptime is a cloud-based subscription service enabling secure access to real-time aeration blower operational insights and alerts, available to users anywhere with an internet connection. In collaboration with product specialists, users review clear and actionable system insights and recommendations and then take action to optimize maintenance and energy consumption. The dashboard is an intuitive interface for quickly assessing the overall health of a wastewater aeration system and also drilling down to specific systems and components for further diagnostics when necessary. It is available for new equipment, or can be retrofitted on existing turbo compressors. It features 24/7 real-time trending and anomaly detection of critical operational parameters, insights into a broad spectrum of systems and components, deviations in the performance of check valves, BOV's and IGV's, individual product monitoring to reveal trends over time and across the fleet, and automated push notifications. **716-327-0341; www.howden.com**

YSI, A XYLEM BRAND PHOSPHORUS IN WASTEWATER

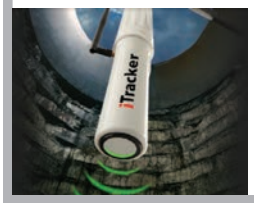
One of the pressing issues facing wastewater treatment today is excess phosphorus. As the EPA continues to lower effluent limits for total phosphorus, wastewater operators need reliable data to

improve treatment processes, remove phosphorus efficiently and meet lower effluent limits. Phosphorus in Wastewater from YSI, a Xylem brand, is a comprehensive guide for wastewater professionals that covers phosphorus removal strategies, treatment options and how orthophosphate measurements can help monitor or control the phosphorus removal process. This 43-page online e-book also includes detailed sections on the different forms of phosphorus in wastewater, measurement methods and instrumentation used for sampling or continuous monitoring. **800-765-4974; www.ysi.com**



Phosphorus in Wastewater guide from YSI, a Xylem brand

Gas/Odor/Leak Detection Equipment



iTracker Sensors from Eastech Flow Controls

EASTECH FLOW CONTROLS ITRACKER SENSORS

Eastech Flow Controls' iTracker Sensors can pinpoint I&I problems down to adjacent manholes and generate data rich analytics, alerts and sophisticated reports for municipal wastewater engineers. These easily installed under manholes sensing devices have located blockages that have caused wastewater overflows in municipal wastewater piping systems in days that municipal wastewater engineers have spent years unsuccessfully trying to find. They allow municipalities to become proactive and alert municipal wastewater engineers at the beginning of a storm or rain event as to where I&I issues will occur so that they can avoid what historically has resulted in after-the-fact very costly environmental problems. **800-226-3569; www.smartwastewater.com**

MSA SAFETY SMC 4001 CONTROLLER

SMC 4001 Controller from MSA Safety

The SMC 4001 Controller from MSA Safety is a reliable, easy-to-use gas detection solution with a modular design featuring the choice of two-, four- or eight-channel configurations providing application flexibility and room to grow. No complicated training is required, and setup is done by a single technician in less than an hour with no special tools. It has a color LCD operator interface. Its highly intuitive menu-driven navigation is accessed using a simple rotary push button to select and enter parameters on the display panel. Industry standard 4-20 mA input with HART V7 is included. It's rugged NEMA 4X enclosure is ideal for wet, dirty environments where toxic or combustible gases are present. It is designed for environments requiring intelligent network interfaces, minimal maintenance, comprehensive diagnostic information and smart sensor communications. **724-776-8600;www.msasafety.com/wastewater**

GX-6000 monitor from RKI Instruments

RKI INSTRUMENTS GX-6000

The GX-6000 from RKI Instruments simultaneously monitors up to six gases, including combustibles, oxygen, carbon monoxide and hydrogen sulfide. Two smart sensor slots accept PID, infrared or other toxic gas sensors. It includes an internal sample pump, man-down and panic alarm, LED flashlight and large auto-rotating LCD. It operates as a single-gas PID unit or a multifunctional tool using all six channels. The PID sensor comes equipped with a library of more than 600 VOC gases and can personalize a favorites list of 30 commonly used VOCs as well as a list of eight of the most recently used VOCs. A benzene-specific PID sensor is also available using a pre-filter tube for detecting low levels of benzene. Four PID sensors are available, 10.0 eV, 10.6 eV (low or high range) and 11.7 eV. Any combination of two PID sensors can be installed. **800-754-5165; www.rkiinstruments.com**

SYRINIX PIPEMINDER-ONE ACOUSTIC

The PIPEMINDER-ONE Acoustic from Syrinix combines high-resolution pressure monitoring and leak detection in one convenient solution. High-resolution data collected at 128 sps empowers water utilities with proactive tools, including transient event detection, operational and maintenance alarms, and support for integrating flow and water quality data. Installed permanently or semi-permanently for use as both an event detector and a survey and analysis tool, it uses a reliable cellular connection on either 4G, 3G or 2G networks. Paired with RADAR, Syrinix's cloud-based platform, operators can now safely and reliably calm their network, saving time and reducing costs while extending the life of key pipeline assets. **844-279-7464; www.syrinix.com**

PIPEMINDER-ONE Acoustic monitoring tool from Syrinix

Meters

MARKLAND SPECIALTY ENGINEERING SUSPENDED SOLIDS DENSITY METER

Suspended Solids Density Meter from Markland Specialty Engineering

The Suspended Solids Density Meter from Markland Specialty Engineering measures, monitors and provides real-time continuous readings of total suspended solids of slurries, sludge (including 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. This meter is available as a non-intrusive inline spool piece transmitter or throw-in style probe. Applications include pipes, re-circulation loops, open-top tanks and clarifiers. It provides the added capability of automating pumps to help optimize dosing, sludge feed 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**

Process Control Equipment

Model XP2F data acquisition instrumentation package from Cla-Val

CLA-VAL MODEL XP2F

The Cla-Val Model XP2F is an all-encompassing data acquisition instrumentation package option available for any Cla-Val control valve. It has flow calculation data and is a differential pressure-based solution and comes complete with pressure transmitters, a valve position transmitter and flow calculation module. It is IP 68 rated, has 12-24 volts DC input, four analog inputs and four analog outputs with the ability to accept additional field instrumentation and retransmit measurements to PLC/SCADA via 4-20mA signals. **800-942-6326; www.cla-val.com**

FLOMATIC VALVES FLO-TROL

Flo-Trol flow regulators from Flomatic Valves

The full line of NSF/ANSI 61-certified Flo-Trol flow regulators from Flomatic Valves are available in 3/8- through 3-inch sizes and in full stainless steel construction. They are suitable for water drinking fountain needs to groundwater heat pump maintenance. With only one internal component — the self-cleaning orifice — there are no other moving parts that could jeopardize functionality. Offering years of experience and innovation, the NSF/ANSI 61 certified automatic valves provide consistent, reliable performance. **800-833-2040; www.flomatic.com**

FORCE FLOW WIZARD 4000

Wizard 4000 system from Force Flow

The Wizard 4000 from Force Flow is a powerful chemical inventory system for monitoring chlorine gas, sodium hypochlorite, hydrofluosilicic acid and all other chemicals used in water treatment. It can help ensure a safe process and a safe plant by providing essential information such as current chemical feed rate, how much chemical has been fed and how much chemical remains. With four separate channels, it can be used to simultaneously monitor levels in up to four separate tanks. Each tank can be monitored independently while monitoring combined totals for all the tanks. The daily-usage function allows for easy record-

keeping, and a days-until-empty function makes it simple to anticipate tank refilling and chemical reorder points. A feed-rate function allows early warning of dangerously low or high feed-rate conditions, preventing hazardous underdosing or overdosing of chemicals to the water supply. **925-686-6700; www.forceflowscales.com**

FRANKLIN ELECTRIC CERUS X-DRIVE

Cerus X-Drive variable frequency drive from Franklin Electric

The Cerus X-Drive variable frequency drive from Franklin Electric offers an extensive range of amperage and configuration options, making it versatile enough for nearly any constant or variable torque application up to 700 hp. Industry standard application settings are pre-configured for submersible or centrifugal pumps, supply or exhaust fans, cooling towers, vacuum pumps and constant torque motors. The controller is loaded with application-specific firmware with enhanced settings for the most demanding applications. In addition, many input/output and control options are available for application specific features, such as PID speed control, pressure control, temperature or fluid level controls and scheduling. Native Modbus RTU and BACnet MSTP communication protocols allow integration with many automated control and building management systems. They are available in multiple packaged configurations. **866-271-2859; www.franklinengineered.com**

HEMCO CORPORATION AIRFLOW MONITOR

AirFlow Monitor from HEMCO Corporation

The AirFlow Monitor from HEMCO Corporation continuously monitors face velocity air flow of fume hood. Users select and calibrate it at a desired FPM velocity set point. If the hood face velocity falls below the set point, an audible alarm sounds and a visual red indicator light appears. The air flow alarm is factory installed or can be field installed. It operates on 115/60Hz AC. **800-779-4362; www.hemcocorp.com**

Sensors

AMETEK PMT PRODUCTS MODEL IDT

Model IDT transmitter from AMETEK PMT Products

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

KELLER AMERICA ECONOLINE

Econoline pressure transmitter from Keller America

The Econoline pressure transmitter from Keller America combines a media-isolated piezoresistive silicon sensor with signal-conditioning electronics to provide a compact pressure transmitter with less than plus or minus 1% total error band accuracy over 32 to 122 degrees F. The industry standard 4-20mA analog output is compatible with most existing monitoring infrastructure and SCADA systems, and it provides meaningful output in ranges from 30 to 10,000 psi. Its design makes it suitable for use under harsh environmental conditions, including those with high levels of electromagnetic radiation, both conducted and radiated. As a result, it provides trouble-free service and sufficient accuracy for almost any application, including those involving aggressive media and/or high levels of electromagnetic interference and where small size, low weight and reasonable cost are required. It provides versatility for customer-specific applications and is produced using modern lean manufacturing methods, allowing short lead times, negating the need to maintain extra inventory onsite. **877-253-5537; www.kelleramerica.com**

PULSAR MEASUREMENT DBI-MODBUS

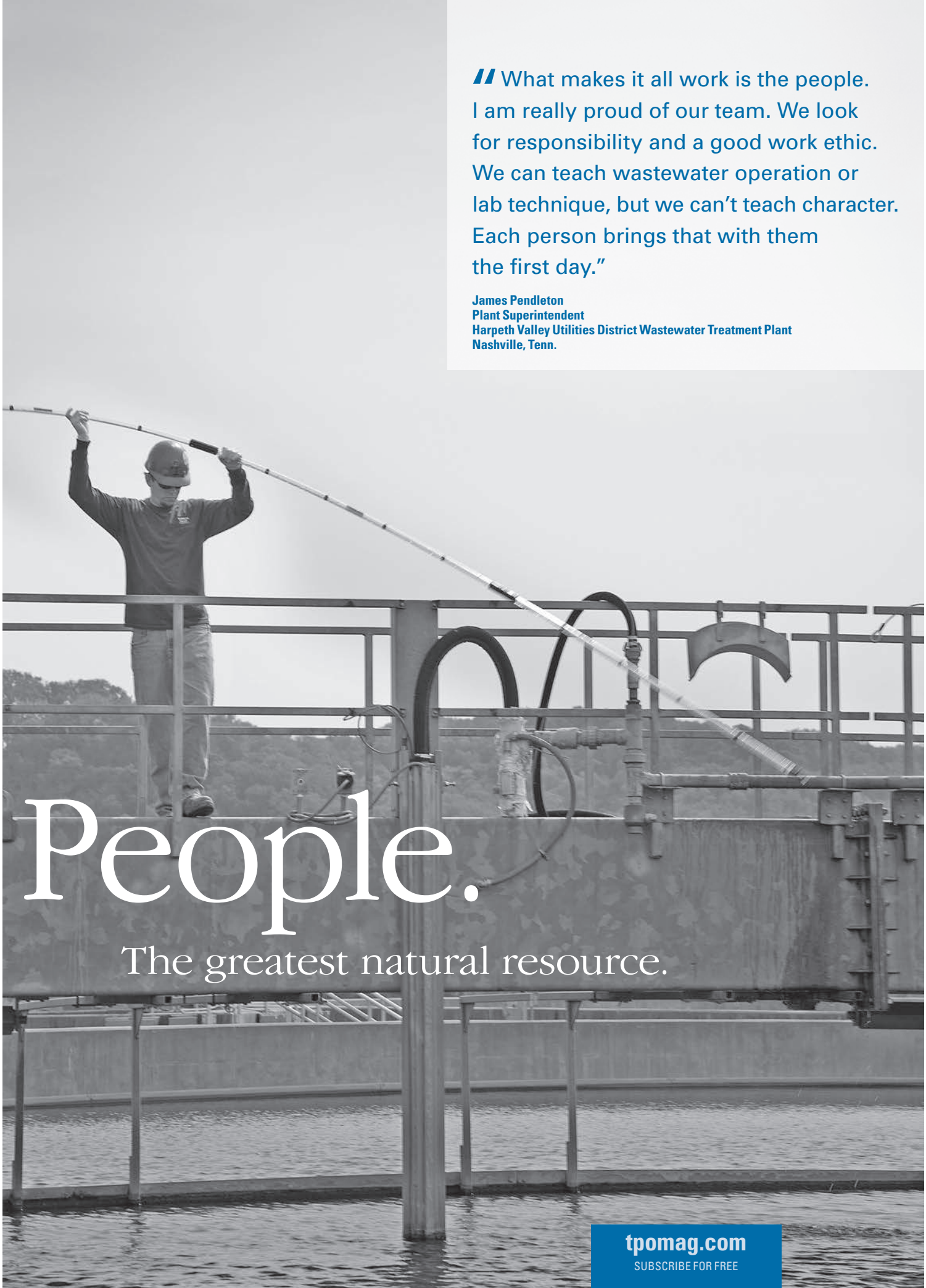
dBi-Modbus level sensors from Pulsar Measurement

Pulsar Measurement's dBi-Modbus (dBi-M) intelligent ultrasonic level sensors are suitable for remote installations. These transducers include DATEM (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**

SENSOREX S8000 SERIES

S8000 Series sensor platform from Sensorex

The Sensorex S8000 Series modular pH/ORP sensor platform delivers accurate pH and ORP measurement in water and wastewater treatment. It is a custom configured system that can grow and change with process needs, saving users time and money. Users first choose the pH or ORP (Redox) electrode suited to their process. Mounting interface choices enable retrofit, submersion and inline installations. Optional electronic modules include unity gain pre-amplifiers for longer installation distances, 4-20mA outputs or Modbus for direct interface to plant control systems. If monitoring needs change, users simply update the applicable module without the need to replace the entire system. **714-895-4344; www.sensorex.com** tpo



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

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

People.

The greatest natural resource.

By Craig Mandli

Automation technology increases lost product recovery for meat processing plant

Problem

A Midwest beef processing facility had a dissolved air flotation system that could not consistently recover the necessary level of FOG from the wastewater stream. One to two pounds of oil and grease per animal was escaping the plant and contaminating a wastewater lagoon.

Solution

The company deployed **S.sensing CS technology** from **Kurita America.** The approach included injecting chemistry through an intelligent system that continually records wastewater loading and flow. It also adjusts chemical injection volume instantaneously on the front end of the DAF system based on those variables. The Kurita team determined the exact proportion of coagulant, flocculant and pH control to achieve the optimum FOG recovery. Then they programmed the unit to automatically adjust coagulant and flocculant injection.

RESULT:

The technology increased recovery, providing two more pounds of marketable oil and grease per animal and resulting in a cleaner and healthier wastewater lagoon. The revenue gain amounted to more than $400,000 per year. **866-663-7632; www.uswaterservices.com**

Solution needed for flushables becoming entangled in impellers

Problem

Rags and so-called "flushable" wipes were getting tangled in the impellers of the pumps in a Maryland sewage lift station. Operators diagnosed pump condition by monitoring suction and discharge pressure, so every pump required a gauge. However, gauges, transmitters and pressure switches were affected by solids in the wastewater. Diaphragm seals bought time, but the suspended solids gradually became impacted under the diaphragm, and the gauges became frozen at one point on the dial.

Solution

The facility installed **Isolation Rings** from **Onyx Valve,** consisting of a steel ring with a rubber inner tube filled with silicone oil. Pressure in the wastewater stream presses against the inner tube, which transmits the pressure to the silicone oil. The pressure impulse travels up through the steel ring and into the pressure gauge. The only fluid in the gauge is clean clear silicone oil.

RESULT:

The entire assembly nests between flanges and provides a full round unobstructed flow path, guaranteed never to clog or plug. It has performed flawlessly. **856-829-2888; www.onyxvalve.com**

System ensures quality, increases production, and reduces chemical usage

Problem

A large manufacturer of residential HVAC systems experienced water spotting and increased chemical consumption in a powder coating operation as production increased.

Solution

Electroplating Consultants International proposed four interventions, including counterflowing rinse water and at-tank continuous monitoring of water conditions using a **Myron L** water quality management system. ECI installed **900 Series Monitor/Controllers** for all five stages of the pretreatment process because of their accuracy, multiparameter capability and the service Myron L had provided on their 720 system. The 900 Series communicates the status of pH, conductivity/TDS, and temperature real time. At Stage 4, chemical feed is controlled using variations in pH values. The manufacturer uses the handheld 6PFCE-BD to validate the performance. Variation between the two instruments does not exceed 0.1 pH on Stage 4 and 25 ppm TDS on Stage 5. The company also deployed a heavy-duty pH probe from Myron L that resists hydrofluoric acid in the coating chemistry.

RESULT:

The manufacturer stabilized its pretreatment chemical processes and cut Stage 4 chemical consumption in half. Part density on the line increased by 25% as the racks went from 5- to 4-foot centers. Line speed increased from 20 to 25 feet per minute. Overall production throughput increased by more than 25%. **760-438-2021; www.myronl.com** tpo

people/awards

The **Palm Beach County (Florida) Water Utilities Department** achieved ISO 55001 certification for its Asset Management System. It is the only North American water utility to receive the certification. Stantec guided the initiative.

Luther Blackburn, Jr., operations manager of the Great Lakes Water Authority, was named the 2020 Michigan WEA Wastewater Operations Professional of the Year. **Stephen Kuplicki,** operations manager of industrial waste control, was named Industrial Pretreatment Program Professional of the Year. Chemist **Sarah Watkins** received the PK Sarda Laboratory Professional of the Year award.

Columbus City Utilities received the Wastewater Treatment Plant of the Year award from the Southern Indiana Operators Association.

The **Lighthouse Point Water Reclamation Facility** received a 2020 Wastewater Treatment Plant Outstanding Performance Award from the Washington State Department of Ecology.

Rebecca Mason, director of wastewater operations with Upper Gwynedd received the Daniel H. Treat Memorial Supervisory Award from the Eastern Pennsylvania Water Pollution Control Operators Association.

Glenwood Municipal Utilities and **Malvern Water Supply** were among 94 community Iowa water systems receiving a Water Fluoridation Quality Award from the U.S. Centers for Disease Control and Prevention.

The **Boothbay Region Water District** received the Best Tasting Water – Disinfected Division and the Andrews Tolman Source Water Award from the Maine Rural Water Association.

Mark Horgan, chief of operations and maintenance with the Genesee County (Michigan) Drain Commissioner's Office, Division of Water and Waste Services retired after 35 years.

Thomas McGrath, Mukilteo (Washington) Water and Wastewater commissioner, stepped down after 13 years.

Dan Tyler was named public works director in Brattleboro, Vermont, after the retirement of **Steve Barrett.**

Mark Kivela was named wastewater superintendent in Marshfield, Wisconsin, after the retirement of Sam Warp. Kivela was previously assistant wastewater superintendent.

Tom Espey, water and wastewater superintendent in Dexter, Missouri, retired after more than 40 years with the city.

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events

April 4-6
2022 DBIA/AWWA/WEF Design Build for Water/Wastewater Conference, Caribe Royale, Orlando, Florida. Visit www.dbwater.com.

April 4-7
Texas AWWA Section Annual Conference, Henry B. Gonzalez Convention Center, San Antonio. Visit www.txwater.org.

April 6
AWWA Microplastics in Drinking Water: Key Issues and the Frontier of Contaminant Knowledge webinar. Visit www.awwa.org.

April 10-13
Alabama-Mississippi AWWA Section Annual Conference, The Battle House Renaissance, Mobile. Visit www.almswater.com.

April 11-29
AWWA High-Tech Operator Course 2, online. Visit www.awwa.org.

April 12-14
Arizona AWWA Section Annual Conference, Phoenix Convention Center. Visit www.azwater.org.

April 12-14
New York AWWA Section Annual Conference, Saratoga Hilton, Saratoga Springs. Visit www.nysawwa.org.

April 12-14
Indiana AWWA Section Annual Conference, Marriott Hotel - Downtown, Indianapolis. Visit www.inawwa.org.

April 12-14
AWWA Rate-Setting Essentials Seminar, Embassy Suites by Hilton – Orlando International Drive Hotel, Florida. Visit www.awwa.org.

April 13
AWWA Buy, Treat, Repeat – A Comprehensive Look at the Value of Water webinar. Visit www.awwa.org.

April 18-May 2
AWWA Water Treatment Operator Level 3 course, online. Visit www.awwa.org.

April 19-20
Quebec Environmental Technologies Fair, Quebec City Convention Center. Visit www.reseau-environnement.com.

April 19-22
WEF Collection Systems Conference 2022, Huntington Place, Detroit, Michigan. Visit www.wef.org.

April 20
AWWA Establishing and Maintaining an Effective Valve O & M Program webinar. Visit www.awwa.org.

April 25-27
Pennsylvania AWWA Section Annual Conference, Penn Stater Convention Center, State College. Visit www.pawwa.org.

April 26-28
Montana AWWA Section Annual Conference, Heritage Inn, Great Falls. Visit www.montanawater.org.

April 27-29
Pacific Northwest AWWA Section Annual Conference, Greater Tacoma Convention Center, Washington. Visit www.pnws-awwa.org.

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