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JANUARY 2015

**Tech Talk:  
Deploying a CMMS**

PAGE 36

Dave Patry  
Superintendent  
Gorham, N.H.

Kurt Johnson  
Chief Operator  
Gorham, N.H.

## Getting What They Need

**A SMALL NEW HAMPSHIRE PLANT WINS  
A REGIONAL EXCELLENCE AWARD WITH  
HELP FROM SUPPORTIVE TOWN LEADERS**

PAGE 12

**How We Do It:  
Solving ragging problems  
in Vancouver, Wash.**

PAGE 22

**In My Words:  
Water plant design by committee**

PAGE 46



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## advertiser index

JANUARY 2015

 Aerzen USA .....	21	Hydro International .....	35
 AIMax Software, Inc. ....	8	 InsiteIG .....	29
 Blue-White Industries .....	17	 Keller America Inc. ....	3
Byo-Gon, Inc. ....	59	 Komline-Sanderson .....	59
 Carylon Corporation .....	2	 Kuhn North America, Inc. ....	57
 ClearSpan Fabric Structures .....	49	LaMotte Company .....	4
Cornell Pump Company .....	25	McNish Corporation .....	45
Fairfield Service Company of Indiana, LLC .....	9	Pulsar Process Measurement Inc. ....	4
Grace Industries, Inc. ....	37	USABlueBook .....	64
Hoffman & Lamson, Gardner Denver Products .....	11	 Vaughan Company, Inc. ....	5
 Huber Technology, Inc. ....	7	 Watson-Marlow Pumps Group ....	35
		<b>CLASSIFIEDS</b> .....	59

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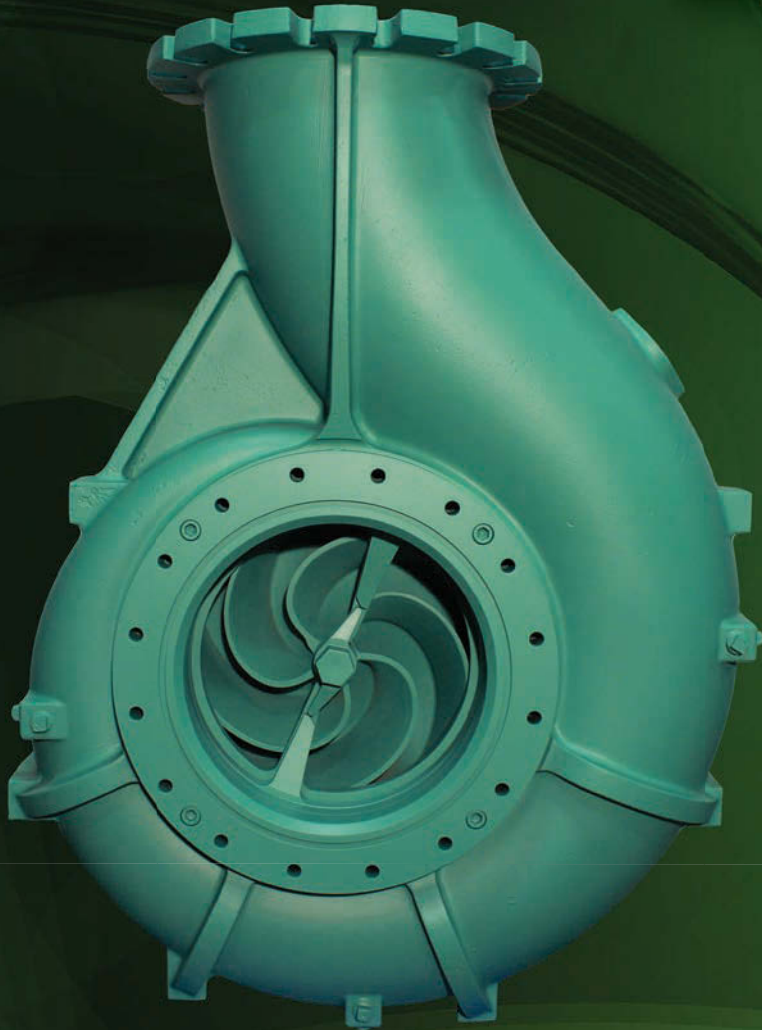


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### on the cover

The Gorham (N.H.) Wastewater Treatment Facility and its two operators have earned a U.S. EPA Regional Plant Excellence Award for achievements in reducing infiltration, replacing and maintaining aging equipment and consistently meeting permit limits. Dave Patry, left, superintendent, and Kurt Johnson, chief operator, are shown near the plant's secondary clarifiers. (Photography by Gabe Souza)

## top performers:

**WASTEWATER: PLANT** Page 30

### Pride and Passion

Asset management gets big attention at the newly upgraded Bucklin Point plant in Rhode Island. That includes the greatest asset of all — the staff.

By Ted J. Rulseh

**WATER: OPERATOR** Page 18

### Hard Work Gets It Done

Susan Butts parlayed a variety of work experiences and a powerful work ethic into a rewarding career as water treatment plant supervisor in Augusta, Ky.

By Jack Powell

**WATER: PLANT** Page 38

### Always Vigilant

The team at the Lawton Water Treatment Plant conquers raw-water issues and operational challenges with ingenuity and dedication.

By Scottie Dayton

**WASTEWATER: PLANT** Page 12

### Getting What They Need

A small New Hampshire plant controls infiltration, maintains and replaces aging equipment and wins regional excellence award with help from a supportive town.

By Trude Witham

**LET'S BE CLEAR** Page 8

### Extending a Hand

Public involvement in big decisions is nothing to fear. In fact, it typically leads to better decisions, better projects and better outcomes.

By Ted J. Rulseh, Editor

**HEARTS AND MINDS** Page 10

### Water on Wheels

The utility in Wisconsin's capital city uses a Water Wagon to take its message about tap water quality to people at a wide variety of venues.

By Linda J. Edmondson

**HOW WE DO IT: WASTEWATER** Page 22

### Spinning Free

Research and development at a Washington pump station solves ragging problems and reduces electrical costs by 50 percent.

By Scottie Dayton

**@TPOMAG.COM** Page 24

Visit daily for exclusive news, features and blogs.

**WWETT SHOW** Page 26

### A Time for Learning

Education offerings provide vital information on technology, safety, management and more for water and wastewater professionals.

By Craig Mandli

**PLANTSCAPES** Page 28

### After the Flood

Plant team members take on the task of replacing a row of trees that screened their facility from a popular biking and hiking trail.

By Jeff Smith

**TECH TALK** Page 36

### Maintenance on Auto Pilot

CMMS software helps water and wastewater operators keep maintenance on track and facilities in compliance. Here's some advice on using the technology to greatest effect.

By Sanjay Murthi

**HOW WE DO IT: WASTEWATER** Page 43

### Clean Separation

A stacked tray grit system with washing and dewatering enhances removal efficiency and improves primary clarifier and digester function.

By Marcia Sherony

**SUSTAINABLE OPERATIONS** Page 44

### One Region, One River

Charlotte-Mecklenburg Utilities Department partners with other utilities in its watershed to help secure a future of abundant and high-quality water.

By Ann Stawski

**IN MY WORDS** Page 46

### Community on Board

A citizens' committee helps architects and engineers develop an attractive design for a water treatment plant in a city park.

By Ted J. Rulseh

**TECHNOLOGY DEEP DIVE** Page 48

### A Reuse Alternative

An ozone-enhanced filtration system is designed to provide a multi-barrier wastewater treatment solution specifically for water reclamation and discharge to sensitive waters.

By Ted J. Rulseh

**PRODUCT FOCUS** Page 54

### Process Chemistry and Laboratory Analysis

By Craig Mandli

**CASE STUDIES** Page 58

### Process Chemistry and Laboratory Analysis

By Craig Mandli

**INDUSTRY NEWS** Page 59

**PRODUCT NEWS** Page 60

Product Spotlights: Cyclonic spray scrubber eliminates odors, pollutants, reduces maintenance / Portable pH, conductivity and DO meters compensate for fluctuating temperature

By Ed Wodalski

**WORTH NOTING** Page 62

People/Awards; Education; Events

**coming next month:** February 2015

**Focus: Biosolids Management and Headworks**

- » Let's Be Clear: Tapping into people power
- » Top Performers:
  - Wastewater Operator: Sid Fredrickson, Coeur d'Alene, Idaho
  - Wastewater Plant: Meeting challenges in Yellow Springs, Ohio
  - Wastewater Plant: Safety awards in Madisonville, Ky.
  - Water Plant: Bottom-up design in Yorkton, Saskatchewan
- » How We Do It: Hydroturbine energy in Corbett, Ore.
- » Building the Team: Teamwork drives success in Jamestown, R.I.
- » Hearts and Minds: Farmers as biosolids ambassadors in Virginia
- » Sustainable Operations: Making wind power affordable in Providence, R.I.
- » In My Words: Oregon recipe for license exam success
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let's be clear

## Extending a Hand

PUBLIC INVOLVEMENT IN BIG DECISIONS IS NOTHING TO FEAR. IN FACT, IT TYPICALLY LEADS TO BETTER DECISIONS, BETTER PROJECTS AND BETTER OUTCOMES.

By Ted J. Rulseh, Editor



Once heard a mining company executive, talking about a controversial project proposed in an environmentally sensitive area, say, "There is no way we are going to let people tell us how to design this mine."

What I thought but didn't say was, "And that may be the reason you never get to build it." The executive's thinking was, essentially, "We are a responsible company. We have the engineers, the environmental data, the experience. We know best."

And in a strictly technical sense, that was surely true. Unfortunately, major projects that affect people and communities don't get decided

solely on technical merit. Aesthetic concerns come into play. Odors and noise can become issues. And sometimes people's fears about effects on their lives and the environment have to be addressed, even though they may seem overblown or outright illogical.

If you invalidate people's genuinely held concerns, you risk backlash. That can lead to protests. Angry outbursts in public hearings. Attacks in traditional and social media. Lawsuits. Delays. On the other hand, if you invite people in and address their issues as part of project design, you're more likely to find public opinion aligning in your favor. You may still have opponents, but they'll tend to be isolated and low on credibility.

### LESSONS LEARNED

People in the public sector, and in the water professions especially, tend to understand this at least on some level. Yet still there are those who fear public input and would prefer to develop plans behind the scenes. The degree of openness to comments and ideas varies from community to community and project to project. This month's "In My Words" feature describes how leaders in Yankton, S.D., opened doors wide to public comment on a new water treatment plant project and got an extremely positive result.

My own experience verifies the value of reaching out to the public. A clean-water district had established a land application program for biosolids. It was technically sound and complied with all regulations. It was highly beneficial to farmers. But initially the district's approach was simply to



haul liquid material into the countryside in tank trucks and apply it on the surface — without talking to local leaders or residents near the farm fields.

Concerns arose about odors and of aerosols drifting on the wind. Big trucks rumbled down town roads past subdivisions. People saw black stuff being applied and didn't know what it was or what it contained.

When they found out it had heavy metals like lead and cadmium (albeit in traces), they rebelled. Townships began passing ordinances against biosolids. The district had to look farther and farther out, in less populated areas, to find farms. Even then, controversy soon followed. The program was in real danger of being shut down.

### TURNING A CORNER

I worked on a public participation program that helped correct the situation. The district switched to subsurface injection, a cleaner operation. Truck routing procedures were refined. A citizens' advisory committee studied up on biosolids, learned about the district's program and offered ideas on how to make it better. The district staff began mak-

People locked out of decisions that affect them can become incredibly powerful enemies. People welcomed, informed and listened to can become incredibly valuable allies.

ing annual reports to town boards in communities where farms received biosolids.

Local officials' and residents' concerns dissipated, sooner than many of us imagined. In essence, things that should have been done on the front end to bring the public in still worked on the back end. The result was a better program — much better than it ever would have been without the involvement of those directly and indirectly affected.

The lesson, of course, is that responsible public agencies proposing sound and necessary projects have nothing to fear from public participation. What they should fear are the consequences of trying to design projects in isolation, behind closed doors. People locked out of decisions that affect them can become incredibly powerful enemies. People welcomed, informed and listened to can become incredibly valuable allies.

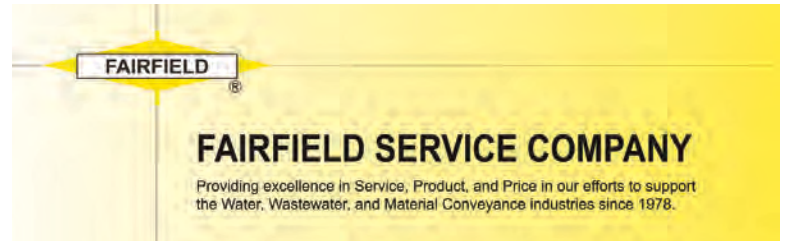
Water and wastewater agencies and their customers and stakeholders are really on the same team. Both want the same basic things: quality service at reasonable cost. Teamwork on important projects can only help bring that about. **tpo**



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Madison Water took the Water Wagon to eight elementary schools in 2014.

# Water on Wheels

THE UTILITY IN WISCONSIN'S CAPITAL CITY USES A WATER WAGON TO TAKE ITS MESSAGE ABOUT TAP WATER QUALITY TO PEOPLE AT A WIDE VARIETY OF VENUES

By Linda J. Edmondson

Customers turn on their faucets dozens of times a day, yet rarely think about what comes out and all the effort that goes into making it clear, usable and drinkable. The Madison (Wis.) Water Utility is working to change that.

The utility's newest educational tool — the Water Wagon — uniquely touts the benefits of Madison tap water. Promoting tap water in a way that's kid-friendly, handicapped accessible, bold and eye-catching, the Water Wagon evolved out of a brainstorming session in 2011.

"We initially wanted to buy some type of wagon that could go around town to promote the use of tap water, but there really was not anything out there," recalls Amy Barrilleaux, public information officer. "We happened to have a very talented welder on our staff who turned a very rough sketch into a real design. Working with one of our engineers, he fabricated our Water Wagon in just a few months."

## FAR AND WIDE

Today, utility team members take the Water Wagon to events, from boat races, school fun runs and community 5K runs, to bigger events where organizers may not want to sell or hand out bottled water because of how plastic bottles affect the environment.

It's a bit of a Midwest joke that Wisconsinites call their public water fountains "bubblers." But bubblers are the key to how the Water Wagon works. It's not a water



The Water Wagon is kid-friendly, with easy-to-reach tap handles.

tank — prefabricated tank systems were hard to find, and the utility didn't want to deal with filling and disinfection, or concern itself with freshness and taste after water sat in the tank for hours at an event.

"We wanted to give people our best water and give them that fresh tap water experience," Barrilleaux says. So the Water Wagon is hooked up to one of several specially modified "bubblers" around Madison. Water moves through the wagon and is cooled when it goes through copper tubing coiled up in an ice chest inside.

"People ask us all the time, 'What is this? Filtered water?'" Barrilleaux says. "And we tell them it's just tap water coming out of that water fountain over there. That's exactly the point we're trying to make about how good tap water is. It really takes people by surprise."



Madison Water staffers hand out "Drink Local" bottles at Water Wagon events and encourage people to bring their own reusable bottles.

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## DISCUSSIONS ON TAP

Madison Water employees who staff the wagon, with its bold graphics and self-serve spigots designed to look like one of the city's water towers, find it effective for engaging residents in conversations about the water and the utility's work. The city's water source is not its two large lakes (Mendota and Monona) but a deep, high-quality aquifer.

"People have a lot of questions about Madison's water source, quality and cost, and it's a great opportunity to have one-on-one conver-

“It's so crazy to be at a school event just offering tap water, but it's great to see kids excited to have their picture taken next to the Water Wagon and lining up to get tap water, saying, 'Wow it tastes so good.' We don't think we'd get that kind of response without the Water Wagon.”

**AMY BARRILLEAUX**

sations,” says Barrilleaux. “We're definitely changing preconceived notions of how tap water tastes. People will say, 'My tap water doesn't taste this good.' But we tell them it's the same water they get at home.

“It's so crazy to be at a school event just offering tap water, but it's great to see kids excited to have their picture taken next to the Water Wagon and lining up to get tap water, saying, 'Wow it tastes so good.' We don't think we'd get that kind of response without the Water Wagon.”

Residents of this university town and state capital are well aware of the environmental toll of water bottles and so are grateful to have the Water Wagon at events. Organizers appreciate that the wagon helps them cut down on waste.

## IN HIGH DEMAND

Concluding its second year, the Water Wagon is in high demand. Staff members do as many events as they can during warm months, when many organizations have no other options for keeping attendees hydrated. The Wagon appeared at almost 50 events in 2013 and about the same number last year.

While the staff serves water when event organizers provide cups, the wagon's spigots are designed to be self-serve, and that's part of the appeal. The utility encourages organizations to alert people to bring reusable water bottles to events.

Madison Water spent \$14,000 on materials to create the Water Wagon (labor was done in-house). On occasion, the utility provides compostable paper cups at events, but the budget also includes some giveaway water bottles that bear the Madison Water logo and the slogan “Drink Local.” The Water Wagon also factors heavily in the utility's social media work.

“We're of course promoting tap water, but we always call it ‘Madison water’ because people have a lot of pride in this city, and that pride carries over to our safe, reliable drinking water supply,” Barrilleaux says. “The Water Wagon has been a remarkable tool, enabling us to show residents how lucky Madison is to have such high-quality water.” **tpo**

## What's Your Story?

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# Getting What They Need

A SMALL NEW HAMPSHIRE PLANT CONTROLS INFILTRATION, MAINTAINS AND REPLACES AGING EQUIPMENT AND WINS REGIONAL EXCELLENCE AWARD WITH HELP FROM A SUPPORTIVE TOWN

STORY: **Trude Witham**  
PHOTOGRAPHY: **Gabe Souza**



Kurt Johnson, chief operator with the Gorham Water and Sewer Department, in one of the wastewater treatment plant's secondary clarifiers.

## INFLOW AND INFILTRATION, AGING EQUIPMENT

and more stringent laboratory standards are just a few of the challenges met by the staff at the Gorham Wastewater Treatment Facility.

This small plant with just two operators has achieved big things, including a 2012 U.S. EPA Regional Plant Excellence Award for achievements in reducing infiltration, replacing and maintaining aging equipment and consistently meeting permit limits.

The 0.75 mgd (design) secondary extended aeration plant is owned by the Gorham (N.H.) Water and Sewer Department, overseen by three commissioners. Their unwavering support has made a world of difference for the treatment plant and the 3,000 residents it serves. "Our commissioners, Lee Carroll, Roger Goulet and Ted Miller, have worked in the water and wastewater fields and understand the business," says plant superintendent Dave Patry. "They make sure we get what we need."

The EPA award announcement noted that support and cited Patry and chief operator Kurt Johnson for exceptional work. "We worked hard to reduce much of the infiltration, and we also replaced the main control panel when it could no longer meet EPA and state Department of Environmental Services regulations," he says.

Vinnie Melendez, wastewater specialist with the Granite State Rural Water Association, who assisted the plant staff on the infiltration issue, observes, "This is one of the best facilities I work with in the state. They are proactive instead of reactive, and are doers instead of talkers. These guys work really hard."

Plant effluent averages 8.2 mg/L BOD and 3.4 mg/L TSS. Says Johnson, "The plant operates very well. It's all about the dissolved oxygen process control. We monitor DO levels daily using a Hach LDO meter to ensure proper aeration."

## DEALING WITH I&I

Gorham, in New Hampshire's White Mountains, caters to summer tourists visiting the area's campgrounds and motels. Built in 1980, the treatment plant is near the Androscoggin River and is susceptible to I&I during heavy rains.

The water and sewer department began an aggressive I&I study in 2005 after the DES declared that the treatment plant had reached design capacity. Granite State Rural Water conducted a townwide smoke test survey to help locate infiltration sources. "The survey showed several areas that needed repair, and we began immediate work," recalls Patry. In December 2006, the DES placed a moratorium on new sewer connections.

## Gorham (N.H.) Wastewater Treatment Facility

BUILT: | 1980

POPULATION SERVED: | 3,000

EMPLOYEES: | 7

FLOWS: | 0.75 mgd design, 0.41 mgd average

TREATMENT LEVEL: | Secondary

TREATMENT PROCESS: | Extended aeration

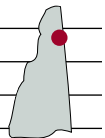
RECEIVING WATER: | Androscoggin River

BIOSOLIDS: | Landfilled

ANNUAL BUDGET: | \$1 million

WEBSITE: | [www.gorhamnh.org](http://www.gorhamnh.org)

GPS COORDINATES: | Latitude: 44°23'14.67" N; longitude: 71°09'59.59" W



The team at the Town of Gorham Water and Sewer Department includes, back row, from left, Derek Croteau, Richard Leveille, Jeff Tennis, and Brian Rivard; front row, Dave Patry, Jessica Jacques and Kurt Johnson.

“This is one of the best facilities I work with in the state. They are proactive instead of reactive, and are doers instead of talkers. These guys work really hard.”

VINNIE MELENDEZ

TOWN OF GORHAM  
WATER POLLUTION CONTROL PLANT

## DOING IT ALL

At the Gorham Water and Sewer Department, the operators do it all: running and maintaining the wastewater and water treatment plants, doing lab work, cleaning, taking care of the grounds, and lending their carpentry, auto body and blasting skills.

“Everyone is multitasking, and they all know how to do every job,” says Kurt Johnson, wastewater treatment plant chief operator. Plant superintendent Dave Patry agrees: “Our staff is special because they are capable of doing so many things. They are willing to use their expertise in this job. There are no slouches here.”

The team works eight hours a day and a few hours a day on weekends. They rotate on-call duty on weekends. Patry is on call during the week. Patry, superintendent for 14 years, holds Grade I water treatment and water distribution licenses. He handles budgeting and all aspects of department operations. Reporting to him are:

- Johnson (Grade II wastewater treatment, Grade III water treatment and distribution, 17 years with the department)
- Brian Rivard, assistant wastewater treatment operator and certified backflow inspector (Grade II wastewater, Grade I water treatment and distribution, 16 years)

- Richard Leveille, department operator and heavy-equipment operator, certified backflow inspector, welder, carpenter (Grade II water treatment and distribution, backflow inspector license, 22 years)
- Jeff Tennis, department operator, mechanic, laborer, auto body repair, painter (Grade I water treatment and distribution, 13 years)
- Derek Croteau, department operator, laborer, carpenter (Grade I water treatment and distribution, seven years)
- Jessica Jacques, department clerk (eight years)

Johnson and Rivard work full time at the wastewater plant unless needed during an emergency in the collection or water system. The other employees work at the water plant and handle the sewer collection and water distribution systems.

Jacques is in charge of billing and revenues for water and wastewater. “She handles this on her own and is excellent at her job,” Patry says. “She also keeps us moving by dispatching us to calls. We’re a team that works together to get the job done, and done right the first time. It’s all about doing quality work for the people of our community.”



Kurt Johnson performs a pH test.

Says Patry, “At this point, the department was working on I&I problem areas by replacing sewer mains and manhole structures as needed. In 2008, the DES recognized the work we had completed and saw that we had reduced influent flows at the wastewater plant, so they lifted the moratorium.”

In one neighborhood, department staff discovered an old sewer main contributing 50,000 to 100,000 gpd of infiltration even under dry conditions. “Fixing that was a huge help,” says Patry. To date, department staff have replaced 12,345 feet of sewer mains, 17,709 feet of water main and 87 manholes. “That’s quite an accomplishment for a department of three water and sewer collection system and distribution employees,” says Patry.

### WEARING MANY HATS

Infrastructure replacement is just one of the staff’s accomplishments. Besides the wastewater treatment plant, they operate and maintain a slow sand filtration water treatment plant, the wastewater collection system, the water distribution system, two reservoirs and the separate Gorham Hill Spring water system.

During sewer main replacement, the department did its own blasting. “There was a significant amount of ledge that needed blasting,” says Patry. “I received my blasting license in 1992, and I purchase the explosives and detonators for the department. By doing the blasting in-house, we were able to save thousands of dollars.”

The plant’s two operators do all the sampling and laboratory testing. Its certified lab began testing potable water samples in 1995 and accepts samples from all over northern New Hampshire. In 2005, the lab was upgraded to meet new National Environmental Laboratory Accreditation

Program standards, which included biannual proficiency testing, annual onsite assessments and personnel qualifications.

“We perform about 650 water samples a year, and the operators spend an hour or two each day just for sampling,” says Patry. “It involves a lot of paperwork, and every year we have to apply to be recertified.” In 2013, the department generated \$17,000 in revenue from water sample testing. That includes DES-required water testing for campgrounds, motels and hotels. The plant also accepts septage from surrounding communities for an additional \$23,000 in yearly revenue.

### EXTENDED AERATION

Before the plant was built, raw sewage from Gorham flowed directly into the Androscoggin, Moose and Peabody rivers and Moose Brook through 31 outfalls. Planning for the new plant started in 1974, and construction began in 1978. The plant started up in late 1980; Metcalf & Eddy provided construction supervision, startup and operator training.

The plant has been upgraded several times. In 1994, a JWI plate and frame filter press (Evoqua) for biosolids dewatering replaced a problematic belt press and allowed the plant to meet new regulations for higher percent solids at the local landfill. In 2002, 100 hp centrifugal blowers (Hoffman & Lamson) with energy efficient motors were added, and a new channel grinder (JWC Environmental) was added in 2010.

Raw water enters the operations building basement and passes through a coarse rack bar screen. It is pumped with two Passavant spiral lift pumps (Bilfinger Water Technologies) to the first floor preliminary treatment room. The wastewater flows through a channel grinder (JWC), then passes through a grit collector (Weir Specialty). Solids are pumped with a sludge pump

### Gorham Wastewater Treatment Facility PERMIT AND PERFORMANCE

	Permit (monthly average)	Effluent (2013 average)
<b>BOD</b>	30 mg/L	8.2 mg/L
<b>TSS</b>	30 mg/L	3.4 mg/L
<b>pH</b>	6-9	Compliant
<b>Fecal coliform</b>	126/100 mL	15/100 mL



Brian Rivard checks bearing temperatures on a centrifugal blower (Hoffman & Lamson) during his daily rounds.

Brian Rivard checks the return activated sludge pumps (WEMCO).

(Moyno) to a grit separator and classifier, and the grit is disposed of at the town's landfill.

Storage (8,750-gallon tank) and pumping (10 gpm diaphragm pump) facilities handle incoming septage deliveries, which are metered into the influent wastewater flow upstream of the comminutor. Degritted wastewater flows to the two aeration tanks (Sanitaire – a Xylem Brand), then to two settling tanks (Ovivo). Clarified effluent is disinfected with sodium hypochlorite before entering the 30-inch diameter, 1,250-foot outfall line that provides adequate chlorine detention time before discharge.

### STAYING ON TOP OF IT

Maintaining the 35-year-old plant can be a challenge. “We do three to four hours of maintenance every day just to stay on top of it, and we learned on our own how to maintain and replace equipment,” Patry says. That has included rebuilding pumps, installing new variable-frequency drives on return activated sludge pumps and painting clarifier domes. In 2005, operators applied a new protective Zebtron coating to the six concrete aeration tanks when the aggregate deteriorated.

Operators use their ingenuity to solve problems. In one case, the clarifiers were not dispersing water accurately into the outfall during high-flow conditions. “The clarifiers would flood, and that caused unauthorized discharges,” says Patry. “The staff suggested that the venturi tube on the 16-inch effluent line in the effluent chamber, which measured effluent flow from the plant, was undersized.”

Although the department's engineering consultants confirmed that the venturi tube was properly sized for the plant's maximum flows, the problem continued. Since there was no way to shut down the effluent flow, plant staff sent a sewer camera into the venturi tube to investigate the interior condition of the throat valve, and found it in excellent condition.

“The staff came up with the idea of removing the venturi tube and inserting a 16-inch spool piece in its place, then changing our flow measuring capabilities to an ultrasonic transducer near the effluent weir plant,” says Patry. “That solved the problem.”

The plant team also replaced the old console control panel in 2012. Outdated and unreliable alarms no longer complied with EPA and DES regulations. The wiring had become brittle and could have caused fire and permanent failure. Says Patry, “We upgraded to a simple panel with a computer screen connected to the SCADA system so we can remotely monitor the plant and control alarms.”

### THANKFUL COMMUNITY

Department staff members conduct annual tours of the water and wastewater plants for anyone, including middle school students. “We've done this for the past 12 years,” says Johnson. “The kids are excited to learn about water and wastewater treatment, and we even get thank you letters.”

Johnson also appreciates the support of the community: “Everyone knows we perform these projects in-house, which saves them money.” Granite State Rural Water has also been supportive. Says Patry, “They provide operators with networking opportunities, technical assistance and training at the local fire station.”

“Our future is the staff. They're everything. I can't say enough about the work they do and how they do it.”

DAVE PATRY



Melendez adds, “If we see the operators struggling with an issue, or if regulators are going to visit the plant, we try to help. Sometimes staff members feel they are the only ones dealing with an issue, but they're not alone.”

### LOVING THE JOB

Patry has been with the department for 30 years, Johnson for 17 and Brian Rivard, assistant operator, for 16. “Turnover is not a problem here,” says Patry. “They love the area, they love working here and they all get along well.”

Patry feels the plant is in good shape: “We're caught up now and taking a breath of fresh air. We have more than enough capacity, and with a new wastewater permit, we don't expect any regulatory changes soon. Our future is the staff. They're everything. I can't say enough about the work they do and how they do it.” tpo

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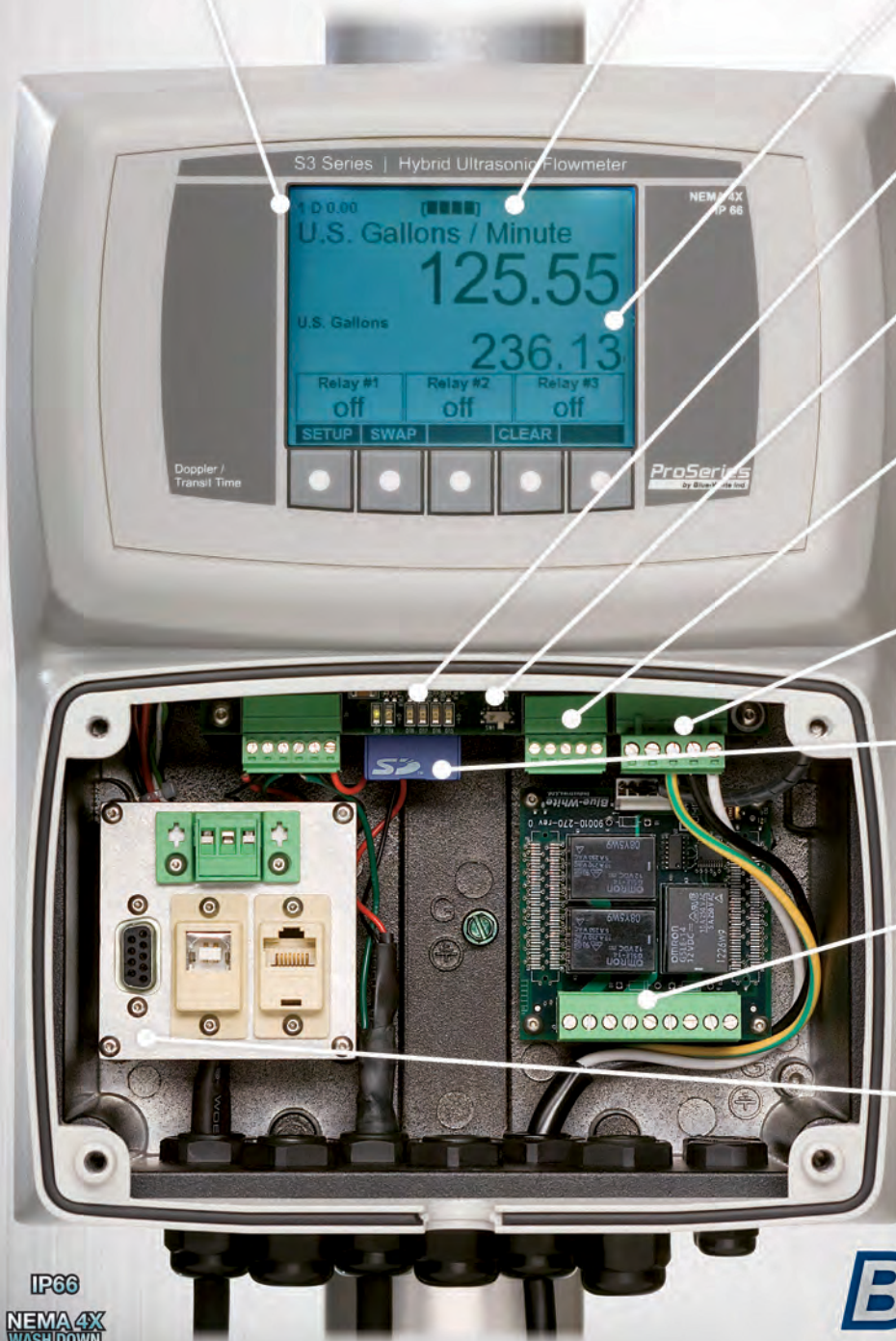
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# HARD WORK GETS IT DONE

SUSAN BUTTS PARLAYED A VARIETY OF WORK EXPERIENCES AND A POWERFUL WORK ETHIC INTO A REWARDING CAREER AS WATER TREATMENT PLANT SUPERVISOR IN AUGUSTA, KY.

STORY: **Jack Powell**  
PHOTOGRAPHY: **Shaun Ring**

WHO SAYS THE WORK ETHIC IS DEAD? TAKE A LOOK AT Susan Butts and you'll see it's alive and well and living in Augusta, Ky., a city of 1,200 on the south bank of the Ohio River, about 70 miles northeast of Louisville.

Butts, supervisor at the Augusta Regional Water Treatment Plant, has been working since she turned 14 and began waitressing. She has been a supermarket assistant manager and a U.S. Army soldier before making water her career in 1990. It was a good move — one that taught the treatment processes and management skills that helped her become a great, hands-on boss, according to her operators, and “a true asset to the plant and the community,” as Augusta’s mayor observes.

In 2013, her go-the-extra-mile efforts earned the first Steve Crosman Award for Outstanding Environmental Professionalism from the Kentucky Division of Compliance Assistance (DCA), part of the state Department of Environmental Protection. The award recognizes people who value professionalism and see the importance of providing quality service to state residents.

Butts has displayed those qualities from her earliest days as an operator at the City of Falmouth Water Treatment Plant. Still, she was moved at being recognized with an award named after her friend, a trainer with the DCA Certification and Licensing Branch who died in December 2011.



Susan Butts, supervisor at the Augusta (Ky.) Regional Water Treatment Plant.

## HUMBLED BY RECOGNITION

“Winning the Steve Crosman Award, I couldn’t have been happier if I’d won the Pulitzer Prize,” says Butts in a soft southern accent. “Steve was a wonderful continuing education teacher and a great guy. I had all my licenses before he started teaching, but he’d always answer all my questions. In fact, he’d do anything to help any water operator in the state.”

When Butts heard the DCA wanted nominations for the award, she took charge, as she has most of her professional life. She told her bosses in Falmouth and Augusta that she wanted to be nominated because she respected Crosman so much, calling him, “my water plant guru.”

She filled out the application and, after a thorough background check as part of the process, she was notified in April that she had won. “I was humbled that I’d won,” says Butts. “It really reflects well on my team and our commitment to provide quality water for the people of Augusta and all of Bracken County.”

## JOBS FOLLOW ARMY STINT

It was a big accomplishment for someone who “kind of fell into the business.” Butts spent 22 years at the Falmouth plant. During 12 of those years, she also worked part time at the Augusta facility, which she joined full time in 2012.



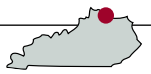
Butts, shown with operator Shane Mains, holds Class IV-A drinking water treatment and Class III water distribution licenses.

“Every day there’s something different to do, and no two days are ever the same. Just to learn how the system works is challenging.”

SUSAN BUTTS



## Susan Butts, Augusta (Ky.) Regional Water Treatment Plant



POSITION: | Plant supervisor

EXPERIENCE: | 24 years in water industry

EDUCATION: | Pendleton (Ky.) High School; U.S. Army

CERTIFICATIONS: | Class IV-A Drinking Water Treatment,  
Class III Distribution, Class I  
Wastewater Treatment

MEMBERSHIPS: | Kentucky Rural Water Association

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Shane Mains performs a hardness test as Susan Butts records the data. (Chart recorder from Honeywell Process Solutions.)



Susan Butts and Shane Mains operate a 1.2 mgd groundwater treatment facility.

## OPERATORS WANTED

Finding good water treatment plant operators can be a big challenge, as Susan Butts can attest. As operator and supervisor at the Augusta water plant, she's always promoting water as a good career choice, but she finds the task daunting.

"Yes, water is a good career, but it's a secret to many young people," she says. "I wish I'd learned about it in high school or while I was in the Army. People think water just comes out of the faucet, but there's a lot more to it than that."

One reason for the lack of new blood is that once operators get into a plant, they don't want to leave. When taking continuing education classes, Butts finds that often she is among the younger people there, although she's been an operator for 24 years.

Another issue is that some good candidates have problems with testing: "Everybody wants a job at the water plant because they think all you do is push buttons all day. When you try to teach them the chemistry and the other stuff, they get frustrated, and when you tell them they have to take a test to get an operator's license, they get scared."

To raise students' interest, Butts has created an education program through the Augusta Independent Schools. She conducts tours of the plant and educates students about proper environmental practices to protect drinking water. While the program is off to a slow start, Butts remains optimistic.

"I went to my granddaughter's second-grade class," she says. "Those kids were smart. They asked questions about where water comes from and if there's a lot of paperwork at the plant. I explained to them that water treatment plant operators need math skills and reading and writing. Every little bit of reinforcement helps."

After graduating from Pendleton High School in 1978, Butts decided college wasn't for her — even though she "wanted to be the next Stephen King." She kept working at the restaurant where she had been since her teen years. Five years later, she joined the Army, serving from 1983 to 1986, first at Fort Dix, N.J., and then at Fort Bliss, Texas, where her son was born. She rose quickly to the rank of E4 (corporal) Promotable. During that time, she "never thought a thing about water when we drank from a canteen or were in the field taking showers."

Her service complete, Butts became assistant manager of an Ameristop Food Mart, one of a chain of gas-food-grocery stores in the Ohio River Valley. Wanting more responsibility and a chance to do something different, she heard about a water operator job at the 1.5 mgd Falmouth plant, applied and went to work.

## BEATING THE FLOOD

In 1997, a major flood hit Falmouth, a city of about 2,100 at the confluence of the South and Main forks of the Licking River. Butts moved her son in with family members and lived at the flooded plant for more than a month. There she worked with city and state officials to clean the facility and reestablish safe drinking water.

"I stayed at the Falmouth plant for 45 days," she says. "We had folks coming in to help us put in new motors, pumps and other equipment. We were back up and running in three days and providing drinkable water in five. That's how dedicated I've been in all my years working in the water treatment business."

With Class IV-A drinking water treatment, Class III distribution and Class I wastewater treatment certifications, Butts manages the 1.2 mgd Augusta plant with a can-do attitude. That includes teaching and coaching

“Susan has done a fantastic job and basically turned our water plant around. ... She helps with water distribution when we have an issue, such as a broken main or pipe. I just can't praise her enough.”

JOHN LAYCOCK

her two Class III-A operators, John Olson and Shane Mains, and interfacing with the mayor and other city officials.

### IN A 'MAN'S WORLD'

Sometimes her job can be challenging in a largely male-dominated industry. For example, when she needs to order parts, she often asks Olson or Mains to do it, “so I don't get the runaround.”

If she calls to order something and asks questions, “You can picture them rolling their eyes and thinking, ‘You don't know; you're just a woman.’”

That's one reason she has been involved in a plant maintenance program. “Maintenance is my weak point,” Butts admits. “Where men can come in and tear a motor apart, I can't, so I want to work on getting better at doing those things.”

Still, Butts keeps things working. Augusta isn't a 24-hour plant — it operates from 4 a.m. to 4 p.m., because, according to Butts, it costs less to start early and bring operations back up. As soon as she gets in, usually by 7 a.m., she does water sampling and meets with her operators, who clearly like the interaction.

### STRONG LEADER

“Susan is a very good, hands-on boss,” says Olson, who gets in at 3:30 a.m. to open up the plant and thanks Butts for helping ease his transition from a 4 mgd surface water treatment plant in Maysville, Ky., whose source water comes from the Ohio River. “She's hard-working, very knowledgeable about the water business, and extremely supportive of everything we do. I've really enjoyed working for her the last two years.”

Mains adds, “Susan is the best. She works with us, and if we need something, she makes sure we get it.” He's grateful that Butts brought him to the plant in 2011, his first job in the water industry. He sees one of her strengths as “teaching us how to do things the right way, so everything goes the way it should.”

That's important, since Butts and her team must supply the 10,000 residents of Bracken County, in addition to Augusta. To do that, they have to fill a 300,000-gallon clearwell and a 300,000-gallon tank for Augusta, along with a 200,000-gallon clearwell and four tanks totaling just over a million gallons for the Bracken County Water District. The Augusta plant draws water from a huge aquifer that stretches all the way to Michigan (the water actually originates under Lake Michigan).

### VIOLATION-FREE

While Augusta's well water has fewer turbidity issues than many groundwater plants, Butts and her team must contend with more dissolved minerals, particularly iron and manganese, which can cause taste and odor problems and speed up corrosion of the plant's piping. To remove the minerals, the operators add potassium permanganate, an oxidizer. They also apply aluminum sulfate (alum) for coagulation, caustic soda for pH control, chlorine for disinfection and fluoride.

Treated water is pumped into a clearwell under the plant and then to the other clearwell and tanks

for the Bracken County district. The water meets all the state and federal standards, and since Butts has been operator/supervisor, there have been no violations. She considers that a testament to her team's ability to keep the plant in good shape, even though it was built in 1996 and “things here and there need repair and replacement.”

John Laycock, mayor of Augusta, appreciates Butts for her no-nonsense focus and commitment to controlling costs, whether saving energy or getting three estimates for chemicals, pumps and motors. It was Laycock who offered her the job when the former head operator quit after working two jobs for more than a decade.

*(Continued on page 23)*

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# Spinning Free

RESEARCH AND DEVELOPMENT AT A WASHINGTON PUMP STATION SOLVES RAGGING PROBLEMS AND REDUCES ELECTRICAL COSTS BY 50 PERCENT

By **Scottie Dayton**

Severe ragging plagued the 18 mgd (design) 117th Street Pump Station in Vancouver, Wash., from the day it entered service in 2008.

The station, built to handle the city's future growth, has five variable-speed model 8NHTA 250 hp centrifugal pumps from Cornell Pump. Each averages 3,500 to 3,600 gpm at 190 feet total dynamic head. Operators at the Salmon Creek Wastewater Treatment Plant in Vancouver activate one pump in the station from December to April to relieve a downstream station.

"Our situation was nobody's fault, as we didn't have flushable [wipes] in the early 2000s," says Tim Scott, wastewater maintenance lead at the plant. "Ragging became a problem only in the last five to seven years."

Even when operators ran pump No. 1 constantly at rated speed, it ragged up in two hours. When performance fell to 1,000 gpm, lag pump No. 1 turned on to lower the level of the wet well. Within two hours, it ragged up, activating lag pump No. 2. "If we ran one pump and nothing else in the control scheme, discharge dropped to 250 gpm," says Scott.

Extended run times increased monthly power usage from 100,000 kWh for one pump to 150,000 kWh and electrical costs from \$6,500 to \$10,500. Scott invited Cornell Pump engineers to help isolate the problem and design a fix. "They were anxious to do research and development on an online station," he says. Butch Veatch, municipal inside sales representative at Cornell, coordinated the eight-month project. Impeller redesign and retrofits solved the ragging problem.

## ROUGH GAME

The pumps have blunt-face impellers with hexagonal lock screw heads. Impellers, the rotating component of centrifugal pumps, transfer energy from the pump motor to the fluid by accelerating it outward against the volute. Impellers have an open inlet (eye) to accept incoming fluid, usually vanes to push it radially and a bore to accept the drive shaft.

Rags sucked into the impeller eye formed a dense bundle around the lock screw head. Twice daily, two mechanics worked through a 5-inch clean-out to remove obstructions with a utility knife. "Cutting them out took an hour and cost \$200 per event," says Scott.

Because the station pumps were not cutter pumps, Cornell suggested retrofitting its standard cutter assembly — a rotating cutter ring on the impeller spinning against a stationary cutter screwed to the volute's suction flange. The conversion included a volute machined for the stationary cutter and an impeller that accepted the cutter in place of the wear ring.

"We installed the components, agreeing to buy five cutters if the test pump ran a week without ragging," says Scott. "It lasted two hours." Engi-



PHOTOS COURTESY OF SHANE RIPP, SALMON CREEK WASTEWATER TREATMENT PLANT

Five variable-speed model 8NHTA 250 hp centrifugal pumps from Cornell Pump serve the 18 mgd (design) 117th Street Pump Station in Vancouver. Pump No. 1 (foreground) ragged up in two hours even when run constantly at 100 percent speed.



The impeller with S-shaped vanes and recessed lock screw head needed more action to release rags from the smoother profile.



The final impeller design extended the height and length of the vanes to create an auger that doubled as a cutter rotating against the original stationary cutter.

neers then modified the stationary cutter, thinning and profiling its three ears to influence the direction of inflow onto the cutter ring. Strike two.

To identify the flow pattern in the pump, engineers built a viewing port and mounted it to the suction flange. "We expected some weird hydraulic condition that affected how the rags hit the pump," says Scott. However, the cloudy flow prevented viewing the cutter interface or solids entering the impeller. Large rags appeared to pass the port every three seconds and go straight into the impeller eye.

## TENACITY WINS OUT

Assuming the impeller and lock screw were the culprits, engineers reinstated the original stationary cutter and designed a smooth conical impeller with recessed hexagonal lock screw head. "When the engineers came, we'd tear down the pump, install the modified assembly and run a test," says Scott. "Everyone was always hopefully optimistic that the next fix would work." The experimental impeller struck out.

After two weeks of conference calls, the engineers designed a smooth cone impeller and a cone with a spiral groove. Neither met expectations. Undaunted, they designed an impeller with S-shaped vanes and recessed lock screw head. "It showed promise, but lacked sufficient geometry to guide rags into the vanes," says Scott.

Sensing victory, the engineers extended the height and length of the vanes to create an auger that doubled as a rotating cutter. They inserted a spacer bushing to fill most of the void at the impeller eye and the deep bore for the lock screw.

"In taking an open impeller and bridging the entire face, Cornell engineers have rethought the entire impeller engineering world," says Scott. "At the end of testing in August 2013, one pump handled all the flow. Later, it ran for a month during a high-flow event and never ragged up. The improvement is dramatic."

“In taking an open impeller and bridging the entire face, Cornell engineers have rethought the entire impeller engineering world.”

**TIM SCOTT**

In early 2014, Scott's crew retrofitted the two lag pumps with volutes, cutter-augers and stationary cutters. "Because the impeller is also a rotating cutter, we didn't have to buy them and saved \$5,000," says Scott. "The retrofits save \$800 per day in labor and have reduced electrical costs by 50 percent. We're seeing a quick payback on our \$60,000 investment."

#### ADDITIONAL BENEFIT

Weekly, the crew switched pump No. 1 to a manual cycle to clean the wet well, but the pump ragged up before it completed the pump-down sequence. After eight months of running the station constantly, solids had accumulated to a blanket depth of 300 square yards. The quote to remove it was more than \$10,000.

After the pump retrofit, Scott selected three days with minimal flow to pump out the solids. The pump ran perfectly, saving the city money and enabling staff to complete the cleaning cycles.

"We couldn't have done this without the serious support of Cornell and upper management," says Scott. "Kay Hust, the plant manager, and our regional sewer partners — the cities of Battle Ground and Ridgefield, and the Clark Regional Wastewater District — wanted a solution. They allowed us to power the station, when it should have been offline, and solve the problem." **tpo**

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(Continued from page 21)



Susan Butts manages the Augusta plant with a can-do attitude that includes coaching her two Class III-A operators, John Olson and Shane Mains (shown), and interfacing with city officials.

“Susan is a very good, hands-on boss. She's hard-working, very knowledgeable about the water business, and extremely supportive of everything we do.”

**JOHN OLSON**

He calls Butts "a well-rounded employee and very valuable to all of us. Susan has done a fantastic job and basically turned our water plant around. Not only is she a full-time operator, but she has created service manuals for the Maintenance Department on how to repair leaks, and for our water, gas and sewer teams. She helps with water distribution when we have an issue, such as a broken main or pipe. I just can't praise her enough."

#### EVERY DAY AN ADVENTURE

For Butts, such praise is welcome recognition that she gladly shares with her operators. But once the glow wears off, it's time to tackle the daily challenges. One winter morning, a 12-inch main in the plant broke. She called Mains, telling him to "use tape, ratchet straps and sealant," which held until the team could make a permanent repair.

During the first cold spell one January, an aerator froze, and the team had to push water through it to break the ice. In February, the valve that controlled the potassium permanganate blew out, raising a few choice words from Butts, who says, "My feet are still wet and cold."

Yet Butts, an avid reader and grandmother of three who lives 13 miles from the Augusta plant, wouldn't have it any other way: "Every day there's something different to do, and no two days are ever the same. Just to learn how the system works is challenging. Sure you work your tail off, and nobody ever says, 'Thanks, my water was great today.' But you can take pride in knowing you did your best to give people the best water you could." **tpo**

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*Ingenuity Winner: Larry Bastian's Creative Brain Improves Operations at DC Water*  
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## ROLL CAMERAS!

### Wastewater Goes Hollywood

It's not every day a movie star shows up at your wastewater treatment plant. But in Austin, Texas, where the film industry is growing, stardom is just part of another day on the job. See how the wastewater treatment plant became the setting for several movies, and find out how the staff adapted to being part of the action.

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## VICTORY!

### Court Upholds Biosolids Application

In a legal victory for the wastewater industry, the Washington Court of Appeals recently decided to strike down a county ban on Class B biosolids. The court case has received national attention because of the precedent it could set for other states. Learn more about the case and why it was backed by the National Association of Clean Water Agencies, the Northwest Biosolids Management Association and the Washington Association of Sewer and Water Districts.

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# A Time for Learning

THE EDUCATION OFFERINGS AT THE 2015 WWETT SHOW PROVIDE VITAL INFORMATION ON TECHNOLOGY, SAFETY, MANAGEMENT AND MORE FOR WATER AND WASTEWATER PROFESSIONALS

By Craig Mandli

The Water & Wastewater Equipment, Treatment & Transport (WWETT) Show in Indianapolis includes an extensive education program in addition to networking and displays of the newest equipment in the industry.

The 2015 show, Feb. 23-26, includes seminars and workshops to help water and wastewater treatment professionals enhance their knowledge and improve their facilities' performance.

The show kicks off on Monday, Feb. 23, with Education Day, offering tracks of seminars sponsored by organizations including the National Association of Wastewater Technicians (NAWT), the National Environmental Health Association (NEHA), the Southern Section Collection Systems Committee (SSCSC) and the National Association of Sewer Service Companies (NASSCO).

The remaining show days include workshops and roundtable discussions on topics from corrosion control to wastewater microbiology to facility security. All workshops will be held at the Indiana Convention Center in meeting rooms near the exhibit hall. For more information on seminar times, locations and speakers, visit [wwett.com](http://wwett.com). Seminars of interest to water and wastewater treatment professionals include:

## Education Day, Monday, Feb. 23:

**A Study of Microbiological Induced Corrosion**, by Claude Goguen, director of sustainability and technical education with the National Precast Concrete Association. Attendees will examine a two-year study on the process of microbiologically induced corrosion in concrete and discuss how the bacteria form and evolve in specific environmental conditions.

**Effective Website Design and Engaging Customers in the Digital Age**, by Suzan Chin, founder of Creative Raven. Review elements to

consider and implement when designing and building an effective website to meet the needs of today's demanding online audience, such as developing a budget, a plan of action, strategy, timelines and content development. Chin also presents **Tapping into the Power of Social Media and Content Marketing**, reviewing the pros and cons of the various facets of social media.

**New Technologies for Non-Potable Water Use**, by Dr. Albert Robert Rubin, emeritus professor in the Biological and Agricultural Engineering



Department at North Carolina State University. The first of two seminars explores standards and requirements for residential and commercial water reuse treatment systems, water-quality requirements for non-potable use, competency of personnel managing reuse systems and using evidence-based information to communicate with the public. The second looks at the challenges of water reuse and technologies for dealing with difficult situations and retrofitting existing systems.

**Employee Retention and Recruitment**, by Beverly Lewis, a 15-year veteran of the sanitation industry. Attendees will discuss why the wastewater industry is a great place to work and how to create a strategy for recruiting and retaining staff.

**Specifying Pumps: Why Do Pumps Fail?**, by Jeff Hawks, president of Champion Pump Company. Hawks will review the various types of construction and design used by pump manufacturers, such as motors, bearings, impellers, seals and cord entrances. He will also touch on the types of switches used in pumping applications.

**Women in Wastewater Roundtable Discussion**, featuring Lara Motolo, Therese E. Wheaton, Shanna Sands and Joyce Gresh. This panel of professionals from different facets of the industry will address product and service questions, the future of the industry, and general managerial and career-building advice for those starting out in the environmental services.

**Lobbying**, by Eric Casey, executive director of the National Onsite Wastewater Recycling Association. Participants will learn why it's important to be politically active and some of the ways to become involved.

## Tuesday, Feb. 24:

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**Introduction to Odor Control**, by Tom Ferrero, who has owned and operated several septage treatment facilities since 1984. Ferrero will outline the basics of controlling odors, including common methods for specific situations and their pros and cons.

**Mapping Solutions for Repair and Maintenance of Water Distribution Systems**, by Lynn Hurley, CEO of Hurco Technologies. This presentation will demonstrate the power of integrating GIS maps with equipment for testing, maintenance and data collection for water distribution systems.

**The Shift from Reactive to Proactive Wastewater Management Best Practices**, by Ed Richards, president and CEO of t4 Spatial. Stringent compliance mandates and tight budgets call for a proactive approach to understand failures and identify potential failures. Owners must implement best practices through people, processes, standards and technology in order to proactively manage and maintain wastewater systems.

**An Emerging Technology for Lagoon-Based Nutrient Removal**, by Tim Canter of Environmental Dynamics International. Attendees will learn how to improve low-temperature nitrification with the Intermittent Discharge Extended Aeration Lagoon (IDEAL), which combines extended aeration with a decanting reactor to remove ammonia and a significant portion of nitrate/nitrite in an earthen basin.

**The New Wastewater: Collection System Challenges Caused by Today's Modern Trash**, by Robert Domkowski, engineering consultant and training manager for Xylem. This session discusses solutions to problems caused by nonwoven "flushable" items in collection systems.

**Wastewater Microbiology**, by Ryan Hennessy, a Grade 4 wastewater operator and technical wastewater service provider. This session will cover

microscopic evaluation for process control and troubleshooting. Topics include floc formation, judging floc structure, ranking filamentous bacteria abundance, judging polysaccharide (slime) content of samples, and determining the concentration of particular organisms at which problems begin to develop. He will also offer identification methods for filamentous bacteria and troubleshooting tips for operators.

**Dewatering Options for Roll-Off Containers**, by Andy McKinlay, director of market development for North America at Premier Tech Aqua. This program will explain how the popularity of organic filtering media exerted pressure on the manufacturing capacity and supply of these materials. Supported by data and third-party testing protocols, McKinlay will trace the development of sustainable and natural filtering media.

## Wednesday, Feb. 25:

---

**Grease Collection and Treatment: Raising the Bar Via Resource Recovery**, by Ed Weinberg, president of ESSRE Consulting. This session tells how grease collection and treatment approaches can provide increased revenue, cleaner water and air, and lower carbon footprints at grease handling and digester facilities.

**Collection System Rehabilitation – Alternative Technology**, by Jill Davis, superintendent of water and wastewater for the Athens (Tenn.) Utilities Board. Low-pressure force main and grinder pump systems have long been used for new construction in difficult terrain, but complete removal of inflow and infiltration, less intrusive construction and often less expense make these systems good options for rehabilitation. A five-year case study demonstrates the value of this rehabilitation tool.

**Utility Regulation Basics for Grease Haulers**, by Wayne Ludwig, unit coordinator for the Washington Suburban Sanitary Commission's Fats, Oils and Grease (FOG) Program. This session will discuss typical wastewater utility FOG programs in relation to the grease hauling and disposal industry, the food service industry and wastewater utility officials, and the challenges they all face.

**The Waste in Our Wastewater**, by Denver Stutler, CEO of Polston Applied Technologies. Attendees will learn how debris enters wastewater systems due to aging infrastructure and weather, affecting treatment plant efficiency and capacity. He will describe how plant managers currently deal with the debris and the choices they face.

**Security Issues and Best Practices for Water/Wastewater Facilities**, by Jeff Hayes, a product manager for Beijer Electronics. This session will explore best security practices and look at security policies, vulnerabilities and risk management. It will explore the relationship between physical security and information security and propose ideas for developing prudent security policies and the technologies to support them.

**Extending Life Expectancies with Corrosion-Resistant Coatings and Linings**, by Kevin Morris of the Sherwin-Williams Protective & Marine Coatings Division. This presentation will discuss the primary corrosion mechanisms in sewer systems and wastewater treatment plants and how corrosion-resistant coatings and linings can extend the life of new structures or rehabilitate existing structures.

*For more information on the WWETT Show, visit [wwett.com](http://wwett.com) or call 866/933-2653. tpm*

Some of the newly planted cedars are seen along the plant's fence line with Lake Champlain and the Adirondacks in the background.



## After the Flood

PLANT TEAM MEMBERS TAKE ON THE TASK OF REPLACING A ROW OF TREES THAT SCREENED THEIR FACILITY FROM A POPULAR BIKING AND HIKING TRAIL

By Jeff Smith

In spring 2011, a flood largely washed out a row of 15-foot-tall cedar trees that screened the Main Wastewater Treatment Plant from a biking and hiking pathway in Burlington, Vt.

Suddenly exposed to passers-by, the plant began to experience vandalism. What's more, the absence of the trees detracted from the scenery on the pathway, which follows Lake Champlain. So Tim Grover, chief operator, and his team took it upon themselves to plant new cedars that in time will again screen the property.

### LOTS OF WATER

The landscape at the 5.3 mgd (design) Main plant changed after the 2011 flood. Unusually heavy snowmelt and runoff from New York's Adirondacks and Vermont's Green Mountains raised Lake Champlain to more than 3 feet above flood stage, the highest level recorded.

Rising water covered the 6-mile-long shielding pathway and took most of the plant's 10 mature cedars with it. The flood affected much of the lakefront and some of the city's infrastructure, including the Main treatment plant, one of three the city operates.

"The flooding on the plant property caused some big hydraulic and equipment issues for about the next three weeks or so until the water receded," recalls Grover. "But we were never totally out of commission and remained fully functional the whole time."

The effluent flowmeter near the outfall became surcharged. The chlorine contact tank was backing up and the clarifiers were losing their hydraulic capacity. Higher-than-normal groundwater increased I&I flow to the facility, which could handle peaks up to 15 mgd. "If the lake had flooded another inch or two, we would have been in serious trouble with our gravity flow out of the plant," says Grover.

### REPAIR MODE

While the plant staff worked to resolve the operational challenges, the city moved to repair and replace washed-out sections of the recreational pathway. In the process, workers removed the damaged trees as well as the remaining sound trees, opening the plant to clear view. During summer, as use of the pathway increased, vandals began attacking the clarifiers.

"Since the trees were gone, our plant was totally visible to anyone on the path, and sometimes someone would use one of our four clarifiers as a target for throwing rocks or rip-rap," says Grover. "The clarifier would go out on torque, and every time that happened, it took six hours or more to recover the rocks and get the clarifier back online."



Floodwaters neared the chlorine tank and clarifiers in May 2011.

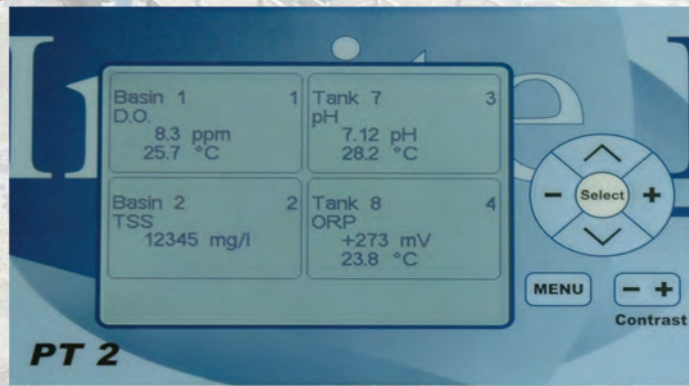
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The team at the Main Wastewater Treatment Plant includes, from left, Tim Grover, chief operator, and Matt Dow, Jim Fitzpatrick and Steve Danyow, operators.

### KEEPING THEM GROWING

“They really did a good job,” says Grover, who admits he was on vacation at the time. “We’ve got a good crew, and they planted the trees and kept the plant running as usual.”

The team members used compost and peat moss during planting to make sure they complied with the warranty requirements of the nursery that provided the trees. Several dry spells followed the planting, so the operators watered the trees with buckets of water drawn from the lake. To deter vandals, they erected signs along the repaired pathway, warning that the area is monitored with security cameras.

Grover says the trees have not yet grown tall enough to provide total shielding, but all have survived and are well on their way to helping

the plant team meet the goals of ending the vandalism and restoring a scenic asset along the recreational path. **tpo**

“They really did a good job. We’ve got a good crew, and they planted the trees and kept the plant running as usual.”

TIM GROVER

Grover and his staff decided to replace the trees themselves when it became clear that doing so was not a high priority for the city crew, which was dealing with many other flooding issues. “We planted the trees because we were frustrated with the continuing vandalism,” Grover says.

Plant operators Matt Dow, Jim Fitzpatrick, Steve Perron and Steve Danyow all helped. Rather than wait for emergency funding from the Federal Emergency Management Agency, they bought 20 cedar trees with funds from the plant’s capital budget. They borrowed a backhoe from another city department and, using Grover’s landscaping experience from a previous career and advice from the nursery, they planted the 6-foot-tall trees in less than a week.

### Share Your Ideas

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



Marc Pariseault, assistant superintendent (left), and Bill Dolan, operator, in the Bucklin Point facility's SCADA center.

# Pride and Passion

ASSET MANAGEMENT GETS BIG ATTENTION AT THE NEWLY UPGRADED BUCKLIN POINT PLANT IN RHODE ISLAND. THAT INCLUDES THE GREATEST ASSET OF ALL — THE STAFF.

STORY: **Ted J. Rulseh**

PHOTOGRAPHY: **David Duprey**

TOM CIOLFI IS PROUD OF THE \$38 MILLION UPGRADE completed last July at the Bucklin Point Wastewater Treatment Facility. He's proud of the effluent that meets a new permit nitrogen limit of 5.0 mg/L.

Most of all, he's proud of the 38 people who operate and maintain the plant, a 46 mgd (design) secondary facility with advanced biological nutrient removal in Providence, R.I., owned by the Narragansett Bay Commission, managed by United Water, and operated and maintained by commission employees.

"The work relationship here is a little unique, considering that we're a contract management company, managing Bay Commission employees," says Ciolfi, plant superintendent. "But there's a heck of a partnership here, and we all have the same goal. That's to be professional, be efficient and do the best job we can do."

To that end, Ciolfi and the United Water leadership team strive to instill a spirit of teamwork in the staff. The routine includes daily meetings at the start of each shift to discuss the day's priorities. It includes periodic "tail-gate meetings" to discuss issues of concern.

And for Ciolfi and shift supervisors Cliff Koehler, Terrance Harrington and Thomas White, it means listening to and addressing team members' concerns, cultivating positive attitudes and sharing information that helps everyone understand the "why" of everyday policies practices.

With the upgrade project now in the rearview mirror, the team is intent

## Bucklin Point Wastewater Treatment Facility, East Providence, R.I.

BUILT: | 1950s

EMPLOYEES: | 38

FLOWS: | 46 mgd design, 23 mgd average

TREATMENT LEVEL: | Secondary

TREATMENT PROCESS: | Activated sludge

RECEIVING WATER: | Seekonk River

BIOSOLIDS: | Composted, land-applied

ANNUAL BUDGET: | \$8 million (operations)

WEBSITE: | [www.narrabay.com](http://www.narrabay.com)

GPS COORDINATES: | Latitude: 41°47'40.63" N; longitude: 71°23'27.57" W



on managing all facility assets effectively and on completing housekeeping projects that help older areas of the plant look and feel like new.

### LONG RELATIONSHIP

United Water is in the ninth year of a 10-year management contract with the Narragansett Bay Commission; two potential five-year renewals are pending. Ciolfi, who previously worked as an operator at the commission's 77 mgd

“There’s a heck of a partnership here, and we all have the same goal. That’s to be professional, be efficient and do the best job we can do.”

TOM CIOLFI

Tom Ciolfi, superintendent of the Bucklin Point Wastewater Treatment Facility in East Providence, R.I.



## THE OLD MADE NEW

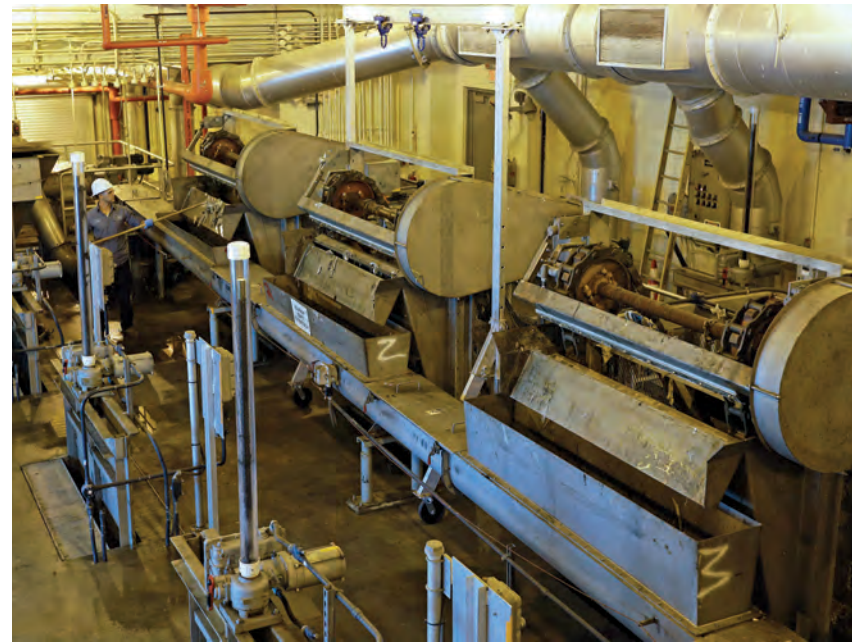
The original Bucklin Point Wastewater Treatment Facility was built in the 1950s. It has seen several upgrades, the most recent completed in mid-2014. Naturally, some older parts of the plant show their age when compared to the newly built sections. That's where the plant beautification project comes in.

"With the upgrade, everything is new and shiny," says Tom Ciolfi, plant superintendent. "We wanted to address the older areas so they wouldn't get old and dingy. We are spending a lot of time on those areas. Members of the operating team came to us and said, 'Let's buy some paint and let's keep those areas up.' So that's what we're doing.

"We got all the sludge pumps cleaned and painted. Once that was done, we moved on to another piece of the plant. Before you know it, we'll have this whole plant kept up — not that it hasn't been before now, but we're taking it to a different level."

The improvements go beyond the cosmetic: "Our maintenance shop was aging. We have all new equipment coming in. We also spent time epoxying the walls and ceilings. It's really no different from painting your living room — it's a question of good housekeeping. We have a lot of enthusiastic people offering their assistance."

A sharp appearance will reinforce perceptions as the plant revives public tours post-construction. "We do a great job — all of us in the wastewater professions," Ciolfi says. "We're responsible for keeping the waterways clean, the shellfish areas open, and beaches clean for swimming and recreation down at the ocean. Why would we want to keep what we do behind closed doors?"



Stephen Kruwell, operator I, cleans debris in the bar screens (Fairfield Service Co.).

(design) Field's Point Wastewater Treatment Facility, joined United Water in 2005 as a shift supervisor. He also worked as maintenance manager and assistant superintendent before taking his current position in early 2014.

"A number of us on the United Water team here used to be Bay Commission employees, so we understand their way of doing business and the high standards of performance they expect," he says. He acknowledges the challenges of helping to lead the team through several years of construction during the upgrade, which aimed not to increase capacity but to enable compliance with new effluent nitrogen limits set by the state Department of Environmental Management.

The plant handles dry-weather flow (average 23 mgd) with primary and secondary (activated sludge) treatment and UV disinfection. Flows beyond the 46 mgd design go through primary settling before disinfection with sodium hypochlorite and sodium bisulfite. "In the winter months, we have a modified Ludzack-Ettinger process, and in summer we switch to a four-stage mode," says Ciolfi. "That's basically what the upgrade consisted of.

### DOWN WITH NITROGEN

"When we're in the winter mode, we have the first anoxic zone and then three aerobic zones follow. The last zone, which we call cell D, has low dissolved oxygen, about 0.5 mg/L, and that's where we recycle from. That return activated sludge [RAS] goes all the way up to the anoxic zone. With the fourth stage, we give the nitrogen another shot to break down in a second anoxic zone.

"We increase the flow of RAS to help in nitrogen removal. We also separated some tanks — made them

Marc Pariseault, assistant superintendent, checks the level of soda ash in the silo.







The team at the Bucklin Point Wastewater Treatment Facility includes, front row, from left, David Sousa, planner/scheduler; Jonathan Isaza and Stephen Kruwell, operator I; Tony Calenda, maintenance foreman; and Robert Partington, electrical maintenance; back row, David McCarthy, inventory clerk; Michael Reilly, operator I; Leann Bates, administrative assistant; Tom Ciolfi, superintendent; Gus Padilla, mechanical maintenance; Ed Taylor, operations foreman; Manuel Velazquez, electrical maintenance; and Marc Pariseault, assistant superintendent.

#### Bucklin Point Wastewater Treatment Facility PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
<b>BOD</b>	200 mg/L	3.0 mg/L	50 mg/L daily max.
<b>TSS</b>	150 mg/L	5.0 mg/L	50 mg/L daily max.
<b>Nitrogen</b>	30 mg/L	<5.0 mg/L	5.0 mg/L daily max. (seasonal)

swing zones in the aeration tanks. We have four trains to enable us to recycle from different locations. We installed mixers in the anoxic zones, set up a pre-aeration zone, and put analyzers in to get feedback for the addition of supplemental carbon, if needed. We don't think we need it, but we do have the ability to introduce it into the aeration tanks. We also have a newly remodeled soda ash silo in case pH should become a problem.

"The key to the aeration process is getting a profile. We do this monthly or weekly, depending on the numbers we're receiving, to determine the point where our ammonia is at its lowest and nitrates are highest. The last cells, C and D, are the swing zones, where we are able to have one half of the cell aerobic and the other half anoxic. We re-establish the anoxic part of the process farther down the train.

"In the four-stage mode, we take the recycle pump that is normally located in cell D at the end of the train, and we move that up to the front of cell C — the point where nitrate is at its highest and ammonia is at its lowest. We get all the nitrates into the first anoxic zone. That's where we get the conversion of the nitrate to N<sub>2</sub> gas."

#### EFFICIENT AERATION

Four 8-foot diameter US Filter screw pumps (Evoqua), each with 38.7 mgd capacity, deliver influent to the treatment process. The flow passes through a catenary bar screen (Fairfield Service Company of Indiana LLC)

and a Waste Tech vortex grit removal system (Kusters Water). Three primary clarifiers have Hi-Tech skimmer arms and sludge rakes (also Kusters Water).

Primary effluent flows through a splitter box to the four aeration tanks. "We have two 600 hp Dresser Roots centrifugal blowers [GE Water Technology] and two newly installed turbo blowers [APG-Neuros] because of the different demand for oxygen at different times," says Ciolfi. "We use the turbo blowers in off-demand times. We are able to throttle those blowers to prevent over-saturating the aeration tanks with oxygen." An optical sensor probe (InsiteIG) monitors DO levels.

Water from the aeration process passes to six Hi-Tech Environmental secondary clarifiers (Kusters Water). Secondary effluent goes through UV disinfection (TrojanUV) and then to the Seekonk River. Waste activated and primary sludges are delivered to two newly installed gravity belt thickeners (BDP Industries) and then to four anaerobic digesters. Biogas from the digestion process fires boilers that provide digester heat; excess biogas is flared. Biosolids at 4.5 to 5 percent solids are removed by a contractor for composting and land application.

#### MAKING IT ALL WORK

It took a strong team to work through the plant upgrade, and that same team now keeps the process flowing smoothly. Key team members in addition to the shift supervisors are Marc Pariseault, assistant superintendent; Tony Calenda, maintenance foreman; Tony Tamburrino, utility crew foreman; Ed Taylor, operations foreman; and Fred Diez, electrical foreman. John



Ed Taylor inspects the UV disinfection system (TrojanUV).

Contrino, instrumentation technician, plays an important role in ensuring that DO control is operating as designed.

Accountability and responsibility are essential to building teamwork and good morale, Ciolfi observes. The foremen, union employees of the Bay Commission, solidify the chain of command. “Once you establish a chain of command, you need to stick to it,” says Ciolfi. “If I am out in the plant and I see something that’s not right, it works better if I go to the assistant superintendent and say I have a concern.

“For example, I might say, ‘One of the algae sweeps on Final Tank 6 seems a little out of sorts — would you have maintenance look into it?’ That way I don’t approach operators with negative issues. There are different levels of responsibility, and we each own a piece of it.

“Another thing I’ve found is that when someone brings you a concern, you address it. It may be a small matter in your mind, but it could be a very big concern to the other person. So you don’t just file it somewhere or say, ‘I’ll get back to you.’

“Suppose an operator says, ‘If I had a rake 2 feet longer, I could reach the top of the bar rack without standing on something.’ You listen and you react. Little things like that take really no time at all, and they pay great dividends.”

## LET’S TALK ABOUT IT

Consistent communication helps keep the team aligned with the plant’s priorities. Mandatory team meetings at the start of every shift tell team members about the day’s assignments. Tailgate meetings, called as needed, address specific concerns in the plant or highlight team accomplishments.

“Let’s say someone noticed that an algae sweep had a 10-foot tail of algae wrapped around it,” says Ciolfi. “We know from experience that it’s going to break free, make its way to the UV disinfection system and cause problems with our fecals. We bring forth things we can’t afford to miss. As a result, we find these kinds of things getting fewer and fewer. Now we’re more focused on morale boosters. Here’s a picture of the effluent — look at what a great job we’re doing. Here’s a picture of the sludge pumps that were painted on your shift.”

The plant leadership team regularly shares data on plant performance on bulletin boards. Twice a year, Bay Commission leaders visit to discuss the bigger picture. On a board at the locker room entrance, Ciolfi posts photos of team members at work: “We keep changing the pictures out. You’ll see the operators looking for themselves. They get a kick out of it.”

On the flip side, Ciolfi says, “We do not entertain negativity. We stop it. Anytime someone is going down that road, we say, ‘Hold on, let’s back up a minute.’ When you allow negativity, it can become a fire that gets out of hand.” Meanwhile, violations of protocol — like arriving late for a pre-shift

meeting — are addressed promptly, consistently and candidly.

## ALL EYES ON ASSETS

The plant’s engaged and energized team devotes substantial attention to the equipment that drives plant processes. Peter Eldridge, asset manager, helps lead an extensive program of planned and predictive maintenance. A computerized maintenance management system (Hansen) automatically generates maintenance work orders.

Maintenance is thoroughly structured so that nothing is missed. The plant has expanded its spare parts inventory to shorten lead times for many repairs. “All work in the facility needs a work order number, or the work cannot be performed,” Ciolfi says. “No one can simply call on the

radio and say, ‘Hey, can you meet me at the pump station? I hear a funny noise.’ There is a whole chain of events that must occur.

“We start with a service request. Someone needs to verify that it is a legitimate task and generate a work order. David Sousa, our planner/scheduler, has a very important role. He lays out the work schedule and makes sure all the proper work orders are associated with each task. Everything has a criticality rating to see to it that nothing critical lags behind.

“Every morning David comes in and reviews service requests that may have been generated during the night. He sees what is critical and schedules the work. Noncritical tasks go to our asset manager, who lines up the schedule with the maintenance foreman. At Friday meetings, we grade the percentage of the work completed. We grade each mechanic. Any work that didn’t get completed gets moved out to the following week — all we need is a reason why.”

Predictive maintenance includes scheduled oil analysis, once-a-year vibration analysis on critical equipment and a general annual assessment of all assets. “We have a capital planning program where we project out five to 10 years and look at equipment that may be nearing its life expectancy,” Ciolfi says. Rebuild kits are kept on hand for selected critical assets.

In the end, what makes it all work is the team, Ciolfi says: “We promote team spirit, teamwork and a team attitude. That takes work — it doesn’t happen overnight. But we stay consistent. We provide structure. We listen. As a result, we have complete buy-in from the staff.” **tpo**

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# Maintenance on Auto Pilot

CMMS SOFTWARE HELPS WATER AND WASTEWATER OPERATORS KEEP MAINTENANCE ON TRACK AND FACILITIES IN COMPLIANCE. HERE'S SOME ADVICE ON USING THE TECHNOLOGY TO GREATEST EFFECT.

By Sanjay Murthi

Water and wastewater operators face strict regulations and unique challenges that often can seem overwhelming. To meet the regulations, equipment and facilities must operate properly and within specifications. Making that happen continuously requires effective maintenance management.

Computerized maintenance management system (CMMS) software can be an important tool in the quest to get the job done as problem-free and cost-efficiently as possible. CMMS helps improve maintenance at many municipal wastewater and water treatment plants. Operators can save hours of work time and significant ratepayer dollars by knowing how to use a CMMS system properly.

## POWERFUL TOOLS

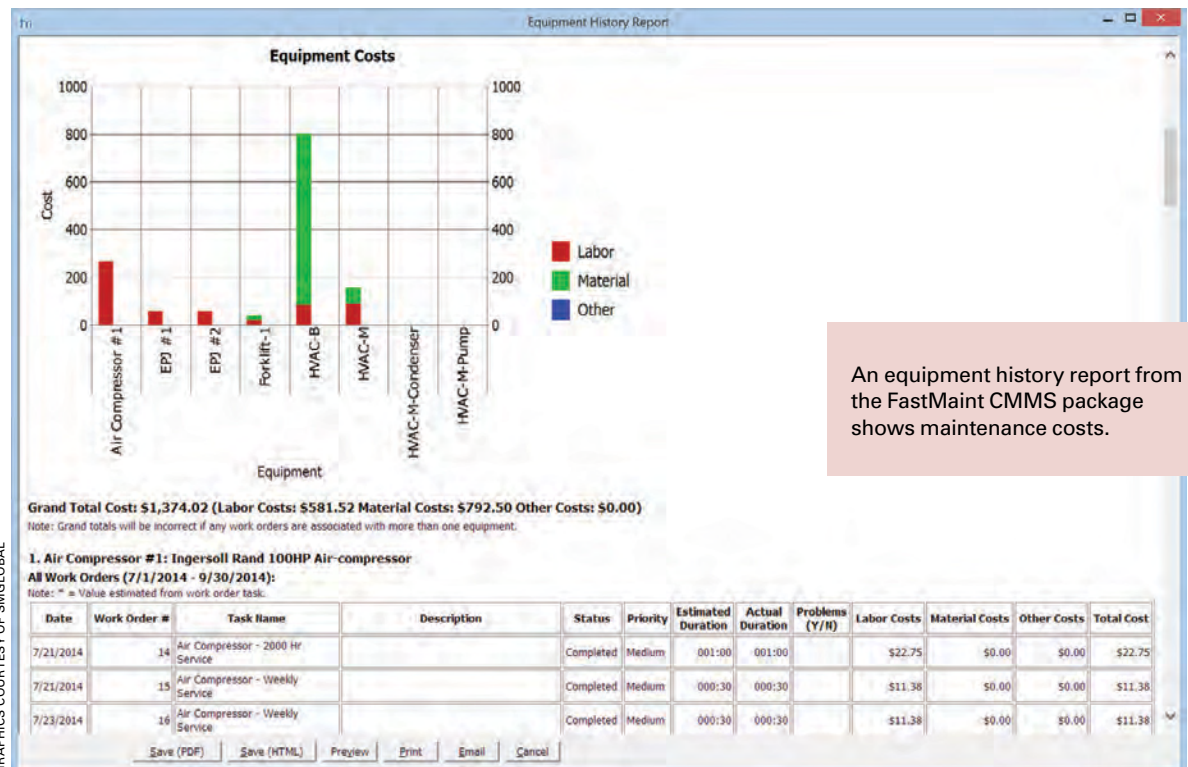
CMMS gives utility managers and their operating teams a broad set of tools that can help keep maintenance on schedule and enhance compliance.

First and foremost, CMMS helps in scheduling preventive maintenance and calibration activities.

In a typical facility, multiple tasks need to be scheduled and completed each year, on time. CMMS makes it easier for the managers and planners to organize and complete the work that needs doing. They can schedule planned maintenance by day or month, schedule meter readings, set alarm conditions and more.

A properly programmed CMMS can also help a team identify problems with equipment that needs to be replaced or overhauled. A quality software package offers a variety of reports that operators can use to effectively review maintenance costs, labor costs and equipment problems over time. This information makes it easier to identify equipment that is responsible for a disproportionate share of maintenance issues and thus justify replacement or overhauls. Other benefits include:

**Catch missed or delayed maintenance.** CMMS software makes sure reports are provided on a regular basis. Even the most mundane of tasks are rarely missed with a CMMS in place.



GRAPHICS COURTESY OF SMGLOBAL

**Work request management.** Users can easily report problems or request maintenance checks. Everything is tracked, and status checks on the work requested can be easily performed.

**Integrated asset management.** Users can easily create a database of all equipment and facilities and how they relate to each other. If one unit is malfunctioning, users will know immediately what other parts of the process will be affected. This keeps one small problem from taking out several vital pieces of equipment.

**Statistics and useful reports.** CMMS programs typically offer a variety of reports that can provide a view of how the maintenance program is doing. An example is a one-page statistics report that shows the health of the entire maintenance program at a glance.

## SUCCESS IN DEPLOYMENT

Just having a CMMS is not a maintenance solution. It is essential to deploy the system in a way that makes the most of its capabilities.

Different CMMS packages use different systems to store and sort data.

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Ideally, the database should be built on a well-supported platform, such as Microsoft Access or Oracle. This ensures that team members have access to troubleshooting assistance and third-party tools. Backup is essential: No system is invulnerable, and there is always a risk of files becoming damaged or corrupted.

Just having a CMMS is not a maintenance solution. It is essential to deploy the system in a way that makes the most of its capabilities.

to a new maintenance software package in the future.

The system should also allow easy addition of users. CMMS packages vary in their requirement and pricing for upgrade from a single user to multiple users. In addition, the staff should have in-house technical skills, or access to outside assistance, for managing any special hardware or software the CMMS requires. It's important to keep close track of installation disks, downloads and passwords.

## MAKING A SOUND CHOICE

Maintenance management is a broad field as a variety of equipment and facilities need ongoing maintenance. Many CMMS software programs are targeted for specific industries or have specialized features. However, a pack-

Software as a Service (SaaS) or Cloud-based systems can have advantages but come with cautions. Here again, backup is critical. Users should also be aware of regulatory issues that could emerge if the systems cannot be accessed due to Internet outage or other problems.

Data transfer must be made easy. Most CMMS packages allow users to import or export data in comma-delimited formats. This is useful for organizations that need the data in a separate system or decide to move

age of this kind may not be an optimum choice if you use the same system to handle different types of maintenance – as in a treatment plant that requires maintenance of equipment as well as facilities such as pipelines.

Specialized offerings may also be more expensive, more complex to deploy and more restrictive in the features they support, as compared with more general-purpose packages.

Some other software suites, such as ERP systems, include maintenance modules. However, these usually do not have all the features and advantages that go with a CMMS package. CMMS can be integrated with some other systems, but that may require the assistance of consultants.

Many maintenance software packages advertise smartphone features and compatibility. Some of these features can be useful, while others have potential to be dangerous. For example, suppose a maintenance technician is modifying system information via smartphone but the transaction drops out midway because of a bad connection.

A better approach is to be able to email or text message work orders to technicians in the field. After completing the work, the technicians should be able to email or text back work order updates that the system can pick up. This allows a disconnected mode that will still work if technicians cannot connect to the network for some period of time.

Besides these considerations, a variety of other items need to be considered when selecting a CMMS software package. CMMS providers should be able to offer guidance. One supplier offers a CMMS Selection Guide on its website with information and checklists that help in selecting the best CMMS for a specific set of needs.

## ABOUT THE AUTHOR

Sanjay Murthi is sales manager at SMGlobal, a provider of CMMS software for plant, utility and building maintenance based in Apex, N.C. He can be reached at smurthi@smglobal.com or 919/647-9440, ext. 105. tpo

# Always *Vigilant*

THE TEAM AT THE LAWTON WATER TREATMENT PLANT CONQUERS RAW-WATER ISSUES AND OPERATIONAL CHALLENGES WITH INGENUITY AND DEDICATION

STORY: **Scottie Dayton**  
PHOTOGRAPHY: **Torrey Purvey**

TREATING WATER WITH LOW TURBIDITY WITH MARGINAL seasonal fluctuations in iron and manganese keeps operators busy at the Lawton (Okla.) Water Treatment Plant. Their routines were complicated by drought and the repair of a leaking clearwell.

Superintendent Carl Gray, a Class A (highest) water and wastewater operator and laboratory technician, worked alongside six operators until his promotion last October. He witnessed their ingenuity and dedication to water quality. “They always put the interest of the plant before personal interests, ignore any friction between them and concentrate on what needs to be done,” he says. “Their coterie of fellowship forms the health and backbone of the plant.”



George Spicer, safety officer, received the Newcomer of the Year Award from the Oklahoma Water & Pollution Control Association.



George Spicer in the control room at the Lawton Water Treatment Plant.

The highly motivated operators impressed Gray, president of the Oklahoma Water & Pollution Control Association and former award committee member. In 2013, he nominated Class C operators and laboratory technicians Scott Golden and George Spicer and Class B laboratory technician Lyn Kisner for awards.

Golden won Outstanding Water Operator of the Year (the Stapley Award) and Kisner was named Laboratory Technician of the Year. Both had worked at the plant for two years. With only 18 months under his belt, Spicer received the Newcomer of the Year Award. Other plant personnel include Mike Sass, line supervisor; Courtney Breshears, chief chemist; Guy Neely, Wade Lewis and Bret Kelly, maintenance technicians; and Dustin Childers, John Elwell, Nick Joslyn, Nicki Watts, Robert Sandford and Michael Simpson, operators.

### DUAL TREATMENT TRAINS

The 40 mgd (design) plant, built by the City of Lawton, was upgraded in 2005 to enhanced coagulation with high-rate clarification and dual-media filters. Finished water is distributed through 525 miles of mains to nearly 100,000 customers.

Water from Lake Lawtonka flows by gravity 750 feet through a 42-inch pipe to the plant, where sulfuric acid and liquid alum are added to begin enhanced coagulation. After the water passes through a bar screen, it enters the east and west treatment trains. Each train has a vacuum assist Superpulsator clarifier (Infilco Degremont) that mixes cationic polymer with the water before it flows to a three-baffle vault. Injectors in the vault introduce ozone — produced on site from liquid oxygen and an ozone generator — as a pre-disinfectant.

From the ozone vault, water enters the FilterWorx (Leopold — a Xylem Brand) filters with 6 inches of sand and a 34-inch cap of granulated activated carbon to help control taste and seasonal odors. “We also feed powdered activated carbon to the SuperPs if odors persist,” says Gray. “For iron and manganese problems, we feed 35 percent peroxide, liquid alum or a cationic polymer on the filters.”

A 30-inch prestressed ductile iron pipe transports water to the 2-million-gallon above-ground concrete finished water storage tank at the plant. Just before distribution through four lines, injectors add liquid ammonium sulfate. A 42- and a 30-inch gravity line feed three 5,000 gpm PACO (Grundfos) pumps in Station No. 4. A 24-inch line supplies the Fort Sill Army base, while another 24-inch line feeds rural districts.

Blowdown valves in the Superpulsators remove sludge, which flows to an equalization basin, then to a sludge clarifier where it mixes with a nonionic polymer and aluminum chlorohydrate and settles out. Effluent discharges to Medicine Creek. Sludge is sent to a pump station, then to a three-cell lagoon discharging to an outfall.

The in-house laboratory uses ozone analyzers from WEDECO — a Xylem Brand, Hach 1720C online turbidimeters, a desktop analyzer, a PLC analyzer (Evoqua Water Technologies) and spectrometers.

### NATURE’S SURPRISES

The process is not without its challenges. Operators expect iron in the



## Lawton (Okla.) Water Treatment Plant

BUILT: | 1932 (upgraded 2005)

POPULATION SERVED: | 99,000

SERVICE AREA: | 34 square miles

CAPACITY: | 40 mgd design

TREATMENT PROCESS: | Conventional

SOURCE WATER: | Lakes Lawtonka, Ellsworth and Waurika

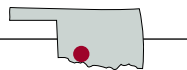
INFRASTRUCTURE: | 525 miles of water mains, 1 below-ground tank, 1 above-ground tank

SYSTEM STORAGE: | 5.25 million gallons

ANNUAL BUDGET: | \$3.4 million (operations)

WEBSITE: | www.cityof.lawton.ok.us

GPS COORDINATES: | Latitude: 34°44'02.08" N; longitude: 98°30'08.66" W





raw water, but they find outbreaks of colloidal manganese harder to treat. By July and August, the condition can turn raw water the color of tea and produce an odor.

“This isn’t elemental manganese,” says Gray. “It’s bound up with organics and must be burned out. Ozone helps, but manganese comes back into solution in the next treatment phase. Our challenge is to keep it out of the water, and we’re researching ways to do it.”



Staff members use a pH meter (Thermo Fisher Scientific) to perform total alkalinity tests.

Another challenge is getting chemicals to the plant. Freight is often the overriding factor when Gray accepts bids, because caustic soda arrives in the Port of Catoosa on barges, then must be trucked 200 miles to the plant. To keep from running out of chemicals in summer, Gray awarded primary and secondary trucking contracts. “We need chemical deliveries within three days of the orders,” he says. “If one company can’t deliver on time, I call the second trucker.”

The facility also has two tasks seldom seen elsewhere. Every week, operators check piezoelectric sensors that measure compressive loading (strain) along the Lake Lawtonka dam. The sensors detect shifts in the structure or changing water levels. Staff engineers inspect the dam annually. During seven- to eight-year drought cycles, operators routinely unhook the clutches and run the motors that drive the dam’s sluice

gates. However, years can pass before lake levels and downstream conditions are right to exercise the gates for flood control.

“We can’t function on rumors about regulations. For an accurate evaluation of what is on the horizon, we stay active in our state association and in the local branch of the state Department of Environmental Quality.”

**CARL GRAY**

### TAPPING RESOURCES

In 2012, operators faced their biggest upheaval when the clearwell went offline for two years of repairs. During its absence, they buffered water in the finish water tank. “We were walking a tightrope,” says Gray. “At 17.2 feet, the finish tank overfills into the clearwell, but contractors were building the new one inside it. If the level in the finish tank fell below 10 feet, some pumps lost prime. We had to regulate flow manually throughout the day.”

The need for constant adjustments alerted Gray to a problem. On some days he had too many people in the control room and had to look for things they could do. On other days, he struggled to find someone to cover a shift. For help in drafting a staffing plan, Gray turned to Golden, who had worked eight years in the city’s revenue services division and at the wastewater treatment plant. He used that experience to schedule two operators per shift.

“I implemented his idea,” says Gray. “It guarantees that someone is always at the plant if the other person doesn’t come in. Double coverage is a safety initiative should something happen to an operator. Scott’s plan made our 24/7 operation more consistent.”

Gray was also impressed with Golden’s ability to apply general knowledge to troubleshooting. “He pays attention,” Gray says. “For example, when he checked the computer monitor and noticed the water level rising in the sludge equalization basin, he went to the basin to verify what he saw instead of recording the water level on a form and walking away.”

Golden’s investigation revealed a blowdown valve stuck open, and yet the water hadn’t risen in the basin during the last two shifts. Gray suspected the valve had been air-locked and that the air bled off over 16 hours. “Scott caught the discrepancy before it became a problem, which impressed the awards committee when they interviewed him,” Gray says.

Meanwhile, in the laboratory, Kisner and his team perform almost 80,000 analyses annually, including tests for rural water districts and Fort Sill, and 90 coliform tests monthly. Besides the daily cleaning and calibration of instruments, Kisner ran verification samples to check online instrumentation. Other tasks included special testing such as high-low chlorine demand in the system and algae identification. Kisner has an associate degree in microbiology.

*(continued)*



Carl Gray, plant superintendent

### IN-HOUSE INSTRUCTION

Carl Gray, superintendent of the Lawton Water Treatment Plant, is certified to teach Class D through Class A courses for water and wastewater operators, and Class C courses for water and wastewater laboratory technicians.

The plant has a classroom with six tables, each seating four people, and classes are open to anyone from surrounding rural water districts. Gray teaches by asking questions that lead students to discover the answers.

“The light comes on when they make the connection between what they learn in a book and how to apply it in the plant,” he says. For a change in teaching styles, Gray occasionally invites other instructors. While a third party does much of the plant’s safety training, Gray wants to see more focus on task-specific in-house training. Consequently, he is writing a safety curriculum with suggestions from the operators.



Superintendent Carl Gray (left) says the Lawton Water Treatment Plant staff is dedicated to water quality and always puts the best interest of the plant first.

“They always put the interest of the plant before personal interests, ignore any friction between them, and concentrate on what needs to be done.”

**CARL GRAY**

“Lyn has moved on since the award, but he left a proud legacy,” says Gray. “Probably his greatest contribution was bridging the communication gap between our operators and dedicated maintenance staff. He explained the different analyses to them, what they mean, and how they work in the plant’s design. Now, instead of just fixing gears and motors, they understand the process.” Golden was promoted to Kisner’s position.

### SEIZING THE INITIATIVE

Spicer may be a newcomer, but his thoroughness and demeanor reflect his years as a U.S. Army paratrooper and trainer. He impressed Gray by looking for trouble on his rounds before it happened. For example, if a valve malfunctions at a sample point, chemical drains into a sump, triggering a float that closes the valve. If the sump isn’t running, the area floods instead of liquid being pumped to the outside containment area. Therefore, Spicer carries a flashlight and inspects each pump and valve to make sure they are working. “George is very conscientious about wearing his personal protection equipment, and reminds other workers to do the same,” says Gray. “Now he’s our safety officer.”

Gray is also proud of the innovation shown by Sass. In 2008, valves were operated by two unreliable water-cooled air compressors that caused frequent plant shutdowns. “Mike found a kit to convert the compressors to air cooled,” says Gray. “He saved us more than \$45,000 in engineering expenses and helped stabilize the system.”

In another instance, sludge was accumulating in the Superpulsator units. Slits in the bottom of the collection pipes weren’t drawing in enough material as it slid down the V-trough. “Mike suggested cutting additional slits in the top of the pipe, enabling sludge to flow straight into them,” says Gray. “Overnight, our quality improved by a factor of 10.”

While staff attends to daily operations, Gray tries to anticipate future unfunded mandates and plan how to deal with them. “We can’t function on rumors about regulations,” he says. “For an accurate evaluation of what is on the horizon, we stay active in our state association and in the local branch of the state Department of Environmental Quality. Whatever is coming, my operators will meet it with ingenuity and integrity.” **tpo**

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# Clean Separation

A STACKED TRAY GRIT SYSTEM WITH WASHING AND DEWATERING ENHANCES REMOVAL EFFICIENCY AND IMPROVES PRIMARY CLARIFIER AND DIGESTER FUNCTION

By Marcia Sherony

The James B. Messerly Water Pollution Control Plant (WPCP) had a history of difficulty with grit removal.

The plant, in Augusta, Ga., (population 195,000), treats residential and significant industrial wastewater from the metropolitan area. Forty permitted industrial users make the plant influent high in BOD and ammonia. Food, paper, textile and chemical plant waters add organic and inorganic chemicals to incoming flow.

In the 1980s, the Messerly plant received an upgrade to its aeration basins and digesters along with a new grit removal system. Three mechanically induced vortex (MIV) units replaced an aerated grit basin; each was sized to handle 15 mgd average and 30 mgd peak flow at a time when total plant flow averaged 26 mgd and peaked at 60 mgd.

Even after updating the grit washing and dewatering system in 2004, the grit collection units performed below expectations. The plant added a stacked tray grit removal system with new washing and dewatering technology in 2010. These systems delivered the necessary grit removal efficiency and helped enhance downstream processes.

## DESIGN BASED ON DATA

The latest grit removal system was installed as part of a larger plant upgrade. City representatives and their engineering consultant visited sites to observe the planned technology and also hired an independent testing

company, Grit Solutions (now Black Dog Analytical), to characterize the plant's grit.

The company analyzed grit entering the plant and downstream of the existing grit system. During the testing, 70 to 76 percent of the grit collected had a physical size of 212 microns and larger, and 45 to 50 percent was between 300 and 820 microns, meaning the influent grit gradation

was relatively coarse. However, as much as 43 percent of the influent grit settled at the same velocity as 106-micron spheres of clean sand. The grit system was not effective in capturing this slow-settling material.

As in nearly all wastewater treatment plants, the grit particles settled much more slowly than their physical size would indicate. Grit particles typically have irregular shapes that reduce settling velocity. In addition, grit includes silica sand as well as components such as gravel, concrete particles, minerals and other materials with specific gravities less than 2.65, the conventional grit system design assumption.

Based on plant data, engineers decided that the new grit system should be designed to remove 95 percent of all grit particles 106 microns and larger in order to capture more than 70 percent of the incoming grit.

## AN ADDED STEP

The plant installed three 12-foot-diameter, 12-tray Eutek HeadCell stacked tray grit removal units with Eutek SlurryCup and Eutek Grit Snail units for washing and dewatering (Hydro International). The system was designed to remove 95 percent of all grit 110 microns and larger at a peak flow of 38.6 mgd per unit.

The existing MIV system remained, and its effluent was pumped to the HeadCell system downstream. From the HeadCell separators, flow travels by gravity through the rest of the plant. Two of the three HeadCell units are typically in operation. Processing an average flow of 31 mgd and a peak flow of 46 mgd, the new system typically removes an additional 8 to 12 cubic yards of grit per week, or about 1.0 to 1.24 cubic feet per million gallons. That is almost 10 times the amount removed by the MIV system.

The new process operates by taking the effluent from the MIV system through the new HeadCell stacked tray system. Grit collected in the HeadCell is pumped to the SlurryCup, introduced tangentially at a controlled rate to establish a free vortex flow. The design of the vortex chamber effectively separates the grit to the perimeter, where it falls by gravity into the boundary layer at the bottom of the unit. The boundary layer sweeps the grit to the center for collection. Excess water and separated organic materials flow out of the unit for additional processing.

A vortex valve regulates the volume of washed grit slurry exiting the SlurryCup and introduces it into the Grit Snail dewatering unit. A slow-moving cleated rubber belt lifts settled grit from the clarifier, allowing it to drain as it is elevated to discharge. Clarified water is returned to the treatment plant.

## BETTER DOWNSTREAM

At the Messerly plant, the system's better grit removal efficiency improved both clarifier and digester operation. The primary clarifier now can be used to thicken sludge, since the grit has been removed. This helps the digester, as less overall sludge volume allows for a longer solids residence time, improving volatile solids destruction.

ESG Operations operates the plant for the City of Augusta. Percy Nolan, operations manager, states: "It is literally amazing how much grit the system is removing — as much as 16 cubic yards per week."

## ABOUT THE AUTHOR

Marcia Sherony is national sales manager for the Water and Wastewater Division of Hydro International, based in Hillsboro, Ore. She can be reached at 503/200-9855. [tpo](mailto:tpo)

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The system's better grit removal efficiency improved both clarifier and digester operation.



The Catawba River Basin is the major raw water source for the Charlotte-Mecklenburg Utilities Department.

# One Region, One River

CHARLOTTE-MECKLENBURG UTILITIES DEPARTMENT PARTNERS WITH OTHER UTILITIES IN ITS WATERSHED TO HELP SECURE A FUTURE OF ABUNDANT AND HIGH-QUALITY WATER

By Ann Stawski

**T**he Catawba River may seem like an endless supply of water flowing from the Blue Ridge Mountains. Leaders of Charlotte-Mecklenburg Utilities Department (CMUD) know different.

Severe droughts in the 1990s, 2002 and 2007 proved that Carolinas communities drawing water from the river could ultimately reach its capacity — by 2048 or sooner according to studies — if no actions were taken.

In response, CMUD and other utilities in the river basin banded together as the nonprofit Catawba-Wateree Water Management Group (CWWMG), devoted to actions to extend the river’s life as a water source. Members include 18 utilities from North and South Carolina that draw from the Catawba, along with Duke Energy, the local electric and gas utility.

In the meantime, CMUD, which serves the North Carolina City of Charlotte, Mecklenburg County and surrounding communities, dedicated itself to sustainable operations, including broad initiatives to increase efficiency and save energy.

## HEAVILY USED

The Catawba River (known as the Wateree River south of where it enters South Carolina) is heavily used. It includes 11 Duke Energy impoundments and hydroelectric dams — these serve as main sources for water utilities that supply homes and businesses. Eighteen public water suppliers draw from the main stem of the Catawba-Wateree, and numerous communities take water from tributaries.

CMUD, the largest water utility in the Carolinas, sees an average drinking water demand of 105 mgd. Its three water treatment plants and 4,000 miles of distribution pipes serve 250,000 accounts. Growth in Mecklenburg County continues to outpace neighboring counties.

## PLANNING FOR THE RESOURCE

In 2007, Charlotte-Mecklenburg led the incorporation of the CWWMG. Members include 18 utilities from North and South Carolina that draw from the Catawba River, as well as Duke Energy.

“Without significant effort to manage water consumption, this generation could see a time when there will not be enough water flowing in the Catawba-Wateree River to support more people moving into the heart of North or South Carolina,” says Barry Gullet, CMUD director. “Not enough water to support new jobs, produce more electricity to drive new industry or ensure the quality of life we currently enjoy.”

The CWWMG exists to identify, fund and manage projects that help extend and enhance the river system’s capacity to meet human water needs — water supply, power production, industry, agriculture and commerce — while maintaining the river’s ecological health.

The group is completing a regional Water Supply Master Plan. That plan established a scenario that extends the river’s water yield by nearly 50 years. “We’re proud of the plan and think this is a good model for at least the rest of North Carolina, if not beyond,” says Gullet.

In creating the plan, the CWWMG solicited guidance from a 19-member public stakeholder team representing environmental interests, lake users, local governments and state agencies. Together, they updated long-term water-use projections, evaluated options and developed long-term basin-wide conservation strategies. The plan calls for a series of measures to make water more available and use water more efficiently.

The plan also calls for improved drought management, and to that end the organization partnered with U.S. Geological Survey to establish new groundwater monitoring sites. The group is also undertaking projects designed to enhance and coordinate drought response.

“Getting the water utilities working together and creating the partnership with Duke Energy was a big step forward,” says Gullet. “We took an approach of mutual gains and benefits and came up with scenarios that are sustainable.”



Charlotte-Mecklenburg employees are required to secure progressively higher levels of certification.

PHOTOS COURTESY OF CHARLOTTE-MECKLENBURG UTILITIES DEPARTMENT

The regional partnership has already generated benefits that include information and resource sharing, and projects that enhance water resource management, increased water use efficiency and public outreach. Future goals include reducing per capita water use, reducing or consolidating intakes, and reducing sediment inflow.

The master plan outlines the development of sound, comprehensive raw-water intake contingency plans for its public water suppliers. The group reviewed each intake's condition, vulnerabilities and existing contingency plans, then ranked the criticality of each intake for its ability to provide adequate water during periods of low flow in the river.



A Water Supply Master Plan calls for a series of measures to make water more available and use water more efficiently.

### EYE ON EFFICIENCY

Along with formation of the CWWMG, the Charlotte-Mecklenburg utility shifted from a focus on rapid growth to a focus on continuous improvement. As a priority, the utility embraced sustainability, energy management and conservation. It adopted a Think-Do-Check-Act cycle and a 40-point action plan targeting areas for improvement. That plan is still in use.

CMUD retrofitted energy-efficient equipment and made use of other opportunities to save electricity. Since 2012, the utility has received or awaits approval on \$75,000 in electric utility incentives for energy savings. Power offset programs at treatment facilities have also saved more than \$500,000.

The more than 760 CMUD employees are required to acquire high levels of certification. "Our employees make a profound impact on all we do and ensure that all the improvements work," notes Gullet. "It's an investment that benefits the community and the environment."

CMUD also contributes to the development of stakeholder communications, including a rate study completed with public input. "We developed customer trust through collaborative development of the 40-point action plan," says Gullet. "It resulted in rate structure changes that provide more stable revenue while maintaining affordability and conservation incentives."

### LOOKING AHEAD

For the future, the CWWMG is considering a follow-up project to address water-quality concerns in the basin. "The management of our regional water supply will continue to be a key issue for our utilities and customers, particularly as unusual bouts of extended drought or extreme wet weather occur," says Gullet. "As a founding leader in the Catawba-Wateree group, Charlotte-Mecklenburg reaffirms its commitment to protecting shared natural resources.

"No utility can solve the problems individually. We understand how interconnected and interrelated the lakes, reservoirs and dam operations are with each other. The system counts on all of us working together." **tpo**

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# Community on Board

A CITIZENS' COMMITTEE HELPS ARCHITECTS AND ENGINEERS DEVELOP AN ATTRACTIVE DESIGN FOR A WATER TREATMENT PLANT IN A CITY PARK

By Ted J. Rulseh

The City of Yankton's 1929 water treatment plant had reached the end of its life. A new collector well and water treatment plant would cost \$29 million — and would have to be built in a park along the Missouri River, between the downtown and a popular pedestrian bridge. What's more, the project would cause water rates to increase by 40 percent.

In other words, the conditions were right for a controversy. That never happened, though, most likely because the leaders of Yankton, a city of 14,500 in southeastern South Dakota, reached out to the community to explain the need for the project.

A key part of that outreach was the creation of a citizens' committee to help architects design a building exterior and landscape that would blend in with the park and harmonize with the atmosphere of the downtown. With the committee's help, the city completed a design for the treatment plant and its surroundings last October.

The process illustrated the importance of not just informing citizens about major projects but of getting them involved and engaged at an early phase. Kyle Goodmanson, the city's director of environmental services, oversees the city's water and wastewater treatment plants, the wastewater collection system and the water distribution system. He talked about Yankton's outreach process in an interview with *Treatment Plant Operator*.

**tpo:** Why was it necessary to build a new water treatment plant?

**Goodmanson:** We have two conventional water treatment plants — a 3 mgd built in 1929 and a 5 mgd facility built in 1972. We need to add capacity and the 1929 plant, the way it was designed, can't be expanded. It has also become difficult to get parts for such an aging facility. So it was time for it to be decommissioned.

“When you have a community of about 14,000, people tend to be involved in government. When somebody says the city is going to spend \$29 million, they want to know why.”

KYLE GOODMANSON

**tpo:** What will be built to replace that old plant?

**Goodmanson:** We will build a new collector well and a 5 mgd membrane treatment facility as an addition to the 1972 plant. Our source water contains a high level of iron, so we are looking at running it through sand filters first and then going to reverse osmosis to remove the oxidized iron. We've just started pilot testing; it appears we'll be able to run water from the sand filters straight to RO, although the engineers are still working on that. We plan to start construction on the collector well this winter and on the treatment plant next fall, for completion in 2017.



The new plant (shown in an artist rendering) is designed to be harmonious with a surrounding park and with the nearby downtown area.

**tpo:** What made the location of this new plant such a potentially sensitive issue?

**Goodmanson:** Both treatment plants are right down along the Missouri River, on the west side of Riverside Park, which is Yankton's main park. The Meridian Bridge crosses the river right there — it's a double-decker bridge built in the 1920s and has been turned into a pedestrian bridge connecting to nature trails on the Nebraska side.

The walkway to the bridge actually cuts right between our two water plants and is about two blocks away from and tied into our downtown. The river here is officially the Missouri National Recreational River, a unit of the National Park Service and Wild and Scenic Rivers System.

Since the 1972 treatment facility is right in the middle of the park, the question was: Do we really want to build a new water plant there?

**tpo:** Why did the new plant have to be built in the park instead of somewhere else?

**Goodmanson:** As we designed the new plant, we explored the possibility of moving it outside of town somewhere. But the price tag to do that was almost \$15 million more because we would have had to change our distribution system and add a new reservoir. So we stayed with the plan to add on to the 1972 plant, which was designed to be expanded. We have the funding in place through the state Revolving Loan Fund.

**tpo:** Why was it important to conduct extensive outreach on this project?

**Goodmanson:** When you have a community of about 14,000, people tend to be involved in government. When somebody says the city is going to spend \$29 million, they want to know why. One thing we've experienced in Yankton is that a small number of people can make a great deal of noise. So we wanted people to be well-informed and educated about what we were doing and why we were doing it.

**tpo:** How did you begin with the public outreach?

**Goodmanson:** One of the first things we did was get our 20 or 30 biggest customers together and talk to them about the project. These were managers of our industries and our two hospitals, influential people in the community. We wanted to get them on board first. Then I went with Amy Nelson, our city manager, and Al Viereck, our finance officer, to meetings with our civic organizations, such as the Knights of Columbus and the Rotary. It all went very well. The City Commission approved the project with no issues. I think the reason was the amount of effort we put into getting people involved early, understanding the project and why it was needed.

**tpo:** How was the citizens' committee created?

**Goodmanson:** The city manager decided to put the committee together because of the concerns with building the new plant in the park. The committee dealt with the look of the plant — the landscaping around it, the brick work, the shape. The aim was to arrive at a design that would tie into the park.

**tpo:** Who served on the committee?

**Goodmanson:** I served on the committee with our parks and recreation director Todd Nelson, our community development director Dave Mingo, three members of the City Commission and three members of the public. The National Park Service was also involved. They technically were not represented on the committee, but they came to all our meetings because they had jurisdiction over much of the permitting for the project. They were very helpful. They're the kind of group that the more you involve them on the front end, the better off you are.

**tpo:** How were the public members solicited and selected?

**Goodmanson:** We put a notice in the newspaper inviting participation. People turned in applications, and our mayor, Nancy Wenande, made the selections. She also appointed the three City Commission members.

**tpo:** What process did the committee follow?

**Goodmanson:** HDR is our engineering firm. Steve Quail, P.E. BCEE, is the design engineer on our project. He brought three architects from his firm — two structural designers and a landscape architect. At the first meeting, we discussed basic ideas about what we wanted and didn't want. The architects then went back to their office and put together renderings showing the landscape and the building itself.

At a second meeting, we went through four or five renderings and picked them apart — things we liked from one, things we liked from another. The architects took that information back and came back with a new design. We had one more meeting to go through that design and make the final minor changes. The architects then created a final rendering, which was approved by the City Commission last October.

**tpo:** What was the nature and tone of the committee's discussions?

**Goodmanson:** I was worried at the start that we wouldn't reach a consensus — that we'd have seven or eight opinions on how the plant should look. I was pleasantly surprised at how much give and take there was. Most of the committee members, including the three members from the public, had been adamant earlier about wanting to move the plant out of the park. But once the decision had been made to leave it there, they were on board in

coming up with unique ideas for making the structure attractive. In every decision there were always one or two who weren't happy with it, but everyone was very willing to compromise. Someone might say, "I'm the only one who thinks the brick should be red, so I'm willing to give on the color of the brick."

**tpo:** What were some key outcomes of the committee's work?

**Goodmanson:** We didn't want a building that would catch people's eyes, but we wanted something that when they did look at it, it would look nice. So we worked with a lot of vegetation to screen the building. Because we don't have a lot of public facilities near the bridge, we added public restrooms to the design. They are the only restrooms in the park that will be open all year. Noise was an issue. We incorporated features to buffer the sound. The plant will include an aeration tower, and we're going to turn that into a clock tower. We came up with a lot of little things that are going to dress the facility up.

**tpo:** Would you say the committee's work led to some better decisions than would have been made otherwise?

**Goodmanson:** Where the building design is concerned, without a doubt. For my part, I'm interested mainly in the engineering side — in the nuts and bolts of how the plant will work inside. With the architects and community members involved, the committee came up with ideas that

“ I think it was critical on the front end to get out to the public and sell what we were doing and why, and keep them informed. ... When you don't educate people on what you're doing and why you're doing it, their first thought is often to say no.”

KYLE GOODMANSON

wouldn't have occurred to me. The public restrooms were a great idea that will help the public support having the building in the park. For security lighting, instead of having lights on the side of the building, we're going to have antique light poles around the plant to tie in with the lighting in the downtown and throughout the park.

**tpo:** What lessons can water professionals learn from your experience about the importance of involving the public in major projects?

**Goodmanson:** I think it was critical on the front end to get out to the public and sell what we were doing and why, and keep them informed. Some votes in the city in the past have not gone well, and I think it's because people just didn't know. When you don't educate people on what you're doing and why you're doing it, their first thought is often to say no.

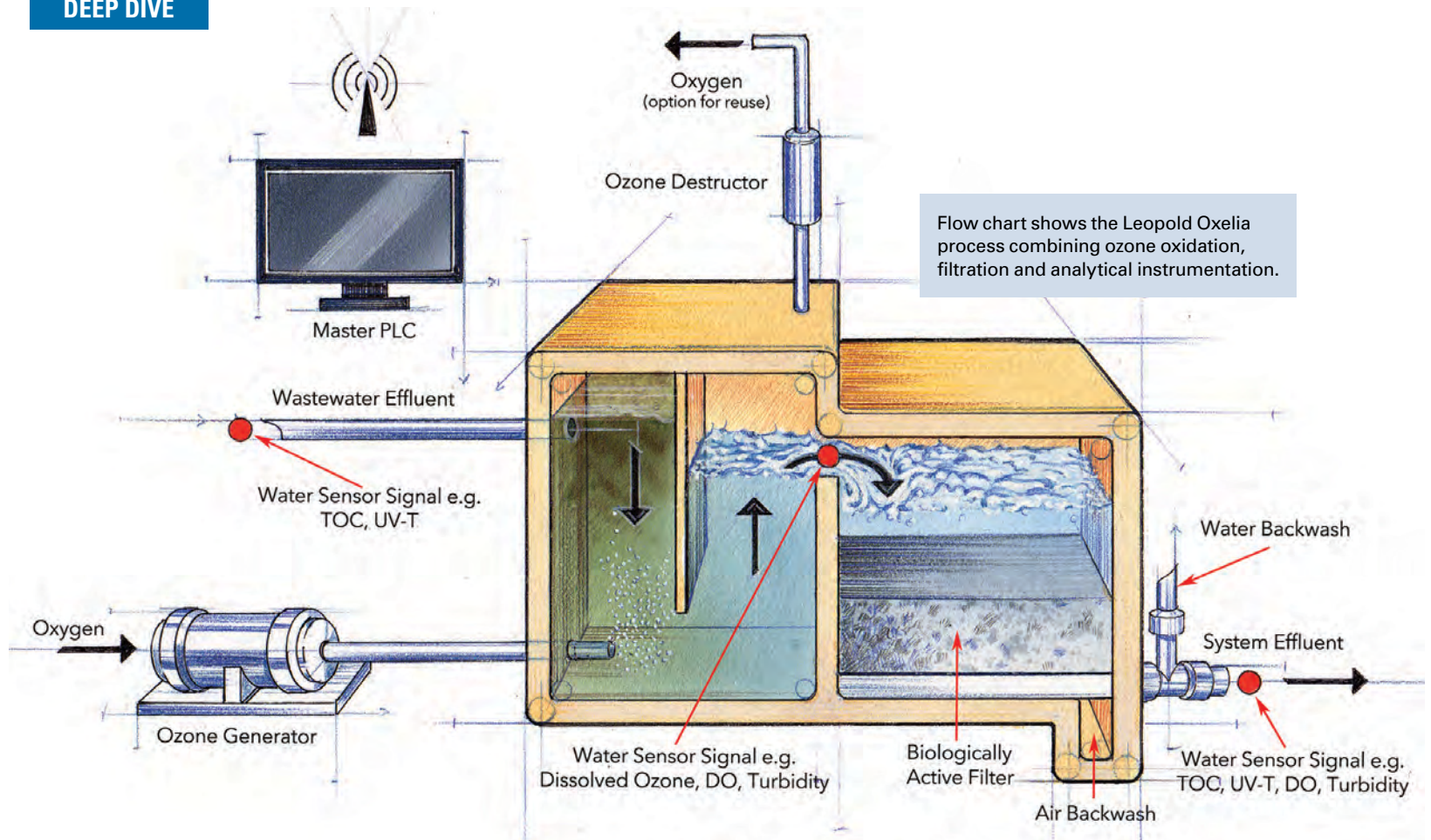
Getting up in front of people and speaking isn't something I like to do, but in the long run, doing that has saved us a lot of time and energy, versus trying to explain the project after it was all designed. People don't want to see their water rates go up by 40 percent, and I don't blame them. But we showed them the issues we had and why we needed to build this plant. As a result, the project has really gone quite smoothly. **tpo**



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# A Reuse Alternative

AN OZONE-ENHANCED FILTRATION SYSTEM IS DESIGNED TO PROVIDE A MULTI-BARRIER WASTEWATER TREATMENT SOLUTION SPECIFICALLY FOR WATER RECLAMATION AND DISCHARGE TO SENSITIVE WATERS

By Ted J. Rulseh

Populations are growing and freshwater suppliers are under stress, not just in developing countries but in many parts of the United States. In response, wastewater utilities turn increasingly to reuse of effluent, even as drinking water.

Now, an ozone-enhanced biologically active filtration system is being offered with the promise to remove difficult pollutants like personal care products, active pharmaceutical ingredients and endocrine-disrupting compounds, and do it cost-effectively. The Leopold Oxelia technology from Xylem is designed to help expand options for water reuse for industrial processes, groundwater recharge, farm irrigation and direct potable reuse.

The company calls the technology a multi-barrier solution for municipal wastewater treatment that combines ozone oxidation, filtration and analytical instrumentation to deliver optimal treatment for reuse or for discharge into sensitive waters. The company says the process costs less than reverse osmosis and does not produce a waste stream that needs added treatment.

Achim Ried, Ph.D., chief engineer for treatment solutions with Xylem, talked about the technology in an interview with *Treatment Plant Operator*.

**tpo:** What creates the need for this technology in a marketplace where many water reuse solutions already exist?

**Ried:** The so-called gold standard in reuse is microfiltration and reverse osmosis followed by UV disinfection. That combination probably yields the highest quality of water. However, it is also a costly solution, and not all reuse applications require such high-quality effluent. The challenge for alternative treatment processes, like our ozone-enhanced biologically active filtration, is to produce the effluent quality required for the specific reuse application, and do it more cost-effectively than membrane filtration solutions.

**tpo:** What are the basic aims of this process?

**Ried:** On one hand, we want to achieve disinfection and create a barrier for trace organic contaminants in the water. And we want a further barrier for total organic compounds [TOC], and some filtration effect for suspended solids and turbidity. With our combination of treatments, we can achieve high-quality effluent for all those parameters.



**tpo: What is the role of ozone treatment in the process?**

**Ried:** Ozone comes first. It disinfects the water and is able to destroy most of the trace organic contaminants – the chemicals of emerging concern such as pharmaceuticals, industrial chemicals, pesticides and endocrine disruptors. Ozone partially oxidizes these substances and makes them more biologically degradable.

**tpo: What is the function of the filtration step?**

**Ried:** Biologically active filtration further reduces the partially oxidized contaminants. So the ozone oxidation with filtration provides a combined barrier to destroy those toxic compounds while eliminating disinfection byproducts and reducing turbidity in the system effluent.

**tpo: How does biologically active filtration work?**

**Ried:** It's a type of media filtration that is well-known and widely used in the wastewater industry. Over time, a thin growth of biofilm develops on the surface of the media. The ozone pretreatment generates more food for the bacteria, which then degrade the partially oxidized organic compounds. It is possible to foster the growth of an optimal balance of microbes on the media surface by operating the ozone step effectively and controlling filter backwash sequencing.

**tpo: What kind of media is used for the biologically active filtration?**

**Ried:** We have a choice between two types of standard media. We normally use anthracite, which is also used widely in wastewater filtration, or activated carbon. Both media have advantages and disadvantages. Depending on the overall treatment goal, we choose the best type of media for the specific case.

**tpo: Can the ozone treatment phase also be tailored to fit the final effluent goal?**

**Ried:** Yes, and that is important to the overall process, because the generation of ozone consumes the largest share of the operating expense. It is essential to regulate the dose so that the ozone is limited to the amount needed to achieve the specific treatment goal. With this system's optimized integral control, ozone dosage is influenced not only by incoming water quality but also by the system effluent quality.

**tpo: How is the ozone dosage optimized in this process?**

**Ried:** It is accomplished through online measurement. Real-time, online sensors are important to running the process efficiently. The sensors measure the TOC concentration and enable automated adjustment of the ozone dosage. Research has proven a relationship between the amount of TOC and the ozone dosing range. With this specific ratio, it is possible to achieve a specific reduction rate for the organic contaminants. By measuring with online sensors and dosing at a rate from 0.3 to 1.2 grams of ozone per gram of TOC, the process can be adjusted to meet a specific treatment goal.

**tpo: Is this system fed with secondary effluent? And has the influent already been disinfected at some level?**

**Ried:** The influent consists of secondary effluent. Normally, there is no disinfection step ahead of the Leopold Oxelia process. The disinfection is accomplished through the ozone oxidation and the filter.

**tpo: How effective is this process against parasites like *Giardia* and *Cryptosporidium*?**

**Ried:** It is highly effective. Ozone is known as an effective disinfection agent. Studies from the WateReuse Research Foundation have shown that depending on the dosage, ozone treatment achieves log 2 to log 3 removal,



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which in most cases is sufficient. In addition, if an ozone system is operated correctly, it can achieve the high reduction rates required by California Title 22. But not all reuse water needs to meet that high a standard.

**tpo: What sizes of clean-water facilities can use this process most effectively?**

**Ried:** The Leopold media filter is designed to perform optimally at flows of 1 mgd or higher, but there is no limitation on higher flows.

“Research has proven a relationship between the amount of TOC and the ozone dosing range. With this specific ratio, it is possible to achieve a specific reduction rate for the organic contaminants.”

**ACHIM RIED, PH.D.**

**tpo: To what extent has this technology been proven in testing and commercial application?**

**Ried:** The global response to the technology has been very good. For example, the government of Switzerland issued a regulation at the beginning of 2014 that the 100 largest municipal wastewater treatment plants in the country must build an additional treatment barrier for specific micro-pollutants, or trace organic contaminants. Ozone-enhanced biologically active filtration is one of the treatment processes approved to fulfill the treatment requirement while also being cost-effective.

Extensive testing also continues in the United States with the Oxelia system and alternative technologies for direct and indirect reuse applications. I would say we have passed through the years of research and full-scale demonstration, and now we can see the first commercial projects coming. **tpo**



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| Barrett                                | Cretex Specialty Products                      | Giant Industries                       | Kewanna Screen Printing                   | No Flow                             | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Wells Fargo                        |
| BASE Engineering Inc.                  | CromFlow Inc                                   | Global Vacuum Systems, Inc.            | Kroy Industries                           | Oakmont Capital Services, LLC       | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Western Equipment Finance          |
| Bayco NightStick/The Jolly Group, Inc. | Crust Busters/Schmitz Brothers, LLC            | Go Green Environmental Products        | Keith Huber Corporation                   | Oceanquip Cables, LLC               | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Western Mule Cranes (D&S Sales)    |
| BDP Industries, Inc.                   | CUES   | Goldak, Inc.                           | Kentucky Tank, Inc.                       | Ohio Electric Control, Inc.         | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Westmor Ltd.                       |
| Benjamin Media Inc.                    | Cummins Power Products                         | Gorlitz Sewer & Drain, Inc.            | Kewanna Screen Printing                   | Omega Liquid Waste Solutions        | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Whirlgig, Inc.                     |
| Benlee, Inc.                           | De Neef Construction Chemicals, Inc.           | Gorman-Rupp Company                    | Kros International USA                    | OMSI Transmissions, Inc.            | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Wiedemann & Reichhardt GmbH        |
| Best Enterprises, Inc.                 | Del Vel Chem Co.                               | GPM Pump and Truck Parts, LLC          | Kroy Industries                           | One Biotechnology                   | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Wieser Concrete Products, Inc.     |
| Best Equipment Company                 | Depth Ray                                      | GPS Insight                            | Kuryama of America, Inc.                  | Oreco Systems, Inc.                 | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Wohler USA, Inc.                   |
| Betts Industries Inc.                  | Ditch Witch                                    | GPS North America                      | Lansas Products Mfd. by Vanderlans        | Oto Trading Inc.                    | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Zhejiang Danau Industries Ltd.     |
| Biffs Pathfinders, LLC                 | Dove Ventures Inc.                             | GRU, LLC                               | Lansas Products Mfd. by Vanderlans        | PA S.p.A.                           | Reed Manufacturing Co.               | Reed Manufacturing Co.           | Zoeller Pump Company               |
| Bio-Microbics, Inc.                    | Downey Ridge Environmental                     | H2 Technical Rescue Equipment          | Lansas Products Mfd. by Vanderlans        | Parson Environmental Products, Inc. | Reed Manufacturing Co.               | Reed Manufacturing Co.           |                                    |
| Bio-Systems International              | Dragon Products, Ltd.                          | Hamburg Messe und Congress GmbH        | Lansas Products Mfd. by Vanderlans        | Par's Pump & Blower                 | Reed Manufacturing Co.               | Reed Manufacturing Co.           |                                    |
| Biolyneus                              | Draincables Direct                             | Hammelmänn Corp.                       | Lansas Products Mfd. by Vanderlans        | Pearpoint/SPX                       | Reed Manufacturing Co.               | Reed Manufacturing Co.           |                                    |
| BKP Beroalino Polyester GmbH           | Dultmeier Sales                                |  | Lansas Products Mfd. by Vanderlans        | Peinermann Equipment                | Reed Manufacturing Co.               | Reed Manufacturing Co.           |                                    |
| Block Tie Products, LLC                |  |  | Lansas Products Mfd. by Vanderlans        |                                     | Reed Manufacturing Co.               | Reed Manufacturing Co.           |                                    |



# Education Day Sessions

Monday, February 23, 2015

## NAWT

National Association of Wastewater Technicians  
Room 234-236

- 8 a.m. Pre-Trip Inspections
- 9:30 a.m. Hours of Service (HOS) Overview
- 11 a.m. Roadside Inspections
- 1:30 p.m. Environmental Impact Study: Effects of Water Softener on Septic Tank Performance
- 3 p.m. A Study of Microbiological Induced Corrosion
- 4:30 p.m. Ask the Expert Q & A

## WJTA-IMCA

Water Jet Technology Association  
Industrial Municipal Cleaning Association  
Room 140-142

- 8 a.m. Hydroexcavation — Tools to Stay Current in a Changing Marketplace
- 9:30 a.m. Maximizing Productivity on Vacuum/Air Mover Projects
- 11 a.m. Waterblast Safety Can Enhance Productivity, Quality and Profits!

## SSCSC

Southern Section Collection Systems Committee  
Room 231-233

- 8 a.m. Combination Vacuum Unit Operation Overview
- 9:30 a.m. Been There, Done That, Got The T-Shirt (Small Business From a Hands-on Perspective)
- 11 a.m. So You Think You Are the Best? CCTV Inspection In Its Highest Form
- 1:30 p.m. Avoid the Pitfalls — Trenchless Pipeline Repair and Renewal
- 3 p.m. NOZZLES, NOZZLES, NOZZLES!
- 4:30 p.m. Ask the Experts Q & A

## SSPMA

Sump and Sewage Pump Manufacturers Association  
Room 243-245

- 1:30 p.m. Sizing Guidelines for New or Replacement Sewage Pumps
- 3 p.m. Backup Battery and Combination Pump Systems Evaluation and Installation
- 4:30 p.m. Specifying Pumps: Why Do Pumps Fail?

## NASSCO

National Association of Sewer Service Companies  
Room 130-132

- 8 a.m. Overview of Manhole Rehabilitation Technologies
- 9:30 a.m. When, Why and How to Defeat Infiltration Cost Effectively
- 11 a.m. New Opportunities in Small-Pipe Relining and Reinstatement
- 1:30 p.m. Pipeline cleaning Best Practices
- 3 p.m. Large-Diameter Pipe and Drain Rehabilitation Technologies
- 4:30 p.m. Ask the Experts Q & A

## NEHA

National Environmental Health Association  
Room 237-239

- 8 a.m. New Technologies for Non-Potable Water Use
- 9:30 a.m. Rules & Regulations with New Technologies and Working with Regulators
- 11 a.m. New Technologies for Non-Potable Water Use Part 2
- 1:30 p.m. OSHA Regulations and Smart Business
- 3 p.m. Sales & Marketing with New Technologies
- 4:30 p.m. Ask the Experts Q & A

## NOWRA

National Onsite Wastewater Recycling Association  
Room 240-242

- 8 a.m. Lobbying
- 9:30 a.m. Field Inspections Part One
- 11 a.m. Field Inspections Part Two
- 1:30 p.m. Septic Tank Safety — Lethal Lids
- 3 p.m. Time Dosing
- 4:30 p.m. Ask the Experts Q & A

## Portable Restroom Track

Beverly Lewis  
Room 243-245

- 8 a.m. Mastering the Busy Season
- 9:30 a.m. A Great Customer Experience
- 11 a.m. Employee Retention and Recruitment

## Business Track

Kelly Newcomb, Ellen Rohr, Women's Roundtable  
Room 136-138

- 8 a.m. Grow or Go! Why Most Companies Fail to Grow Effectively and What You Can Do to Keep Your Company From Failing
- 9:30 a.m. Target Marketing: How to Effectively and Efficiently Grow Your Sales
- 11 a.m. Effective Branding and How it Can Help Your Business
- 1:30 p.m. Business Basics 101
- 3 p.m. Build the Business You REALLY Want
- 4:30 p.m. Women in Wastewater Roundtable Discussion

Gil Longwell  
Room 140-142

- 1:30 p.m. Protecting Private Enterprise

## Marketing Track

Susan Chin  
Room 133-135

- 8 a.m. Ladies and Gentlemen: Create Your Personal Brand and Strategic Network for Success in 5 Easy Steps
- 9:30 a.m. Effective Website Design and Engaging Customers in the Digital Age
- 11 a.m. Tapping into the Power of Social Media and Content Marketing

## Road Rules & Safety Track

John Conley  
Room 133-135

- 1:30 p.m. A Trucker's Guide to Washington Speak
- 3 p.m. Cargo Tank Safety and Regulatory Report
- 4:30 p.m. Compliance with Part 180 and Preparing for a Tank Truck CT Shop Audit

You can view the complete schedule of events along with an exhibitor list, floor plan, travel information and everything else you'll need to plan your trip to Indy at [www.wett.com](http://www.wett.com)



# Tuesday Sessions

Detailed session information available at: [wwett.com](http://wwett.com)

February 24, 2015

## NAWT Track

Room 234-236

- 8 a.m. Septage Processing Introduction:  
Working with an Engineer
- 9:30 a.m. Analyzing Your Resources:  
What Goes on Around You is Important!
- 11 a.m. Introduction to Odor Control

## Onsite Installer Track

Room 231-233

- 8 a.m. Soils, Design, O&M: What Every Installer  
Should Know
- 9:30 a.m. Best Installation Practices for  
Trouble-Free Pump Controls
- 11 a.m. Introduction to Effluent Filters

## \*MSW Track

Room 237-239

- 8 a.m. Mapping Solutions for Repair and  
Maintenance of Water Distribution Systems
- 9:30 a.m. The Shift from Reactive to Proactive  
Wastewater Management Best Practices
- 11 a.m. Why Hasn't Your Sewer System Evaluation  
Survey Testing Worked?

\*MSW - Municipal Sewer & Water

## Treatment Plant Operator Track

Room 240-242

- 8 a.m. An Emerging Technology for Lagoon-Based  
Nutrient Removal
- 9:30 a.m. The New Wastewater: Collection System  
Challenges Caused by Today's Modern Trash
- 11 a.m. Wastewater Microbiology

## Industry Safety Track

Room 243-245

- 8 a.m. New Trends and Technology in Equipment  
for Excavation Safety
- 9:30 a.m. Best Practices: Use, Care and Repair of  
High-Pressure Sewer Cleaning Hose
- 11 a.m. Development and Execution of a Cross-Bore  
Prevention Program

## Business Track

Room 130-132

- 8 a.m. How to Position Your Company in the Market Today
- 9:30 a.m. Six Proven Tactics to Generate Leads and  
Turn Them Into Revenue
- 11 a.m. Growth by Acquisition or Exiting Gracefully:  
Buying or Selling a Septic or Sewer Business

## Drain Cleaning Track

Room 133-135

- 8 a.m. Drain Cleaning Methods - Then and Now
- 9:30 a.m. The Physics of Pipe Cleaning Tools and  
How I Make it Work for Me
- 11 a.m. Lateral Lining - Are You Using the Right Tool?

## Industry Technology Track

Room 136-138

- 8 a.m. How to Manage Septic Systems  
using Remote Monitoring
- 9:30 a.m. GPS Tracking: Hype Vs. Reality
- 11 a.m. Wireless Controls in the Waterjet Industry:  
Sacrificing Safety for Convenience

## Septic Series Track

Room 140-142

- 8 a.m. True Crime Scene Stories: How to Inspect  
and Troubleshoot Suspect Onsite Systems
- 9:30 a.m. One Man's Waste is Another Man's Treasure
- 11 a.m. Dewatering Options for Roll-Off Containers



\*Complete contest rules and details at: [wwett.com/rules](http://wwett.com/rules)



# Wednesday Sessions

Detailed session information available at: [wwett.com](http://wwett.com)

February 25, 2015

## Septic Series Track

Room 140-142

- 8 a.m. Considerations in Building Your Next Vacuum Truck
- 9:30 a.m. Grease Collection and Treatment:  
Raising the Bar Via Resource Recovery
- 11 a.m. Analyzing Common Onsite Septic System  
Malfunctions and Options for Prevention & Correction

## \*MSW Case Study Track

Room 231-233

- 8 a.m. Retrofit of the Lansdowne Sanitary P/S
- 9:30 a.m. Huntington Beach Successfully Navigates  
Emergency Repair of Fragile Storm Drain  
Collection System Rehabilitation –  
Alternative Technology
- 11 a.m. Collection System Rehabilitation –  
Alternative Technology

## \*MSW Technology Track

Room 237-239

- 8 a.m. Implementation of Acoustic Inspection Technology  
at the City of Augusta
- 9:30 a.m. Highlights from the 7th Edition of Operation  
and Maintenance of Wastewater Collection  
Systems Manual
- 11 a.m. Technological Advancements Fulfill the  
Promise of Zoom Survey Paradigm

\*MSW - Municipal Sewer & Water

## Portable Sanitation Track

Room 136-138

- 8 a.m. Portable Sanitation - Special Events
- 9:30 a.m. Making Your Portable Restroom Business Lean  
and Mean – How to Boost Productivity and  
Increase Your Bottom Line
- 11 a.m. T.B.D.

## Treatment Plant Operator Track

Room 240-242

- 8 a.m. Utility Regulation Basics for Grease Haulers
- 9:30 a.m. The Waste in Our Wastewater
- 11 a.m. Security Issues and Best Practices for Water/  
Wastewater Facilities

## Pipe Rehab Track

Room 243-245

- 8 a.m. Integrating Temperature Sensor Technology  
within Lateral Pipeline CIPP Installations
- 9:30 a.m. CIPP Calibration and Vacuuming
- 11 a.m. Extending Life Expectancies with Corrosion-  
Resistant Coatings and Linings

## Business Track

Room 133-135

- 8 a.m. Team Building for Profit
- 9:30 a.m. Ten Commonsense Ways to Grow and  
Improve Your Business
- 11 a.m. Setting Expectations – The Key to Sales  
and Customer Satisfaction

## Advanced Onsite Installer Course

Room 234-236

8 a.m. - 5 p.m.

- Introduction and Site Evaluation
- System Sizing and Basic Design Principles
- Pumping to Systems
- Installations of ATUs
- Installing for Management
- Troubleshooting Systems

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# Process Chemistry and Laboratory Analysis

By Craig Mandli

## Algae Control

### MODULAR COVER

Modular covers from Geomembrane Technologies (GTI) control odor and algae and provide thermal protection. The covers reduce the effects of wind and sunlight. Gases are held inside, limiting odors and algae growth. The floating covers accommodate water level fluctuations. Workers can safely walk on them. Cover panels can be opened or removed for basin cleaning and other maintenance. They are constructed with durable polyethylene and resist chemicals, environmental exposure and UV rays. They are custom designed and suited for aerated and nonaerated systems. 855/484-4630; [www.gticons.com](http://www.gticons.com).



Modular covers from Geomembrane Technologies (GTI)

## Bacteria/Enzymes

### BIOLOGICAL GREASE SOLVENT BLEND



Citrus Float terpene solvent blend from Chemtron

Citrus Float concentrated, heavy-duty, fast-acting citrus terpene solvent blend from Chemtron penetrates, cleans and dissolves heavy grease. It is made entirely from plant and vegetable materials and a thickening blend. It can act as a drain maintainer, degreaser and odor counteractant where rapid action is required. Users add the product to grease traps, manholes and piping where odor and floating grease and oils are a problem. It acts as an odor barrier while odor-

encapsulating molecules trap and neutralize the odor. It helps dissolve and soften old grease and oil deposits that float on water. 954/584-4530; [www.chemtron.com](http://www.chemtron.com).

### POWDERED BIOAUGMENTATION BACTERIA

Dry powdered MicroClear 207 bioaugmentation bacteria with micronutrients from Environmental Leverage help eliminate foaming, heavy scum and greasy oil. The bacteria degrade FOG quickly, reducing BOD and TSS and odors. Biological activity starts degrading grease immediately. Downstream grease and scum are reduced by upstream pretreatment. Bioaugmentation helps clean pipes, reduce residual grease buildup and reduce or eliminate maintenance issues. 630/906-9791; [www.environmentalleverage.com](http://www.environmentalleverage.com).



MicroClear 207 bioaugmentation bacteria from Environmental Leverage

## Biological Stimulants



PX-109 alkaloid compound from Byo-Gon

### BIOLOGICAL ALKALOID COMPOUND

PX-109 alkaloid compound from Byo-Gon helps eliminate grease, sewage odor and hydrogen sulfide from grease traps, lagoons and sewage systems by improving biology. It promotes rapid cell growth and consumption of organic material and overcomes limiting environmental factors to stabilize wastewater systems. It helps prevent large capital expenditures and reduces operations and maintenance costs. 800/580-5509; [www.byogon.com](http://www.byogon.com).

## Chemicals/Chemical Feeding

### DRY CALCIUM HYPOCHLORITE FEEDING SYSTEM

The Constant Chlor Plus MC4-150 dry calcium hypochlorite feeding system from Arch Chemicals, a Lonza company, prepares and automatically delivers a consistently accurate dose of liquid available chlorine for disinfection. The feeding system can supply up to 150 pounds of available chlorine per day without storage and handling issues. This customizable feeder uses EPA-approved dry calcium hypochlorite briquettes and a spray technology to produce and maintain a fresh liquid chlorine solution. 800/478-5727; [www.archwaterworks.com](http://www.archwaterworks.com).



Constant Chlor Plus MC4-150 dry calcium hypochlorite feeding system from Arch Chemicals, a Lonza company



Chlorine dioxide preparation kits from Beckart Environmental

### CHLORINE DIOXIDE PREPARATION KIT

Chlorine dioxide preparation kits from Beckart Environmental offer various methods of quick and safe preparation to control, reduce or eliminate odor. Dry kits include one pouch each of reactor and activator that mix in water and are ready to use in about 10 minutes. The kits can produce vari-

able liquid concentrates by adjusting the amount of water in the recommended formula. Chlorine dioxide is an oxidizing agent and an agent for pH and viscosity stabilization and BOD and COD reduction. Kits can be prepared and stored in any suitable container following manufacturer recommendations. 262/656-7680; [www.beckart.com](http://www.beckart.com).

### CHLORINE GAS FEED VALVE

The Regal Smartvalve from Chlorinators Incorporated helps operators apply the exact chlorine dose needed to accommodate changes in water flow and quality. It can be used with a gas chlorinator to apply residual-only control or compound loop control schemes. A chlorine residual analyzer measures the chlorine level and provides feedback to the Smartvalve, which then compares the measured chlorine residual to the desired residual and, if necessary, adjusts to the chlorine gas feed rate. 772/288-4854; [www.regalchlorinators.com](http://www.regalchlorinators.com).



Regal Smartvalve from Chlorinators Incorporated

## SODIUM CHLORITE

ADOX Sodium Chlorite from DuPont Clean Water Technologies is used in generating chlorine dioxide using DuPont MG III generators. Chlorine dioxide remains a truly dissolved gas in water and retains its oxidative and biocidal properties throughout a pH range of 2 to 10. It does not form halogenated disinfection byproducts. **302/999-2709; www.dupont.com.**

## ANTIFOAM ADDITIVE

Foam-A-Tac 435 chemical antifoam additive from Enterprise Specialty Products impacts foam by destabilizing froth with a physical interaction, rather than biological or chemical control methods. It is effective and consistent on all biological-based foam, whether the source is filaments (such as Nocardia or Microthrix parvicella) or a result of advanced MCRT/SRTs and/or high MLSS. The advanced formulation is nontoxic and nonhazardous, does not contribute nitrogen and phosphorus nor inhibit their removal, does not impact sludge respiration and is effective at extremely low doses. **864/984-7700; www.enterprisesp.com.**

## Enclosures

### MODULAR LABORATORY

Modular Clean Labs from HEMCO Corporation have chemical-resistant modular construction for ease of on-site assembly. They achieve strict environmental control by incorporating HEPA and/or carbon filtration to regulate air quality. Humidity can be regulated with desiccant systems available for lower humidity requirements. Options include a wide selection of doors, lighting, plumbing, electrical and lab furniture systems that can be factory installed. **800/779-4362; www.hemcocorp.com.**



Modular Clean Labs from HEMCO Corporation

## Laboratory Supplies and Services

### CIRCULATING BATH

Circulating Baths from PolyScience, Div. of Preston Industries, are versatile temperature control products designed to streamline work processes. Available with a choice of six controllers, they offer a wide range of functionality, with temperature ranges from -40 to 392 degrees F. They offer time/temperature programming capabilities and are equipped with connectivity options for RS-232, RS-485, Ethernet, USB to Flash Drive and USB to PC. Remote on/off and external temperature probe ports are built-in. Models that conform to APHA, AWWA, WEF and EPA testing standards are available. **800/229-7569; www.polyscience.com.**



Circulating Baths from PolyScience, Div. of Preston Industries

### LABORATORY INFORMATION MANAGEMENT SYSTEM

The SampleManager 11 laboratory information management system from Thermo Fisher Scientific has tools and user-interface enhancements that improve laboratory process mapping, management and



SampleManager 11 laboratory information management system from Thermo Fisher Scientific

automation. It delivers workflow configurability, user-intuitive multiple-sample login, point-and-click extensibility and enhanced data mining and tracking. Enhanced features include the ability to track aliquots and composites and enable fine control over samples. **800/637-3739; www.thermoscientific.com.**

## Sampling Systems



Jerome J505 mercury vapor analyzer from Arizona Instrument

### MERCURY VAPOR ANALYZER

The portable Jerome J505 mercury vapor atomic fluorescence spectroscopy analyzer from Arizona Instrument has an efficient optical cell that requires minimal flow to purge the system, allowing it to run at a low flow rate, minimizing sample dilution. It uses atomic fluorescence spectroscopy to read down to 50 nanograms. It needs no regeneration. It has USB data logging and more than 10 hours of battery life. It can switch between units of measure with the push of a button on the test screen. **800/528-7411; www.azic.com.**

### LAB SPECTROPHOTOMETER

The DR 6000 lab spectrophotometer from Hach Company offers high-speed wavelength scanning across the UV and visible spectrums and comes with more than 250 pre-programmed methods, including the most common testing methods. With optional accessories allowing high-volume testing via a carousel sample changer, and with increased accuracy using a sample delivery system that eliminates optical difference errors, it handles multiple water testing needs. TNTplus reagent vials provide additional accuracy with guided step-by-step procedures. Averaging of 10 readings makes scratched, flawed or dirty glassware a nonissue. **800/227-4224; www.hach.com.**



DR 6000 lab spectrophotometer from Hach Company

### GAS DETECTION RTU WALL-MOUNT CONTROLLER



TA-2016MB-WM gas detection controller from Mil-Ram Technology

The TA-2016MB-WM gas detection wall-mount controller from Mil-Ram Technology is a 16-channel system (eight-channel available) using an RS-485 Modbus RTU Multi-drop smarter Detector (Sensor) Network. It has four 10 amp relays (SPDT), low/mid/high-fault relays, LED alarm indicators, a local buzzer and backlit LCD auto-scrolls for channel data/fault conditions. The auto-configuration wizard makes channel configuration simple and automatic. It comes in an explosion-proof enclosure with external alarm stations. **510/656-2001; www.mil-ram.com.**

### AUTO SAMPLER

The ISOLOK SAL-series Sampler from Sentry Equipment monitors sludge-to-solids ratios for high digestion efficiency. It collects samples from pressurized process lines up to 300 psi, while allowing operators to perform routine sampler maintenance.



ISOLOK SAL-series Sampler from Sentry Equipment

nance independent of process line operation. The heavy-duty isolatable samplers capture up to 25 cc samples per cycle, handling solids up to 9.5 mm, to ensure a representative wastewater sample is collected. Using the device with a PLC-based Sentry SBC Controller, an operator can regulate batch, composite or flow proportional sampling, allowing single grab, continuous or time-regimented sample collection throughout the process. **262/567-7256; www.sentry-equip.com.**



**TOC-L carbon analyzers from Shimadzu Scientific Instruments**

**LABORATORY TOC ANALYZER**

TOC-L laboratory total organic carbon analyzers from Shimadzu Scientific Instruments are suitable for analyzing ultrapure to highly contaminated samples of wastewater, brine water and drinking water. In PC-controlled and stand-alone versions, they have a sample range of 4 µg/L to 30,000 mg/L and use the 680 degree C combustion catalytic oxidation method. They have automatic sample acidification and sparging and automatic dilution that reduces sample salinity, acidity and alkalinity. They can be combined with the SSM-5000 solid sample combustion unit to analyze large particles, solids, soils and sludge. **800/477-1227; www.ssi.shimadzu.com.**

**Testing Equipment**

**MICROWAVE MOISTURE/SOLIDS ANALYZER**

The compact SMART Turbo microwave moisture/solids analyzer from CEM Corporation provides an accurate total solids determination in less than three minutes and can measure TSS and total solids in wastewater and sludge. Rapid, precise analysis offers effective dewatering and efficient polymer usage, reducing handling costs by optimizing solids content. Its IntelliTemp temperature feedback system constantly monitors weight loss and sample temperature, adjusting the power so that the sample is thoroughly dry without being overheated, providing fast, accurate results and reproducibility. The system is simple to operate, and methods are easily transferable from unit to unit. It can store up to 100 methods and 300 test results. **800/726-3331; www.cem.com.**



**SMART Turbo microwave moisture/solids analyzer from CEM Corporation**



**T80 universal transmitter from Electro-Chemical Devices**

**DUAL-CHANNEL UNIVERSAL TRANSMITTER**

The dual-channel T80 universal transmitter from Electro-Chemical Devices measures DO, pH or five other common liquid parameters. Self-configuring electronics provide fast plug-and-play monitoring. A single unit can monitor turbidity, DO, pH, ORP, pION, conductivity or resistivity. It can combine with the Triton TR6 sensor to measure suspended solids or turbidity in four selectable dual ranges with preset low and high ranges from 0 to 4,000 NTU. It measures turbidity in milligrams per liter, parts per million and percent solids. Turbidity measurements are calibrated to the user application. The pH sensors come in an insertion/submersion configuration or a valve retractable configuration with a flared end to prevent blowout. **800/729-1333; www.ecdi.com.**

**ONLINE WATER-QUALITY MONITOR**

The Testomat 2000 online field-measuring instrument from Heyl USA analyzes feedwater hardness and parameters such as chlorine, p-value, chromate and iron on a quantity- or time-controlled basis. Online water-quality monitoring helps prevent lime scale inside pipes and other metal boiler components that can reduce heat transfer and heating capacity and increase flow resistance. **312/377-6123; www.hey1.de.**



**Testomat 2000 online field-measuring instrument from Heyl USA**



**AquaSelect Multi-Input Process Analyzer from HF scientific**

**INTELLIGENT PROCESS ANALYZER**

The AquaSelect Multi-Input Process Analyzer from HF scientific displays the status of up to four parameters simultaneously, offering a complete picture of process status with a single analyzer. Multi-channel capability means fewer analyzers, faster installation, and easier maintenance and upgrades. It is compatible with a wide range of analog and digital analytical sensors, including the AdvantEDGE series of measurement probes. **888/203-7248; www.hfscientific.com.**

**SMART DEVICE-ENABLED PHOTOMETER**

The eXact iDip Smart Photometer from Industrial Test Systems provides two-way wireless connection (Bluetooth Smart wireless technology) with the iPhone, iPad and iPod Touch and Android smart devices. With the GPS-enabled feature, operators can keep track of customers and store and quickly share test sample results and testing history. It uses an app combined with a four-step reagent delivery method for accurate analysis. Users can select from more than 30 tests, executed by filling with a 4 mL water sample and dipping the reagent strip for 20 seconds using a gentle back-and-forth motion. After testing, results display on the smart device. **803/329-9712; www.sensafe.com.**



**eXact iDip Smart Photometer from Industrial Test Systems**



**ATP test kits from LuminUltra Technologies**

**ATP TEST KIT**

Portable second-generation ATP test kits from LuminUltra Technologies allow accurate and comprehensive biological monitoring and control in water systems. The test provides total microbial activity within five minutes of sample collection to troubleshoot microbiological contamination. When combined with the PhotonMaster luminometer and LumiCalc

software, the kit offers complete microbiological testing. **506/459-8777; www.luminultra.com.**

**MULTIPARAMETER WATER-QUALITY MONITORING SYSTEM**

The multiparameter Macro 900 Water Quality System from Palintest withstands harsh environments and demanding measurement requirements. It measures blue-green algae and chlorophyll levels on the spot without sending samples to a lab. Kits include calibration solutions, carrying cases and PC software for data management. Two available models include accessory probes and built-in GPS. **859/341-7423; www.palintestusa.com.**



**Macro 900 Water Quality System from Palintest**



## SULFIDE ION SOLUTION TUBES

Gastec Sulfide Ion Detector Tubes from Nextteq accurately and rapidly measure sulfide ion levels in solution. The simple, direct-reading tubes provide results in two to three minutes. The calibration scale, printed on each tube, provides on-the-spot measurements that are easy to read. They require no color comparison chart or laboratory equipment, and the color-stain ends with a clearly defined line of demarcation to eliminate confusion and increase accuracy. They are available in four ranges for specific measurements, with a total range of 0.5 to 1,000 ppm. **877/312-2333; www.nextteq.com.**



Gastec Sulfide Ion Detector Tubes from Nextteq

## ONLINE TOC ANALYZER

The 9210p online TOC analyzer from OI Analytical, a Xylem brand, suits routine monitoring and regulatory compliance reporting in drinking water. It can give operators a dynamic, real-time view of NOM levels in water to adjust and control the coagulation, flocculation and disinfection steps and minimize disinfection byproducts. Data may also be used for D/DBPR compliance reporting, provided the analyses are performed



9210p online TOC analyzer from OI Analytical, a Xylem brand

in accordance with the sample oxidation, detection, calibration and QC verification criteria in U.S. EPA approved methods 415.3 or SM 5310C. **979/690-1711; www.oianalytical.com.**

## UV TRANSMITTANCE MONITOR

The Real UV254 M1500 probe from Real Tech is accurate and reliable in open-channel or nonpressurized wastewater UV disinfection. It monitors UV transmittance between 15 and 100 percent. An optional Real Controller wall-mounted operator interface allows convenient control and display. The 4-20 mA output links real-time UVT measurements with the operator or UV reactor to meet treatment goals while saving operator time and money. **877/779-2888; www.realtechwater.com.**



Real UV254 M1500 probe from Real Tech

## MULTIPARAMETER COLORIMETER

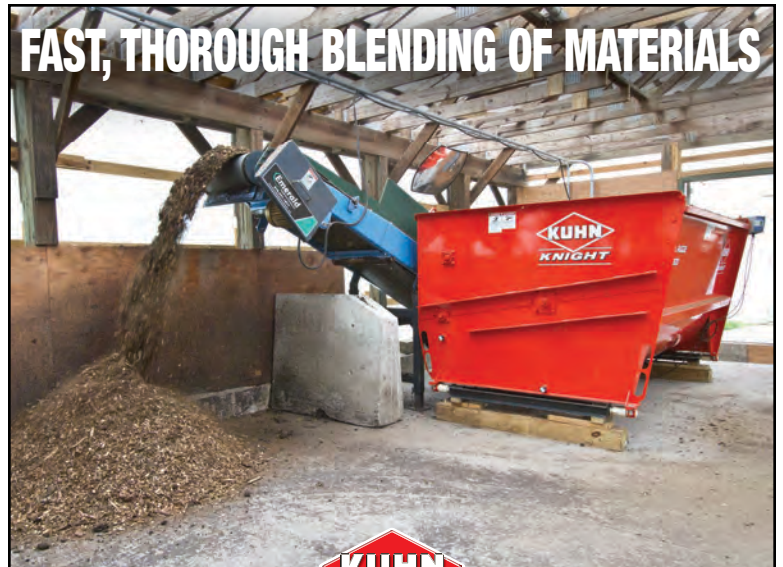
The Lovibond MD 600 colorimeter from Tintometer tests water-quality parameters in the field or laboratory. It has an LED photodetector array of six light sources that keeps the instrument cool. It supports more than 120 pre-programmed methods, many of which offer multiple ranges and include DPD chlorine, COD, phosphate and molybdate. Operators can use the Open Reagent System



Lovibond MD 600 colorimeter from Tintometer

(which includes VARIO Powder Packs, tablets and liquids or ampule reagents) for testing. The unit includes on-screen assistance, 20 user-defined methods and the ability to store 1,000 data points. Scroll-driven menus allow users to find the test they need quickly. **800/922-5242; www.lovibond.us. tpo**

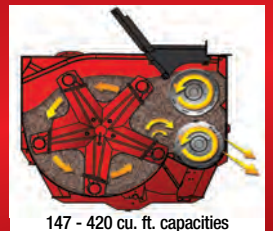
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## Product improves total solids destruction in aerobic digester

### Problem

Operators in an east-central Missouri city wanted better digester performance in the cold months, when low volatile solids destruction and frozen soils did not allow land application of biosolids. The team wanted better settling, increased decant and more digester space.

### Solution

After six months of trials, the operators discovered that **BIO ENERGIZER** from **Probiotic Solutions** could accelerate endogenous respiration by improving cell wall permeability, thus increasing biomass metabolism and reducing volume.



### RESULT

The product created nearly 85 percent volatile solids destruction in 27 weeks and improved decants. It led to greater digester capacity, better settleability and better overall digester operation. **800/961-1220; www.probiotic.com.**

## Microbial treatment helps facility meet load limits

### Problem

Sewage treatment plant No. 4 at the Kennedy Space Center in Florida serves the vehicle assembly building area sanitary sewer system, treating 100,000 gpd. The nature of manufacturing and maintenance means a wide variety of natural and synthetic organics can enter the collection system. The plant saw periodic upsets due in part to the suspected entry of toxic organics. Operators had trouble meeting effluent nutrient limits, primarily total nitrogen. Upsets were often worst during shuttle launch and return periods, when total nitrogen removal was only 28 percent.

### Solution

Operators began using **Munox organic shock upset microbial treatment** from **Osprey Biotechnics**. Pseudomonas bacteria are well-known for their ability to break down a wide range of chemicals.

### RESULT

BOD, TSS and total nitrogen decreased. There was no evidence of shock upset although two shuttle launches occurred during the inoculation period. The addition of 2 gpd of Munox reduced susceptibility to and recovery from organic shock upset and stabilized the plant's overall performance. **800/553-7785; www.ospreybiotechnics.com.**

## Treatment reduces contaminants in closed landfill wastewater

### Problem

Leachate collected at the toe of the closed Heaps Peak Sanitary Landfill in San Bernardino County (Calif.) had been stored in tanks for transport to the Running Springs Wastewater Treatment Plant. This was expensive and, in bad weather, involved considerable risks to workers and the public.

### Solution

Geo-Logic Associates (GLA) identified elevated iron, manganese and total dissolved solids (TDS) as the most problematic constituents and proposed treatment by oxidation, lime dosing and flocculation of precipitated solids within the **Suspended Air Flotation System** from **Heron Innovators**.

### RESULT

The system was optimized to meet treatment objectives. It reduced TDS from 0.5 parts per million to 30 parts per billion, and iron and manganese concentrations from about 2.5 ppm to 20-30 ppb. This allowed the effluent to be discharged to on-site percolation galleries. **916/408-6601; www.heroninnovators.com.**

## Tests reinforce peracetic acid's high success rate in wastewater treatment

### Problem

A wastewater treatment plant in Steubenville, Ohio, needed a cost-effective disinfection method that would not generate chlorinated byproducts.

### Solution

**Solvay Chemicals** conducted plant-scale trials using **Proxitane WW-12 peracetic acid (PAA)** over a little more than one month. PAA, a rapidly acting disinfectant, generates no disinfection byproducts even if overdosed. The dosing system can be economically retrofitted or work in series with an existing disinfection system. The 13.5 mgd (design) plant was treating 5 to 8 mgd.



### RESULT

PAA dosage never exceeded 1.5 ppm, and the residual chlorine averaged 0.4 ppm, never exceeding 1 ppm. PAA feed was flow-paced, CBOD remained constant and pathogen control was always within the permit limits. **800/765-8292; www.solvaychemicals.us. tpo**



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**PRIMEX names business development manager**

PRIMEX promoted Adam Conover to business development manager. He had served as sales engineer and has worked in the water and wastewater controls industry for 10 years.



Adam Conover

**Schneider Electric opens R&D center**

Schneider Electric opened a North American research and development center in Andover, Mass. The Boston One Campus also will serve as the company's North American headquarters, housing approximately 750 employees.

**Thermoplastic Valves launches website**

Thermoplastic Valves launched its newly designed website, [www.plasticvalves.com](http://www.plasticvalves.com). The site provides product information, rep locator and company history, as well as valve installation maintenance instructions.



**Milliken acquires Pipe Wrap**

Milliken Infrastructure Solutions acquired the assets of Pipe Wrap's pipe repair business. Based in Houston, the company provides custom solutions for structural reinforcement, leak repair and corrosion prevention. **tpo**

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Gardner Denver T-375M: Bare Shaft pump. Gardner Denver T450M Bare Shaft pump. Gardner Denver TF-375M 21 gpm @ 10,000 psi. Gardner Denver TX-450HB 21gpm @ 20,000 PSI. Gardner Denver TF-450MB 52gpm @ 10,000 psi. NLB 10-200. 34 gpm @ 10,000 psi. HT-150S 25 gpm max 10,000 psi max, Shell Side Machine, Wheatley 165: 30 gpm @ 10,000 psi. Wheatley 125 with aluminum bronze fluid end. Boatman Ind. 713-641-6006. View @ [www.boatmanind.com](http://www.boatmanind.com). (C01)



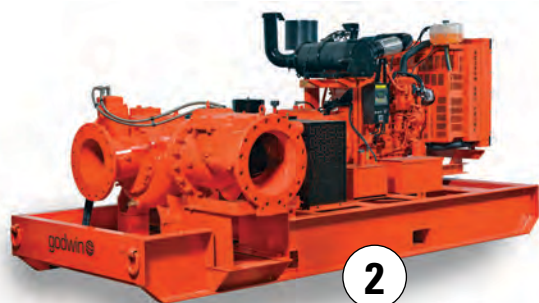
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### 1. TRIMBLE LASER LEVEL

The Spectra Precision LL300N laser level from Trimble is designed for general construction, concrete and site preparation applications. Featuring a glass lighthouse, the one-button operation level has an IP66 environmental protection rating for operation in adverse environmental conditions. It can withstand 3-foot drops onto concrete and tripod tip-overs up to 5 feet. **800/527-3771; [www.spectralasers.com](http://www.spectralasers.com).**

### 2. GODWIN SELF-PRIMING PUMP

The Dri-Prime NC350 pump from Godwin, a Xylem brand, delivers flows to 6,530 gpm and discharge heads to 160 feet. The pump features Flygt N-technology with self-cleaning impeller for non-clog performance. It can prime and re-prime from dry to 28 feet without operator assistance. The pump can be customized with a diesel engine or electric motor and is available as a Critically Silenced unit or as a Godwin DBS for pump station backup. **800/247-8674; [www.godwinpumps.com](http://www.godwinpumps.com).**

### 3. KOHLER GASEOUS-FUELED GENERATORS

The 50REZGT and 70REZGT gaseous-fueled generators from Kohler Power Systems can switch between optional onboard LP fuel tanks and external LP liquid, LP gas or natural gas fuel sources. The 50REZGT (50 kVA) features a 4.3 liter naturally aspirated engine while the 70REZGT (70 kVA) features a 5.7 liter engine. **800/544-2444; [www.kohlerpower.com](http://www.kohlerpower.com).**

### 4. FCS TOUCH-SCREEN LEAK DETECTION CORRELATOR

The TriCorr Touch leak detection correlator from Fluid Conservation Systems works with acoustic leak noise sensors to identify and

locate leaks in water distribution systems. Data gathered by the sensors pinpoints leaks without exploratory digging. The device's automated filter intelligence system runs 55 filter combinations on the correlation data, enabling the correlator to automatically check the quality of the results and adjust filter settings until the clearest and most accurate result is obtained. The VGA screen provides maximum visibility and easy data entry. **800/531-5465; [www.fluidconservation.com](http://www.fluidconservation.com).**

### 5. POWERPRIME CENTRIFUGAL PUMP

The SiteMax centrifugal pump from PowerPrime Pumps can handle up to 3-inch solids and is available in 4-, 6- and 8-inch sizes with skid or trailer mount options. Powered by a Kubota engine, the pump has an 88.5-gallon fuel tank for 65 hours of continuous run time. The pump has a venturi or vacuum priming system and is able to prime and re-prime in less than 20 seconds and on long suction lengths (100 feet or more). **661/399-9058; [www.powerprime.com](http://www.powerprime.com).**

### 6. POLSTON MULTIPURPOSE CLEANING TRUCK

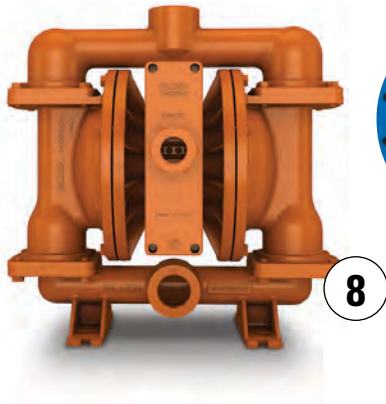
The PAT 360-HD multipurpose cleaning truck from Polston Applied Technologies has four 8-inch hydraulic pumps (2,500 gpm each) and delivers up to 1,100 hp. The knuckleboom crane has 49 feet of reach from the center and 180-degree rotation. **844/765-7866; [www.polstonprocess.com](http://www.polstonprocess.com).**

### 7. SENSOREX DIFFERENTIAL SENSORS

SD7000 Series pH/ORP differential sensors from Sensorex feature three electrodes. Solution pH is measured differentially with process and inner reference electrodes for optimal accuracy. An encapsulated pre-



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amp eliminates moisture. Equipped with 1.5-inch NPT convertible threads, sensors can be mounted into flow tees or adapted to a pipe for process submersion. 714/895-4344; [www.sensorex.com](http://www.sensorex.com).

## 8. WILDEN AIR-OPERATED, DOUBLE-DIAPHRAGM PUMPS

The FIT line of air-operated, double-diaphragm pumps from Wilden Pump & Engineering are designed to drop into an existing plumbing footprint. No plumbing rebuilds are required. Re-engineered fluid paths increase flow rates to 54 percent compared to current Wilden models. Pumps are available with the Pro-Flo X or Pro-Flo SHIFT air distribution system. 909/422-1730; [www.wildenpump.com](http://www.wildenpump.com).

## 9. VAL-MATIC RUBBER SEATED BALL VALVE

The EnerG rubber seated ball valve from Val-Matic Valve & Manufacturing Corp. has a self-flushing contoured ball design that complies with AWWA C507. The Tri-Loc seat retention system provides a low-friction, wear-resistant seat that allows for adjustment or replacement without removing the valve from the line. When fully open, the valve provides 100 percent flow area. 630/941-7600; [www.valmatic.com](http://www.valmatic.com). tpo

## wastewater: product spotlight

### Cyclonic spray scrubber eliminates odors, pollutants, reduces maintenance

By Ed Wodalski

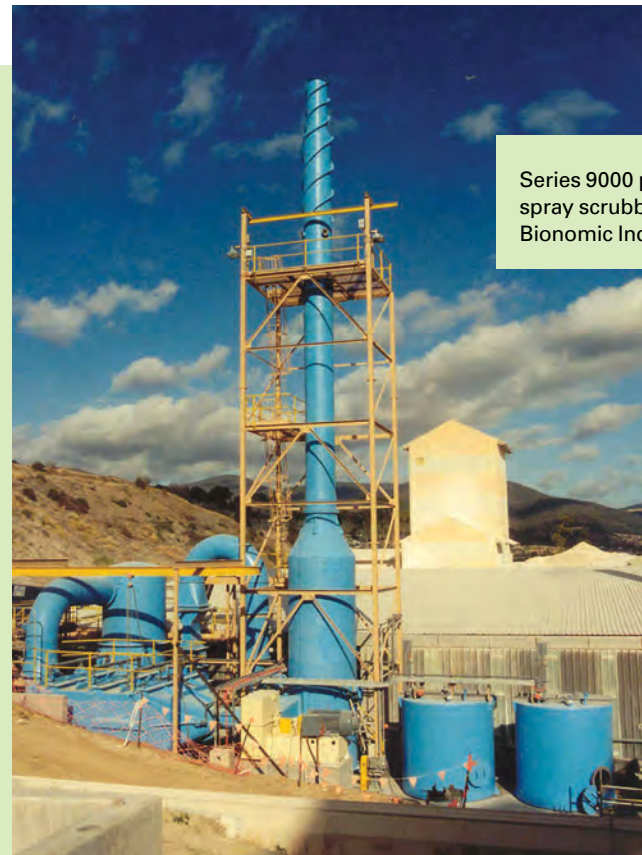
The **Series 9000 preformed spray scrubber** from **Bionomic Industries** is designed to simultaneously remove odor compounds and particulate from dryers, digesters and other processing operations.

The unit features an ultra-fine droplet scrubbing liquid spray zone within a confined involute section that eliminates any bypass of untreated gas. The scrubber meets PM 2.5 and PM 10 regulations for particulate removal and can achieve greater than 99 efficiency on acid gases and odorous organosulfur compounds. The Series 9000 is available in sizes to handle gas volumes from 1,000 through 75,000 cfm.

“Besides being quicker, it’s a much more efficient reaction,” says John Enhoffer, president of Bionomic Industries.

Contaminated gas enters a long, narrow involute and is horizontally accelerated through a concentrated zone of sheared reverse jet spray. Hydraulically air-atomized droplets of scrubbing liquid collide with the oncoming gas and particulate. The generated fine mist and chemical reagent scrubs solid particulate and neutralizes gaseous pollutants.

The particulate-contained droplets with reacted gaseous compounds collect in the final section of the involute and separate from the gas stream before entering the cyclonic removal section. Spinning forces separate the remaining pollution droplets from the gas, which exits the top of the unit while the droplets collect on the scrubber wall and drain to the bottom sump.



Series 9000 preformed spray scrubber from Bionomic Industries

The system, because of its open design, provides easy access to components and reduces downtime for maintenance.

“Basically, all you have are spray nozzles in the involute section, which you might change every three to four years,” Enhoffer says. “Unlike other technology, you don’t have any of the internal components that require servicing. It also saves on energy costs because you don’t have recirculation pumps.” 800/311-6767; [www.bionomicind.com](http://www.bionomicind.com).

(Continued on page 63)

## people/awards

The **River Road and Hollywood Road wastewater treatment facilities** in Amarillo, Texas, received Peak Performance Awards from the National Association of Clean Water Agencies.

**Carlos Zuniga** was hired as a principal project manager for engineering company Hatch Mott MacDonald and will be based in Burlington, Ontario. He has more than 20 years of experience in the water and wastewater industry, with a focus on SCADA, automation, power systems and energy management.

The **Emerald Coast Utilities Authority** received a Gold Peak Performance Award from the National Association of Clean Water Agencies to honor the Central Water Reclamation Facility in Cantonment, Fla.

The **New Mexico Region Sustainability Team of CH2M HILL** received the 2014 Sustainability Award from the Rocky Mountain Water Environment Association for its sustainable wastewater infrastructure efforts in New Mexico.

**Mark James**, an employee with the Redmond Wastewater Division, received the 2014 Oregon Collections System Operator of the Year Award from the Pacific Northwest Clean Water Association.

**Brad Baird** was named the administrator of Public Works and Utility Services for the City of Tampa, Fla.

**Cleveland Utilities** received the Operational Excellence Award from the Kentucky-Tennessee Water Environment Association.

**West Hamlin Water** was named Water System of the Year by the West Virginia Rural Water Association. **Lonnie Wilson**, plant operator, was runner-up for the Operator of the Year category.

The Butler (Texas) Water Supply Corporation honored **Rodney Watkins** for 25 years of service. He started in 1989 as a water operator assistant and is now the senior certified water operator/manager.

The National Association of Water Companies recognized **Duyen Tran** of CH2M HILL as the grand prize winner for the 2014 NAWC Living Water Award. The NAWC also presented **Julee Womack** of American Water Military Services Group with the NAWC Living Water Award.

The Institute for Sustainable Infrastructure gave the **Tarrant Regional Water District of North Central Texas** the Envision sustainable infrastructure rating system Silver award for its Line J, Section 1 Pipeline project. The pipeline was designed by Freese and Nichols.

The **South San Joaquin (Calif.) Irrigation District** received the 2014 WaterSave Technology Award for its Division 9 pressurized piping system, which gives customers flexibility on when they take delivery and how the water is distributed.

Harvard professor **John Briscoe** received the Stockholm Water Prize, the "Nobel Prize of Water," for his work on global water policies. He has worked in multiple places including Bangladesh, Mozambique and Brazil.

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

## education

### Arkansas

The Arkansas Environmental Training Academy is offering these courses:

- Jan. 2-16 – Basic Water Treatment, online
- Jan. 12-16 – Backflow Assembly Tester Recertification, online
- Jan. 16-30 – Basic Water Distribution, online
- Jan. 19-23 – Backflow Assembly Tester, Little Rock
- Jan. 20 – Backflow Assembly Tester Recertification, Little Rock
- Jan. 20 – Basic Water Math, Camden
- Jan. 21 – Applied Water Math, Camden
- Jan. 22 – PWS Compliance, Camden
- Jan. 26-30 – Backflow Assembly Tester, Camden
- Jan. 27 – Backflow Assembly Tester Recertification, Camden
- Jan. 27-29 – Intermediate Water Distribution, North Little Rock

Visit [www.sautech.edu/aeta/](http://www.sautech.edu/aeta/).

### British Columbia

The British Columbia Water & Waste Association is offering an Advanced Sanitary Sewer Modeling and Master Planning Seminar Jan. 22 in Burnaby. Visit [www.bcwwa.org](http://www.bcwwa.org).

### California

The California-Nevada Section of AWWA is offering an Intermediate Water Treatment course Jan. 12 in Rancho Cucamonga. Visit [www.ca-nv-awwa.org](http://www.ca-nv-awwa.org).

### Colorado

The Rocky Mountain Water Environment Association is offering a Supervisor Certificate Program course Jan. 8 in Parker. Visit [www.rmwea.org](http://www.rmwea.org).

### Illinois

The Illinois Water Environment Association is offering a Government Affairs Conference on Jan. 23 in Burr Ridge. Visit [www.iwea.org](http://www.iwea.org).

The Illinois Section of AWWA is offering a Manage for Success: Effective Utility Leadership Practices course Jan. 5 to Feb. 2 in Rockford. Visit [www.isawwa.org](http://www.isawwa.org).

### Kansas

The Kansas Water Environment Association is offering these courses:

- Jan. 21 – Asset Management, Salina
- Jan. 22 – Ultrasound and UV, Hugoton
- Jan. 29 – Wastewater Treatment, Liberal

Visit [www.kwea.net](http://www.kwea.net).

### New Jersey

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

- Jan. 8 – Instrumentation for Water/Wastewater Operations, New Brunswick
- Jan. 22 – Writing Skills for Utility and Operations Personnel, New Brunswick
- Jan. 29 and Feb. 5 – Safe Drinking Water Act Regulatory Update, New Brunswick

Visit [www.cpe.rutgers.edu](http://www.cpe.rutgers.edu).

### Oklahoma

Accurate Environmental in Oklahoma is offering these courses:

- Jan. 2 – Open Exam Session, Stillwater
- Jan. 6-8 – D Water and Wastewater Operator, Stillwater
- Jan. 9 – Open Exam Session, Tulsa
- Jan. 14-16 – C Water Operator, Tulsa
- Jan. 20-22 – D Water and Wastewater Operator, Tulsa

## events

### Jan. 22

AWWA Water Energy Summit, Utah Governments Trust Building, North Salt Lake, Utah. Visit [www.ims-awwa.org](http://www.ims-awwa.org).

### Jan. 22-23

Michigan Water Environment Association Wastewater Administrators Conference, Bavarian Inn, Frankenmuth. Call 517/641-7377 or visit [www.mi-wea.org](http://www.mi-wea.org).

### Jan. 25-28

New England Water Environment Association Annual Conference and Exhibit, Boston Marriott Copley Place Hotel, Boston. Visit [www.newea.org](http://www.newea.org).

- Jan. 26-29 – C Water Laboratory, Stillwater  
Visit [www accuratelabs.com/classschedule.php](http://www accuratelabs.com/classschedule.php).

## Texas

The Texas Water Utilities Association is offering these courses:

- Jan. 6-8 – CSI/CCC, Lindale
- Jan. 13-15 – Collection, Carrollton

Visit [www.twua.org](http://www.twua.org).

## Utah

The Intermountain Section AWWA is offering a Leadership Forum Jan. 14 in West Jordan. Visit [www.ims-awwa.org](http://www.ims-awwa.org).

## Wisconsin

The Wisconsin Rural Water Association is offering these courses:

- Jan. 8 – Sampling 2015, Tomahawk
- Jan. 13 – Sampling 2015, Saukville
- Jan. 14 – Cross Connection Hazards and Your Water System, Appleton
- Jan. 14 – Winter Operations, Appleton

Visit [www.wrwa.org](http://www.wrwa.org).

The Wisconsin Department of Natural Resources is offering a Distribution Certification course Jan. 27-28 in Fond du Lac. Visit <http://dnr.wi.gov>. **tpo**

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



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## product news

(Continued from page 61)

## water: product spotlight

### Portable pH, conductivity and DO meters compensate for fluctuating temperature

By Ed Wodalski

#### Oakton pH 450, CON 450 and DO 450 meters from Cole-Parmer

provide automatic and manual temperature compensation to ensure accuracy, even with fluctuating temperatures.

Up to 500 data sets can be stored and downloaded with USB or RS-232 cable. The battery-powered meters (500 hours using two AA batteries) are available with a universal power adapter, built-in stand and optional wall mount when bench space is at a premium. Other features include an IP67-rated waterproof housing, backlit LCD display and built-in auto stability.

“As soon as it stabilizes, you can push a button and send that measure into memory and it will be time-date stamped with the calibration data, as well as the measurement temperature,” says Sabrina Kalsi, product manager for Cole-Parmer. “Everything about that measurement will be captured when you hit the button.”

The plastic Grip-Clip on the side of the meters secures the probe and enables it to be attached to the side of a beaker or container for hands-free operation.

“You don’t have to worry about your probe, you can focus on your meter and what you’re doing,” she says.

The pH meter features six-point calibration: USA, NIST, DIN and custom pH buffers. Auto buffer recognition automatically identifies the correct pH meter buffer for rapid calibration. An alarm signals when it’s time to recalibrate, while data is presented as percent slope.

“It will tell you it’s 0.9967, or whatever, based on calibration,” Kalsi says. “It gives you core numbers to easily see and understand how your meter is operating.”

The CON 450 meter offers autorange conductivity from 0 to 199.9 mS in five ranges with automatic calibration up to five calibration points. The selectable temperature coefficient is adjustable from 0 to 10 percent per degree C for accurate compensation in most solutions. Taking measurements is a matter of placing the probe into the liquid.

A third member of the 450 series is the Oakton DO optical dissolved oxygen meter with probe.

“Optical dissolved oxygen is a big step for us,” Kalsi says. “There are no membranes, no solutions. You don’t have to worry about interference. You don’t have to have a source of flow or stirring to get a good measurement. You turn it on, put the probe in and take the reading. We’ve eliminated a lot of maintenance time and cost. We’ve made it a very easy measurement to take.” 800/323-4340; [www.coleparmer.com](http://www.coleparmer.com).



Oakton pH 450, CON 450 and DO 450 meters from Cole-Parmer

Emma Kohl  
 Lab Supervisor  
 City of Crystal Lake  
 Wastewater Treatment Plant  
 Crystal Lake, Illinois



Working in the lab can be one of the most important and most challenging roles at a wastewater treatment facility. In Crystal Lake, Illinois, it's Lab Supervisor Emma Kohl who's heading up their laboratory processes.

Emma relies on USABlueBook to get her what she needs, when she needs it. "When we run out of reagents or other things in the lab, I always compare prices. In most cases,

USABluebook is the least expensive, and I know they'll have what I need, and get it to me the very next day. Plus, the customer service people are always very helpful," she shared.

**"I use a lot of USABlueBook brand products... They're great quality, and cost a lot less than other brands."**

As Lab Supervisor, one of Emma's main responsibilities is to make sure they're getting the most out of their budget. "I use a lot of USABluebook brand products, including buffers, reagents and filters. They're great quality and cost less than other brands. Plus, I get them faster than from other distributors."

USABlueBook is proud to serve Emma, as well as the entire team at Crystal Lake's WWTP. We look forward to assisting them with all of their needs for a long time to come.

## Featured Products From **USABlueBook**<sup>®</sup>

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### LaMotte 2020we Turbidimeters

- Datalog up to 500 measurements and download to your computer

LaMotte's 2020we turbidimeter is precise, sensitive and dependable. The advanced microprocessor and patent-pending optical chamber offer high accuracy, even in low ranges. Digital signal processing algorithms reduce reading fluctuations for rapid, highly repeatable measurements.

Meter uses a multi-detector optical configuration that ensures long-term stability, and minimizes stray light and color interferences. It also features easy menu-driven operation, advanced calibration algorithms and a large backlit LCD display.

**Includes:** turbidity standards (0, 1 & 10 NTU), four sample tubes, sample bottle, USB cable, USB wall plug and waterproof case.



**Range:** 0 to 4000 NTU  
**Accuracy:** ±0.05 NTU @ 0-2.5 NTU;  
 ±2% @ 2.5-100 NTU;  
 ±3% above 100 NTU

DESCRIPTION	STOCK #	EACH
2020we Portable Turbidimeter	49377	\$ 999.00



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