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JANUARY 2010

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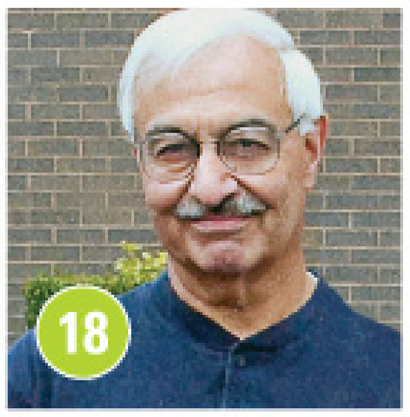

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on the cover

Deb LaVergne grew up a short distance from the Blackstone River in Massachusetts. Now her job is helping to protect that river as lab and pretreatment manager for the Upper Blackstone Water Pollution Abatement District. She feels she found the perfect job to suit her passion for environmental quality. (Photography by Scott Erb)

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OPERATORS CONSISTENTLY PROVE THEIR ABILITY TO SOLVE PROBLEMS AND IMPROVE PROCESSES WITH A UNIQUE BRAND OF CAN-DO CREATIVITY

By Ted J. Rulseh, Editor

In a memorable exchange from The Wizard of Oz, Dorothy tells the wizard how she and her comrades killed the Wicked Witch of the West.

"We melted her," says Dorothy.

"Oh, you liquidated her, eh?" says the wizard. "Veeerry resourceful."

Veeerry indeed. Who knew that something as simple as a splash from a bucket of water would kill the witch and enable Dorothy and company to fulfill their quest and bring the wizard the broomstick?

Wastewater treatment operators don't often slay witches, but they do slay an incredible range of challenges with sometimes amazingly simple remedies. Only, unlike Dorothy, they don't do it by happy accident. They do it with knowledge, creativity, and an ability to shed conventional assumptions.

HOW THEY DO IT

That's why some of my favorite articles in *Treatment Plant Operator* fall under our regular feature heading of "How We Do It."

Sometimes (as in this issue) these stories tell how a plant used a manufacturer's product to correct a process disruption or improve effluent quality. And that's great. But often more enjoyable are those in which plant personnel use the simplest and cleverest of tools and methods to make the plant run better.

We published one of my favorites last November. It told how Frank Hill, an electric instrument technician at the River Road Wastewater Treatment Plant in Wichita Falls, Texas, worked with colleagues to devise a simple mechanism that would prevent the release of overly chlorinated water, in violation of the plant's permit.

The problem releases would happen only when analytical instruments or the dechlorination chemical feed systems failed, or after power outages. The staff always discovered the problem quickly, but until they did, and intervened, chlorinated water would escape to the Big Wichita River.

The system they created essentially uses a programmable logic controller (PLC) to activate a trap door upon detection of excess chlorine. When the trap door opens, a suspended bag of sodium metabisulfite drops into the effluent stream and dangles there. In the meantime an alarm sounds to alert operators to the problem, so they can quickly find and address the cause.

Sophisticated? Not exactly. Elegant? Yes, in its simplicity. Effective? Yes again — it has worked for 10 years. If you missed this story in the magazine, by all means go to www.tpomag.com and read it.

ART PLUS SCIENCE

Stories like this just go to demonstrate that operating a treatment plant is one part art and one part science. In a perfect world, where cost was no object, the Wichita Falls team might have called in a consulting engineer for a fix. It would have been a great deal slicker, but also a great deal more expensive (and not nearly as much fun for the staff).

Wastewater treatment operators don't often slay witches, but they do slay an incredible range of challenges with sometimes amazingly simple remedies. Only, unlike Dorothy, they don't do it by happy accident.

Of course, money is always an object. So how do you begin to place a value on people like these who can find the proverbial nickel solution to the $1,000 problem? A lot of these folks know what they know and can do what they do because they have been around for a while. Ideally, the younger people on their teams learn from what they see.

There is no way to imagine a freshly minted operator with a two-year degree doing what Hill and his team did at Wichita Falls. And it forces one to ask: What are treatment plants going to do when wave after wave of experienced people like this retire?

So here's the point: If you have done something amazingly creative, and remarkably inexpensive, to fix a problem at your facility, drop a note and tell us about it. We'll be glad to share it with the operator community, in hopes it may work for someone else. If we tell enough of these stories, maybe in a small way we can blunt the impact of all these retirements we keep hearing about.

To offer your idea, just send a note to editor@tpomag.com, or call me at 877/953-3301. We'll be glad to tell your peers in the field just how "very resourceful" you are. **tpo**

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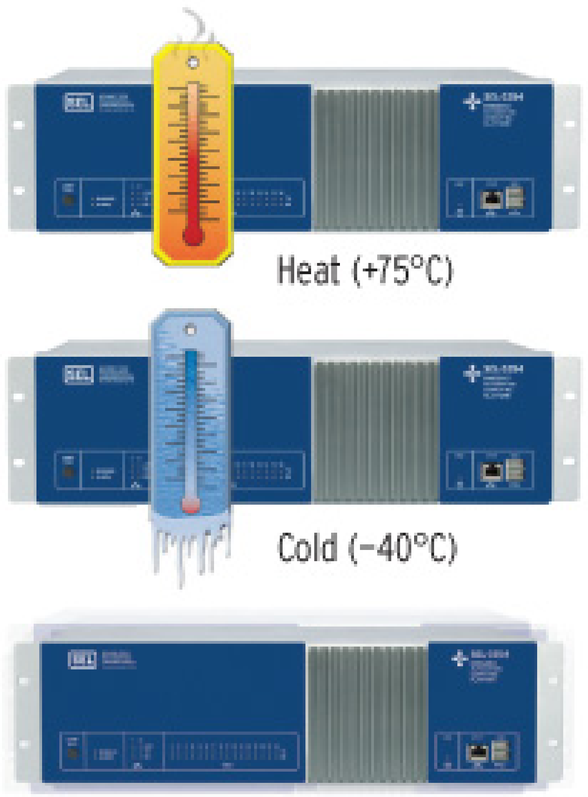

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Calling All Cadets

GRADE SCHOOL STUDENTS IN HOLLYWOOD, FLA., GET RECRUITED TO LEARN ABOUT AND THEN HELP TEACH THE IMPORTANCE OF WASTEWATER TREATMENT AND CLEAN WATER

By John K. Thompson

You can talk all you want about activated sludge, but how do you get Florida's future ratepayers to show an interest in clean water?

The staff at the Southern Regional Wastewater Treatment Plant (SRWTP) in Hollywood, Fla., has been active in educating the city's youngest learners. When it's time to talk clean water, they roll out the Clean Water Cadets.

The Clean Water Cadets program uses art and performance to help teach kids about water resources.

Clean Water Cadets, a cooperative effort between the city and local schools, teaches kids about the importance of clean water, and gets them to encourage good behaviors back at home. The kids also create and perform plays built around clean water.

MAKING THE CONNECTION

Getting kids to think about wastewater treatment takes hard work. Over the years, the Southern Regional treatment plant has grown from a trickling-filter system to the activated sludge process. There are two discharge paths, one moving on to additional treatment in the water reclamation system, and the other entering the Atlantic Ocean.

> "It is important to work with and teach our future generations the vital role of water in our society."
> **ALBERT PEREZ**

The complex processes in a treatment plant can be difficult for residents to understand and appreciate. In the past, with cooperation from the city Department of Public Utilities, the treatment plant staff helped organize events to celebrate clean water.

The city had booths and displays at community centers, plant tours for school-age children, and an official city proclamation. "It is important to work with and teach our future generations about the vital role of water in our society," notes Albert Perez, Public Utilities director.

The Clean Water Cadets program takes education a big step farther, directly engaging kids in learning about and teaching the connection between treatment plants, clean water, and the quality of life in their own community.

What's Your Story?

***TPO* welcomes news about your public education and community outreach efforts for future articles in the Hearts and Minds column. Send your ideas to editor@tpomag.com or call 877/953-3301.**

LEARNING THE CYCLE

The program involves Public Utilities staff members who visit selected third and fourth grade classrooms to explain how the city's wastewater and stormwater systems work. Staff members use large laminated posters along with a Clean Water Cadets coloring book to help children learn how the water cycle works — both in nature and in the treatment plant.

The interactive classes include opportunities for active learning. Students receive educational coloring books to take home, along with "Do Not Dump Down Drain" stickers to place on containers of household products.

Students also get a homework assignment to teach the rest of their families what they have learned. Students who complete the

The program culminates with a class project in which students write and perform their own plays.

assignment earn the title of Clean Water Cadet and pledge to protect and conserve the waters and to spread the message of water conservation and protection to friends and family.

Many teachers also use Clean Water Cadet visits as part of their writing lesson plans by having the students write thank you notes to treatment plant staff members.

Public Utilities staff added a brief skit illustrating how Clean Water Cadets could talk to friends and family about water issues. Teachers also received a lesson plan for another class project in which students would write and produce their own plays with a clean water theme.

TAKING IT TO THE STAGE

School staff judged the plays, and the kids performed the five best ones in front of the entire school and invited guests. The plays were performed in a community theater next to the school and judged by a panel of city, county and school officials.

Ribbons were awarded for first, second, and third place. Each student in the winning productions received a ribbon, and a larger ribbon was awarded for display in the classroom. Each student also received a personalized certificate and a City of Hollywood pencil case. A cast party with cupcakes and juice followed the performances.

In all, more than 500 students, teachers, and guests attended the performances. The program was filmed and developed into a community public service announcement, which was broadcast regularly on the local cable access channel.

Through partnership between the treatment plant staff, the city, and elementary schools, the community generated positive feedback and educated hundreds of students on the importance of wastewater management and clean water. Plans are in the works to expand the program to more schools.

For more information on Clean Water Cadets, visit the City of Hollywood Web site at www.hollywoodfl.org. **tpo**

letters

So, What Do You Do?

To the editor:

I was on my way to the top when the elevator stopped to pick up another passenger. I quickly asked the well-dressed young man what he did for a living. "I'm Dean of the Chemistry Department at Very Big U," he replied.

"Oh," I said. "Someone has to do it." He pushed the elevator button and exited before he planned, obviously befuddled by my response.

A professional woman bustled in as though she were trying to beat the crowd that wasn't there. No sooner had she pushed the elevator button when I pushed her button and asked where she worked.

"I'm the State Comptroller."

"Well, somebody has to do it," I politely laughed.

At that point, I awoke from my dream with the realization that I should make that vision reality by striking first. I well remember the first reaction to my answer, "I work in a wastewater plant."

The normally garrulous gent stood as still as a dumb deer peering into my headlights before he replied with the vacuous comment, "Uh, somebody has to do it." And he, an educated man.

The second occurrence was a mirror of the first, with the exception that this was an uneducated janitor. This proves that ignorance covers a wide spectrum. Please do not misunderstand. The only problem with ignorance is to remain in that state.

My wife and I were in a class with 10 other couples when someone asked my vocation. I replied, "I'm not going to tell you because half of the people here will wish that I hadn't told them, half who know a little about my field will find it disgusting, and half of you will wonder why I am not the dean of the chemistry department."

How did the group respond? While the meeting was not about the "stink plant," everyone left with an understanding and appreciation for the work that we do. Mission accomplished.

Rolly Church
Crete Wastewater
Crete, Neb.

Likes the Magazine

To the editor:

Congratulations for 12 fantastic editions of *TPO*. One simple statement — "It's your magazine — tell your story" — clearly rings true. On that note, thank you for an excellent magazine and for the free subscription.

TPO is definitely an asset to all wastewater treatment professionals — great topics that cover many aspects of the industry. Not only do the pages of *TPO* contain a wealth of experience and valuable knowledge, being free is priceless.

I enjoy the format and writing style of your magazine very much. It is simple and very easy to comprehend. I especially appreciate the fact that it is geared more toward being a layman's magazine, highlighting the real unsung heros in the profession. With any magazine (as in the wastewater treatment profession), there is always room for improvement. In my opinion, *TPO* improves with every issue.

As for thoughts and suggestions: Keep up the great work! Future articles geared toward industrial wastewater treatment, water reclamation (water reuse projects) and alternative treatment options (such as constructed wetlands) might be nice additions.

Before closing, I'd like to compliment the "Let's Be Clear" column. The editorial is always interesting and chocked full of wisdom. Take care, and thank you once again.

Respectfully,

Richard Downing "Rob"
Robbins Jr.
Wilson, N.C.

top performer: **PLANT**

Lessons Learned

A METICULOUS STARTUP PROCESS BUILT AROUND CAREFUL HIRING AND EFFECTIVE TRAINING GETS A WORLD-CLASS MEMBRANE BIOREACTOR PLANT OFF TO A SOLID START

By Jim Force

profile
Broad Run Wastewater Reclamation Facility, Ashburn, Va.

BUILT:	2008
TREATMENT LEVEL:	Advanced tertiary
MAIN PROCESS:	Membrane bioreactor
POPULATION SERVED:	120,000
FLOWS:	11-mgd design, 3.5-mgd average
RECEIVING WATER:	Broad Run waterway (feeds Potomac River)
BIOSOLIDS:	Thickening, anaerobic digestion, centrifuge dewatering, cake-to-land application
ANNUAL BUDGET:	$6.7 million
WEB SITE:	www.loudounwater.org

The main entrance to the Broad Run Wastewater Reclamation Facility. (Photography by Towner Jones Photography LLC)

ANYONE ABOUT TO START UP A BRAND NEW wastewater treatment plant would do well to talk to Bob Canham, Mike Rumke, Ray Kirkpatrick and Sam Richardson at Loudoun Water in Loudoun County, Va. They've learned some valuable lessons while commissioning the Broad Run Wastewater Reclamation Facility, one of the world's largest and newest reclamation plants to use membrane bioreactors (MBRs).

Canham's lifelong career as a consulting engineer and wastewater trainer, combined with Richardson's, Rumke's and Kirkpatrick's many years in wastewater operations, resulted in a three-step process that assured success when Broad Run went through its shakedown period and opened for business in May 2008.

The keys were meticulous planning for every unit process, detailed training, and an approach to staff selection that sought team players who could generalize and become proficient at operating everything in the plant. "It was a long, drawn-out process," says Rumke, operations supervisor. "But it was the right way to do this. I wouldn't change it for the world."

Says plant manager Canham, "It was the most successful startup I've ever been through." The Broad Run WRF has been recognized by the American Association of Environmental Engineers as the first application of membrane bioreactors with carbon contact and UV light disinfection, and the first plant of its kind to meet stringent nutrient removal requirements.

MANY BARRIERS

Loudoun Water was created in 1959 by the Loudoun County Board of Supervisors to provide water and wastewater services to the unincorporated areas of the county.

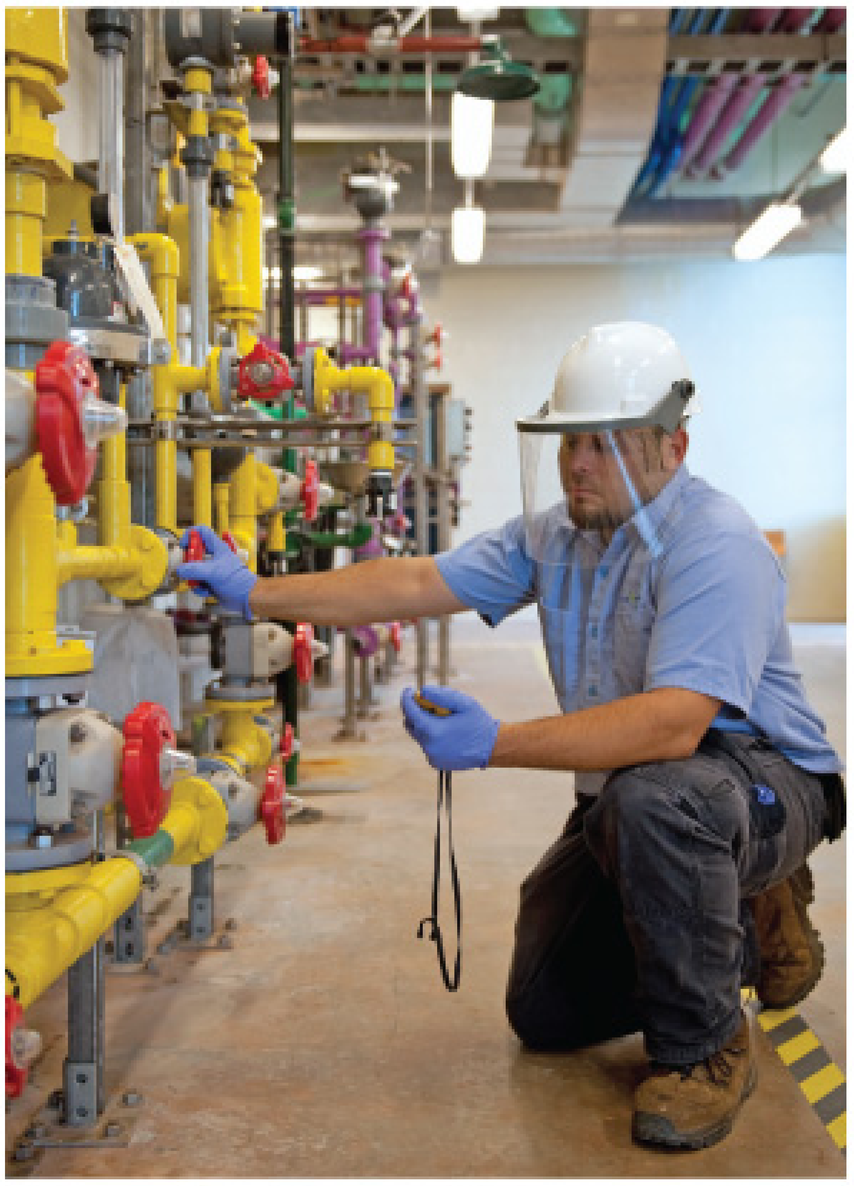
Wastewater at the Broad Run WRF flows through an extensive series of barriers and treatment steps to make sure it is as pure as technically possible when it leaves the plant. Designed by CH2M HILL for up to 11 mgd, the plant now takes about 3.5 mgd from the eastern unincorporated areas of Loudoun County.

That is just a portion of the wastewater collected in the county — much of it is conveyed to the Blue Plains Wastewater Treatment Plant in the District of Columbia under a long-standing contract (see sidebar).

James Marrone and Curt Moore perform maintenance on the plant's five-stage Bardenpho process (Eimco Water Technologies).

"It was a long, drawn-out process. But it was the right way to do this. I wouldn't change it for the world."

MIKE RUMKE



ABOVE: a 12-train ZeeWeed 500 membrane system from GE-Zenon. CENTER: James Marrone performs a calibration on a sodium hydroxide (caustic soda) pump. Right, Marrone with the plant's odor scrubber tower.

In Broad Run's preliminary treatment stage, three 6.0-mm coarse screens (Parkson, Schreiber, and SPIRAC) remove large solids and debris. Tangential motion PISTA grit chambers (Smith & Loveless Inc.) then remove grit and sand, which is washed and compacted in a WEMCO system for disposal at the county landfill.

Next, the flow passes through primary clarifiers and then an additional set of 2.0-mm fine screens (Jones & Attwood Inc., a subsidiary of Eimco Water Technologies). Scum is removed from the primary clarifiers with equipment from JWC Environmental and WEMCO, and a Moyno pump moves settled primary sludge to the anaerobic digestion system. Aluminum sulfate is added for phosphorus removal in the biological reactor basin.

The biological system consists of a five-stage Bardenpho process (Eimco Water Technologies), providing anaerobic, anoxic and aerobic zones, coupled with the membrane bioreactor. The plant uses a 12-train ZeeWeed 500 membrane system (GE-Zenon) submerged in separate tanks of mixed liquor pumped up from the bioreactor basins (ITT Flygt Corp. pumps).

Each membrane train is equipped with two cassettes of 48 modules each and is expandable to four cassettes per membrane train in the future. Effluent from the MBR flows by gravity to permeate tanks supplied by The Crom Corp., where it can be stored for distribution to the water reuse system, scheduled to come online in early 2010.

Or, it can be passed through granular-activated Calgon carbon contactors and a Calgon Sentinel UV disinfection system before cascading down a step-aerated effluent channel to the Broad Run waterway and ultimately the Potomac River.

Tall cylinder-shaped anaerobic digesters (The Crom Corp.) receive raw primary sludge, while waste activated sludge is thickened in GEA Westfalia separator centrifuges to about four percent solids before entering the digesters. The digesters operate in the mesophilic range (95 degrees F) and achieve an average volatile reduction of 38 percent over a 20-day period. Methane gas is recovered and used to heat the digesters and fuel boilers for plant heat. Additional Westfalia centrifuges further dewater the solids to around 21 percent for land application.

The plant effluent is of exceptional high quality. Some of the permit numbers are "real eye-openers," remarks Canham. For example, effluent COD must be below 10 mg/l, the limit for total nitrogen is 4 mg/l, and total phosphorus must be 0.1 mg/l or lower.

No problem here, however. After a year of operation, Broad Run posted less than 5.0 mg/l of COD, 3.2 mg/l of total nitrogen without supplemental methanol, and an average phosphorus level of less than 0.05 mg/l.

"We conducted half-day classes with the design engineer and equipment vendors for nearly a year before startup. As we went along, we encouraged staff members to share something they learned each day with the others."

BOB CANHAM

THE BROAD RUN TEAM

The successful startup of the Broad Run Wastewater Reclamation Facility was a true team effort, and so is the day-to-day operation that keeps the plant in compliance with its stringent effluent requirements.

Plant leadership includes program manager Tom Broderick, plant manager Bob Canham, administrative supervisor Sherrie Leonard, program assistant Kelley Luckett, safety specialist Lenny McDonald, and operations supervisor Mike Rumke.

The plant operations staff members are Kevin Anderson, Carlton Edwards, Albert Owens, Frank Stokes Jr., Nestor Siguenza, David Gray, Jason Ziemann, Nader Maramkhah, Mehmet Odkan, Eugene Wharton, Hank Stewart, and James Marrone. Maintenance supervisor Ray Kirkpatrick leads staff members Curt Moore, Kevin Peed, David Dale, Sal Nerio, Eddie Staubs, and Ray Braithwaite. Laboratory supervisor Sam Richardson directs staff members Marnie Mix and Zoya Mesh.

Broad Run plant team members include, from left, Eugene Wharton, James Marrone, Kevin Peed, Mehmet Odkan, operations supervisor Mike Rumke, Eddie Staubs, and Albert (Butch) Owens (back).

STARTING FROM SCRATCH

Performance like this is a testimony to the viability of the Broad Run startup plan. "We started working on this plan literally years in advance," says Canham. "We divided the plant into five groups of processes, and nine phases of operation. Working with the design engineer, contractors, vendors and our operations team, we developed a detailed plan for each."

As an example, Canham says, the membrane manufacturer had specific requirements for mixed liquor suspended solids levels going to the membranes. "We identified procedures to start up the biological process," he says. "We brought in seed activated sludge, and we sat down with our operations staff and the design engineer and went step-by-step, each day following the plan we had developed."

Training was just as thorough. "We were sticklers on training," Canham says. "The engineer provided background on each process in language that operators could comprehend. We conducted half-day classes with the design engineer and equipment vendors for nearly a year before startup. As we went along, we encouraged staff members to share something they learned each day with the others."

GREENFIELD STAFF

Staff selection remained the critical element in operational success, because if this was a greenfield plant, it was also a green staff. Canham, Rumke, Richardson and maintenance supervisor Ray Kirkpatrick took an unusual approach.

"Everyone was new here," explains Rumke. "We had no experienced veterans of this facility — no seniority." Thus, the interview process was a bit like picking players for an Olympic basketball squad. "We didn't ignore qualifications," says Rumke, "but we were really looking for people who could work together — form a good team. We asked ourselves: Will these people work with us? What do they bring to the table?

"There were too few jobs for all the talent that applied, but in the end we hired the candidates best suited to meet the unique needs and requirements of the plant and the organization. We were able to build a strong foundation."

The Broad Run management team also knew they needed true generalists on the staff — people who could become proficient at operating and maintaining all parts of the process. "We're lean here, with only 12 in shift operations," says Canham. "As it has evolved, we have our champions — people who have become subject-matter-expert at running certain sections of the plant. But everyone on staff is familiar with all the processes, from one end of the operation to the other."

In some organizations, knowledge is power, but at Broad Run, that type of mindset is unacceptable. Sharing of expertise is the bottom line. "This is a finely-tuned machine," says Canham. "Cross-training is essential. We can't afford to withhold knowledge. Sharing knowledge empowers us to be successful and good stewards of our environment."

> "This is a finely-tuned machine. Cross-training is essential. We can't afford to withhold knowledge. Sharing knowledge empowers us to be successful and good stewards of our environment."
>
> **BOB CANHAM**

Because the plant was brand new, the Broad Run staff had the opportunity to run the complex processes on potable water for several months before accepting wastewater. Canham compares this to a sports team's exhibition season. The approach helped facilitate repairs and adjustments without jeopardizing performance. "It was also nice to be able to turn the flow off at night and on weekends, and turn it back on when regular hours resumed," Kirkpatrick says.

KEY LESSONS

When asked what other lessons were learned during the startup of this $180 million, award-winning operation, the Broad Run team members scratched their heads and claimed there were far too many to mention. But here are some key experiences:

Flow equalization. A pair of 5-million-gallon equalization tanks (The Crom Corporation) positioned after the fine screens have been crucial to maintaining consistent flows and optimum operation. "We've wired them into the SCADA system as part of our regular operation," says Canham. "They were instrumental in the startup process, providing steady flows to the MBRs and assuring COD and total nitrogen removal."

Multiple pathways. Along with the equalization tanks, the Broad Run managers feel they gained desirable flexibility through multiple drain lines, bypasses, and pathways built into the plant. This flexibility was especially helpful during startup, as it gave the staff a variety of ways to control the flow through the various unit processes.

Automation. The plant is fully automated with a state-of-the-art SCADA system (ICONICS).

Odor control. Broad Run has the latest in odor control (Twin City Fan & Blower). All structures are enclosed, and air is drawn off to a football-sized "moon-rock" biofilter (Verantis – Environmental Solutions Group, BioRem Technologies Inc.).

"It's important that we 'keep the lid on,'" says Canham. Doors left open or hatches not closed can cause odorous air to escape and annoy employees in the nearby administration building and visitors to the park. "We basically have to subscribe to a no-tolerance odor policy here. All our operators carry hatch-key openers, and our biofilter has done an excellent job." The staff received only three odor complaints in the first year of operation.

Membrane cleaning. The use of alum for phosphorus removal has

The plant headworks includes a 6.0-mm coarse screen system (Parkson, Schreiber, and SPIRAC).

BROAD RUN WASTEWATER RECLAMATION FACILITY
PERMIT AND PERFORMANCE (FIRST YEAR OF OPERATION)

	INFLUENT	EFFLUENT	PERMIT
COD mg/l	520 mg/l	< 10.0 mg/l	10.0 mg/l
TSS mg/l	341 mg/l	< 1.0 mg/l	1.0 mg/l
TN mg/L	53 mg/l	3.2 mg/l	4.0 mg/l
TP mg/L	6.4 mg/l	< 0.05 mg/l	0.1 mg/l

SHARING THE LOAD

Only a portion of the flow from the eastern unincorporated areas of Loudoun County flows to the new Broad Run Wastewater Reclamation Facility, which handles 3.5 mgd. About 13.8 mgd can be delivered to the Blue Plains Wastewater Treatment Plant, operated by the District of Columbia Water and Sewer Authority, under an agreement signed several years ago.

"When the Dulles Airport was constructed back in the early 1960s," explains Bob Canham, Broad Run plant manager, "a large sewer was built from this area to Blue Plains to treat the growing amount of wastewater generated by the airport and the surrounding development.

"We have a contract allotment of 13.8 mgd that goes to Blue Plains. As we grow and produce flow beyond that contracted amount, more and more will be coming to the new Broad Run facility."

increased mixed liquor suspended solids, and has had an impact on membrane permeability. Rumke and Kirkpatrick have found success cleaning the membranes with a solution of sodium hypochlorite and citric acid.

Carbon essential. The Broad Run team reports that the six granular-activated carbon contactors have been essential in meeting the stringent COD and TKN effluent requirements.

With more than a year of operation now in the books, reuse of the high-quality effluent is up next. Loudoun Water is putting the purple pipes (which designate recycled water) in the ground and is looking for end-users.

"We're starting to work with a local golf course and a few local establishments and commercial lawn owners to see if reuse is feasible," says Rumke. Costs are a factor, and end-users need to calculate tax credits, LEED certification (for accredited green buildings), and water availability into their decision to take the reclaimed water. Loudoun Water is paying for most of the infrastructure costs. Economics aside, projections from planners are that the demand for recycled water may be greater than the supply. tpo

more info:

BioRem Technologies Inc.
519/767-9100
www.biorem.biz

Calgon Carbon Corp.
800/422-7266
www.calgoncarbon.com

CH2M HILL
703/376-5178
www.ch2m.com

Eimco Water Technologies
801/931-3000
www.glv.com

GEA Westfalia Separator Inc.
201/767-3900
www.wsus.com

GE-Zenon
215/355-3300
www.zenon.com

ICONICS Inc.
508/543-8600
www.iconics.com

ITT Water and Wastewater U.S.A. - Flygt Products
203/380-4700
www.flygtus.com

JWC Environmental
800/331-2277
www.jwce.com

Moyno Inc.
877/486-6966
www.moyno.com/wastewater.html

Parkson Corp.
954/974-6610
www.parkson.com

Schreiber LLC
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www.schreiberwater.com

Smith & Loveless Inc.
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www.smithandloveless.com

SPIRAC Inc.
770/632-9833
www.spirac.com

The Crom Corporation
352/372-3436
www.cromcorp.com

Twin City Fan & Blower
763/551-7600
www.tcf.com

Verantis – Environmental Solutions Group
800/554-8673
www.verantis.com

Weir Specialty Pumps/WEMCO Pump
801/359-8731
www.weirpowerindustrial.com

A LIFER FOR THE ENVIRONMENT

DEB LaVERGNE MANAGES THE UPPER BLACKSTONE WATER POLLUTION ABATEMENT DISTRICT LABORATORY WITH EFFICIENCY AND HIGH STANDARDS

By Jim Force

DEB LaVERGNE GREW UP JUST A STONE'S THROW AWAY FROM the Blackstone River in Massachusetts. And she's spent her career helping to clean it up.

As laboratory and pretreatment manager for the Upper Blackstone Water Pollution Abatement District, she makes sure the effluent from the district's wastewater treatment facility meets strict discharge requirements. It's a critical job because, as she says, "Where we're located, our effluent makes up most of the river's flow." In other words, the performance of the plant has had everything to do with improving water quality in the river.

"When I was little, we'd go down to the river and it would be red or blue or green, depending on the dye the local textile mills were using," LaVergne recalls. "It was dead. There wasn't anything living in it at all." Today, she says proudly, the river supports populations of fish, muskrat, and crayfish.

For her efforts, LaVergne was honored with the 2008 Laboratory Proficiency Award, given by the Massachusetts Water Pollution Control Association to someone who exemplifies "outstanding dedication and integrity in laboratory analysis, reporting and follow-through."

Her nominator, colleague Sharon Lawson, says LaVergne really cares about the quality of the water in the river: "She's a lifer for the environment."

The laboratory LaVergne manages has a full-time staff of four, plus up to three part-timers, and operates seven days a week. It's big and busy because the Upper Blackstone Wastewater Treatment Facility is, too. The district it serves includes Auburn, the Cherry Valley Sewer District, Holden, Millbury, Rutland, West Boylston, and the city of Worcester. The district also serves portions of Oxford, Paxton, Shrewsbury, and Sutton and treats septage and sludge from numerous other communities.

Deb LaVergne (Photography by Scott Erb)

CONTINUOUS IMPROVEMENT

The current treatment plant replaced an old trickling filter plant and went into operation in 1976. It is now an advanced treatment facility, providing phosphorous and nitrogen control, with an average flow of 45 mgd.

The district recently completed a $140 million improvement that modernized air pollution controls, constructed a new landfill, updated the laboratory, and improved stormwater management, wastewater treatment, odor control, and plant instrumentation. Later phases of the project will provide more efficient solids management and expand treatment plant capacity.

As it is, however, the plant has done an excellent job fulfilling its mission of improving the water quality in the river and protecting its headwaters from contamination. "We're actually achieving a higher standard of performance than was envisioned when the plant was designed and constructed, but we must achieve even more stringent standards in the future," says plant manager Paul Caron.

Flow first passes through screens and aerated grit chambers to remove debris and grit and freshen the wastewater. Wastewater then passes through a Parshall flume and into primary clarifiers. In the activated sludge basins, BOD, phosphorus and nitrogen are treated. Effluent is chlorinated, dechlorinated with sodium bisulfite, and discharged directly to the Blackstone.

Waste activated sludge thickens in dissolved air flotation thickeners, aided by polymer addition. A sludge holding tank blends thickened WAS, primary sludge, scum and imported solids. Komline-Sanderson belt filter presses produce a 20-25 percent solids cake that is burned in the plant's multiple hearth furnaces. Excess heat from the combustion process heats the plant's buildings. The inert ash is transported to the plant's onsite landfill.

Deb LaVergne, laboratory and pretreatment manager for the Upper Blackstone Water Pollution Abatement District, was the 2008 winner of the Laboratory Proficiency Award, given by the Massachusetts Water Pollution Control Association.

"Some days the work load seems insurmountable. I'm here bright and early, before 6:30 in the morning. Sometimes I'm the manager, sometimes I'm the lab rat. Usually I'm occupied with a little bit of everything. With samples, and paperwork, and testing and reports, I often go home exhausted."

DEB LaVERGNE

profile

Deb LaVergne, Upper Blackstone Water Pollution Abatement District, Millbury, Mass.

POSITION:
Pretreatment and laboratory manager

EXPERIENCE:
31 years

EDUCATION:
Bachelor's degree, biology, Worcester State College

CERTIFICATION:
NEWEA Wastewater Laboratory Analyst Certificate Grade II, Massachusetts Grade 7 combined operator's license

AWARDS:
2008 Laboratory Proficiency Award, Massachusetts Water Pollution Control Association

GOALS:
Prepare for plant upgrades; continue improving laboratory and pretreatment programs

Team members at the Upper Blackstone district include, from left, William Wrightson, administration officer; Deb LaVergne, laboratory-pretreatment manager; Paul Caron, plant manager; Karla Sangrey, district engineer; Karen Boulay, administrator assistant and HR coordinator/district clerk; Thomas Walsh, engineer director and treasurer; and Sharon Lawson, lab specialist/pretreatment coordinator.

"I love my work. I always wanted to work in the environmental field, protecting water quality and wildlife. I was really fortunate to get this position. I don't know what else I would want to do. It's really the only job for me."

DEB LAVERGNE

AN INDUSTRIAL HERITAGE

Deb LaVergne and her team are also responsible for the Upper Blackstone Water Pollution Abatement District's industrial pretreatment program.

"I arrived here just as the district was starting to develop and implement a pretreatment program," LaVergne says. "We have a lot of industries, especially in the City of Worcester. Our program developed permits based on EPA categories, established inspection procedures, and monitored performance and violations. The pretreatment program has been a real team effort."

For more than 200 years, industry has been both important and diversified in Worcester, one of the most populous cities in New England. The Blackstone Valley area is known as the "birthplace of the American Industrial Revolution," and the local economy and the Blackstone River have been linked throughout the area's history. In fact, the first textile mill in the United States was located here in 1791, powered by water from the Blackstone.

The current recession and past downturns have altered the face of area industry. "Where we used to have a lot of textile mills, clothing and shoe factories, dye houses and tanneries, many have shut down or moved elsewhere," says LaVergne.

Instead, the Upper Blackstone wastewater treatment facility now receives wastewater from a variety of circuit board manufacturers, industrial laundries, printers, medical facilities, specialty material manufacturers, and electroplating operations.

A state-of-the-art air pollution control system removes and thermally destroys particulate matter, acid gases, metals, and volatile organic compounds (VOCs) in the exhaust from the furnaces.

The system's technologies include a Venturi scrubber that removes contaminants via liquid contact and condensation, a spray scrubber system to remove acid gases and additional metals, a wet electrostatic precipitator (Western Pneumatics), and a regenerative thermal oxidizer for thermal conversion of VOCs to carbon dioxide by combustion of gases at 1,500 degrees F. A 125-foot-high exhaust stack assures adequate dispersion of off-gases.

THE LAB SCENE

This elaborate process, and the wide range of performance requirements the plant must meet, are tested, verified, and reported by LaVergne's laboratory. LaVergne and her full-time crew of Sharon Lawson, Cindy D'Alessandro, and Denise Prouty run grab and composite samples on primary influent, primary effluent, aeration, and final effluent seven days a week.

They also test plant recycle streams and industrial samples required by the pretreatment program. In addition to the normal laboratory procedures for dissolved oxygen, BOD, TSS and pH, the lab group regularly tests for metals, COD, ammonia, total Kjeldahl phosphorus, total Kjeldahl nitrogen, nitrates and nitrites, ortho P, and total chlorine residual.

Quick turnaround and on-site results enable plant operators to tweak processes to make sure all phases of the plant are operating efficiently and effectively. On weekends, a recently retired lab employee, Ann Cohen, conducts tests required for the district's permit. Only one category of samples is sent out for testing — the toxicity bioassay, which goes to Aquatec Biological Sciences, a commercial laboratory in Vermont.

The Upper Blackstone plant is an advanced facility with an average flow of 45 mgd.

"Some days the work load seems insurmountable," LaVergne says, but she admits she loves her job and attacks it with zest: "I'm here bright and early, before 6:30 in the morning.

"Sometimes I'm the manager, sometimes I'm the lab rat. Usually I'm occupied with a little bit of everything. With samples, and paperwork, and testing and reports, I often go home exhausted."

Still, she manages the milieu with professionalism and compassion. "She's a very fair boss," says Lawson. "She understands people and makes allowances for the things that come up in our lives. And she helps us better ourselves by sending us to classes and workshops. It's a big department, with lots of people and tasks, but she always makes it work."

Cindy D'Alessandro runs tests on the plant's atomic absorption (AA) system for metals analysis.

MANY ACHIEVEMENTS

Among her many noteworthy achievements, LaVergne is the district representative on the Blackstone River Team project on environmental issues. She also managed the hazardous waste recycling center for the City of Worcester, sets up all treatment plant tours, and designed a more modern and updated laboratory during the district's most recent upgrade project.

The lab modernization project included a new ventilation system, cabinetry, bench tops, and other laboratory fixtures. LaVergne's emphasis on quality and accuracy, together with the EPA's stringent effluent standards, prompted her search for new analytical equipment.

She acquired an atomic absorption (AA) system (PerkinElmer) for metals, and the EasyChem (Systea Scientific LLC) discrete analyzer for nutrient analysis. The EasyChem and the AA help eliminate delays associated with using outside labs. That allows LaVergne's staff to perform analyses faster and run tests when needed, especially important with unexpected or non-routine samples. This has greatly improved laboratory efficiency.

"We're a municipality using taxpayer money, so the first consideration in acquiring new equipment is initial cost and the cost of supplies and maintenance," she says. "Ease of use and diversity — can it do more than one test? — and life expectancy are also important."

GLAD TO BE THERE

LaVergne gladly shares credit for her accomplishments with her co-workers. "I'm part of a great team here," she observes. "We have employees who give 100 percent, and that's the key to our success."

LaVergne earned a bachelor's degree in biology from Worcester State College. She started as a lab technician for the District in 1978, just two years after the new treatment plant opened its influent gates. She has taken several professional development classes since and has attained the New England Water Environment Association Wastewater Laboratory Analyst Certificate and a Massachusetts Grade 7 Operator's License.

When LaVergne does manage to get away for a few days or weeks, she loves to travel. "If you ask if I want to go, I'll say 'when do I pack?'" she says. Most recently, she cruised the eastern Mediterranean, visiting Turkey, Greece, and the Greek islands.

All things considered, however, she finds her return to Upper Blackstone just as rewarding. "I love my work," she says. "I always wanted to work in the environmental field, protecting water quality and wildlife. I was really fortunate to get this position. I don't know what else I would want to do. It's really the only job for me." **tpo**

more info:

Komline-Sanderson
800/225-5457
www.komline.com

PerkinElmer
800/762-4000
www.perkinelmer.com

Systea Scientific LLC
630/645-0600
www.easychem.com

Venturi Aeration
603/635-8239
www.venturi-aeration.com

Western Pneumatics Inc.
541/461-2600
www.westernp.com

The Farm Next Door

The team of Annetta Grillo, Peter Hartz and William Radue stand in the prairie they planted on the grounds of the Johnson Creek Wastewater Treatment Plant, with help from an environmental group. (Photography by Kim Bumgardaner of Juhl Photography)

profile

Johnson Creek (Wis.) Waterworks

BUILT:	1982; upgrade in 2000
FLOWS:	0.7-mgd design, 0.32-mgd average, 2.1-mgd hourly peak
TREATMENT LEVEL:	Secondary
TREATMENT PROCESS:	Rotating biological contractors
RECEIVING WATER:	Rock River
BIOSOLIDS PROCESS:	Lime stabilization and plate-and-frame press dewatering
BIOSOLIDS VOLUME:	400 cubic yards per year
BIOSOLIDS USE:	Land application of Class A cake (40 to 50 percent solids)
WEB SITE:	www.johnsoncreek.govoffice2.com

THE VILLAGE OF JOHNSON CREEK (WIS.) RELIES ON A SINGLE BIOSOLIDS APPLICATION SITE, WHILE LOOKING AHEAD TO PROSPECTS FOR GASIFIER TECHNOLOGY AND SALEABLE PRODUCT

By Diane Gow McDilda

Rotating biological contactors (RBCs) are the heart of the plant's secondary treatment process.

THE VILLAGE OF JOHNSON CREEK, WIS., LAND-APPLIES biosolids almost next door. With just one application site, one mile from the treatment plant, it's a partnership worth nurturing.

"We keep our relationship good with that farmer, since he's so close," says Peter Hartz, water/wastewater superintendent at the Johnson Creek Waterworks. Since 2004, the plant has produced a Class A exceptional quality product using lime stabilization to achieve pathogen reduction and a plate-and-frame press for dewatering. The biosolids are stored outside in a pole barn before being transported.

Historically, biosolids hauling was handled in a variety of ways. Either the treatment plant staff hauled the material to local farms, or various farmers hauled the material themselves (or contracted for hauling).

Johnson Creek, in southern Wisconsin, is surrounded by farms, but the plant staff eventually saw advantages in minimizing the number of land application sites. The plant now delivers to its farmer partner every other year. The plant flow averages 0.32 mgd, making the biosolids volume easily manageable.

"Four hundred cubic yards per year doesn't cover too many acres, so we go every other spring or fall," says Hartz. "Otherwise we would have to look for smaller pieces of land. We would need about 10 acres of land every year or 20 acres for the two years of biosolids."

Even with the successful treatment plant-farmer partnership, Hartz would eventually like to make the system even more sustainable and possibly produce a product that can be sold. For Hartz, pelletizing biosolids to produce gasifier fuel seems the way to go and he's working to prove its viability. But in the meantime, it's business as usual.

The plant produces dewatered biosolids cake that qualifies as Class A material.

SIMPLE PROCESS

The treatment plant uses a primary clarifier followed by rotating biological contactors (RBCs) and a secondary clarifier, all manufactured by Walker Process Equipment. A Trojan UV system provides disinfection. Effluent flows to the Rock River, a popular destination for anglers and paddlers.

Solids from the aerobic digestion process are pumped to a 12,000-gallon reactor tank. The solids content of the incoming material controls how it is processed at any given time. "The solids content is usually 1.75 to 2.75 percent, even up to 3 percent," says Hartz. "If solids decrease, then the volume in the reactor tank increases, and vice versa."

> "We don't really need other means due to the good relationship we have with the farmer, but if the land goes away, or the farmer retires, or cuts come about, the biosolids can be a source of revenue."
>
> **PETER HARTZ**

Lime slurry is added to the reactor tank to raise the pH to at least 12. The mixture is held at this pH for two hours. The contents are then blended and held at a pH of at least 11.5 for an additional 22 hours. This allows the process to meet U.S. EPA pathogen reduction requirements for Class A biosolids.

Solids are dewatered in a Netzsch plate-and-frame press. A seepex progressive cavity pump pulls a batch out of the reactor tank and pushes it into the press, which operates in two stages. During the first stage, the plate is filled at a low speed as it begins to press air out from the solids. In the second stage, the press continues to squeeze the solids, pushing out filtrate, which is pumped back into the treatment process.

Johnson Creek Waterworks
WASTEWATER PERMIT REQUIREMENTS

PARAMETER	PERMITTED AVG.
BOD_5	30 mg/l monthly avg.
TSS	30 mg/l monthly avg.
Ammonia as N	4.1 mg/l weekly avg. in summer
Total Phosphorus	1 mg/l monthly avg.

PASSING THE TESTS

When it comes to ensuring regulatory compliance for biosolids, Peter Hartz and his team at the Johnson Creek wastewater treatment plant (William Radue and Annetta Grillo, both grade 2 operators) don't take any chances.

They can collect samples from various stages in the biosolids process to ensure that the material meets the requirements for land application. A composite sample is collected from material that has been through the plate-and-frame press, and it is analyzed for enteric viruses, viable helminth ova, and compliance with exceptional quality solids requirements for pathogens.

"Samples can be collected on raw sludge, pre-dewatered sludge, and dewatered sludge," says Hartz. "But by testing the dewatered sludge, we verify that the process is destroying pathogens." The staff also performs a composite coliform test on the material stored in the pole barn to verify no re-growth. To date, none has been found.

Because the solids content fluctuates from batch to batch, the system isn't entirely hands-free. The pump can operate at pressures up to 100 psi, but staff must measure the solids content and make the necessary pressure adjustments. "It's automated to a point," says Hartz. "But we have to adjust set points on every batch."

From the press, biosolids drop onto a conveyor belt and are moved to the open-sides pole barn, next to the dewatering building. As more solids are conveyed to the barn, they are moved and shifted using a Bobcat skid-steer or front-end loader. The storage capacity is about 1,000 cubic yards, or at least two years of biosolids. The barn's concrete floor has a drain that conveys leachate to the sanitary sewer system.

OFF TO THE FARM

Farmers in the area grow corn, beans, and wheat and would gladly take the biosolids as a nutrient supplement, but for now only one farmer gets the goods. "We currently use only one farmer, but we have two others who accept the biosolids," says Hartz. "We have the material hauled to the farmer's field, where it is applied with manure spreaders."

Hartz marks the areas of the field where land application will take place. He works with an agronomist who calculates the best loading rates based on crop nutrient needs.

Water/wastewater superintendent Peter Hartz with the plant's Netzsch plate-and-frame biosolids dewatering press.

If the village looked to land-apply at any of the other farms, it would hardly be a hurdle to overcome: The delivery system is flexible, and the volume is manageable. But that doesn't mean Hartz isn't on the lookout for other options. While he may not be actively looking for more farmers, he is looking at other technologies.

"We don't really need other means due to the good relationship we have with the farmer, but if the land goes away, or the farmer retires, or cuts come about, the biosolids can be a source of revenue," Hartz says.

The treatment plant lab includes a Barnstead Mega Pure 3A water still (Thermo Fisher Scientific).

He is part of an organization called the Community-Supported Energy Group, a sub-group of Sustain Jefferson County, a nonprofit organization that works with local companies, individuals, and municipalities to make transitions to more sustainable practices. Together, the group members are working on a bench-scale study to determine whether a commercial pelletizer would be a wise investment for the village.

Annetta Grillo sets up BOD samples for testing.

BETTER WAY?

"We have a diverse group of members, some young and some older," Hartz says. "We have retired engineers, working farmers, hobbyists, wastewater operators, business people, and ordinary citizens."

The pellets could be used as a soil amendment or as fuel in a stove or gasifier. A gasifier would burn at 1,200 to 1,400 degrees C and produce about 20 percent hydrogen, 20 percent carbon monoxide, and small amounts of methane, all combustible. Nitrogen would comprise 50 to 60 percent of the gas and is not combustible.

"The synthesis gas, or syngas, burns cleaner than coal and is comparable to natural gas as the products of combustion are carbon dioxide and water vapor," Hartz says. As part of the pilot study, the biosolids are mixed with leaves and compost before being pelletized. Full-scale plans would include using the pellets on site to produce heat and electricity. Leftover pellets could be sold to the general public, and excess electricity produced could be sold for carbon credits.

"Energy production is possible in a sustainable manner and we have the means to do so at the present time."
PETER HARTZ

Before any large-scale changes can be made, the village council would need to hire an engineer to specify a gasifier for the site. Even with a successful land application program, Hartz hopes the plan for the pelletizer will move forward. "Energy production is possible in a sustainable manner, and we have the means to do so at the present time," Hartz says. **tpo**

Peter Hartz checks out a seepex progressive cavity pump.

more info:

Bobcat
866/823-7898
www.bobcat.com

Netzsch Inc.
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www.netzschusa.com

seepex Inc.
937/864-7150
www.seepex.com

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www.thermo.com

Trojan Technologies
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SOUTHERN SECTION COLLECTION SYSTEMS COMMITTEE

ROOM C204-C205 - *SSCSC*

8:00 - 9:00	Manhole Inspections 'The Need'
9:30 - 10:30	Combination Truck Maintenance and Safety, Sewer Hose Maintenance and Nozzle Technology
11:00 - 12:00	Jetting Nozzles – Their Design, Technology and Effective Usage
12:00 - 1:00	***LUNCH BREAK***
1:00 - 2:00	Elevating the Quality of Your CCTV Inspection Program
2:30 - 3:30	Critical Steps in Prioritizing Sewer Rehabilitation
4:00 - 5:00	Traffic Control – The Critical Factor in Pipeline Inspection

NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION

ROOM C105-C108 - *NEHA*

8:00 - 9:00	Decentralized Systems – The Next Wave in Our Industry
9:30 - 10:30	Septic Tanks: A Gift That Keeps on Giving
11:00 - 12:00	Selling CIOWTS Certification to Installers and Regulators
12:00 - 1:00	***LUNCH BREAK***
1:00 - 2:00	Softeners and Onsite Systems
2:30 - 3:30	Advanced Wastewater Treatment Systems
4:00 - 5:00	Maximize Efficiency by Working Closely with Regulators and Within the Regulatory System

NATIONAL ASSOCIATION OF WASTEWATER TRANSPORTERS

ROOM B101-B102 - *NAWT*

8:00 - 9:00	Sampling Protocols and Methods for Alternative Technologies
9:30 - 10:30	Dealing with Restaurant or High-Strength Waste
11:00 - 12:00	O & M for ATUs
12:00 - 1:00	***LUNCH BREAK***
1:00 - 2:00	O & M for Drip Irrigation
2:30 - 3:30	What to Expect When the EPA Comes A-Callin'
4:00 - 5:00	A Template for Keeping Your Employees Trained

NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES

ROOM C101-C104 - *NASSCO*

8:00 - 9:00	Pipe Inspections without an Operator?
9:30 - 10:30	Ways to Increase Your Daily Sewer Cleaning Production Rates without Increasing Your Costs
11:00 - 12:00	Proper Preparation of the Substrate Results in Coating Longevity
12:00 - 1:00	***LUNCH BREAK***
1:00 - 2:00	Collection System Asset Management – Getting from Reactive to Proactive
2:30 - 3:30	Trenchless Lateral Renewal Technologies – Lessons to be Learned
4:00 - 5:00	Zoom Camera Technologies: The Next Level of Infrastructure Inspection

WATERJET TECHNOLOGY ASSOCIATION

ROOM C203 - *WJTA*

8:00 - 9:00	The Impact of OSHA's Combustible Dust National Emphasis Program on Industrial Vacuuming
9:30 - 10:30	Waterblast Safety
11:00 - 12:00	Waterjet Applications and Business and Financial Considerations

PORTABLE SANITATION ASSOCIATION INTERNATIONAL

ROOM C203 - *PSAI*

1:00 - 2:00	Understanding Your True Cost Analysis to Ensure Profitability – Part 1
2:30 - 3:30	Understanding Your True Cost Analysis to Ensure Profitability – Part 2

LEADERS RESOURCE NETWORK

ROOM C201-C202 - *LRN*

8:00 - 9:00	Creating Your Vision for Success
9:30 - 10:30	Getting Your Team On Board
11:00 - 12:00	Working Effectively in a Family Business Culture
12:00 - 1:00	***LUNCH BREAK***
1:00 - 2:00	Creating Your Own Competitive Edge
2:30 - 3:30	Winning More Sales
4:00 - 5:00	Women in Business: Panel Discussion

NATIONAL ONSITE WASTEWATER RECYCLING ASSOCIATION

ROOM B103-B104 - *NOWRA*

8:00 - 9:00	Wastewater Characteristics
9:30 - 10:30	Soils and Site Evaluation Overview
11:00 - 12:00	Septic Tank Overview: Function, Design, Construction, Inspection and Troubleshooting
12:00 - 1:00	***LUNCH BREAK***
1:00 - 2:00	Seminar on Aerobic Treatment Units
2:30 - 3:30	Seminar on Media Filters
4:00 - 5:00	Seminar on Pumps and Controls

SCOTT HUNTER

ROOM C109-C112

9:30 - 10:30	Relationship is the Key!
11:00 - 12:00	The Art of Customer Service
12:00 - 1:00	***LUNCH BREAK/BOOK SALES***
2:30 - 3:30	Creating an Outrageously Successful Company - Part 1
4:00 - 5:00	Creating an Outrageously Successful Company - Part 2

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BUSINESS TRACK — ROOM C101-C104

8:00 - 9:00 New 4 P's of Marketing
Jerard Nighorn/Lenzyme Trap-Cleer Inc.

9:30 - 10:30 Quit Learning and Start Doing
Bill Raymond/Nexstar Network

11:00 - 12:00 5 Secrets of Winners
Kenny Chapman/Nexstar Network

INSTALLER TRACK — ROOM B102

8:00 - 9:00 Risk Assessment for Determining SVC Frequency
Colin Bishop/Bord na Mona

9:30 - 10:30 From Theory to Reality
Roger Lacasse/Premier Tech

11:00 - 12:00 Timed Dosing and Controls
Mark Gross/Orenco

LIQUID WASTE TRACK — ROOM B103

8:00 - 9:00 Understanding the Biology and Function of an ATU
Doug Dent/Ecological Laboratories

9:30 - 10:30 Permit Required Confined Space
Ed Fitzgerald/Jack Doheny Co.

11:00 - 12:00 Keep Profit Margins High
Joel Smith/Clear Computing Inc

PORTABLE TOILET TRACK — ROOM B104

8:00 - 9:00 Up-Selling: How to Thrive During a Recession
Ray Luden Jr./PolyJohn

9:30 - 10:30 Portable Sanitation Business Overview
Deric Boggs, Phil LaRoche/Satellite

11:00 - 12:00 Routing Efficiency and Analysis
Greg Muth /UPS Logistics Technologies

MUNICIPAL TRACK — ROOM C105-C108

8:00 - 9:00 Pipe Cleaning Tools
Dana Hicks/ENZ USA Inc.

9:30 - 10:30 Increase Revenues through Pipeline Laser & Sonar
Doc Bennet/CUES

11:00 - 12:00 How to Prevent I/I in the Manhole Chimney Area
William Goff/Sealing Systems Inc.

SPANISH TRACK — ROOM C109-C112

8:00 - 9:00 Limpieza de Drenajes y Tuberías y la Elección de Boquillas
Jim Aanderud/SSCSC

9:30 - 10:30 Formando un Programa Eficaz de Inspecciones CCTV
Jim Aanderud/SSCSC

WOMEN IN THE INDUSTRY — ROOM C203

9:00 - 12:00 The Regeneration Process: How to Re-energize, Re-purpose, Re-invent and Handle Everything!
Ann Fry

FRIDAY

February 26th, 2010

MUNICIPAL TRACK — ROOM C105-C108

8:00 - 9:00 Identifying Manhole I/I Sources and Cost-Effective Repair Methods
Lee Haessig/Cretex Specialty Products

9:30 - 10:30 Jet Up! Taking Science to the Sewer
Scott Paquet/NozzTeq Inc.

11:00 - 12:00 Cured in Place Pipe vs. Digging and Replacing
Travis Bohm/Perma-Liner

BUSINESS TRACK — ROOM C101-C104

8:00 - 9:00 Quality and the True Cost of Ownership
Matt Sutton/Rapid View

9:30 - 10:30 Vision and Direction: Leading your Service Company to Prosperity
Victoria Finley/One Biotechnology

11:00 - 12:00 How to Shop Your Insurance Effectively
Mark Herring/Heffernan Insurance

INSTALLER TRACK — ROOM C109-C112

8:00 - 9:00 Safety in Excavation
Gary Hooks/Safety Corporation of America

9:30 - 10:30 Comprehensive Control Panel Training
Joe Zimmerman, Scott Rietsema/SJE Rhombus

11:00 - 12:00 Onsite Wastewater Effluent Disinfection
Jim Cruver/Salcor

LIQUID WASTE TRACK — ROOM B103

8:00 - 9:00 Dewatering Alternatives
Kelly Brown/BDP Industries

9:30 - 10:30 Convert a Liability to an Asset
Emily Landsburg/Black Gold Biofuels

11:00 - 12:00 The Role of Bacteria and Bioaugmentation in Grease Traps and Septic Systems
Dr. Clarence Baugh/Custom Biologicals

SEWER & DRAIN TRACK — ROOM B102

8:00 - 9:00 Drain Cable Technology and Their Real World Applications
Keith Nesky/Spartan Tool

9:30 - 10:30 OSHA Procedures Regarding Confined Space
Chris Cira/M Tech

11:00 - 12:00 Sonde and Utility Line Locating Techniques
Rob Trefz/RIDGID

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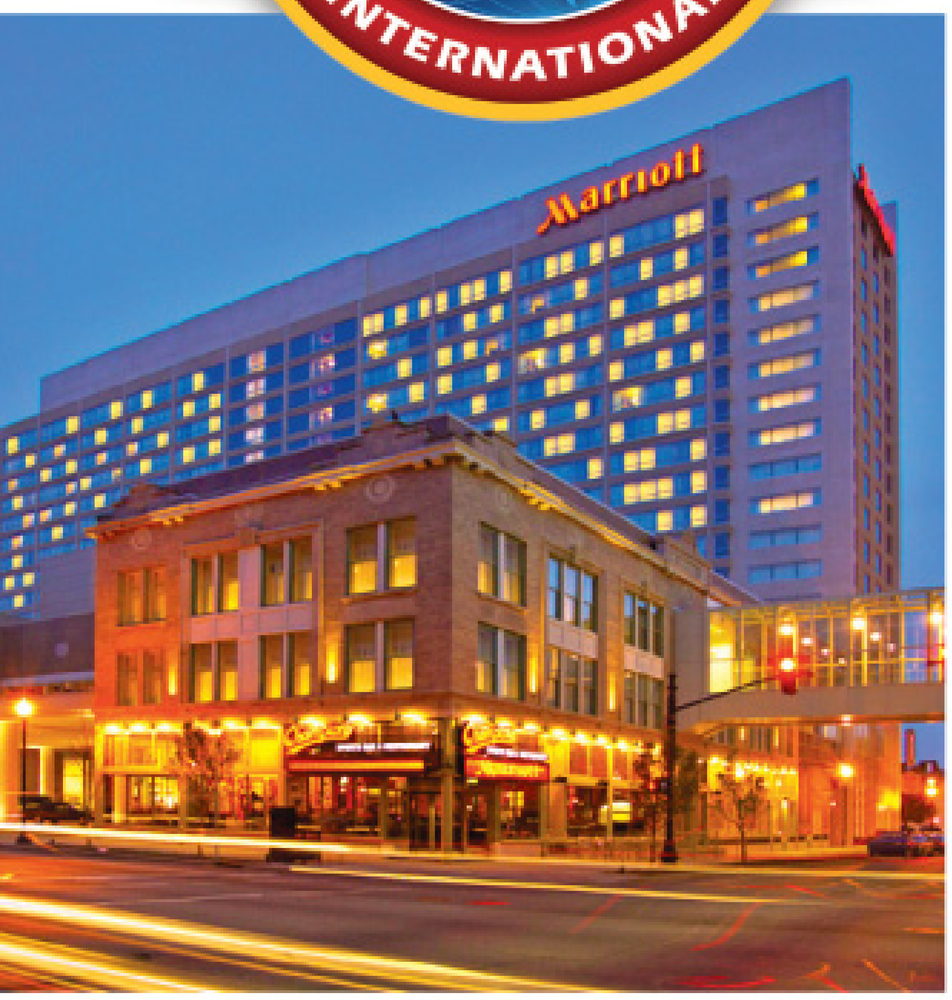

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No Stone Unturned

THE BERGEN POINT TREATMENT PLANT LOOKS AT EVERY FACET OF OPERATIONS FOR WAYS TO SAVE ENERGY AND REDUCE ENVIRONMENTAL IMPACTS

By Doug Day

PHOTOS COURTESY OF BERGEN POINT WASTEWATER TREATMENT PLANT

Overview of the Bergen Point treatment plant. Primary settling tanks to the left (six in all); effluent pump station building at upper left.

The 30-mgd Bergen Point Wastewater Treatment Plant in Suffolk County, N.Y., has made big strides in cutting energy usage and greenhouse gas emissions.

Through a long list of projects, the plant has reduced greenhouse gas emissions by 1,000 tons per year, saved the equivalent of 3,400 barrels of oil annually, and reduced annual energy costs by $375,000. Those are just a few of the benefits, according to Ben Wright, chief engineer.

"The first one was really the easy stuff, like more efficient motors, lighting retrofits, variable-frequency drives — the low-hanging fruit." The total cost of about $3 million will be funded through the savings. The plant will also get some utility rebate money from the Long Island Power Authority.

The second project will be more extensive, and more beneficial. The construction cost will be about $1.5 million, and the payback will be relatively short.

> "We put in fine-bubble diffusers and saved about $1 million a year in power costs."
>
> **BEN WRIGHT**

GETTING CURRENT

Payback on items in the first phase of projects ranges from seven to 12 years. The plant was built in the 1970s, and its T-12 fluorescent lighting fixtures were outdated. The plant staff replaced them with high-efficiency T-8 fluorescent fixtures. "We put occupancy sensors in areas with significant lighting loads to knock down some of the power use," Wright says.

The old HVAC controls and reheat coils were replaced with Johnson Controls to improve air-handling efficiency. Motors across the plant were also changed out. "On most motors — anything above 3 hp — we used high-efficiency motors and variable-frequency drives wherever it made sense, to match the flow more closely and not have big peaks on motor startup," Wright says.

"We had old high-energy and maintenance-intensive reciprocating compressors for our instrument air, so we added much more efficient rotary screw units (Hibon-Ingersoll Rand). The baseline load will be met with one of the new units, while the second unit will modulate the speed and load to match the demands. The third unit will provide redundancy."

What's Your Story?

***TPO* welcomes news about environmental improvements at your facility for future articles in the Greening the Plant column. Send your ideas to editor@tpomag.com or call 877/953-3301.**

Besides the energy savings, the plant received $128,500 in rebate money from Long Island Power: $100,000 for lighting improvements and motors, and $28,500 for three high-efficiency 100-hp air compressors.

FASTER PAYBACK

Next up, and still in the planning stage, is the second-phase project. "Our energy engineer, Javed Ashraf, is developing the project and obtaining proposals that will result in savings of around $425,000 a year, not counting utility rebates," Wright says. The simple payback will be less than three years.

About $550,000 of the $1.5 million cost will pay for efficient gas-fired condensing boilers to replace the 1980s-era heating system. "The new boilers will have a payback of four years," says Wright. "Right now we have a central plant, and we run heated lines as much as 1,000 feet, so they lose some heat and aren't as efficient as they could be. We're thinking a decentralized system may be better, but then we might need more maintenance staff. It's a balancing act."

The work will also include new chillers and air-handling units. "We're one of the higher users of power in the county, so we're always looking at ways to reduce," Wright says. "A lot of it comes from the operations staff and their day-to-day work, and where they see where some improvements may be made."

Bergen Point has also added a SCADA system (Reflex Technologies and GE-Intellution) to automate control of various plant processes. "We put in fine-bubble diffusers (Parkson) about 10 years ago and saved about $1 million a year in power costs," says Wright. "We had three 1,750-hp aeration blowers. Going to fine-bubble diffusers allowed us to turn off one of those blowers."

"We are evaluating our sludge management plan right now. Whatever it ends up being, it has to be energy efficient, possibly a beneficial reuse that is compatible with the county and our neighbors."
BEN WRIGHT

CUTTING CHEMICALS

The plant staff also knows the environmental impact of chemical use. "We use chemicals for odor control, sludge thickening and dewatering, disinfection, and pH control," Wright says. "We always look for ways to do the same thing for less cost or fewer pounds of chemicals.

The staff has already reduced chemical use by about 1,500 pounds per day. The impact extends beyond Bergen Point: "Somebody is producing those chemicals and transporting it to us. There's a significant energy reduction by doing that."

Wright expects a significant reduction in the plant's transportation carbon footprint from steps being taken to improve biosolids handling. Since its incinerators went offline in 2002, the plant has been shipping raw sludge to southern states. "We are evaluating our sludge management plan right now," says Wright. "Whatever it ends up being, it has to be energy efficient, possibly a beneficial reuse that is compatible with the county and our neighbors."

Already, improved dewatering has reduced hauling. New belt filter presses (Ashbrook) have increased the solids content from 22 percent to nearly 30 percent. That means 40 fewer trucks per month driving from the plant to a rail site in New Jersey for transportation a thousand miles one-way to Georgia, South Carolina or Virginia. "It saves about five pounds of carbon emissions per mile, per truck as well as less rail-related emissions," Wright says.


The influent pump room houses five pumps with 60-mgd capacity.


A grit chamber at the Bergen Point facility.


The final clarifier overflow weir was refurbished in 2007.

The dewatering project cost $5 million, but it saves $1 million a year in trucking costs. "The payback is pretty good for us, and we haven't even put a dollar figure on what we're doing to help the environment," Wright says.

LOOKING INTO UV

For disinfection, the plant now uses chlorine, but Wright and his team are considering a switch to UV disinfection.

Choosing between a new chemical method and UV has to account for more than the cost. "If I just said we're using chlorine now and we're putting in ultraviolet, there is a significant power load that someone could question," Wright admits.

"But when you compare UV against chlorine disinfection and chlorine removal by chemicals, the amount of chemicals is significant when compared to the increased power. The cost-effectiveness analysis says use UV. We're going to save money, and it's safer for the environment."

Another project on the planning board now is a natural-gas-fueled cogeneration facility. A 4-MW unit would power the entire plant. If it is cost-effective to build a larger unit, the excess power could be sold to the utility.

STATEWIDE EFFORTS

Bergen Point's efforts to use energy wisely are part of a larger statewide initiative. The New York Power Authority in 2009 launched a program to reduce energy demand from water and wastewater treatment plants by about 20 percent by 2015.

In honoring Bergen Point and Suffolk County earlier this year, NYPA president and CEO Richard M. Kessel said, "The energy efficiency upgrade at Bergen Point crystallizes the benefits of clean energy technologies for wastewater treatment plants, which are among the most energy intensive of industrial applications. The upgrades are also reducing greenhouse gases and other emissions, as we do our part for a healthy and clean environment."

NYPA says electricity accounts for 25 to 40 percent of the budget of a typical wastewater treatment plant and 80 percent of the cost of drinking water treatment systems. The utility is promoting measures such as on-site solar electric systems, biogas recovery to supply on-site power, and energy efficiency measures. Wright and the staff of Bergen Point are helping to pave a trail to meet the NYPA goals. **tpo**

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The Power of Data

INLINE DO AND ORP MONITORING YIELDS INFORMATION THAT HELPS AN OHIO TREATMENT PLANT IMPROVE BIOLOGICAL PHOSPHORUS REMOVAL AND CUT COSTS

By Bob Dabkowski

The American-Bath plant installed Hach LDO luminescent technology sensors and ORP sensors in the oxidation ditch channels, mounted on the ends of stanchions.

PHOTOS COURTESY OF HACH COMPANY

For years the American-Bath Wastewater Treatment Plant (WWTP) in northwest Ohio's Allen County had met stringent phosphorus limits through biological removal and aluminum sulfate (alum) addition.

But when the cost of alum more than doubled from $161 per ton in 2006 to nearly $443 per ton in 2008, management decided to improve the plant's process control for biological phosphorus removal and so reduce alum consumption.

"These probes finally allowed us to see what was going on in our system and make the necessary changes to significantly improve our process control."
JOHN MOTYCKA

"We are very concerned about maintaining our phosphorus limits, and we never had a problem before with using alum to help us accomplish that," says plant superintendent John Motycka. "But when we went from spending about $2,000 a year for alum to upwards of $5,000, it got us to thinking about how improving our biological process could lower our alum consumption while still maintaining our phosphorus limits."

Motycka knew the plant needed to attain precise and continuous process information to achieve that goal. To that end, the plant installed new inline instrumentation to provide real-time dissolved oxygen (DO) and oxidation reduction potential (ORP) measurements. With the process control improvements enabled by the new process sensors, the plant has significantly improved biological phosphorus removal while reducing annual chemical and energy costs by more than $11,000.

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CHANNELS IN SERIES

American-Bath is one of three wastewater treatment plants (along with two smaller package plants) that comprise the Wastewater Treatment Division of the Allen County Sanitary Engineering Department. The plant, which serves about 8,000 residents in American and Bath townships, uses an ORBAL (Siemens) three-channel oxidation ditch system for biological treatment.

The system includes three concentric elliptical channels, each operating at different DO levels. The wastewater passes through the channels in series, from outermost to innermost. Flow circulates around each channel, allowing the raw sewage to be dispersed quickly with microorganism flocs.

The outer channel is the anaerobic ring, where the raw influent mixes with the mixed liquors. The middle channel is the anoxic zone, and the inner channel is the aerobic zone, where oxygen levels are brought up to maintain free DO for the aerobic bacteria.

The plant's phosphorus limits are 1.5 mg/l weekly average and 1.0 mg/l monthly average. According to Motycka, the key to achieving more stringent biological process control and meeting those limits is to have accurate control of oxygen levels in the treatment channels.

"For us, one of the most important things is maintaining anaerobic conditions in our outer channel by creating an oxygen deficit condition," he says. "This causes the aerobic phosphorus-consuming bacteria in the mixed liquor to release the phosphorus they have consumed.

"Then, when they enter the second and third channels, the phosphorus-consuming bacteria will consume the phosphorus that was released, as well as additional phosphorus from the raw wastewater (termed 'luxury uptake'). Our goal is to have the bacteria consume enough phosphorus so that we can keep the level below 1.0 mg/l and not have to add alum."

SENSOR TECHNOLOGY

Essential to success was the decision to add inline dissolved DO and ORP probes to provide continuous, real-time measurements within the biological processes. The plant installed Hach LDO luminescent technology sensors and Hach ORP sensors in the channels: one ORP probe in the outer channel, ORP and LDO probes in the middle channel, and an LDO probe in the inside channel.

The probes plug into Hach sc100 controllers that continuously read the process sensors and can communicate via a 4-20 mA signal to a plant's PLC or SCADA system. The controllers also have built-in dataloggers that collect measurements at user-selectable intervals (1 to 15 minutes), along with calibration and verification points, alarm history, and instrument setup changes for up to six months. The controllers are designed to receive data from one or two sensors simultaneously.

With the inline meters providing a real-time and historical picture of DO and ORP values at different organic/hydraulic loading rates, recycle rates, solids retention times and seasonal conditions, operators were able to establish trends to optimize DO control, and determine the time and cause of any transient conditions.

In selecting the DO probe, the plant chose a new technology. Hach LDO probes do not consume oxygen during measurement, as that often creates a fouling buildup in membrane sensors and an oxygen gradient that slows down response. Because there is no membrane, there is no replacement due to fouling and no need to monitor and replace electrolyte solution.

ABOVE: American-Bath chief operator Jeff Bassitt downloads data from the Hach sc100 controller. With inline meters providing real-time and historical DO and ORP values, Bassitt and colleagues can establish trends to optimize DO control and determine the time and cause of transient conditions.
RIGHT: The probes plug into Hach sc100 controllers that continuously read the process sensors and can communicate via a 4-20 mA signal to a plant's PLC or SCADA system.

REAL-TIME DATA

The ORP probe in the outer channel helps ensure an anaerobic environment, and the LDO in the inner channel determines whether sufficient free DO is present for the aerobic bacteria to survive. When operators began studying data from the controller's dataloggers, they learned a lot. "We were going anaerobic part of the day in the outer channel, but for some reason, at about 3 a.m., the oxygen would start to rise and then eventually begin to drop off again midday," says Motycka. "This was adversely affecting biological phosphorus removal."

Once operators discovered that, they were able to restore anaerobic conditions in the outer channel during the identified period by adding a bigger pulley on the gear reducer that drives the outer channel's ditch drive. This enabled the plant to slow the drive from 42 rpm to 39 rpm, bringing more consistent anaerobic conditions to the outside channel.

"As soon as we did that, our biological removal improved significantly," Motycka says. "Within a week or two, our phosphorus dropped to between 0.4 mg/l and 0.5 mg/l without addition of alum."

When the weather began cooling off a few months later, however, operators again saw biological removal declining. "During the summer, we were achieving good biological removal in the inner channel with our DO ranging from 3.0 to 4.0 mg/l," says Motycka. "But during the fall, DO levels started climbing up to 6.0 and 7.0 mg/l, so we had to start adding more alum."

Real-time, continuous DO and ORP monitoring again provided the information to help operators resolve the issue. "Although the ORP in the outer channel didn't rise a great deal, it was enough that the phosphorus release wasn't sufficient and the luxury uptake in the middle and inside channels decreased," Motycka says. "DO in the inside channel was much higher, which indicated that we were recycling DO in the return activated sludge."

The Hach sc100 controllers were connected to the PLC that controls the plant's aerator drives. The PLC was programmed to automatically control the aerator drives to maintain a DO level in the inside channel between 2.0 and 3.0 mg/l, based on the current LDO probe readings.

CUTTING ENERGY COSTS

Programming of the aerator drive's PLC to maintain DO within the established set point further increased phosphorus removal efficiency. "Within a few days, effluent phosphorus decreased to about 0.5 mg/l with no alum addition," Motycka says. "And, as a side benefit, we considerably reduced our energy costs. We tracked the run time and the starts for the aerator drive. We went from running that ditch drive around the clock to running it only three or four hours a day, which will save us more than $8,000 per year in power costs."

The use of the inline DO and ORP probes has significantly improved process control for biological phosphorus removal. "Some alum use will always be necessary, due to conditions beyond our control, such as very cold temperatures in the winter and high flows during wet weather, but we have effectively reduced alum use by more than half," Motycka says.

That savings combined with the power savings, total about $11,800 per year, providing a payback of less than one-year payback on the DO and ORP probes and controllers.

"These probes finally allowed us to see what was going on in our system and make the necessary changes to significantly improve our process control," says Motycka. "Before this upgrade, we worked with lots of grab sample data, but nothing that really allowed us to look at the complete cycle of our biological system the way we do now with inline monitoring. You really can't compare grabbing a sample to having DO probes continuously monitoring key points in the system." **tpo**

ABOUT THE AUTHOR

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A Remedy for Pump Cavitation

APPLICATION OF A SPECIAL CAVITATION-RESISTANT POLYMER CAN RESTORE A DAMAGED PUMP IMPELLER AND HELP FORESTALL COSTLY PUMP REPLACEMENT

By Glenn Machado

Cavitation is the formation and implosion of vapor bubbles in a region where the pressure of a liquid falls below its vapor pressure. Cavitation is extremely damaging and can occur in any fluid-handling equipment, especially in pumps, one of the most important components of wastewater treatment systems.

Technological advances in industrial protective coatings and repair composite materials have made it possible to repair pumps suffering from cavitation, rather than simply replacing them. Cavitation-resistant (CR) elastomers can retain adhesion under long-term immersion, dissipate energy created under high-intensity cavitation, and provide outstanding resistance to corrosion and other forms of erosion.

Cavitation is a serious problem for pumps. In simple terms, a pump moves fluid from one location to another with mechanical actions that can be extreme, and can damage the internal working parts of the pump. The focal point of damage is the pump impeller vane. During operation the impeller is subject to pressure gradients that cause bubbles to form and implode, striking the surface underneath.

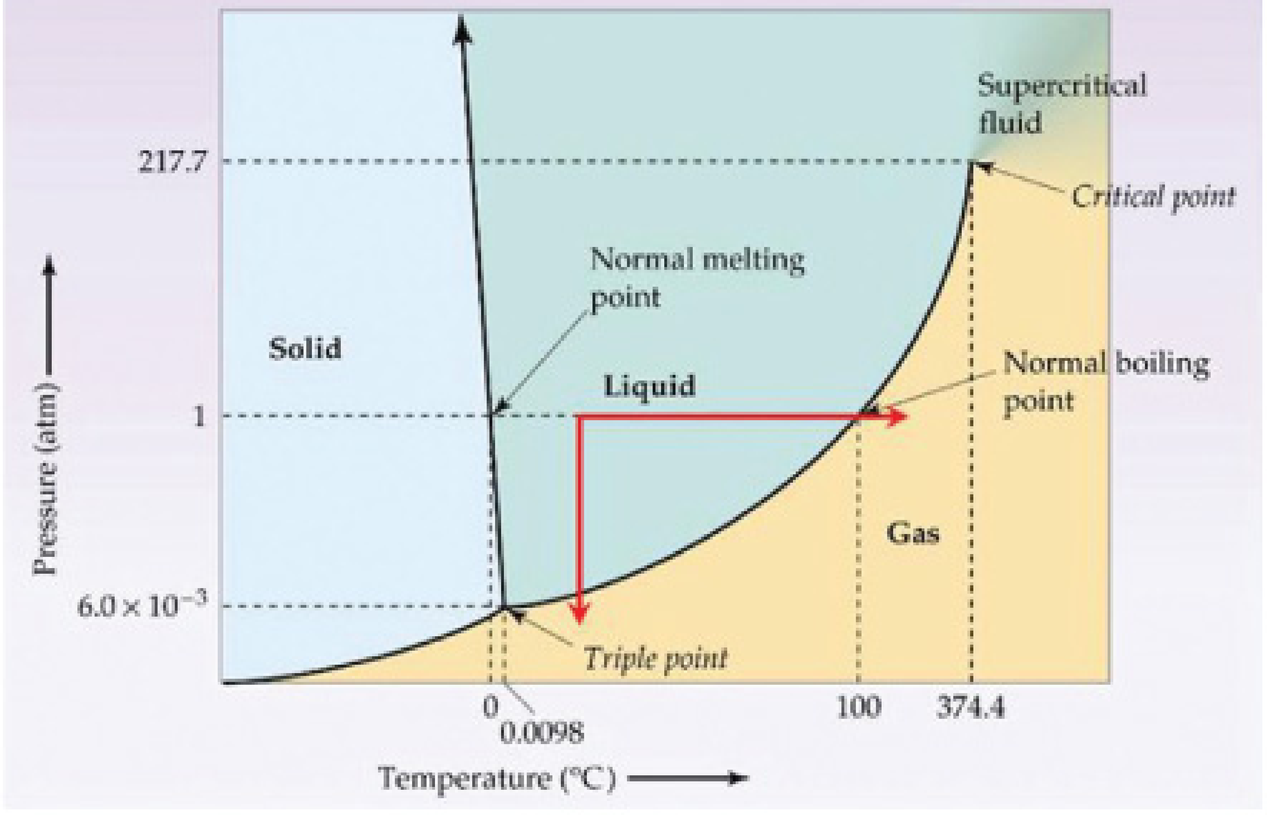

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FIGURE 1: Phase diagram of water.

KNOWING THE MECHANICS

The phase diagram of water is a practical aid to understanding cavitation (Figure 1). The diagram shows the three physical states of water at different temperatures and pressures. The curves on the graph represent equilibrium states. The curve bordering the liquid and gas phases is called the vaporization curve.

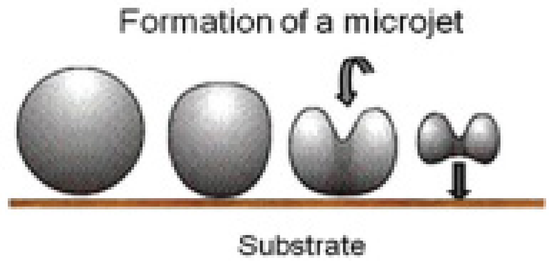

FIGURE 2: Process of implosion of vapor bubbles in water.

At normal pressure and temperature, a fluid is at 1 atmosphere (14.7 psi) and 25 degrees C. Water is most commonly boiled by heating at a constant pressure, such as boiling a pot of water on a stovetop (follow the black arrow). As temperature increases at constant pressure, water remains in a liquid phase until it reaches the normal boiling point (100 degrees C at 1 atmosphere), at which point, it starts to boil.

Less intuitive but equally true is that water can also be boiled by dropping the pressure at a constant temperature (follow red arrow). This is what happens just behind the leading edge of a pump impeller vane. As water enters the pump, it is deflected by the vane. Above the leading edge of the vane, the fluid is compressed, creating a high local pressure area.

Directly after the leading edge, there is a small area of decreased pressure. If this drop in pressure moves below the vaporization curve at constant temperature, the water will boil, and vapor bubbles will form in it. Behind this low-pressure area, there is another high-pressure region. As the vapor bubbles entrained in the water move into this region, they condense and collapse violently against the metal, forming a "micro jet."

Figure 2 illustrates the implosion of the vapor bubbles. The top of the bubble becomes unstable and collapses toward the metal surface substrate. During this process, pressures as high as 145,000,000 psi have been recorded. That exceeds the elastic limit for any alloy, proving that not even the most exotic alloys can prevent cavitation.

These vapor bubbles are responsible for the mechanical damage found on pump impellers after extreme service. Figure 3 shows a typical pump suffering from cavitation and some other form of erosion after normal operation.

SOLVING THE PROBLEM

The solution to pump impeller cavitation lies in finding a material that can withstand high pressures, bear harsh environments, and be machinable. At present, no readily available alloy can do that cost-effectively. Thus the only tangible way to salvage the pump is to protect it with a sacrificial material that is readily available, easy to use, and cost-effective.

Figure 3: Pump impeller surface showing evidence of cavitation erosion.

After years of research in corrosion engineering, a CR fluid has been formulated; Elastomers that can bond to virtually any substrate, including steel. With the appropriate surface preparation, adhesion strengths greater than 3,200 kg/m² are achievable. By combining elastomeric properties and great adhesive strength, the material can withstand full immersion and a harsh working environment.

More important, the material's flexibility enables it to dissipate the enormous energy of cavitation and other erosion processes. A CR fluid elastomer has been in service for a number of years. Before it came on the market, it underwent a series of highly demanding quality checks, including laboratory tests to determine that the correct properties had been achieved.

The testing did not stop at the inception of the product — it has continued throughout the material's market life. To ensure longevity, CR fluid elastomers are scheduled to be subjected to the ASTMG8 testing for magnesium anode and cathodic disbondment.

A solution to eradicate pump impeller cavitation has not been discovered. The best solution at present is to coat the fluid-handling device with a high-performance material that is elastomeric and has high-adhesive strength.

In one particular case, the sides and the trailing surfaces of a large impeller had suffered from cavitation and significant metal loss (Figure 3). The CR elastomer was applied by an authorized coating applicator. Here is a summary of the methodology:

- All surfaces to be coated were grit-blasted using an angular abrasive to NACE No. 2 (near white metal), ensuring a minimum 3-mil (75-µm) angular profile.
- All those surfaces were subsequently washed down with a recommended cleaner degreaser to remove residual blasting debris and contaminants.
- Masking tape was placed at the outer edges of the areas to be coated to give a neat and clean finish.
- The substrate was rebuilt and brought back to factory specification. To rebuild such a large area, an extended-working-life paste-grade polymer from a reputable manufacturer was used.
- To protect the freshly rebuilt substrate, an efficiency-improving and abrasion-resistant polymeric coating was applied, using stiff, short-bristled brushes to a maximum wet thickness of 10 mils (250 µm). Two coats of this material are required to ensure that pinholes and other defects are eliminated. This coating is used to prevent the effect of erosion and corrosion.
- With the pump rebuilt, a CR coating was applied to the entire impeller (Figure 4). An alternative solution would be to weld numerous damaged areas, or cut out a large section and weld it in a new plate.
- All the coated surfaces were allowed to cure, the coating was inspected for continuity, and the pump was put back into service.

PROVIDING PROTECTION

A solution to eradicate pump impeller cavitation has not been discovered. The best solution at present is to coat the fluid-handling device with a high-performance material that is elastomeric and has high-adhesive strength.

The high adhesion allows the material to bond to the fully immersed substrate, while the elastomeric characteristics better dissipate the energy of cavitation. If a solution to control mechanical damage to the pump is needed, a CR fluid elastomer is the answer. tpo

FIGURE 4: Pump impeller with cavitation-resistant elastomer applied.

ABOUT THE AUTHOR

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Making It Clear

A PRACTICAL APPROACH HELPS RON TRYGAR'S STUDENTS AT FLORIDA'S TREEO CENTER GRASP BASIC CONCEPTS, PASS EXAMS, AND OPERATE THEIR PLANTS EFFECTIVELY

By Ted J. Rulseh

It would be hard to pack more diverse experience into 25-plus years in the wastewater industry than Ronald Trygar has.

Before joining the University of Florida TREEO Center a little less than two years ago, Trygar worked as an operator at several wastewater treatment plants in New Jersey, Virginia and Florida. He also gave technical assistance to treatment plants as a wastewater section supervisor for the Florida Rural Water Association, worked for a plant operations and management company, trained operators for a private company in the Virgin Islands, and ran his own wastewater training consulting business.

Ronald Trygar

Today, he's the senior training specialist in water and wastewater at TREEO Center (the name stands for Training, Research and Education for Environmental Occupations). There, he instructs water and wastewater treatment plant operators from across Florida, both in on-campus classes and on the road at treatment plants. He holds Florida Level A wastewater and Level B water operator licenses.

"Right now, we do about half our classes on the road, where before about 90 percent were here at the TREEO Center. I think that in the near future, maybe 75 percent of the time I'll be traveling."

RON TRYGAR

The role of TREEO Center is to help environmental professionals keep current with developments in their fields. Besides water and wastewater the center's more than 250 professional development courses cover environmental and health and safety, air quality, asbestos abatement, GIS, GPS, groundwater, hazardous materials, ISO 14000, landfill design, lead abatement, and solid waste, water and wastewater.

Trygar, a certified environmental trainer (CET), is a member of the Florida Department of Environmental Protection Operator Certification Program Exam Review Committee. He is also active in the Water Environment Federation, the Florida WEA, the Florida Water & Pollution Control Operators Association, and the Board of Certification for the National Environmental Safety and Health Training Association.

His diverse experience in operations and instruction gives him unique perspectives on current trends in training, the training methods that work, and the importance of training for today's wastewater operators and the organizations they serve. He spoke on those and other topics in an interview with *Treatment Plant Operator*.

tpo: How did you get into the wastewater business?

Trygar: After high school in New Jersey, I moved to Virginia Beach, Va., and had a temporary job doing deliveries for a flower wholesaler. One of the guys who worked with me said his mom worked at an employment agency, and he arranged for me to talk to her. She said, "There's a job at this water treatment plant. Would you be interested in that?"

My dad was a water operator in New Jersey, so I decided to check it out. Lo and behold, it was a wastewater plant. I decided, well, it was a job with benefits. So there I was, 18 years old and an operator trainee with the Hampton Roads Sanitation District at a 50-mgd pure oxygen activated sludge plant.

When I saw how everything worked, I just fell in love with it. Even today, I get so excited about teaching it. It's so intricate — the biology and chemistry and all the things that happen. To me, it's so much more exciting than drinking water. I'm really glad it was a wastewater plant I went to.

tpo: What are some key issues you see in wastewater training today?

Trygar: The economy has affected operators' ability to get the kind of training they want. Here in Florida, many students tell me their cities have money available for training, but they don't have any travel money. They can't travel outside the city limits and be reimbursed for it. So they have to pay out of pocket to come to my classes.

Others tell me their training budgets are so low that all they can afford are online courses. Those courses may be very good, but most adult learners I teach really like the interaction with other learners in a classroom setting, and they're not as comfortable sitting there in front of a computer. They really like the ability to put their hands on a piece of equipment or run a test themselves.

tpo: How is TREEO Center responding to that?

Trygar: We are taking more of our training on the road. For example, last year I did a three-day course in a city near Orlando on activated sludge, process control, and troubleshooting. Since we used the city's facility, we gave a couple of their people free admittance. So the class was a mixture of classroom, theory and lecture,

and then we went out to the plant and actually did the testing.

That kind of training has been a real success for us. Right now, we do about half our classes on the road, where before about 90 percent were here at the TREEO Center. I think that in the near future, maybe 75 percent of the time I'll be traveling.

tpo: How have tight effluent standards affected the need for quality training?

Trygar: Permit requirements for effluent discharge are getting stricter, and the environmental groups are pushing the EPA and the Florida DEP to enforce the regulations more thoroughly. Nitrogen and phosphorus standards in particular are getting tougher. We have facilities that need to meet limits of 0.2 mg/l phosphorus.

It's tough for some rural towns to get to those limits without a lot of process control and a lot of training on how to operate their facilities. One of my most popular courses is in biological nutrient removal. It's two days covering just nitrogen and phosphorus, and when the evaluations come back, the people say they want it to be a three-day class.

Many plants I deal with in Florida are designed to meet BNR requirements, but they have trouble meeting those very low limits without chemical addition. So we include chemical safety in the BNR course.

tpo: What has the aging of the operator workforce done for training needs?

Trygar: It's incredible to see the number of people retiring and leaving the industry, and when they go they take a lot of knowledge and experience with them. We're trying to get more young people into the industry.

Several utilities in Florida have internship programs, where they'll pay for a trainee student to take the courses and the exam while they work at the treatment plant. In turn, they want the students to guarantee they will work there for at least a year. That's been really successful.

I'm trying to get us out more into the science classes at elementary and middle schools. We want to get kids more aware of wastewater treatment and water conservation, because we need to as a society, but also to give them an idea of what it takes to be a water or wastewater operator.

I'll bring my microscope to the class and hook it up to their TV monitor, and we'll look at some slides so they get to see what the bacteria and all the indicator organisms look like. I do some work with the University of Florida and the local community colleges.

tpo: What approach do you take to training? Do you use the standard resources like the Sacramento books?

Trygar: The books are in my classroom, and we use them as reference material if we need them, but I have developed my own presentations that I've delivered over the years, and we go with that. My presentations use a lot of pictures. I have a pretty extensive library of photos that I can pick out at any given point to show them what I'm talking about. I think that really makes a difference. That approach is something I learned about through my CET training.

tpo: What do you consider to be the most important part of your courses?

Trygar: I would have to say it's the math. The odd thing is that I was terrible at math in school, and yet some of the best training I give now, and some of the most fun I have with the operators, is teaching them math.

When I ask a class of operators what their weakest subject is, nine times out of 10 it's math. In my classes, if it's a three-day class, we'll spend roughly a day and a half on math. Little do they know it ends up being that much. We work it in as we talk, and that way it's not scary to them. They understand it when we put it into context. The evaluations I get say the thing they liked most was math. And I had to have a math tutor when I was in high school!

tpo: What are some of the most popular courses you offer?

Trygar: We do a lot of exam prep courses. Many people go through the standard Sacramento courses. They read the books, they do the chapter quizzes, and they get a certificate at the end that they took the course. But when they go and sit for the exam, they really don't have practical application knowledge of what they've read.

When we do an exam review course, we spend quite a bit of time just reviewing the basics. I aim the training at giving the people a good understanding of how the processes work. As a result, we have a really good passing rate on the state exams.

Our passing rate for the C level, which is the lowest level in Florida, is at about 81 percent for the students who take our exam prep course. For the B level, we're seeing about a 70 percent pass rate, and for the A level it's about 65 percent.

tpo: What makes these exam prep courses so effective?

Trygar: We thought we would be teaching a refresher course, but it ends up being more of a crash course in the basics. We teach them about how bacteria eat, and what they do, and what chemistry happens around them. Make sure the operators have a handle on the basic processes and how to troubleshoot.

You can't troubleshoot if you don't know the basics of how it works to begin with. We spend a lot of time on the basics, so when they get a troubleshooting question on the exam, they say, "Oh, I know exactly why that is." The neat thing is that we don't offer CEUs for those courses, and yet they're very well attended. That tells me the students are there for the knowledge, that they want to learn.

tpo: How would you describe your style of teaching?

Trygar: My teaching method is very informal. I try to set the classroom up so that the students have the most ability to interact with each other. A U-shape works well. I encourage them to talk and learn about each other and share stories, as well as listen to what I deliver to them. I find many operators have great stories to share. We all have input, and I learn something from them as much as they learn from me.

tpo: What message would you like to leave with wastewater operators?

Trygar: Just because you don't have a college degree doesn't mean you can't go far in this industry. The only time I've set foot on a college campus is to go to Florida State football games, but I've done really well for myself in the industry. If you find something you really like, and you're passionate about it, and you follow your heart, great things can happen. **tpo**

"You can't troubleshoot if you don't know the basics of how it works to begin with. We spend a lot of time on the basics, so when they get a troubleshooting question on the exam, they say, 'Oh, I know exactly why that is.'"
RON TRYGAR

Down to the Wire

FORTY-ONE TEAMS COMPETED IN THE 22ND WEF OPERATIONS CHALLENGE. THE DEFENDING CHAMPION TRA CReWSers TOOK THE OVERALL TROPHY AGAIN.

By Ted J. Rulseh

Intense faces. Spectators shouting encouragement. Team members high-fiving. No, it wasn't a sporting event, but it was the toughest competition of the year for 41 teams of wastewater operators from around the nation and beyond.

When it was over, the defending champion TRA CReWSers from the Water Environment Association of Texas and Trinity River Authority took top honors in the 22nd Operations Challenge, held during WEFTEC '09, the Water Environment Federation's 82nd Annual Technical Exhibition and Conference, Oct. 10-14 at the Orange County Convention Center in Orlando, Fla.

Trinity River Authority's Jake Burwell inverts BOD bottles in the laboratory event to ensure they contain no entrained air bubbles. (Photos by Oscar & Associates)

Coached by Raudel Juarez, the team of Jacob Burwell, Dale Burrow, Steve Price, and David Brown competed against teams from the United States, Canada, and Argentina during the fast-paced, full-day event.

Operations Challenge has grown from an original 22-team event to its 41-team, two-division format. Teams represent WEF member associations. Winners are determined by a weighted point system for five events related to collection systems, laboratory, process control, maintenance, and safety.

"Each year we tend to set a record in number of teams," notes WEF vice president Jeannette Brown, P.E., BCEE. "Each facility that has a team really gains because their operators are studying and practicing the various processes involved in wastewater treatment. In addition, because the events are timed, the participants have to learn to work as teams, and in our business we need to have that teamwork.

"I think the event is truly valuable to the people involved, as well as to their agencies. While they're at WEFTEC, they're able to go to technical sessions to increase their knowledge and spend time on the exhibit floor, talking to equipment suppliers and getting ideas to take back to their treatment plants."

Here are the overall winners, and the winners of the individual events:

Overall

	MEMBER ASSOCIATION	TEAM NAME
Division 1		
First Place	WEA Texas	TRA CReWSers
Second Place	Virginia WEA	Terminal Velocity
Third Place	Rocky Mountain WEA	Commode Commandos
Division 2		
First Place	Illinois WEA	Windy City Wizards
Second Place	Virginia WEA	Team HRSD
Third Place	New England WEA	Seacoast Sewer Snakes

Laboratory

	MEMBER ASSOCIATION	TEAM NAME
Division 1		
First Place	Virginia WEA	Terminal Velocity
Second Place	WEA Texas	TRA CReWSers
Third Place	Rocky Mountain WEA	Commode Commandos
Division 2		
First Place	Illinois WEA	Windy City Wizards
Second Place	Virginia WEA	Team HRSD
Third Place	Hawaii WEA	Septic Soljahs

Safety

	MEMBER ASSOCIATION	TEAM NAME
Division 1		
First Place	WEA Texas	TRA CReWSers
Second Place	Virginia WEA	Terminal Velocity
Third Place	New Jersey WEA	Cape Shore Workers
Division 2		
First Place	Ontario WEA	OCWA Jets
Second Place	WEA Texas	Dillo XXpress
Third Place	Virginia WEA	Team HRSD

LEFT: In the collections event, Terminal Velocity's Donnie Cagle (left), Paul Cubilla, and Jason Truitt complete a lateral repair. BELOW: Clockwise from top: Steve Price, David Brown, Jake Burwell and Dale Burrow of the Trinity River Authority CReWSers prepare a Godwin Dri-Prime CD100M pump for service at a disabled lift station during the maintenance event.

The TRA CReWSers won first place in Division One of the 2009 Operations Challenge at WEFTEC. They represented the Water Environment Association of Texas and are employed by Trinity River Authority of Texas, based in Arlington. From left to right are Operations Challenge committee chair Jeff Pratt; team members Steve Price, David Brown, Jacob Burwell, Dale Burrow, Mike Young and Raudel Juarez; WEF president Rebecca West; and Bill Tatum of TRA.

Process Control

	MEMBER ASSOCIATION	TEAM NAME
Division 1		
First Place	Virginia WEA	Terminal Velocity
Second Place	Rocky Mountain WEA	Commode Commandos
Third Place	California WEA	LA Wrecking Crew
Division 2		
First Place	Illinois WEA	Windy City Wizards
Second Place	Rocky Mountain WEA	Aurora's Ascending Aerobes
Third Place	Central States WEA	Pumpers

Maintenance

	MEMBER ASSOCIATION	TEAM NAME
Division 1		
First Place	New Jersey WEA	Cape Shore Workers
Second Place	Utah WEA	Wasted Gas
Third Place	WEA Texas	TRA CReWSers
Division 2		
First Place	Utah WEA	Wasatch All Stars
Second Place	South Carolina WEA	Liquid Force
Third Place	New England WEA	Seacoast Sewer Snakes

Collections

	MEMBER ASSOCIATION	TEAM NAME
Division 1		
First Place	WEA Texas	TRA CReWSers
Second Place	Virginia WEA	Terminal Velocity
Third Place	Rocky Mountain WEA	Commode Commandos
Division 2		
First Place	Illinois WEA	Windy City Wizards
Second Place	Virginia WEA	Team HRSD
Third Place	New England WEA	Seacoast Sewer Snakes

The Windy City Wizards took first place in Division Two in the 2009 Operations Challenge at WEFTEC. They represented the Illinois Water Environment Association and are employed by the Metropolitan Water Reclamation District of Greater Chicago. From left are Operations Challenge committee vice-chair Cordell Samuels; team members Jim Kaminski, Bob Jones, Rich Stubing, Ed Staudacher, Paul Wysocki and Jim McNamara; and Water Environment Federation president Rebecca West.

product focus

Keeping Tabs

LAB EQUIPMENT AND PROCESS CHEMISTRY ARE VITAL TO EFFECTIVE PERFORMANCE AND COMPLIANCE IN WASTEWATER TREATMENT PLANTS

By Benjamin Wideman

Any operator knows there is more to a treatment plant than bar screens, tanks, pumps, motors and blowers. Mechanical equipment does the bull work, but performance ultimately depends just as much on process chemistries and lab analysis. Here's a look at a variety of current offerings designed to help treatment plant teams keep processes healthy and verify permit compliance.

KPSI Transducer models from Pressure Systems

FAST DELIVERY

Three popular **KPSI Transducer models from Pressure Systems** are now built and ready to ship in two days, helping to reduce facility downtime associated with a transducer's failure. The service is available with the hydrostatic and submersible 700, 705 and 750 models, used in water and wastewater treatment for level measurement.

For water resistance, the transducers have a water blocking cable that self-seals in the event of an accidental cut. Over-molded cabling on the transducers is more reliable than snap-in connectors. Each transducer comes with a SuperDry vent filter that provides maintenance-free moisture protection.

The general purpose Model 700 has analog outputs of 4-20 mA and 0 VDC to 5 VDC in custom level ranges up to 700-ft H_2O. Static accuracy is +/-1 %FS. The Model 705 uses a flush Teflon-coated elastomeric diaphragm with a surface area of 0.90 inch to prevent clogging. The transducer is available in custom level ranges from 6-ft H_2O to 115-ft H_2O with analog outputs of 4-20 mA or 0 VDC to 5 VDC. Static accuracy is +/-0.25 %FS.

The Model 750 offers a 2.75-inch non-clogging sensing area for highly viscous applications. Custom level ranges are available from 10-ft H_2O to 115-ft H_2O with analog outputs of 4-20 mA or 0 VDC to 5 VDC. Static accuracy is +/-0.25 %FS. **800/328-3665; www.pressuresystems.com.**

HANDHELD PHOTOMETER

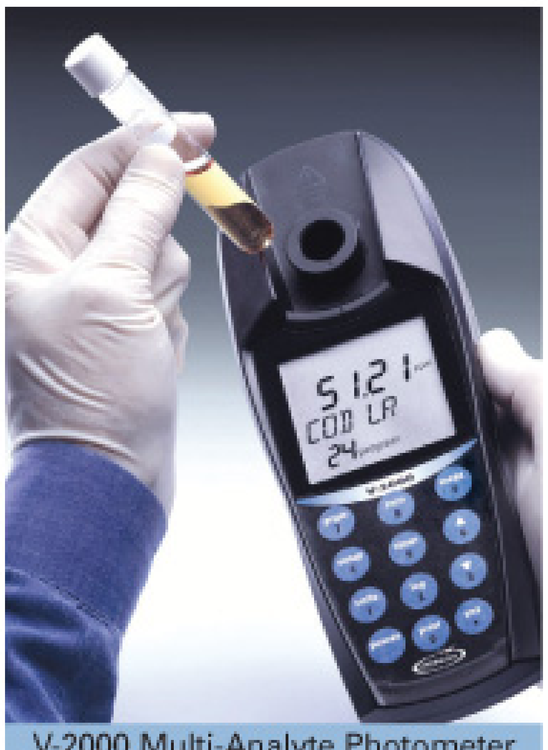
Industrial Test Systems Inc. offers the eXact Micro 7+ handheld photometer. It reads 10 parameters directly, and in transmission mode the meter tests for 26 additional water parameters. The unit is EPA-compliant for free and total chlorine regulatory testing. With a 4-ml sample cell, it is environmentally friendly, using 60 percent less chemicals than many other 10-ml tests. The device is waterproof (IP-67), and the sampling cell is built into the meter. It provides fast results (using the 20-second test method) at 0.01 resolution. **803/329-9712; www.sensafe.com.**

eXact Micro 7+ handheld photometer from Industrial Test Systems Inc.

MULTI-ANALYTE PHOTOMETER

The **V-2000 Multi-Analyte Photometer from CHEMetrics Inc.** offers advanced water testing with push-button ease. Lightweight and field portable, the microprocessor-based LED colorimeter uses preprogrammed methods to measure 13-mm, 16-mm, or 1-inch cells in concentration, percent transmittance (%T) or absorbance (abs) modes.

In addition, up to 10 user-created custom methods can be stored in memory. The intuitive interface guides users through setup and measurement. With a built-in computer interface/output, the instrument can log 100 data points with date/time tags and download them to a printer or PC. Self-filling Vacu-vial reagent ampoules minimize contact with chemicals and provide accurate and safe water-quality tests for more than 30 important analytes, including chlorine, dissolved oxygen, nitrate/nitrite, sulfide and COD. **800/356-3072; www.chemetrics.com.**



V-2000 Multi-Analyte Photometer from CHEMetrics Inc.

BOD ANALYZER

The **QuickScan BOD Analyzer from Challenge Technology** is a fully digital respirometer system. It helps users gain knowledge of BOD, short-term BOD, oxygen uptake rates and SOUR in aerobic processes, and gas production in anaerobic processes.

Users can see real-time rates and totals on up to four samples at one time and make comparisons. All data is stored via the included notebook computer with pre-loaded monitoring and graphing software. Also included is the MS-304 stirring

QuickScan BOD Analyzer from Challenge Technology

unit, which uses rare earth magnets to allow stirring speeds of up to 750 rpm, along with glassware and a test kit. **479/927-1008; www.challenge-sys.com.**

MEASURING TURBIDITY

The **LTC-3000 benchtop turbidity and chlorine meter by LaMotte Company** offers a wide range and high accuracy. The meter meets EPA 180.1 for turbidity and EPA 330.5 for chlorine. The turbidity range is 0 to 4,000 NTU with a MDL of 0.05 NTU. The free and total chlorine range is 0 to 10 ppm with a MDL of 0.02 ppm. The meter can store 4,000 data points, which can be downloaded to a computer or printer. It also allows six languages and employs a universal AC adapter for worldwide use. **800/344-3100; www.lamotte.com.**

LTC-3000 benchtop turbidity and chlorine meter by LaMotte Company

MOISTURE AND ASH ANALYSIS

The **Computrac MAX 5000XL moisture and ash analyzer from Arizona Instrument** enables rapid analysis with a temperature-controlled balance that provides users with stable, accurate measurements. The instrument also has a temperature ramp-control feature that allows it to be used for qualitative analyses that were previously only possible using a thermogravimetric analyzer (TGA). The unit can analyze materials with ash concentrations as low as 0.5 percent. **800/290-1414; www.azic.com.**

LAB INFORMATION

The **MSC-LIMS laboratory information management system by Mountain States Consulting** is a flexible, powerful, secure and stable GALP-compliant system designed for small- to mid-sized facilities. It integrates with handheld PCs or PDAs to efficiently import data recorded in the field.

A Microsoft Excel interface can be used to create analyte-specific calculating data entry screens and to import operations data and results from instruments. The interface also allows labs to use their existing Excel regulatory report formats (NPDES, DMR, MOR). The system supports basic statistics, trend graphs, and control charts. It is available in single-user and multi-user versions for work groups of up to 20 concurrent users, in labs processing up to 75,000 samples per year and up to 300,000 analyses per year. The system includes an integrated audit trail, archiving, e-mail messaging, and security access controls. **307/733-1442; www.msc-lims.com.**

TOC ANALYZER

The **QuickTOC online TOC analyzer from Liquid Analytical Resource** validates purity and protects against organic contaminants that threaten expensive systems, public safety and product quality. The device provides fast, accurate, filterless measurements. Using thermal combustion technology, it provides continuous online monitoring for the measurement of total organic carbon (TOC), total carbon (TC), total inorganic carbon (TIC), dissolved organic carbon (DOC), and non-purgeable organic carbon (NPOC), according to EPA 415.1. It has an operating range of 0.01 to 50,000 mg/l. **978/425-0300; www.lar.com.**

Computrac MAX 5000XL analyzer from Arizona Instrument

Micro-90 cleaner from International Products Corporation

PRECISION CLEANER

Micro-90 concentrated precision cleaner from International Products Corporation is used in laboratory applications to clean flasks, pipettes, slides, analysis equipment, counter surfaces and other labware, as well as to de-foul filter membranes used in wastewater purification. The cleaners can be used in ultrasonic, immersion and machine-washing applications. **609/386-8770; www.ipcol.com.**

CONDUCTIVITY MEASUREMENT

The **Model 3084 multi-function conductivity instrument from Amber Science Inc.** measures conductivity, resistivity, total dissolved solids, salinity and temperature of all types of water. The device has user-friendly menu prompts, push-button front panel switches, and a bright backlit, two-line display. It is simple to calibrate and has an RS-232 output for data logging. **541/345-6877; www.conductivity-meters.com.**

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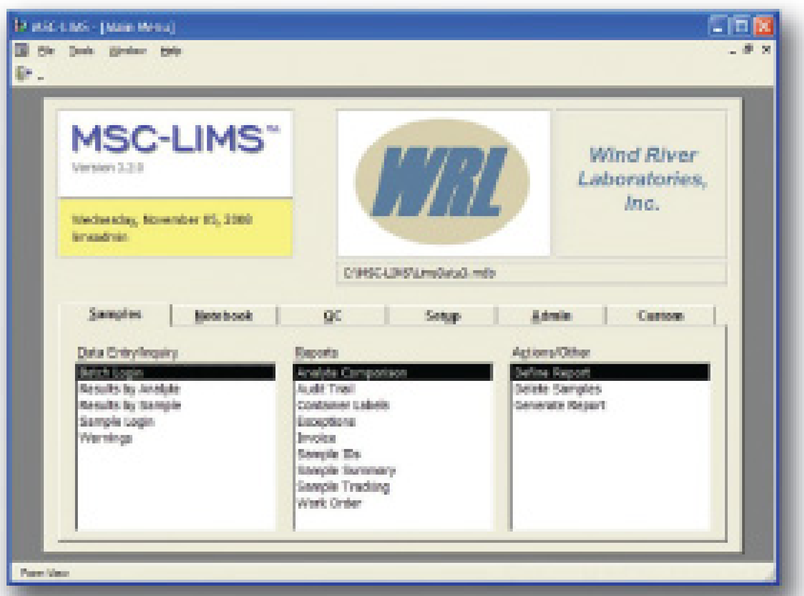
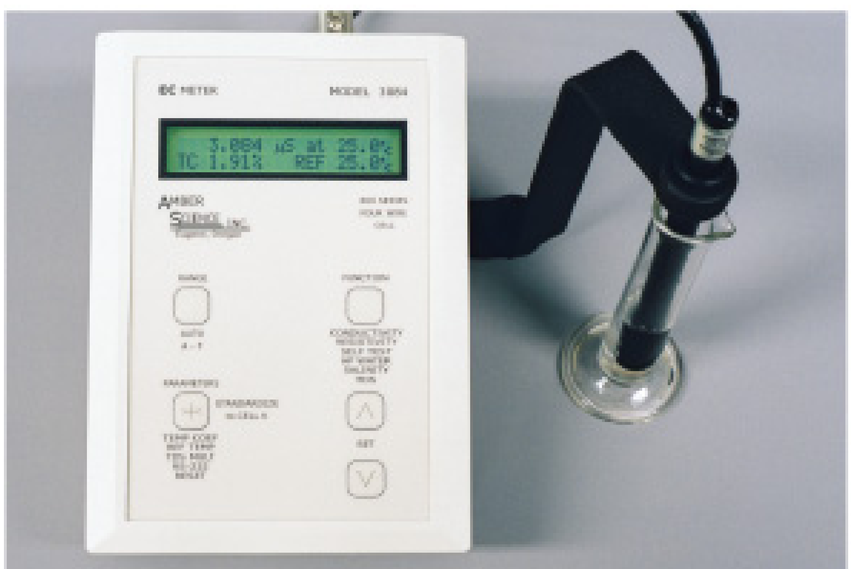


MSC-LIMS laboratory information management system by Mountain States Consulting

QuickTOC online TOC analyzer from Liquid Analytical Resource



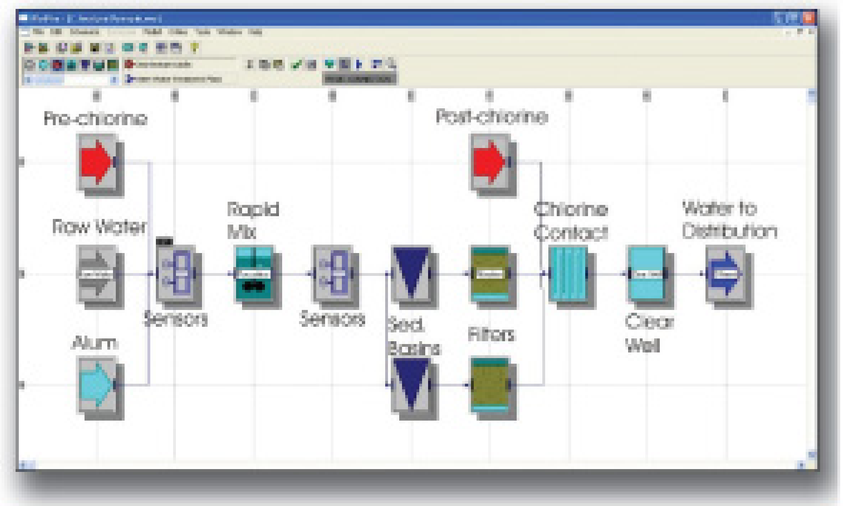
Model 3084 multi-function conductivity instrument from Amber Science Inc.

DESICCANT DEHUMIDIFICATION

Liquid desiccant dehumidification systems from Kathabar Dehumidification Systems Inc., are designed for precise, reliable, energy efficient temperature and humidity control regardless of air inlet conditions. The devices also capture most airborne bacteria, viruses, and mold.

Liquid desiccant dehumidification systems offer energy recovery and utility cost savings. With an integrated systems approach, the equipment can use waste heat and support on-site power generation and cogeneration. All systems are made of fiber reinforced plastic (FRP) with industrial grade construction and can handle airflows from 750 to 84,000 cfm. **732/356-6000; www.kathabar.com.**

Liquid desiccant dehumidification systems from Kathabar Dehumidification Systems, Inc.



GPS-X software by Hydromantis Inc.

OPTIMIZATION SOFTWARE

GPS-X software by Hydromantis Inc. is a full-featured application for optimization and management of wastewater treatment facilities. It includes advanced tools for evaluating plant performance while improving effluent quality and reducing operating costs. Customized screens can be developed to allow operations staff to easily carry out what-if investigations using their own plant layout. It is ideal for training and process optimization. **905/522-0012; www.hydromantis.com.**

MULTI-PARAMETER MEASUREMENT

Version 2.0 of the LiQC multi-parameter system from Mettler Toledo is designed for simultaneous determination of density, refractive index, pH/conductivity and color. The system increases productivity by combining single measurements in a fully automated process.

After a sample is filled into a vial, placed onto an automatic sample changer and assigned a barcode label, the system automatically completes every step: choosing the appropriate method, pumping the sample into the various flow-through cells, and performing all measurements. The results are statistically evaluated, compared to specifications, and transferred to LIMS systems. The unit also thoroughly cleans and dries the measuring cells before moving on to the next sample. **800/638-8537; www.mt.com.**

Version 2.0 of the LiQC multi-parameter system from Mettler Toledo

CHEMICAL STORAGE

Poly Processing Company's Crosslinked Polyethylene Chemical Storage Tanks with the OR-1000 system are certified to NSF/ANSI 61 Drinking Water System Components standards. Sizes range from 55 to 14,650 gallons. They are available in verticals, full-drain IMFO, double-wall SAFE-tanks, horizontals and cones. **866/590-6845; www.polyprocessing.com.** tpo

Crosslinked Polyethylene Chemical Storage Tanks from Poly Processing Company

Rockwell Automation Publishes Resource Catalog

The *Water and Wastewater Consultant Resource Catalog* (www.rockwellautomation.com/industries/water/crc.html) from Rockwell Automation includes water and wastewater product and solution literature, specifications and engineering software for consulting engineers.

Bord na Mona Names Peat Business Development Director

Bord na Mona Environmental Products U.S. Inc. has named Raymond Peat director of business development for the company's North American residential and commercial wastewater and water reuse treatment systems.

Thompson Pump Launches New Web Site

Thompson Pump & Manufacturing Company Inc. has launched its new Web site, www.thompsonpump.com. The site offers expanded product information and customer service options.

Parkson Names Hydro International Distributor for UltraFlex Aeration Panels

Parkson Corp. has granted Hydro International an exclusive license to market its HiOx UltraFlex aeration panels in the United Kingdom and Ireland. tpo

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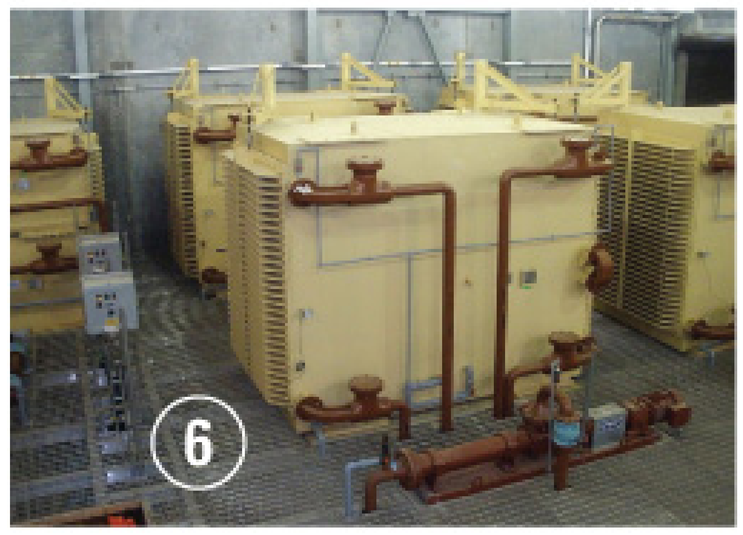

1. GATEWAY INTRODUCES PEAKFIT RESPIRATORS

PeakFit air-purifying respirators from Gateway Safety Inc. have a contoured design and molded nose bridge to fit most faces. The bridge features an internal cushion with closed-cell foam to ensure a snug fit. The integrated, one-piece cloth head strap with clasp is fully adjustable. **800/822-5347; www.gatewaysafety.com.**

2. ABS INTRODUCES SUBMERSIBLE SEWAGE PUMPS

The PE1, PE2 and PE3 EffeX range of submersible sewage pumps from ABS feature premium-efficiency motors designed to reduce energy consumption and environmental impact. The wastewater pump range also offers greater safety margins and free solids passage of at least 3 inches, long-term reliability and excellent rag handling. **www.abseffex.com.**

3. CONTROL MICROSYSTEMS INTRODUCES ACCUTECH HYBRID BASE RADIO

The BR20 wireless base radio from Accutech, a division of Control Microsystems, offers two radios in one. The primary radio provides connectivity and configuration to a range of wireless instruments. The optional long-haul Trio K-Series radio communicates remotely with a central master radio, providing process instrumentation data from field units to the host workstation. **888/267-2232; www.accutechinstruments.com.**

4. METROHM OFFERS 850 PROFESSIONAL IC SYSTEM

The 850 Professional IC inorganic compounds measurement system from Metrohm USA Inc. is designed to produce quasi-continuous measurements using the particle-into-liquid-sampler method. After removing interfering gas-phase compounds, the remaining aerosol particles are dissolved to water via a supersaturated steam phase. The subsequent liquid sample is transferred to the IC system for analysis, enabling changes in the iconic composition of ambient air to be recorded almost immediately and allowing for more precise correlation with meteorological and other data. **800/727-6768; www.metrohmusa.com.**

5. HOFFMAN OFFERS UTILITY JUNCTION ENCLOSURES

Utility junction sectionalizing enclosures from Hoffman offer aboveground housing for sectionalizing, tapping or terminating underground distribution systems. Available in a range of single- and three-phase models, the enclosures are available in steel or aluminum and made to endure harsh outdoor environments. **763/421-2240; www.hoffmanonline.com.**

6. DDI OFFERS RECTANGULAR SQUARE CUBE HEAT EXCHANGER

The Rectangular Square Cube sludge-to-sludge heat recovery exchanger from DDI Heat Exchangers Inc. features compact rectangular flow channels for a no-plug design. The unit also has a larger heat transfer surface, small footprint and 3-inch gaps to limit sludge blockage. **514/696-7961; www.ddi-heatexchangers.com.**

ZEBRA EXPANDS B SERIES BELT SKIMMER LINE

Zebra Skimmers Corp. has expanded its B Series belt skimmer line to include a wider 2-inch belt for heavier oil load applications. A stainless steel belt also is available. Skimmer features include heavy-duty steel construction and fan-cooled motor in various electrical configurations. **888/249-4855; www.zebraskimmers.com.**

7. HACH OFFERS ALL-WEATHER REFRIGERATED SAMPLER CABINET

The corrosion-resistant Sigma all-weather refrigerated sampler cabinet from Hach Co. is made of low-density polyethylene with UV inhibitors. It contains a top-mounted compressor that dissipates heat into the air, a thermal microprocessor control system for consistent temperature and insulated lid. **800/227-4224; www.hach.com.**

8. ORIGINOIL DEVELOPS ALGAE GROWTH SYSTEM

The Attached Growth System from OriginOil Inc. facilitates the growth of algae on a solid surface as a fuel source, while helping to process wastewater. The system can be configured in treatment plants to encourage bacterial growth as well as algae. At harvest time, the algae is scraped off as sludge, decreasing the energy cost of dewatering during oil extraction. **877/999-6645; www.originoil.com.**

9. NEW PIG INTRODUCES PIG BLUE ABSORBENT MAT

The Pig Blue absorbent mat from New Pig Corp. is designed to absorb and disperse liquid evenly. The mat contains 70 percent recycled and renewable fibers and is available in pads and rolls. **800/468-4647; www.newpig.com.**

WONDERWARE RELEASES WASTEWATER INDUSTRYPACK

The IndustryPack unified software platform for water and wastewater from Wonderware is designed to enhance overall productivity, focusing on vertical market segments. The software includes a pre-configured set of application templates and graphics. **http://us.wonderware.com.**

SHERWIN-WILLIAMS INTRODUCES HI-SOLIDS, MILDEW-RESISTANT COATING

Hi-Solids Polyurethane-MR (mildew-resistant) coating from Sherwin-Williams is designed for use on tanks and structures in high-visibility areas. The two-component, low VOC aliphatic-acrylic polyurethane resin coating is available in a high-gloss finish. **www.sherwin-williams.com.**

(continued)

product spotlight

Blending System Simplifies Polymer Mixing

By Ed Wodalski

dynaBLEND liquid polymer blending system from Fluid Dynamics

The dynaBLEND liquid polymer blending system from Fluid Dynamics, a division of Neptune Chemical Pump Company Inc., offers a non-destructive, cost-effective and space-efficient process for mixing polymers in wastewater treatment plants.

Valued for their ability to attract, absorb and ultimately remove suspended particles, polymers can be difficult to work with because of their molecular properties. In concentrated form, polymers resemble a coiled spring. Uncoiled, they become susceptible to fracture. High-speed mixers used to keep sticky polymer particles separated can break the activated strands, rendering them less effective. To compensate, plant operators often feed more polymer than necessary into the mix, increasing chemical costs.

While a slowly blended polymer mix might be less destructive, the process requires large holding tanks and can be time-consuming. Greg Kriebel, Fluid Dynamics national sales manager, says the liquid mixing system was designed to replace the hand-made process. "Before the advent of the inline liquid polymer blending unit, operators would take a bucket of polymer, dump it into a tank of water and turn on a mixer and batch it manually," he says.

Instead of mixing impellers, the dynaBLEND system uses a two-step process to protect the molecules. A 70-feet-per-second jet of water is followed by low-shear turbulent blending to produce a homogeneous solution. A precise metering system cuts chemical cost by allowing only the amount of polymer needed to be pumped into the blender. Since there is no holding tank, the system saves space.

The system includes a polymer metering pump, water-flow meter, water-flow adjusting valve, mixing chamber, and control panel. Flow capacities range from 30 to 21,000 gallons per hour of polymer solution. **For more information, call 215/699-8700 or visit www.dynablend.com. tpo**

product news

10. MSA INTRODUCES ADVANTAGE 420 HALF-MASK RESPIRATOR

The Advantage 420 half-mask respirator from MSA enables users to adjust the mask according to individual needs. The AnthroCurve II multi-ethnic face seal design is made to adapt to different head sizes and facial contours. The UniBond facepiece helps to eliminate multiple leak paths, while the textured sealing surface reduces facepiece slippage when working in hot, humid conditions. **800/672-2222; www.msanet.com.**

11. MICROTEL INTRODUCES D51T VOICE ALARM DIALER

The D51T voice alarm dialer from Microtel Inc. has a built-in temperature sensor that never needs calibration and features both high and low temperature alarms, four fully isolated dry-contact inputs and rechargeable battery. User-recorded voice messages allow alarm conditions to be recorded in any language. **225/303-0436; www.microtel-inc.com.**

12. WAGO OFFERS IP 200 PLOTTER

The IP 200 plotter from WAGO Corp. offers universal marking capabilities in a compact unit. At 17.3 square inches, the DIN A4-size plotter marks all WAGO markers, marker strips and wire markers, along with cards from other manufacturers. The plotter accommodates two carrier plates, has a USB interface and is compatible with WAGO's EG 450 engraver, enabling the unit to engrave push-buttons, legend plates and ID tags on plastic or aluminum components. **800/346-7245; www.wago.us.**

13. PRIME SOLUTION OFFERS ROTARY FAN PRESS

The Rotary Fan Press from Prime Solution Inc. is a space-saving, continuous operation dewatering system. Available in four sizes, the system moves at 1 rpm and features an enclosed environment with automated cleaning. The liquid/solid separation system eliminates the need for storage lagoons, drying beds or liquid hauling. **269/673-9559; www.psirotary.com.** tpo

TPO invites your national, state or local association to post notices and news items in this column. Send contributions to editor@tpomag.com.

people/awards

Jim Clark, vice president of Black & Veatch, received the Water Environment Federation's Engelbrecht International Achievement Award.

Gary Englund received the Vere R. Ewing Award from the South Dakota Water and Wastewater Association.

DC Water and Sewer Authority was named to *CIO* magazine's annual list of Top 100 organizations that exemplify the highest level of operational and strategic excellence in information technology.

Mark McGuire received the Arthur Sidney Bedell Award from the Iowa Water Pollution Control Association.

Tim Snyder received the William D. Hatfield Award from the Iowa Water Pollution Control Association.

Alaina Leggette received the Louisiana Stockholm Junior Water Prize.

The **Illinois Association of Water Pollution Control Operators Inc.** named the following award recipients:

- City of Woodstock North Wastewater Treatment Facility, Class A, Group 1 Plant Award
- City of St. Charles West Wastewater Treatment Facility, Class B, Group 2 Plant Award
- City of Jerseyville, Class C, Group 3 Plant Award
- Village of Durand, Class D, Group 4 Plant Award
- Danny Piquard, City of Carbondale, Operator of the Year

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

education

Kansas Water Environment Association

The KWEA has these courses:

- Jan. 7 – Small Systems Wastewater, Garden City
- Jan. 13 – Waste Stabilization Ponds, Dodge City
- Jan. 14 – Small Wastewater Systems, Clearwater
- Jan. 16 – Small Systems Wastewater Operations, Goodland
- Jan. 22-23 – Stormwater Management, Hays
- Jan. 27 – Membranes for Wastewater Treatment, Garden City
- Jan. 28-29 – Activated Sludge, Pittsburg
- Jan. 29-30 – Wastewater Reclamation and Reuse, Medicine Lodge
- Feb. 3 – Wastewater Recertification Preparation, Dodge City
- Feb. 3-4 – Small Wastewater Systems
- Feb. 5-6 – Wastewater Treatment, Hays
- Feb. 10 – Special Environmental Topics, Dodge City
- Feb. 17 – Ultraviolet for Wastewater Treatment, Garden City
- Feb. 17-18 – Wastewater Math, Concordia
- Feb. 17-18 – Wastewater Examination Preparation School, Hays
- Feb. 18-19 – Wastewater Treatment, Topeka
- Feb. 24 – Ethics, Dodge City
- Feb. 25-26 – Wastewater Treatment, Independence
- Feb. 27 – Small Systems Wastewater, Dodge City

Visit www.kwea.net

Texas Water Utilities Association

The TWUA has this course in Waco:

- Feb. 9-11 – Basic Wastewater

Visit www.twua.org

University of Wisconsin

The University of Wisconsin Department of Engineering-Professional Development is offering the following courses in Orlando, Fla.:

- Feb. 2-3 – Upgrading Your Sanitary Sewer Maintenance Program
- Feb. 4-5 – Designing Wastewater Pumping Systems and Lift Stations

Visit http://epdweb.engr.wisc.edu.

Wisconsin Department of Natural Resources

The Wisconsin DNR has these courses:

- Jan. 25-29 – General Wastewater Treatment, Chippewa Falls
- Feb. 2 – Wastewater Math, Oconomowoc
- Feb. 3-4 – Primary Treatment – Intro and Advanced Wastewater, Green Bay
- Feb. 16 – Confined Space Entry (Wastewater), Chippewa Falls
- Feb. 18 – Cross Connection Control (Wastewater), Chippewa Falls
- Feb. 22-26 – General Wastewater Treatment, Green Bay

Visit www.dnr.state.wi.us/org/es/science/opcert/training.htm. tpo

CALENDAR OF EVENTS

Jan. 24-27
New England Water Environment Association Annual Conference & Exhibition, Boston Marriott Copley Place Hotel, Boston. Visit www.newea.org.

Jan. 28-29
Snowball Wastewater Conference, Holiday Inn, Kearney, Neb. Visit www.ne-wea.org.

Jan. 31-Feb. 3
New York Water Environment Association Annual Meeting, Marriott Marquis, New York. Visit www.nywea.org.

Feb. 2
Iowa Water Pollution Control Association Maintenance Conference, Ankeny, Iowa. Visit www.iawpca.org.

Feb. 21-24
The Utility Management Conference, InterContinental San Francisco, San Francisco. Call 703/684-2441 or visit www.wef.org.

Feb. 24-27
Pumper & Cleaner Environmental Expo International, Kentucky Exposition Center, Louisville, Ky. Call 800/257-7222 or visit www.pumpershow.com.

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EDUCATION

RoyCEU.com: We provide continuing education courses for water, wastewater and water distribution system operators. Log onto www.royceu.com and see our approved states and courses. Call 386-574-4307 for details. (O-02)

POSITIONS AVAILABLE

Lehigh County municipality seeking full-time assistant operator of a wastewater treatment plant holding a Pennsylvania B2 E4 (or greater) wastewater certification. General job description can be furnished upon request. Send resume with cover letter and salary history to email: slatebor@ptd.net or Steve Salvesen, Slatington Borough Manager, 125 S. Walnut St., Slatington, PA 18080 by 4:30 p.m. on Friday, January 15, 2010. (O-01)

WANTED

QUALITY SURPLUS POLYMER WANTED: Email product number, polymer form, purchase date and quantity. Will attempt to make a cash offer. Also I can offer aggressive prices on our polymer sales to you. Email stuart@acpsouth.com. (O-11)

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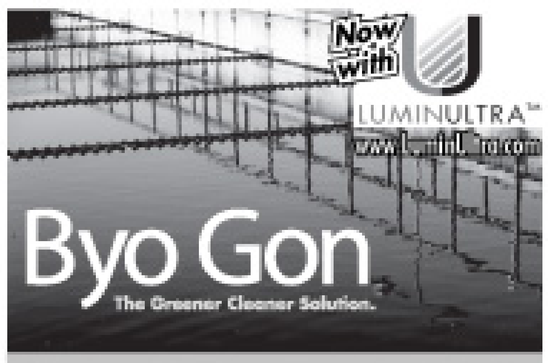

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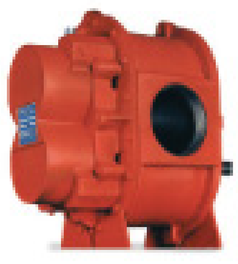





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