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How We Do It: Real-time effluent monitoring

PAGE 42

On the *Fly*

CREATIVITY AND COMMUNICATION
ARE KEYS DURING A GEORGIA
PLANT'S UPGRADE

PAGE 12

In My Words:
Toward net zero energy

PAGE 44

Greening the Plant:
Solar power in
Boulder, Colo.

PAGE 26

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advertiser index

MARCH 2011

Aerzen USA	27	 JDV Equipment Corporation	64
AllMax Software, Inc.	62	Keller America Inc.	9
 Analytical Technology, Inc.	25	 Komline-Sanderson	62
 Ashbrook Simon-Hartley	67	KSB, Inc.	47
Atlas Copco	5	LaMotte Company	29
BASF Corporation	15	Liquid Waste Technology LLC	41
BDP Industries, Inc.	10	LUDECA, INC.	65
BESTechnologies Inc.	62	Lutz-JESCO America Corp.	56
 Blue-White Industries	4	Meltric Corporation	62
Boerger, LLC	41	Milton Roy Company	19
 Carylon Corporation	39	Nasco	62
 ClearSpan Fabric Structures	10	National Filter Media	66
DSI/Dynamatic	53	Neptune Chemical Pump Company	62
 Environmental Dynamics, Inc.	43	OdorTool.com LLC	53
Eurus Blower, Inc.	43	 Ovivo	2
 Flo Trend Systems, Inc.	49	 Prime Solution, Inc.	61
Fluid Metering, Inc.	47	Probiotic Solutions	63
GA Industries, LLC	24	Robert-James Sales, Inc.	49
Gorman-Rupp Company	17	Roto-Mix LLC	57
 Hach Company	62	seepex Inc.	57
 Huber Technology, Inc.	7	 Simple Solutions Distributing, LLC	63
Hydro International	10	Smith & Loveless Inc.	8
ITT Water & Wastewater – Flygt Products	3	SOLON Corporation	60
		The Bilco Co.	41
		USABlueBook	68
		Vacuum Truck Rentals, LLC	48
		 Vaughan Company, Inc.	11
		Weir Specialty Pumps / WEMCO Pump	23
		CLASSIFIEDS	63



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features

12 TOP PERFORMER – PLANT: ON THE FLY

Staff creativity and clear communication help a Georgia treatment plant stay online and meet permit conditions during a major process upgrade.
By Jim Force

20 TOP PERFORMER – OPERATOR: A WINNING DUO

George Calloway and Joe Derbyshire combined knowledge and expertise to transform their facility into an award-winning nutrient removal plant.
By Trude Witham

26 GREENING THE PLANT: OUTLOOK SUNNY

A solar PV installation in Boulder, Colo., required minimal up-front investment, and yet provides substantial benefits in lower power costs.
By Doug Day

28 HOW WE DO IT: MAKE AND BREAK

A Wisconsin treatment plant uses a new motor plug that simplifies mixer replacement and service as well as generator hookup at lift stations.
By Bill Fortman

30 PUMPS COMPANY DIRECTORY

36 TOP PERFORMER – PLANT: BACK TO THE LAND

A meticulous staff operates an award-winning plant in Bonita Springs, Fla., that recycles all wastewater for irrigation and biosolids for fertilizer.
By Jim Force

42 HOW WE DO IT: DOING IT WITH DATA

A Calgary wastewater treatment plant finds real-time information on effluent quality critical to achieving consistent performance in biological nutrient removal.
By Dave Marsh

44 IN MY WORDS: TARGET ZERO

Wastewater contains more energy per gallon than is needed to treat it. The question is how to put more of it to work in the treatment plant.
By Ted J. Rulseh

46 PLANTSCAPES: LOOKS GREAT, RUNS GREAT

A visually appealing treatment plant helps inspire operators to perform and creates a positive impression for community residents and visitors.
By Pete Litterski

COMING NEXT MONTH: APRIL 2011

Product Focus: Monitoring and Instrumentation

- Top Performer – Biosolids: Class A process in Stewartstown, Pa.
- Top Performer – Operator: Mike Turley, New Lennox, Ill.
- Top Performer – Plant: Advanced reuse system in Huntley, Ill.
- How We Do It: IFAS process at Fairplay (Colo.) Sanitation District
- PlantScapes: Pond restoration in Geneva, Ill.
- Greening the Plant: Wind-powered treatment in Cascade, Wis.
- In My Words: Training for operators in Minnesota



departments

8 LET'S BE CLEAR: IT'S ALL ABOUT THE PRODUCT

In wastewater treatment as in any profession, attention to quality makes the difference between market success and failure.
By Ted J. Rulseh, Editor

48 INDUSTRY NEWS

50 PRODUCT NEWS

Product Spotlight: Pre-Engineered System Combines Screening and Grit Removal
By Ed Wodalski

54 PRODUCT FOCUS: PUMPS

By Benjamin Wideman

58 CASE STUDIES: PUMPS

By Scottie Dayton

64 WORTH NOTING

Education; Calendar of Events

on the cover

Operations supervisor Tim Holder and his team at the Middle Oconee Water Reclamation Facility in Clarke County, Ga., used plenty of creativity to keep treatment on track during a major plant upgrade from 6 mgd to 10 mgd. Collaboration between plant management and the contractor was also key: "It's almost like they're wastewater treatment operators themselves," Holder observes. (Photography by Terry Allen)





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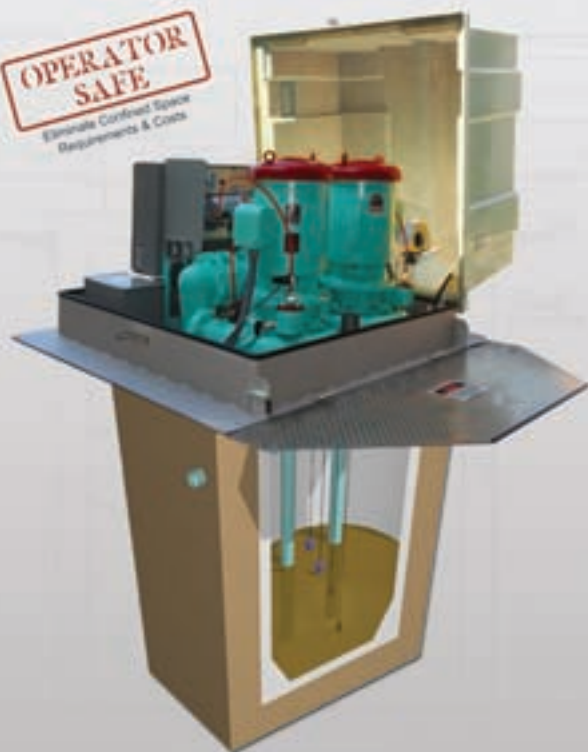


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let's be clear

It's All About the Product

IN WASTEWATER TREATMENT AS IN ANY PROFESSION, ATTENTION TO QUALITY MAKES THE DIFFERENCE BETWEEN MARKET SUCCESS AND FAILURE

By Ted J. Rulseh, Editor

Last month's article about biosolids composting in Kelowna, B.C., should remind us all about the importance of tending to quality.

The city has been composting for years, but only in more recent times has it found the secret to making a quality product in a way that's friendly to the community. In this case, that means a compost that is pleasant to handle, does great things to the soil and the plants that grow there, and is created with an essentially odor-free process.

The city's compost, called Ogo-grow, now has a large and loyal following among landscapers, nurseries and individual gardeners. It brings a substantial price, and there is more demand than supply.

It's all because organics supervisor Gordon Light and his operations team weren't willing to stop until they had a process that truly

constituted Best Management Practices under the province's Organic Matter Recycling regulation.

GOING TO MARKET

Any product of wastewater treatment, be it compost, land-applied liquid or cake biosolids, or secondary-treated or reuse-quality water, starts at a disadvantage because of where it comes from. Quality control has been the key to getting products like biosolids and reclaimed wastewater better established in the public mind.

It took a little time for the public to accept the use of reclaimed water for irrigation on parks, golf courses and lawns. Establishing trust for biosolids has been even tougher because the "yuck factor" is greater and creating a quality product is more challenging. Still, we have come a long way on that front, too.

Part of the solution with biosolids is believing in the product and helping consumers perceive that it has value. Back in the 1980s when I got my first exposure to beneficial use of biosolids, some clean-water agencies were "marketing" their product by essentially telling farmers and rural residents that they were doing a public service by taking it. Of course, they gave the material away — hardly a ringing endorsement.

ALL STEPS NECESSARY

Some communities still give their material away in various forms, as compost for public pickup or as farm fertilizer and soil conditioner. And that's fine, but it wouldn't be possible if the products weren't excellent. People today just won't accept material that smells bad or looks less than presentable with visible scraps of paper or plastic mixed in. Nor should we expect them to.

It's the same where wastewater effluent is concerned. The best thing a treatment plant has to sell when it comes to winning public acceptance and admiration is an exceptional-quality end product.

Wastewater operators as a class seem to know this. Many operators I talk to, in fact I would venture to say most of

Any product of wastewater treatment, be it compost, land-applied liquid or cake biosolids, or secondary-treated or reuse-quality water, starts at a disadvantage because of where it comes from. Quality control has been the key to getting products like biosolids and reclaimed wastewater better established in the public mind.

them, treat their permit limits not as ultimate objectives but as minimum standards. If their permit says 30/30 BOD/TSS, they're not looking to achieve 29.9/29.9. They're aiming for the lowest levels they can reach with the equipment and budget available.

THE RIGHT ATTITUDE

Kelowna, after it fixed its composting process, immediately began talking it up and marketing the product aggressively, with superb results. That's a step treatment plants should take with their high-quality effluent. Of course, plants don't sell their effluent unless they're producing water for reuse. But even so they should be selling the public on the final product's quality.

It's great just to keep a low profile and do a good job and go home at the end of the day walking proud. But for the industry's sake it's important to let the community know just how good a job your treatment plant is doing. Whether you're making a biosolids product for money, or making the case for the value of your facility and team, product quality is essential. And so is marketing that product well. **tpo**

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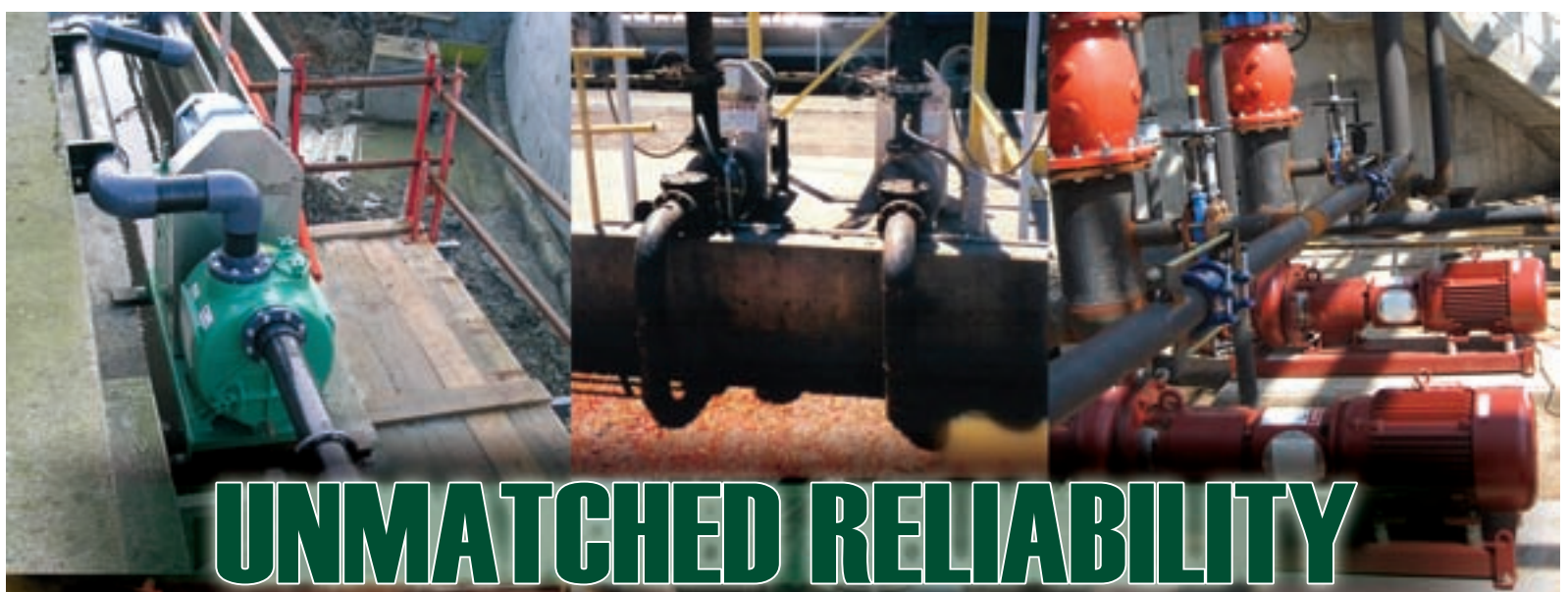
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PERMIT CONDITIONS DURING A MAJOR PROCESS UPGRADE

By Jim Force



Western Summit general superintendent Nathan Boone, left, and Middle Oconee Water Reclamation Facility operations supervisor Tim Holder review plans at the new oxidation ditch. (Photography by Terry Allen)

IT MIGHT NOT HAVE BEEN THE PARTING OF THE RED SEA, BUT THE EARLY-MORNING CHLORINE contact chamber diversion at the Middle Oconee Water Reclamation Facility in Athens-Clarke County, Ga., was pretty dramatic.

While continuing to operate and maintain compliance during a major construction program, the plant staff and contractor needed to stop plant flow for several hours so one of two chlorine contact chambers could be taken down for conversion to UV disinfection.

"We worked on a plan several weeks in advance," says plant operations supervisor Tim Holder. "Everyone knew exactly what to do." Without the luxury of an equalization basin, Holder's team emptied one of the oxidation ditches and drew down clarifiers to provide extra storage capacity. Then, in the middle of the night, they stopped flow and the contractor cut and capped pipes, isolating one of the chlorine chambers and started its demolition.

"There was no water leaving the plant for eight to nine hours," Holder says. "The contractor (Western Summit of Colorado) worked super fast. When the sun came up the next day, we were done."

It's just one of many on-the-fly adjustments the staff has made as the plant upgrades treatment to add phosphorus removal and increase capacity from 6 mgd to 10 mgd. It's also an example of how plant management and the contractor work together. "We've had an excellent relationship," says Holder. "It's almost like they're wastewater treatment operators themselves."

MAJOR PROJECT

The Middle Oconee plant project is one of three the Athens-Clarke County public works department is completing at a total cost of about \$49 million. The other two are the North Oconee plant, and the Cedar Creek plant.

The original Middle Oconee plant dates to the late 1960s, when it was a trickling filter operation. It was converted to activated sludge in 1990. Today, wastewater travels through a 106-mile sewer system serving a 36-square-mile drainage basin and about 35,000 residents.

When the plant is fully upgraded, the flow will be boosted by four submersible pumps (Weir Specialty Pumps/WEMCO) to a headworks containing JWC 3-mm band screens and a Eutek grit removal



profile

**Middle Oconee Water
Reclamation Facility,
Athens-Clarke County, Ga.**

POPULATION SERVED: 35,000

BUILT: 1968; upgraded 1990

FLOW: 10 mgd (design)

TREATMENT LEVEL: Tertiary

TREATMENT PROCESS: Oxidation ditch, biological phosphorus removal

BIOSOLIDS: Centrifuge dewatering, cake to composting

OPERATING BUDGET: \$1.5 million

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Maintenance mechanic Clarence Burgess checks the aeration equipment on the oxidation ditches.

Sharples (Alfa Laval), and a new Andritz centrifuge is being added. Plant staff can use centrifuges for thickening and dewatering.

The new plant will have a sophisticated SCADA system, tying all three treatment plants together. Transdyn is the system integrator. The plant staff in addition to Holder includes superintendent Mark Roberts (retiring soon); operations coordinator Dave Bloyer; operators Robert Barrington, Jack Brehm, Charles Cowart, Jimmy Elder, Pat Freeman, Jameson Goolsby, Rex Hatfield, Jim Hanson, Scott Jones and Bomani Wilson; maintenance mechanics Clarence Burgess and Bill Lumpkin; and electricians Jon Cline and Richard Young (shared with the other two treatment plants).

“We had to test the new polymer in order to convince management that the change was necessary. We tried it out and it worked great. In fact, we now think we can get by without thickening in the future.”

TIM HOLDER

system (Hydro International). Then it will pass through an anoxic-anaerobic biological basin for phosphorus removal.

From there the flow will be split among three 2-million-gallon Orbal oxidation ditches (Siemens) for further biological treatment. Three existing 80-foot-diameter clarifiers are being joined by a fourth, 120 feet in diameter. TrojanUV units will disinfect the effluent before discharge to the Middle Oconee River, which flows to a recreational lake downstream.

Just recently, Athens-Clarke County began composting its biosolids at the local landfill. At the Middle Oconee WRF, waste solids will be digested in a coarse-bubble aerobic system, followed by centrifuges. Existing units are


FACING CHALLENGES

Improving and expanding treatment while working around continuing operations has had its share of challenges. Holder and his staff have had to deal with several other issues involving return activated sludge, digesters, and the dewatering process.

“We had an issue similar to the chlorine contact diversion when we installed the new return activated sludge splitter box,” says Holder. “We had to either plug the line or pump around it in order to give the contractor a 6-hour window with no return flow.” Again, the staff took advantage of the nighttime low-flow period, took one clarifier out of service, and lowered the level in one of the oxidation ditches, using both basins to contain the RAS.

“We were still filling the clarifiers when the installation was finished,” Holder says. “We were daring the bugs to die. We’re either great operators or the plant is very forgiving. It’s probably a little of both.”

(continued)



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Team members at the Middle Oconee facility include, from left, superintendent Mark Roberts; operators Bomani Wilson, Robert Barrington and Scott Jones; maintenance mechanic Tim Thompson; operator Charles Cowart; maintenance mechanic Clarence Burgess; operations supervisor Tim Holder; and operators Jameson Goolsby and Pat Freeman. ABOVE, RIGHT: Construction of a new clarifier.

A TRIO OF TREATMENT PLANTS

The Middle Oconee Water Reclamation Facility is one of three wastewater treatment plant projects going on in Athens-Clarke County. The Georgia Environmental Protection Department requires phosphorus removal throughout the Oconee River basin, and the Athens-Clarke County plants, serving 110,000 people, are old and in need of some new equipment.

The North Oconee plant is being expanded from 10 mgd to 14 mgd. Activated sludge and biological phosphorus removal are replacing trickling filters. The Cedar Creek plant is being expanded from 2 mgd to 4 mgd, and it has also been equipped with biological phosphorus removal and activated sludge. Old trickling filters have been phased out.

Both plants use UV disinfection and dewater biosolids with centrifuges. The biosolids cake goes to the county's central composting site. Eventually, the compost will be made available to the public for gardening and soil amendment.

Close work with the contractor led to another solution with old anaerobic digesters, which hadn't been used for years. As the vessels were being pumped out so they could be converted to coarse-bubble aerobic units, workers discovered more solids than expected, and an abnormally high ammonia content in the remaining water.

The plant could only process a certain amount of the contaminated water without violating its permit, "so we worked out a plan with the contractor to pump the water out very slowly so it could be treated," Holder says. "It was a compromise. They were able to put their people to work on other projects while we drained the digesters."

SOLIDS BUILDUP

In the dewatering building, the Middle Oconee plant staff had been having trouble with both the centrifuges and the polymer addition system as the plant modifications began. Construction only exacerbated conditions, and the buildup of solids became worrisome.

"We've had an excellent relationship with our contractors. It's almost like they're wastewater treatment operators themselves."

TIM HOLDER

"It was frustrating," says Holder. "Our solids were twice what they should be." The solution lay in switching polymers. That stopped polymer plugging, and less polymer was required, saving significant money.

"We had to test the new polymer in order to convince management that the change was necessary," Holder says. "We tried it out and it worked great. In fact, we now think we can get by without thickening in the future."

Finally, taking one chlorine contact chamber out of service raised additional issues. "Our detention time was essentially cut in half," says Holder. "We've had to experiment, learn new chlorine dosing rates, and rethink the chlorine residual to achieve our fecal kill in less contact time." The team used no specific calculation, but increased chlorine dosage by trial and error, closely monitoring fecal kill.

"At first we weren't getting the kill we wanted, so we started adding chlorine at the final clarifier, essentially splitting the chlorine feed between the clarifier and the contact chamber," Holder says. The fecals have come down, and the plant is using less chlorine than before. The dechlorination process has required adjustment, too. The staff adds sulfur dioxide based on the chlorine residual, resulting in effluent chlorine less than 0.05 mg/l.

STAYING CURRENT

Even though the Middle Oconee staff has learned a lot during construction, Bloyer and Holder make sure all operators are fully trained in the new plant processes. They want the training program to result in a library of training materials they will maintain on site.

"Each process manufacturer must provide adequate training on all new pieces of equipment," Bloyer says. "That's part of the contract." The training

(continued)

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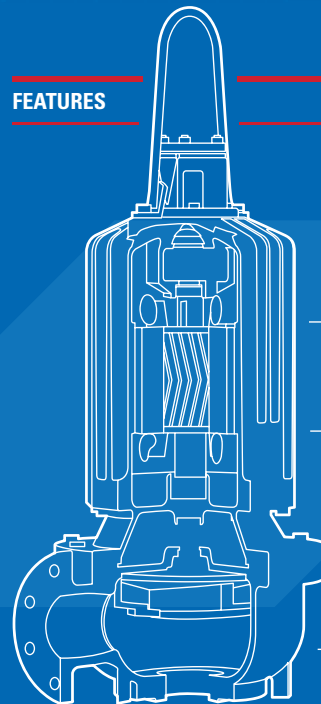
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“Each process manufacturer must provide adequate training on all new pieces of equipment. That’s part of the contract.”

DAVE BLOYER

Middle Oconee Water Reclamation Facility PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
BOD	222 mg/l	8 mg/l	30/20 mg/l (seasonal)
TSS	266 mg/l	8 mg/l	20.0 mg/l
Phosphorus	10.4 mg/l	N/A	1.0 mg/l
Ammonia N	16.0 mg/l	3.0 mg/l	7.5 mg/l

is to be provided by a technical (not sales) representative from the manufacturer. Training materials must include videos, lessons and tests. “We’re going to get some excellent training,” Holder says.

Bloyer wants the training to qualify for continuing education units (CEUs) that operators can accumulate toward certification. “The goal is to have a library of training here so new employees will get the same training the existing staff received,” Holder says. “We are also contemplating making the training materials available to other municipalities in the area.”

The materials might also come in handy in the plant’s close relationship with the University of Georgia, whose athletic fields are just down the road. “The university frequently uses us for research projects,” says Bloyer. “In the past, they have brought portable labs to the plant and conducted wastewater research.”

MUTUAL RESPECT

Holder says the new treatment facilities throughout Athens-Clarke County might create enough interest that students will want to intern there. “Dave and I are working on that through the ecology department at the university,” he says. “We hope we’ll get some students interested.”

If and when they come, they’ll see the results of good planning, carried out by parties that communicated constantly and trusted each other. Holder “can’t say enough about the level of respect” between the plant management, staff and contractors.

Regular meetings, and even more so, daily one-on-one contact between the plant and contractor, made for a successful project, even in the face of some tough situations. He adds that superintendent Roberts has shown tremendous support and has encouraged the good relationships. “Having the confidence of someone like Mark, with 37 years of experience, is very humbling to say the least,” Holder says.

“We’ve had very few surprises. Just a few nicks, a cut phone line, but nothing serious. I’m proud of



Construction workers put the finishing touches on the new enhanced biological phosphorus removal tank.



Staff members receive training for the plant’s new SCADA system. From left, administrative assistant Karen Lawrence; maintenance mechanic Tim Thompson; instructor Paul Cherry; staff electrician Richard Young; operations supervisor Tim Holder; and staff electrician Jon Cline.

our operators. We’d all sit down and discuss a plan, shoot holes in it, and in the end each person knew exactly what they had to do.”

Trust has been the key, both Holder and Bloyer, believe. “Even with my new pickup truck,” says Holder, “if they’re digging a line right next to it, I don’t worry.” **tpo**

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A WINNING DUO

GEORGE CALLOWAY AND JOE DERBYSHIRE COMBINED KNOWLEDGE AND EXPERTISE TO TRANSFORM THEIR FACILITY INTO AN AWARD-WINNING NUTRIENT REMOVAL PLANT

By Trude Witham

GEORGE CALLOWAY AND JOE DERBYSHIRE CAME from different backgrounds: Calloway from a machine shop business he owned and operated, and Derbyshire from a lifetime in water and wastewater treatment.

Yet they combined their strengths, ingenuity and hard work to operate the City of Fruitland (Md.) Wastewater Treatment Plant, built as a biological nutrient removal (BNR) facility, as an enhanced nutrient removal (ENR) operation.

“Because our effluent ultimately reaches Chesapeake Bay, our nutrient removal specs are fairly stringent, with a monthly average phosphorus of 2.0 mg/l and total nitrogen of 10.0 mg/l,” says Derbyshire, director of utilities for the City of Fruitland. “We are consistently achieving total nitrogen levels of less than 3.0 mg/l, which is considered to be enhanced nutrient removal.”

That would not be impressive if the plant were designed as an ENR facility. The facility, where Calloway is plant superintendent, was upgraded in 2002 from a 0.5 mgd trickling filter plant to a 0.8 mgd (design) BNR plant to meet a growing population and a more stringent discharge permit. The facility includes:

- Andritz Hydrasieve fine-slot screens
- Eutek (Hydro International) grit removal system
- Two Jet Tech (Siemens) 800,000-gallon concrete sequencing batch reactor (SBR) tanks
- Jet Tech post equalization tank
- Davco (Siemens) traveling bridge sand filters
- TrojanUV disinfection system



George Calloway, plant superintendent (left), and Joe Derbyshire, director of utilities. (Photography by Rick Maloof)


The plant is controlled by an Allen-Bradley (Rockwell Automation) programmable logic controller and a Jet Tech/Integrated Controls SCADA system with the Wonderware program (Invensys Operations Management). The control system is key to the enhanced nutrient removal.

“Our ultimate goal was to achieve 8 mg/l nitrogen removal and 2 mg/l phosphorus removal,” says Derbyshire. “But our permit specified that we would operate the plant to achieve the lowest levels we could. We were able to do this with George’s expertise in control systems and his modifications to our SCADA system.”

CONTROLS EXPERTISE

Calloway was hired as plant superintendent in 2002, halfway through the new plant’s construction. Although his background was in machine operations, he had known Derbyshire for years and was looking to change professions. After the upgraded Fruitland plant started up in 2003, Calloway operated the SBR system for a few months to understand where he could make changes to optimize the process. He looked at the SCADA system and saw the need for some additional controls.

“We wanted to have more control over the aeration process monitoring, but the SCADA provider was a little leery of having us do that, because they were afraid we would mess it up,” he says. “They did end up allowing us to make changes so that we could monitor the anoxic times and the mixed liquor, and that gives us a lot more control over our process. We added blower controls on the screen, additional controls for some valve operations, and timing.”



Joe Derbyshire's experience in biological treatment and George Calloway's expertise in controls bring impressive performance results at the Fruitland Wastewater Treatment Plant.

profile



Joe Derbyshire, Fruitland (Md.) Wastewater Treatment Plant

POSITION: Director of Utilities

EXPERIENCE: 35 years

EDUCATION: Bachelor's degree in biology, post-graduate work in environmental science

CERTIFICATION: Maryland Class 5A in wastewater treatment; Class 4 in water treatment

MEMBERSHIPS: WEF, AWWA, MRWA

GOALS: Make sure the facility meets Maryland regulations, including future enhanced nutrient removal limits

"We are consistently achieving total nitrogen levels of less than 3.0 mg/l, which is considered to be enhanced nutrient removal for total nitrogen."

JOE DERBYSHIRE

George Calloway, Fruitland (Md.) Wastewater Treatment Plant

POSITION: Plant Superintendent

EXPERIENCE: 8 years

EDUCATION: Two years vocational training

CERTIFICATION: Maryland Class 5A in wastewater treatment; Class 3 in water treatment

MEMBERSHIPS: WEF, AWWA, MRWA

GOALS: Begin beneficial reuse of biosolids, meet new enhanced nutrient removal regulations

The Fruitland facility meets stringent nutrient requirements to help protect water quality in Chesapeake Bay.

PHOTO COURTESY OF THE FRUITLAND WASTEWATER TREATMENT PLANT



City of Fruitland Wastewater Treatment Plant PERMIT AND PERFORMANCE

	PERMIT (monthly avg.)	EFFLUENT (yearly avg.)
TSS	30 mg/l	<2
CBOD	30 mg/l	<2
pH	6.5-8.5	6.8-7.5
DO	5.0 ppm	6.9 ppm
Fecal coliform	200	10
Total nitrogen	10 mg/l	2.3 mg/l
Phosphorus	2.0 mg/l	1.2 mg/l



Joe Derbyshire and George Calloway discuss process control adjustments.

Calloway also added remote access for operators to check plant status at any time so they could make process adjustments when needed. His background owning a machinery fabrication/installation business in the sawmill and poultry processing industries was invaluable, as was his work in managing and operating a soft-shell crab production plant. At that facility, he monitored and maintained dissolved oxygen and pH, and maintained all test results and discharge monitoring results required by the state.

"The mechanical processes at the Fruitland plant were the easiest for me because of my previous experience with pumps, blowers and piping," he says. "I learned the biological part from in-house training with Joe and took classes from the Maryland Rural Water Association (MRWA), the Wastewater Operators Association (WWOA), and the Maryland Center for Environmental Training (MCET) during my first three years."

Peter Bozick, project director with the George, Miles & Buhr (GMB) consulting firm, says, "By integrating the DO control and being able to turn the air system on and off, George maximized the ability to denitrify. In my opinion, it's the automated DO control that set this plant apart."

BIOLOGICAL EXPERTISE

The plant's third-year annual average results were outstanding: 2.3 mg/l total nitrogen and 1.2 mg/l total phosphorus, obtained biologically with no chemical addition. But that took time to achieve.

"We experimented with the SRT (solids retention time) for the SBRs and found that we had a narrow range to work within," Derbyshire says. "We

MUCH DECORATED

The Fruitland Wastewater Treatment plant has earned ample recognition for performance since its upgrade in 2002. Awards include:

- Maryland Rural Water Association (MRWA) Clearest Final Effluent in 2003.
- MRWA Wastewater System of the Year in 2004.
- Salisbury Area Chamber of Commerce Environmental Excellence in 2004.
- MRWA Decision Maker of the Year in 2007 for Joe Derbyshire, director of utilities.
- MRWA Rookie Wastewater Operator of the Year in 2003 for plant superintendent George Calloway.
- MRWA Rookie Wastewater Operator of the Year in 2005 for chief operator Dominic Dilegge.

"The water discharged from the Fruitland plant is so clean, the plant could easily take part in a reclamation or reuse program under the regulations being proposed by the State of Maryland," says engineering consultant Peter Bozick.

Derbyshire observes, "There are fish in the clear well at the end of the traveling bridge filter, before the disinfection process. That's how clean the water is."

Derbyshire and Calloway are eager to share their knowledge with other plants. The Town of Berlin is building a new plant similar to Fruitland's. "They came and looked at our plant and asked questions," says Calloway. "We are always willing to help others. There is an environmental aspect, too. We are all responsible for Chesapeake Bay, and we all need to do what we can to help."

Bozick says, "What makes these guys successful is their good character, their ability to take their jobs seriously, and their commitment to the environment. They have tried to the best of their ability to treat the water for the environment. And, they know what they're doing."

were never far off, but we ran it both at the low and high ends of the scale before getting it in the middle."

The plant has also met or beaten its permit limits for BOD, TSS, pH, DO and fecal coliform. The success is a team effort. Says Bozick, "Joe had a hand in choosing the equipment, and used his expertise on the biological side of the wastewater treatment process. George's talent is on the controls side.

(continued)

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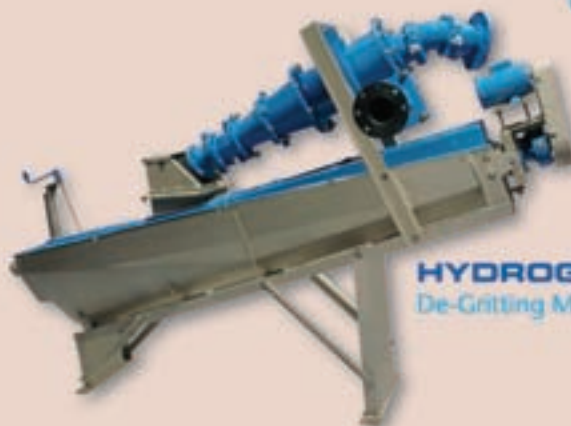
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They worked together closely to monitor the process and tweak the controls to get the best results.”

Derbyshire started his career as superintendent at the Fruitland plant in 1973. In 1978, he was promoted to director of utilities for the water and wastewater facilities. From 1975 to 1985, he was lead instructor for water and wastewater courses at Wor-Wic Community College in Salisbury.

“We have gotten the results we have because of teamwork.

All parties involved are contributors to that success.”

GEORGE CALLOWAY

Derbyshire started learning about the biological wastewater process in 2003, after the upgraded Fruitland plant came online. Although he has a bachelor's degree in biology and did post-graduate work in environmental science, he learned about wastewater treatment from a book. “I spent many months reading *Biological Wastewater Treatment*, second edition, by Grady, Daigger and Lim,” he says. “It discusses the chemistry and biology of nutrient removal.”

RELYING ON TEAMWORK

Calloway and Derbyshire have some great company in chief operator Dominic Dilegge and operator/lab technician Mike Wilson. Derbyshire, Calloway and Dilegge are Class 5A certified in operations, and Wilson is a certified lab technician working on his 5A operator certification.

“Dominic and Mike were on board during the construction,” says Derbyshire. “Dominic worked for the contractor who built the new system and came to work for us when the project was completed. They got hands-on, in-house training with the new equipment through the MRWA and MCET.”

Regular nutrient testing in the laboratory is key to the plant's success. “You have to do process control testing daily; you'd be lost without it,” says Derbyshire. They sample for nutrients twice a week for reporting purposes,

and their lab technician samples throughout the day to get batches at different times in certain portions of the cycle. For compliance, the plant prefers to have third-party verification on the testing, which is why they also send samples to an outside lab for nitrogen and phosphorus analysis.

The plant staff does most of its own maintenance and grounds work. Four years ago, they started using pre-release inmates from the state prison to do grounds work, painting and general maintenance, freeing up the staff to do other jobs. That enabled the plant to continue operating with current staffing.

“We have gotten the results we have because of teamwork,” says Calloway. “All parties involved are contributors to that success.” Derbyshire agrees: “We have a really good staff, and they take pride in their work. They like what they do and they're not just here to get a paycheck. They're self-motivated.”

Calloway has high praise for his boss. “Joe tries to make himself part of the process, not just someone in the office,” he says. “He rolls up his sleeves, and the operators see him out there. He's not afraid to do the same job they're doing.”

They agree that constructive criticism is important. “If a guy makes a mistake, I don't jump all over him,” says Derbyshire. Calloway adds, “If you see something that isn't correct, you offer a solution to the problem.”

FUTURE CHALLENGES

Derbyshire says the next step is to finish addressing issues with infiltration and inflow. They have purchased a camera to inspect the collection system, have lined the manholes, and have slip-lined the pipes that were in the worst condition.

They would also like to explore the beneficial reuse of biosolids. At present, sludge from the SBR tanks is wasted at a rate set by the operations staff to two aboveground concrete aerobic digesters. Supernatant from these is returned to the head of the plant. Biosolids from the digesters is sent to asphalt drying beds or to a Somat screw press for dewatering. The dewatered material is landfilled.

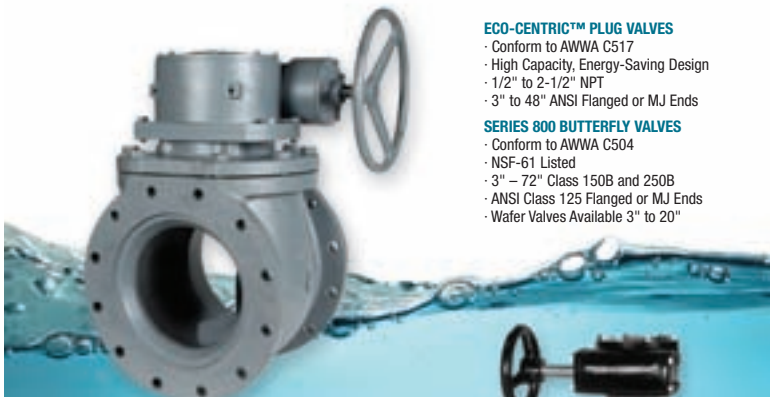
“Our future goal is to have a tri-county biosolids facility,” says Calloway. “It isn't cost-effective to build a facility for a small plant like ours. It's an environmental issue, and there are uses out there for the material.”

As for the ENR process, Derbyshire says the plant is reviewing the best way to meet the future permit requirement of 0.3 mg/l total phosphorus. “We will have to do this in the next three years, for the new permit in 2014,” he says. “We won't add more plant capacity, but will tweak the current process for better phosphorus removal.”

Derbyshire advises other plants to have a good working relationship with their consulting engineers. “This is critical, and it goes both ways,” he says. “You have to know what you're talking about if you want the consultant to listen to you.”

Says Calloway, “You have to really analyze your wastewater system. You could have a great system, but everything is interrelated. So, wherever you have a weakness is going to create a problem somewhere else.” **tpo**

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A SOLAR PV INSTALLATION IN BOULDER, COLO., REQUIRED MINIMAL UP-FRONT INVESTMENT, AND YET PROVIDES SUBSTANTIAL BENEFITS IN LOWER POWER COSTS

By Doug Day

Staff members at the Boulder (Colo.) Wastewater Treatment Plant know exactly how much they will pay for about 15 percent of the facility's electricity 20 years from now. That's because of a 1 MW solar photovoltaic (PV) system that began supplying power to the plant last July.

The city's Environmental Action Division developed the idea a few years ago when solar developer EyeOn Energy Ltd. approached officials about leasing five acres of city property at the treatment plant in exchange for a purchased power agreement (PPA) at rates lower than those from the local utility, Xcel Energy.

The resulting contract locks in electrical rates for 20 years at levels below what the plant now pays for the utility power it still uses, according to project manager Douglas Sullivan. "This was a great deal for the city," he says. "We pay an average of about 6.5 cents per kWh for utility power now, and the solar facility production is about half the cost."

The price from the PV system started at 3.25 cents per kWh and escalates at 2.75 percent per year for the first ten years, after which it will be 4.17 cents. That's where the price will stay for the last 10 years of the contract.

"We had very few up-front costs," adds Andrew Barth, public works communications specialist. "Normally the city would be funding large capital projects, but the brunt of this was funded by the developer and construction contractor." Xcel was also able to count the facility toward its Portfolio Standards requirement to have 10 percent of its generation from renewables by 2020.

The system will reduce annual emission by about 3.2 million pounds of carbon dioxide, 18,000 pounds of sulfur dioxide, and

8,500 pounds of nitrous oxide. According to the U.S. EPA, that is equivalent to taking 296 cars off the road and planting 360 trees.

EXCEEDING EXPECTATIONS

As is often the case, Boulder's treatment plant is the largest power user of all of the city's facilities. Its on-site PV system is one of the largest in the state and one of the largest municipal systems in the country. It is designed to provide 15 percent of the plant's annual electrical needs and would save about \$43,000, according to original design estimates.



A \$6 million photovoltaic system (foreground) provides about 15 percent of the Boulder wastewater plant's electricity at a cost of about half what it would pay for utility power. Even after ten years, the cost will be below today's utility rate.

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.

"When the facility went online, it immediately dropped one of the two utility feeds to zero, so it was providing 65 percent of the plant's power for six hours," says Sullivan. That happened to be a sunny day and the array went online during the peak time for sunshine (10 a.m. to 4 p.m.).

The system includes 4,452 solar panels on 900 aluminum posts in a fixed array facing due south at a 43-degree angle to the ground. The developers, who had the final decision on the design, considered a tracking system.

"They looked at a couple of different options," says Sullivan. "There are pros and cons from a price perspective, and there is a maintenance cost associated with a tracking system. The feeling was that the fixed system made the most sense."

The fixed system had the best cost/benefit ratio because of Boulder's location relative to the equator and because of the climate in the Colorado mountains. "We average 300-plus sunny days a year in Boulder, so it is a beneficial spot for solar," says Barth. Other locations may be better served by a single-axis tracking system that follows the sun, or dual-axis tracking that also adjusts to the angle of the sun in the sky.

The PV system feeds power into a high-voltage switchyard in the plant. The only time plant operators may become involved is if the PV system does not automatically disconnect in case of a utility power outage. They would need to disconnect the system to prevent back-feeding of voltage onto the grid and endangering utility crews, and to prevent phasing problems with the plant's two cogeneration engines and its emergency diesel generators.

COMPLICATED ARRANGEMENT

While the city doesn't operate the PV system, it was still a complex deal to complete. EyeOn Energy ran into significant difficulty getting long-term financing during the economic downturn in 2008 and 2009.

To help fund the project, the company sold the \$6 million plant to SOLON Corporation. SOLON is a manufacturer of PV panels, and its North American unit focuses on building PV facilities, not owning them long term. So as construction ended, the plant was sold again, to SunEdison.

Still, it took significant effort from the city. "We learned a lot, and we now have expertise on staff that positions us well in the event we have the interest to pursue this kind of a contract at another facility,"



Underground lines lead from the 1 MW solar photovoltaic systems to the Boulder Wastewater Treatment Plant.



OFF THE GRID

The Boulder Wastewater Treatment Facility had a historic day on Oct. 28, 2010. For more than two-and-a-half hours that day, the plant was completely powered by its solar photovoltaic system and its two digester-gas-fueled cogeneration engines.

During the time the plant was off the grid, from 11:20 a.m. to 2 p.m., its renewable energy sources delivered a steady 1,200 to 1,400 kW. At its peak, the photovoltaic system provided close to 800 kW.

Plant officials credit several factors, including low wastewater flows and less demand than usual, combined with cool temperatures and clear, sunny skies.

says Barth. It took substantial staff time and due diligence on both the contract and the technology to make sure the solar system would meet the plant's requirements and would not interfere with plant operations.

Sullivan suggests that treatment plants considering solar look for outside help if they don't have the expertise in-house. "We were reactionary at first to the proposal, but we hired some consultants to look at what made sense for the city," he says.

What happens at the end of the 20-year contract will be decided near the end of the agreement. "We might see a proposal from SunEdison to replace the panels with new technology that could be significantly more efficient," says Sullivan. "We could renegotiate the contract, or the city could purchase the facility."

MORE RENEWABLES?

The Boulder plant has been using cogeneration since 1987. Two digester-gas-powered cogeneration engines provide 2.1 million kWh per year, 10 to 15 percent of the plant's electrical demand. The PV system doubled the plant's self-generation portfolio.

Energy consultant McKinstry Company is exploring possibilities for more renewable energy at every city facility, including two water treatment plants, three recreation centers, and several other municipal buildings.

Boulder also has eight hydroturbines to take advantage of its elevation in the foothills of the Rocky Mountains. The city owns several reservoirs 3,000 to 6,000 feet above the city and uses hydroturbines in those water pipelines to generate 42.5

"The city is constantly looking at new renewable energy resources. We have a goal of achieving the targets established by the Kyoto Protocol, which would reduce greenhouse gas emissions to 7 percent below 1990 levels by 2012 for the whole city."

ANDREW BARTH

million kWh per year. The city was among the first in the country to use that technology. One hydro-turbine due to be replaced soon is 73 years old; another turned 100 in August.

"The city is constantly looking at new renewable energy resources," says Barth. "We're putting solar panels on buildings right now, and we're looking at wind energy. We have a goal of achieving the targets established by the Kyoto Protocol, which would reduce greenhouse gas emissions to 7 percent below 1990 levels by 2012 for the whole city." **tpo**

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Make and Break

A WISCONSIN TREATMENT PLANT USES A NEW MOTOR PLUG THAT SIMPLIFIES MIXER REPLACEMENT AND SERVICE AS WELL AS GENERATOR HOOKUP AT LIFT STATIONS

By Bill Fortman

The Watertown (Wis.) Wastewater Treatment Plant is saving time with a combination plug/receptacle and disconnect switch that makes motor and generator connections safer and faster in the plant and at lift stations around town.

The Decontactor Series switch-rated motor plug from Meltric Corporation allows workers to make and break electrical connections safely even under full load and provides the line-of-sight disconnect as required by the National Electrical Code (NEC).

The activated sludge secondary treatment plant (5.2 mgd design flow, 3.5 mgd average) serves a city of about 23,000. Submersible mixers in the aeration basins originally were hard-wired. When one of the mixers had to be replaced, the project put the tank out of service for about a day while the mixer was disconnected and a new one re-wired.

To resolve that issue, the facility staff installed DSN30 (30A, 480V, 10 hp rated) Decontactor plugs on all its aeration tank mixers. The devices allow the mixers to be connected and disconnected safely with plug-and-play simplicity.

SIMPLE DISCONNECT

Now, technicians can easily replace or service the mixers without needing an electrician and without electrical personal protective equipment as required by NFPA 70E. "When the first mixer failed, we had to shut everything off and disconnect all the wiring before we could pull it out and drop in a replacement," says Kevin L. Freber, assistant water systems manager-wastewater. "Now we just pull the



The Decontactor provides a safe connection between the generator and lift station.



PHOTOS COURTESY OF RAY SCROGGINS

If a submersible mixer at the Watertown treatment plant fails, it can be changed quickly and safely by disconnecting power with the Meltric Decontactor before it is hoisted up from the aeration basin.

Share Your Idea

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

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

plug, crank the mixer up, and plug in a new one. We're ready to go in minutes, and there's never any exposure to live power."

Disconnecting a motor is now a simple operation, initiated by pressing a pawl on the Decontactor plug, which causes it to break the circuit and eject the plug to its rest position. Then, a quarter-turn of the plug allows it to be totally withdrawn from the receptacle in complete safety, since the circuit is already dead. When the plug and receptacle are separated, a safety shutter prevents access to live parts.

The plugs incorporate spring-loaded, silver-nickel, butt-style contacts that provide consistently high electrical performance over thousands of operations. They also resist wear, corrosion, oxidation and other conditions that contribute to failure of pin-and-sleeve devices.

TO THE LIFT STATIONS

Success with the aeration basins led the utility to equip its portable emergency generators and remote lift stations with similar connectors. Typically, the lift stations are located below ground level with a control panel above ground.

A power failure may make it necessary to bring the portable generators to power the pumps at some lift stations. Previously, the stations were equipped with conventional pin-and-sleeve connectors and could not be locked easily to prevent tampering or entry by children or vandals. "The generators deliver 100-amp service, and with the plugs we had before, there was no way of locking the two parts together," says Freber. "Any child could walk up and pull it apart."

The Decontactor plugs are easy to lock to prevent tampering and also are safe when separated. "You have to twist it to open it, and



Unlike pin-and-sleeve devices, the Decontactor can be padlocked easily in the on or off position to eliminate the dangers of tampering.

When disconnected, the plug's deadfront construction keeps workers safe by preventing accidental contact with live parts.

even if someone could get it apart, they never could get at the live contacts," Freber says.

That is because the devices have dead-front construction and enclosed arc chambers. Easily accessible contacts on the previous connectors had the potential to expose workers or others to live power. Switching to the Decontactor plugs also helped the utility simplify compliance with NFPA 70E arc flash requirements.

"When the first mixer failed, we had to shut everything off and disconnect all the wiring before we could pull it out and drop in a replacement. Now we just pull the plug, crank the mixer up, and plug in a new one. We're ready to go in minutes, and there's never any exposure to live power."

KEVIN FREBER

ABOUT THE AUTHOR

Bill Fortman, P.E., MBA, is marketing manager for Meltric Corporation, a maker of industrial-duty plugs and receptacles in Franklin, Wis. tpo

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TREATMENT PLANT OPERATOR Pumps DIRECTORY 2011

	Centrifugal	Chemical Feed	Chopper	Dewatering/Bypass	Diaphragm	Effluent	Grinder/Sump	High Pressure
 ABBA Pump Parts & Service 5370 Munro Ct., Burlington, ON L7L 5N8 Canada 800-268-5142 905-333-2720 Fax: 905-333-0973 wendy_j@abbaparts.com www.abbaparts.com	YES					YES		
 Ashbrook Simon-Hartley 11600 E Hardy Rd., Houston, TX 77093 800-547-7273 281-985-4473 Fax: 800-999-6737 ken.medlin@as-h.com www.as-h.com See ad page 67	YES			YES				
 Blue-White Industries 5300 Business Dr., Huntington Beach, CA 92649 714-893-8529 Fax: 714-894-9492 sales@blue-white.com www.blue-white.com See ad page 4		YES			YES			
 Boerger, LLC 740 NE Harding St., Minneapolis, MN 55413 612-435-7300 Fax: 612-435-7301 info@boerger.com www.boerger.com See ad page 41		YES	YES	YES		YES	YES	
 Dragon Products Ltd. 1655 Louisiana St., Beaumont, TX 77701 800-231-8198 409-833-2665 Fax: 409-833-3170 sales@modernusa.com www.dragonproductsltd.com	YES			YES				
 DSI/Dynumatic PO Box 0361, Sturtevant, WI 53177-0361 800-548-2169 Fax: 262-554-7041 sales@drivesourceusa.com www.drivesourceusa.com See ad page 53								
 Flo Trend Systems, Inc. 707 Lehmen St., Houston, TX 77018 800-762-9893 713-699-0152 Fax: 713-699-8054 sales@flotrend.com www.flotrend.com See ad page 49	YES	YES				YES	YES	
 Fluid Metering, Inc. 5 Aerial Way, Ste. 500, Syosset, NY 11791 800-223-3388 516-922-6050 Fax: 516-624-8261 pumps@fmipump.com www.fmipump.com See ad page 47		YES						
 Global Pump 10162 E Coldwater Rd., Davison, MI 48423 866-360-7867 810-653-4828 Fax: 810-658-0632 sales@globalpump.com www.globalpump.com	YES			YES				YES
 Gorman-Rupp Company 600 S Airport Rd., Mansfield, OH 44903 419-755-1011 Fax: 419-755-1208 grsales@gormanrupp.com www.GRpumps.com See ad page 17	YES			YES		YES		YES
 ITT Water & Wastewater – Flygt Products 1000 Bridgeport Ave., Ste. 402, Shelton, CT 06484 203-712-8999 Fax: 203-712-8998 flygt_info@itt.com www.flygtus.com See ad page 3	YES		YES	YES		YES	YES	

Metering	Peristaltic	Piston/Plunger	Progressive Cavity/Screw	Propeller	Pump Alignment/Vibration	Pump Controls	Pump Parts/Components	Pump Repair/Service	Rotary Lobe	Solids/Sludge	Submersible	Vacuum	Vertical/Lift Station
							YES	YES		YES	YES		YES
							YES	YES		YES			
YES	YES												
			YES						YES	YES	YES		
							YES					YES	
						YES							
	YES	YES				YES							
							YES	YES		YES	YES		
						YES	YES	YES		YES	YES		YES
			YES	YES		YES	YES	YES		YES	YES		YES

TREATMENT PLANT OPERATOR Pumps DIRECTORY 2011










(continued)

	Centrifugal	Chemical Feed	Chopper	Dewatering/Bypass	Diaphragm	Effluent	Grinder/Sump	High Pressure
 Komline-Sanderson 12 Holland Ave., Peapack, NJ 07977 800-225-5457 908-234-1000 Fax: 908-234-9487 info@komline.com www.komline.com See ad page 62								YES
 KSB, Inc. 4415 Sarellen Rd., Henrico, VA 23231 804-222-1818 Fax: 804-222-6961 sheinly@ksbusa.com www.ksbusa.com See ad page 47	YES					YES	YES	
 Larox Flowsys Inc. 808 Barkwood Ct., Ste. N, Linthicum, MD 21090 888-356-9797 410-636-2250 Fax: 410-636-9062 todd.loudin@larox.us www.larox.us		YES				YES		
 PIT HOG pumps sludge fast. See ad page 41	YES		YES					
 LUDECA, INC. 1425 NW 88th Ave., Doral, FL 33172 305-591-8935 Fax: 305-591-1537 info@ludeca.com www.ludeca.com See ad page 65								
 JESCO Lutz-JESCO America Corp. See ad page 56	YES	YES			YES			YES
 Meltric Corporation 4640 Ironwood Dr., Franklin, WI 53132 800-433-7642 414-817-6160 Fax: 414-817-6161 mail@meltric.com www.meltric.com See ad page 62								
 MET-PRO Global Pump Solutions See ad page 62	YES	YES					YES	
 MILTON ROY See ad page 19		YES			YES			YES
 Neptune See ad page 62		YES			YES			
 NETZSCH								
Netzsch Pumps North America LLC 119 Pickering Way, Exton, PA 19341 610-363-8010 Fax: 610-363-0971 npa@netzsch.com www.netzschusa.com								

Metering	Peristaltic	Piston/Plunger	Progressive Cavity/Screw	Propeller	Pump Alignment/Vibration	Pump Controls	Pump Parts/Components	Pump Repair/Service	Rotary Lobe	Solids/Sludge	Submersible	Vacuum	Vertical/Lift Station
		YES					YES	YES		YES			
							YES	YES			YES		YES
YES	YES		YES							YES			
										YES			
					YES								
YES		YES				YES	YES						
						YES	YES	YES					
													YES
YES		YES	YES		YES	YES	YES	YES					
YES													
			YES						YES				

TREATMENT PLANT OPERATOR Pumps DIRECTORY 2011

(continued)

	Centrifugal	Chemical Feed	Chopper	Dewatering/Bypass	Diaphragm	Effluent	Grinder/Sump	High Pressure
 Penn Valley Pump Co., Inc. 998 Easton Rd., Warrington, PA 18976 800-311-3311 215-343-8750 Fax: 215-343-8753 info@pennvalleypump.com www.pennvalleypump.com		YES			YES			
 Prime Solution, Inc. 2861 127th Ave., Allegan, MI 49010 269-673-9559 Fax: 269-673-8241 info@psiroatary.com www.psiroatary.com See ad page 61		YES		YES				
 Revere Control Systems 2240 Rocky Ridge Rd., Birmingham, AL 35216 800-536-2525 205-824-0004 Fax: 205-824-0439 revere@reverecontrol.com www.reverecontrol.com								
 seepex Inc. 511 Speedway Dr., Enon, OH 45323 937-864-7150 Fax: 937-864-7157 sales@seepex.net www.seepex.com See ad page 57			YES					
 Smith & Loveless Inc. 14040 Santa Fe Trail Dr., Lenexa, KS 66215 800-898-9122 913-888-5201 Fax: 913-888-2173 answers@smithandloveless.com www.smithandloveless.com See ad page 8	YES			YES		YES		
 SPX Flow Technology 611 Sugar Creek Rd., Delavan, WI 53115 800-252-5200 262-728-1900 Fax: 262-728-4904 ft.amer.info@spx.com www.spxft.com	YES	YES			YES			YES
 USABlueBook PO Box 9006, Gurnee, IL 60031 800-548-1234 847-689-3000 Fax: 847-689-3030 www.usabluebook.com See ad page 68	YES	YES		YES	YES	YES	YES	YES
 Vaughan Company, Inc. 364 Monte-Elma Rd., Montesano, WA 98563 888-249-2467 360-249-4042 Fax: 360-249-6155 info@chopperpumps.com www.chopperpumps.com See ad page 11	YES		YES					
 Weir Specialty Pumps / WEMCO Pump 440 West 800 S, Salt Lake City, UT 84101 801-359-8731 Fax: 801-530-7828 info@weirsp.com www.weirsp.com See ad page 23	YES		YES	YES		YES		YES



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Gary Hengst

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Chief Plant Operator, Lincoln (Calif.) Wastewater Treatment and Reclamation Facility

Metering	Peristaltic	Piston/Plunger	Progressive Cavity/Screw	Propeller	Pump Alignment/Vibration	Pump Controls	Pump Parts/Components	Pump Repair/Service	Rotary Lobe	Solids/Sludge	Submersible	Vacuum	Vertical/Lift Station
		YES								YES			
	YES					YES				YES			
						YES							
			YES			YES	YES	YES		YES	YES		
						YES	YES	YES		YES			YES
YES		YES	YES										
YES	YES		YES			YES	YES		YES	YES	YES	YES	YES
										YES	YES		YES
										YES	YES		YES

Read about original environmentalists like Gary each month in *Treatment Plant Operator*.

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Gary Hengst checks on a maturation pond at the Lincoln facility.

Back to *the Land*

A METICULOUS STAFF OPERATES AN AWARD-WINNING PLANT IN BONITA SPRINGS, FLA., THAT RECYCLES ALL WASTEWATER FOR IRRIGATION AND BIOSOLIDS FOR FERTILIZER

By Jim Force



profile

The Bonita Springs Utilities East Wastewater Reclamation Facility provides tertiary treatment for a population of 30,000. (Photography by Greg Kahn)

East Water Reclamation Facility, Bonita Springs Utilities, Bonita Springs, Fla.

POPULATION SERVED:	30,000
COMMISSIONED:	April 2007
TREATMENT LEVEL:	Tertiary
FLOW:	4 mgd design, 2.9 mgd average
TREATMENT PROCESS:	Membrane bioreactor
RECEIVING STREAM:	100 percent recycled for irrigation
BIOSOLIDS:	Pelletized for sale
STAFF:	12
ANNUAL BUDGET:	\$1.9 million (operations)
WEBSITE:	www.bsu.us

CLIFF MORRIS IS LIKE A MAN WITH A NEW CAR. AS CHIEF OPERATOR OF THE THREE-YEAR-OLD East Water Reclamation Facility in Bonita Springs, Fla., he's as proud as can be of his staff, the plant, and the pristine effluent that is 100 percent recycled.

Started up in April 2007, the membrane bioreactor plant has functioned flawlessly, thanks to the TLC of Morris and his conscientious staff. Professionals from around the world have come to see it.

"I can't take credit for it," Morris says, "but it's the easiest plant I've ever had to supervise." That's saying a lot for someone who has managed treatment plants in South America and Guantanamo Bay, among other locations.

"After all these years bopping around the industry," he says, "I feel like I'm driving a Ferrari." The facility has won state and national engineering awards for its design by the engineering firm of CH2M HILL.

"I can't take credit for it, but it's the easiest plant I've ever had to supervise. After all these years bopping around the industry, I feel like I'm driving a Ferrari."

CLIFF MORRIS



PUBLIC SENSITIVITY

The plant wasn't easy to build. Constructed to supplement the agency's 7 mgd West Water Reclamation Facility eight miles away, the East WRF was placed on 470 acres along Interstate 75, but complaints from a neighboring trailer home community forced construction to the rear of the property. Wetlands had to be restored and a bird habitat created, requiring close control of all plant lighting, noise and odors.

The odor-control system, consisting of covered areas and a trio of bio-towers from Bioway (OdorTool.com LLC), is very effective. "People visit and comment on the fact that nothing smells," Morris says.

Just under 4 mgd flows from a collection system that includes 315 lift stations. Wastewater is channeled through a 6-mm rotating band screen (Ovivo), and a manual bar screen. A cyclone grit remover and classifier follow, and the



Cliff Morris, chief operator.

water then passes to a 1.25 mgd equalization tank. The tank features blowers (Dresser Roots) and a Jet Tech jet aeration system (Siemens Water Technologies Corp.) to keep the contents agitated.

From the EQ tank, the wastewater undergoes additional screening and then enters the modified Ludzack-Ettinger biological process, consisting of an anoxic basin divided into two trains, and an aerobic basin divided into three trains. Each train contains three zones, separated by baffle walls. The zones are equipped with Flygt (ITT Water & Wastewater) mixers, Hoffman blowers (Gardner Denver), and Sanitaire (ITT Water & Wastewater) fine-bubble diffusers.

"It's a step-down design with dissolved oxygen probes before and after the process," says Morris. "We have automatic controls on the blowers and valves to automatically turn down the airflow and maintain proper biological activity."

The four membrane trains are the ZeeWeed systems from ZENON, a Division of GE Water & Process Technologies. There are five cassettes per train, and each train is designed to process 1 mgd. Each cassette has 48 modules, manifolded together, and is connected to a common permeate header linked to a dedicated air separation tank and permeate pump. A small vacuum produced by the pump draws water through the membranes and leaves mixed liquor suspended solids on the outsides of the membranes. Air scour blowers (Aerzen) agitate the membrane surfaces to prevent biomass from accumulating.

FULLY RECYCLED

"The MBR technology is amazing," Morris says. "It takes the place of clarifiers and filters." The plant design allows for two recycle flows. The mixed liquor recycle stream feeds the membranes at 4,000 to 7,000 ppm of suspended solids and is concentrated after filtering and returned to the head of the aerobic basins. The second stream consists of a nitrified recycle and is returned to the anoxic basins.

The East WRF uses multi-channel sodium hypochlorite to disinfect the effluent. But that's not the end of the story. The plant recycles 100 percent of its effluent. The clear water is pumped to a pair of 4-million-gallon lined ponds, one for reject and one for recycle.

Water is transferred to the reject pond only in rare cases where there may have been a glitch somewhere in the treatment process. That water is treated again. The water in the recycle ponds joins water from the West WRF and is sold to a private company, which distributes it as irrigation water to local golf

courses. A small portion of the reclaimed water is returned to the East plant for process water.

The water quality is simply magnificent. In the lobby of the plant, Morris and his staff maintain a 200-gallon aquarium filled with effluent where healthy fish swim around and attract interest from plant visitors.

"The last few months, I've taken grab samples before the disinfection step, and it's pretty amazing," Morris says. "We look for fecals and suspended solids, and we haven't had a hit yet. The membranes do a great job."

MEMBRANE CARE

Morris says the key is protecting the membranes by keeping them and the screens ahead of them clean and functioning. "We clean all our membranes twice weekly with sodium hypochlorite, and every third clean is with citric acid," he says.

The cleanings are triggered automatically by the plant's SCADA system, and staff members are careful not to damage membrane fibers as they work around the units. "We clip everything (pens, sunglasses, tools) so they don't drop on the fibers," says Morris. "In three years, we haven't had a broken fiber."

Biosolids are not wasted either. After aerobic digestion, a Vulcan rotary drum thickener brings them to 1.5 percent solids, and they are transferred to a GEA Westfalia Separator centrifuge that produces material at 19 to 20 percent solids. A natural-gas-fired Andritz dryer processes the material into 93 to 94 percent solids Class AA pellets.

Two 40-ton-capacity silos store the pellets, and a drive-through scale station dispenses the pellets onto trucks that convey them to a local fertilizer manufacturer. It represents yet another revenue stream for Bonita Springs Utilities.

The agency used to sell the pellets to a wholesaler who sold them to farmers, but the current arrangement creates a steady demand for the material. "The dryer is a good unit," Morris says. "It puts out a real nice product." No odors. No outfall. No landfilling of biosolids. "Everything gets recycled here," says Morris. "That's a good thing."

IT'S AUTOMATIC

As pleased as he is with his MBR system, Morris is just as enthused about his plant's controls. The system, made up entirely of Allen-Bradley (Rockwell Automation) components, is both powerful and loaded with redundancy.

"We have lots of PCs, and both primary and secondary PLCs," says Morris. "We have four electrical rooms, all with PLC racks. All our probes for DO,

SHARING EXPERTISE

Cliff Morris, chief operator at the Bonita Springs Utilities East Water Reclamation Facility, chairs the ZeeWeed Users Group, for users of ZeeWeed membrane treatment systems from ZENON, a Division of GE Water & Process Technologies.

The group meets every year in April to discuss membrane operations, usually with company technical experts sitting in to help develop solutions and solve problems. Often, a plant visit is involved. Small-group discussion leads to candor and camaraderie.

"It's an interesting makeup of people," says Morris. "There are 50 or 60 of us from all over the world. During the year, we stay in touch by phone or e-mail. We help each other, and sometimes we visit one another. I've invited guys nearby to come over and do some fishing."

The association can pay other dividends, too. When the group met in Virginia last spring, the plant they visited had just replaced its membrane vacuum pumps with a different system. Morris made an offer on the pumps and got all five of them at a significant bargain.



The plant produces Class AA bio-solids pellets in a natural-gas-fired Andritz dryer that heats up to 1,200 degrees F.



ABOVE: Maintenance technician Jim Davis performs routine service on Gardner Denver centrifugal blowers.

RIGHT: The ZENON membrane basins are the heart of the facility. The membranes are hollow strands of porous plastic fibers.



nitrites, pH, and total dissolved solids feed into the system."

Morris says a key to success was that the system integrator (Revere Control Systems of Birmingham, Ala.) worked with all subcontractors and equipment suppliers so that all controls and automation throughout the plant are tied together in a single system.

(continued)

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"I admit I'm a clean-freak. Spit-and-polish is all I ask. When I started out, I was a micro-manager. Not anymore. Our people have the authority to make decisions. We demand professionalism here and we get it."

CLIFF MORRIS

East Water Reclamation Facility, Bonita Springs Utilities PERMIT AND PERFORMANCE (monthly averages)

	INFLUENT	EFFLUENT	PERMIT
CBOD	238 mg/l	< 2 mg/l	30
TSS	412 mg/l	< 0.6 mg/l	5 (weekly avg.)
Fecal coliform	25 mg/l	<1	25 (weekly avg.)

Fiber optics connect all the agency's water and wastewater treatment plants, and a Category 5 hurricane center built next to the East plant also hosts all controls, so that any and all of the plants can be operated from it in a bad storm. "There are multiple places to monitor all operations," Morris says. Two separate electrical sub-feeds to the plant, and an on-site 1,750 kW generator (Caterpillar), provide even further redundancy.

STAFFING AND TEAMWORK

Morris's enthusiasm transfers to his staff, which includes electrician/technician Scott Becker, in charge of the automation system; maintenance technician Jim Davis; biosolids technicians Mike Fedczak, Bruce Keller and Dennis White; and operators Chad Peets, Brian Daniels, Steve Frates and Martin Hennigan, all Class C; and Neil Harden and Mark Sweitzer, Class A. "Everybody is proud of this plant," Morris says. "Staff members find things on their own to make the place better than it was when we started up."

He points to a team project to clean and refinish floors in portions of the plant so they absolutely shine. "In the biosolids room, we have a policy of no dust," Morris says. "You could eat off the floor in there."

"I admit I'm a clean-freak. Spit-and-polish is all I ask. When I started out, I was a micro-manager. Not anymore. Our people have the authority to make decisions. We demand professionalism here and we get it."

The plant is required to have a licensed operator on site only 16 hours a day, but Bonita Springs has chosen to staff it around the clock. Much of the

Cliff Morris, chief operator at the Bonita Springs plant, foreground, with staff members, from left, Mark Sweitzer, plant operator; Dennis White and Bruce Keller, biosolids technicians; and Jim Davis, maintenance technician.

staff is cross-trained for wastewater and drinking water. Morris himself holds Florida Double A certification in both. "Actually," he observes, "running a membrane plant like this is almost the same as running a water plant."

Morris says morale is aided by the flow of visitors who come from around the world, interested in the MBR process. "Plus," he says, "I've given papers and webinars on the plant and the process. We've received a lot of accolades. There's a 'wow factor' here."

Pride and teamwork carry over into activities outside the plant. "Six of us ride motorcycles," Morris says. They go on rides together on weekends and during off hours. "We're proud of what we do, on and off the job," Morris says. "Everybody accepts each other." **tpo**

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The Bonnybrook Wastewater Treatment Plant upgraded to BNR processes and installed ChemScan process analyzers from ASA Analytics.

Doing It With Data

A CALGARY WASTEWATER TREATMENT PLANT FINDS REAL-TIME INFORMATION ON EFFLUENT QUALITY CRITICAL TO ACHIEVING CONSISTENT PERFORMANCE IN BIOLOGICAL NUTRIENT REMOVAL

By Dave Marsh

In 1994, the Bonnybrook Wastewater Treatment Plant in Calgary, Alta., completed the first phase of an upgrade to biological nutrient removal (BNR) after several years of testing.

Bonnybrook was not the first treatment plant to upgrade bioreactors for nutrient removal: Other communities had struggled with the technology. Bonnybrook operators determined that real-time information on final effluent quality was important to the BNR processes and installed online process analyzers to provide the data they needed to manage the plant.

A decade of use affirmed that the analyzers were critical to successful BNR operation. Paul Do, senior process engineer, was deeply involved in the BNR design and implementation and in the decision to install the ChemScan process analyzers from ASA Analytics.

With the analyzer, “We obtain real-time and instantaneous indications of the plant’s final effluent quality, including TSS, ammonia, soluble phosphorus, nitrate and nitrite,” says Do. “Knowing the instantaneous final effluent quality, we can immediately take corrective process measures to improve process performance and final effluent quality.”

“The reliable performance of the analyzers enables us to substantially reduce laboratory staff workloads and operating costs. At the same time, it’s much easier for us to monitor and control the BNR processes.”

PAUL DO



BNR COMES OF AGE

The Canadian government estimates that 25 percent of all water body contamination is nutrient-related. That has led to increasingly strict wastewater effluent limits for phosphorus and nitrogen.

To remain in compliance while operating with constrained budgets, more operators are evaluating upgrades to BNR bioreactors.

BNR has come of age for various reasons. Coagulants such as calcium, aluminum and iron have become more expensive for treating wastewater from growing populations. BNR also produces less biosolids in a form more conducive to land application. In addition, a public that favors green technology perceives biological processes as friendlier to the environment.

BNR technology was in its infancy when Alberta Environment established new stringent effluent limits and forced treatment plants to meet a phosphorus discharge of 1.0 mg/l. Instead of launching

Share Your Idea

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a full-scale conversion, Bonnybrook tested BNR on a limited scale while continuing to rely on its tried and true method of precipitating phosphorus with liquid alum.

Calgary, Alberta’s largest city, was seeing steady growth that affected the operations of its two wastewater treatment plants. Bonnybrook’s chemical costs were steadily increasing — in 1985 they approached \$2.6 million and were forecast to reach \$3 million within seven years, when the city population reached one million.

Controlling costs was a primary reason Calgary invested in BNR. Today Bonnybrook (design capacity of 132 mgd) is the largest BNR plant in Canada and the largest cold-weather BNR plant in the world. It treats an average daily flow of 111 mgd, operating 10 state-of-the-

Bonnybrook is the largest cold-weather BNR plant in the world, operating 10 state-of-the-art bioreactors that use biological phosphorus and nitrogen removal processes.

art BNR bioreactors that employ biological phosphorus and nitrogen removal processes. Specifically, the plant uses the A2/O BNR process with return activated sludge nitrification.

MONITORING EFFLUENT

Bonnybrook installed five ChemScan analyzers, which can monitor four key parameters in real time from two different sample points using a single central analyzer. Four analyzers monitor secondary effluent from the 10 bioreactor trains, and one monitors the combined final effluent before discharge to the Bow River.

When the analyzer monitoring the final effluent alerts the operators to deterioration in the process, they check the data from the other four analyzers to determine which bioreactor is causing the problem. The analyzers were a significant upgrade from the time-consuming process of grab sampling and lab testing to monitor the bioreactors.

The analyzers automatically collect samples and test them for specific chemicals using fully automated UV-visible spectrometry to measure absorbance levels across 256 wavelengths of ultraviolet and visible light.

"Before the ChemScan units, our wastewater laboratory staff had to expend much more effort, time and costs on wastewater sampling and analysis," says Do. "The reliable performance of the analyzers enables us to substantially reduce laboratory staff workloads and operating costs. At the same time, it's

much easier for us to monitor and control the BNR processes. The analyzers provide valuable information for corrective actions, thus creating tremendous time savings and avoiding problems with wrong diagnoses."

CHEMICAL SAVINGS

As with other cold-weather plants, Calgary wastewater contains insufficient quantities of short-chain volatile fatty acids (VFAs) needed to trigger the biochemical pathways involved in releasing phosphorus in the anaerobic zone of the biological phosphorus removal (BPR) bioreactors. As a result, the staff still applies small doses of alum to polish final effluent and ensure compliance with Alberta Environment permit limits.

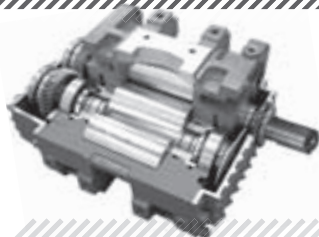
"The ChemScan units helped us to achieve chemical savings," says Do. "We use the analyzers' soluble P results to instantaneously reduce our alum doses, and we are still able to comply with the total phosphorus permit limit of 1 mg/l. Our annual alum savings of around \$2 million was due to both our BNR process and the analyzers."

With more than 10 years of experience monitoring the bioreactors, Do has no complaints about the process analyzers. He observes, "When they are properly maintained, they will keep on working smoothly, and reliably producing all the important parameters associated with a wastewater treatment plant's final effluent quality." **tpo**



ChemScan analyzers provide instant assessments of effluent quality that enable the plant staff to make quick process adjustments when needed.

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Target Zero

WASTEWATER CONTAINS MORE ENERGY PER GALLON THAN IS NEEDED TO TREAT IT. THE QUESTION IS HOW TO PUT MORE OF IT TO WORK IN THE TREATMENT PLANT.

By Ted J. Rulseh

Energy efficiency has become a big issue in wastewater treatment. There are two basic ways to deal with energy in a treatment plant: Use less and make more.

Using less means deploying more energy-efficient equipment and processes. Making more primarily means increasing production of digester methane. Today, researchers are pursuing the ideal of the net-zero-energy wastewater treatment facility.

Is that possible? In theory, yes — because the energy content of wastewater (about 8 kWh for 1,000 gallons) far exceeds the energy required for treatment (0.8 to 1.6 kWh for 1,000 gallons). But is it also feasible in practice? Some experts think so.

Among them is Marc Roehl, P.E., product manager, biosolids technology, with Siemens Water Technologies. Roehl and colleagues are working on technologies that, along with current best practices in energy management, could make net-zero-energy treatment a commercial reality within a few years.



Marc Roehl

Roehl holds a master's degree in environmental engineering from the University of Iowa and has been in the wastewater industry for 18 years. He spent the first half of that career with MSA Professional Services, consulting with municipal treatment plants in and around Wisconsin. In nine years with Siemens, he has dealt with anaerobic digestion, solids minimization, biological treatment and clarification.

Roehl talked about energy efficiency and his company's research and development project on net zero energy in an interview with *Treatment Plant Operator*.

tpo: What is your impression of the state of the industry today in terms of how energy efficient treatment plants are?

Roehl: There's an incredible opportunity to improve efficiency and reduce power usage in treatment plants. That's partly because many plants are older and due for upgrade. Until recently, we haven't had really good ways to measure efficiency, and it didn't become a focal point in plant design or operation until the past five or ten years.

tpo: Do you see energy efficiency becoming a major priority?

Roehl: Most definitely. We're seeing that in the technologies plant designers and operators are evaluating when looking at upgrades, and in the technologies being installed in retrofits. There's a general mindset today that if we're going to improve the plant, let's make sure we do it with the best practices available.

tpo: What's mainly driving this trend? Cost savings? Sustainability? Concerns about climate change?

Roehl: Cost is the primary driver, but I think the others are also of interest, depending on the community. We're seeing more and more communities say that in the interest of good citizenship, they're going to choose investments that are as sustainable or as green as

possible. But at the end of the day, there's money to be saved, and that's really the biggest driver.

tpo: What exactly is a net-zero-energy facility?

Roehl: Basically it's a facility that can produce as much energy on site as is needed for plant operations. That's not to say the facility wouldn't need a utility connection, but the general concept is that the utility bill should be close to zero.

tpo: Why are treatment plants good candidates for net zero energy?

Roehl: They have a waste stream that can be readily converted into biogas that can be burned to generate electricity and heat. That's nothing new — it's been done for decades through anaerobic digestion. Still, the fact that you have this waste stream and you have a digester on site gives you potential to set up a renewable energy system on site to handle the plant's power demands.

tpo: Typically, the energy plants generate from digester methane falls pretty far short of the total plant energy demand. So how do we get to net zero?

Roehl: I talk about this as the technology gap. The size of the gap varies depending on the treatment plant, what its effluent treatment objectives are, and the type of processes used. Plants today generally can expect to cover maybe 25 to 30 percent of their electric power needs through the installation of an on-site cogeneration system. So there's a big gap from there to meeting all the plant's power needs.

Our company has been working on that problem for the past two years. We have a research and development facility in Singapore where we're working on technologies for all facets of the water and wastewater industry, and one project we're working on is focused on closing that technology gap, so we can get very close to or actually achieve the target of net zero energy.

tpo: Does closing of the gap primarily involve achieving greater efficiency in existing operations?

Roehl: It involves a few different things. The U.S. EPA has gathered data to identify the biggest power consumers in a treatment plant. Typically about 50 to 60 percent of a treatment plant's energy demand is for aeration. Next biggest are pumping and the heating of anaerobic digesters.

Clearly, we can have the biggest impact by reducing the amount of energy used for aeration. Our research is focused on reconfiguring the process so we can rely much less on aerobic treatment and have most of the treatment occur anaerobically. When you do that, you shift the load from the energy-intensive process of aeration to the biogas-generating process of anaerobic digestion.

So you convert a much greater percentage of the organic matter in wastewater to methane rather than carbon dioxide, which is what you produce in the aeration basins. You essentially scale back the amount

of aeration and increase production of methane, so that in the end you have a new balance where you come pretty close to producing enough biogas to power aeration and all the other processes on the site.

tpo: Does this involve changing the nature of the entire treatment process?

Roehl: Yes and no. We're looking at using much of the existing tankage and most of the processes already on site. The process wouldn't look that different. We're seeking ways to concentrate the waste stream so more of it can be sent to the anaerobic digesters.

tpo: What are some of the ways of doing that?

Roehl: That's really the heart of the research project, and it would be premature to talk about the details, but it's essentially a waste concentration challenge. We don't have an actual solution yet, but we have pretty good evidence that we're on the right track. It's an ongoing project, and we expect to have an answer in 12 to 18 months.

tpo: What would be the impact of this change on a typical activated sludge wastewater treatment plant?

Roehl: You would end up with much smaller aeration basins and perhaps slightly larger anaerobic digesters. One of our challenges is to see whether we can get by with the same-size anaerobic digesters. Essentially we would just have a more concentrated stream going into the digesters than we have today.

tpo: In general terms, what is involved in concentrating the waste stream? Is it some sort of mechanical or filtration process?

Roehl: We're trying to do it biologically — basically manipulating the microorganisms so that they do it for us. If you can get the bugs to help you concentrate the waste stream without actually treating it, you can look at moving that concentrated waste stream over to the anaerobic system. In broad terms, that's what we're trying to do.

tpo: Would this have any impact on plant throughput? Can you get the same gallons per day through the plant as before?

Roehl: We don't see this affecting plant capacity. We should be able to get the same flow out of the plant.

tpo: Would you characterize this as somewhat futuristic — not something someone would be able to do in one or two years, but maybe longer down the road?

Roehl: It's definitely in the future but it's more near-term. I'd say realistically two years out we'd be able to bring this to market. It really comes down to some pretty basic ideas of improving energy recovery, reducing reliance on aerobic processes, and improving some process efficiencies throughout the plant, so we're not wasting energy.

tpo: Turning to process efficiency, what are some of the ways to make substantial improvements?

Roehl: One technology that really helps reduce energy requirements is aerated-anoxic treatment. It involves providing a certain amount of treatment under aeration but without a positive dissolved oxygen (DO) presence.

That allows you to have simultaneous nitrification/denitrification. It also gives you a little better driving force for getting oxygen into the system, since you don't have any residual DO present. You use less energy because you're not putting excess oxygen into the system. This technology has been in use for the past 20 or 25 years.

Another improvement in aeration is smart biological nutrient removal control. It basically consists of tying your aeration system to

DO and oxidation-reduction potential (ORP) sensors. In that way you're tuning the process to adjust itself with varying flows and loads so that, for example, you're not burning excess energy at night creating high DO levels when you don't need to. Again, this is nothing new, but a lot of plants could benefit from it.

tpo: What about efficiencies in other areas of the treatment train?

Roehl: Depending on the treatment plant, things can be done with enhanced primary treatment, essentially doing chemical additions in the primary clarifiers to help reduce TSS and BOD going into the aeration basins. That allows you to move more material over to the digesters, and so use less power for aeration. The most common ways of doing this are through addition of alum or ferric chloride to precipitate more constituents out of the waste stream.

tpo: What about making plant equipment itself more efficient?

Roehl: Blowers available today in many cases can improve efficiency by 20 percent or more. If your plant is using coarse-bubble diffusers, you can certainly improve efficiency with state-of-the-art fine-bubble diffusers.

Then, looking around the plant, you can install variable-frequency drives on pumps and motors, so you can avoid using more energy than is needed at any given time. And finally it can be worth considering premium-efficiency motors, especially for the high-horsepower motors on site. Depending on the plant, you might see a 5 to 10 percent reduction in total plant power usage just by deploying variable-frequency drives and premium-efficiency motors.

When you combine all those things, the total impact varies, because some plants have better practices already in place than others. But for a fairly average treatment plant, you might be able to reduce energy usage by 20 to 30 percent just by making those kinds of process improvements and upgrading equipment. And you might save even more.

tpo: What role do renewable energy sources other than biogas play in treatment plant energy efficiency and your net-zero-energy concept?

"We're seeing more and more communities say that in the interest of good citizenship, they're going to choose investments that are as sustainable or as green as possible. But at the end of the day, there's money to be saved, and that's really the biggest driver."

MARC ROEHL, P.E.

Roehl: I'm starting to hear about more treatment plants putting up wind turbines on site or doing solar installations. I've been exposed to several such projects around the country. But that's a different scenario because those things really go beyond the scope of the treatment plant itself. Wind turbines or solar panels aren't required to sustain treatment or to meet regulations. That's more of a community initiative — but treatment plant sites can be good places to do those things because they have space available.

tpo: How would you characterize the state of development on the net-zero-energy treatment scheme?

Roehl: We started by doing some modeling — if we did certain things with the process, would net zero be achievable? The answer was yes. So we did bench-scale testing with an activated sludge process to confirm our initial theories. That looked promising, and so we moved to a pilot-scale test.

Now we're doing a demonstration-scale project to evaluate the concept thoroughly. That system is to begin operation in the first half of 2011. **tpo**

Looks Great, Runs Great

A VISUALLY APPEALING TREATMENT PLANT HELPS INSPIRE OPERATORS TO PERFORM AND CREATES A POSITIVE IMPRESSION FOR COMMUNITY RESIDENTS AND VISITORS

By Pete Litterski

Chris Hamilton doesn't think it's a coincidence that the W.B. Casey Water Reclamation Facility was named Wastewater Plant of the Year by the Georgia Association of Water Professionals last June, just a year after winning a beautification award from the Keep Clayton County Beautiful organization.

Hamilton, plant supervisor, believes the Clayton County Water Authority's focus on the site's aesthetics plays a key role in the attitude and performance of the operations staff.

"If we go the extra mile, it encourages the staff to go that extra mile," he says. "When you pull into a facility such as ours and it's nice, neat and clean, it helps promote a certain pride in the staff. If you take pride in how it looks, then you take pride in how it operates."

The W.B. Casey plant, in Jonesboro, Ga., is an activated sludge facility with a licensed capacity of 24 mgd. It is one of three treatment plants operated by the CCWA, serving a growing customer base of more than 250,000 in Clayton County and its six cities on the southern outskirts of Atlanta.

SENSITIVE SURROUNDINGS

The utility's original treatment plant was built in 1958 in what was a fairly remote area, well away from the residents and businesses. By the time the current W.B. Casey plant began operations in 2004 on a parcel fronting the old plant site, it was on a major business thoroughfare and directly across the street from an apartment complex.

The trees and the planting beds along the plant's road frontage and shading its entrance were all part of the 2004 construction project. As plans for the project were being introduced to the community and neighboring landowners, the landscaping plans helped the utility "put on a nice face," says Hamilton.

The water authority gave county officials and the public assurances that the new plant would be a good neighbor. "So far we've done that," says Ham-

ilton. "We've held up our end. It is the nicest looking business on the road we're located on."

The plant is always in the public eye, and a well-groomed site makes a difference in the public's perception. "People often smell with their eyes," Hamilton says. "If it looks bad, they think it smells bad. But if it looks good, they might say, 'That place doesn't smell so bad.'"

"On top of the traffic on the road, we get a lot of plant tours — schools and other groups. When they come on the property they know if you're keeping all of this up, you're probably doing a good job of operating it."

PRIDE IN UPKEEP

Visitors are greeted by a tree-shaded entry sign and an entry gate flanked by junipers and river birches. Planting beds lush in ornamental Yaku Jima grass and low-lying holly bushes add a welcoming touch. The entry area is being updated with sod to replace some beds that were once covered in pine straw and must be regularly maintained and replaced to keep the entry neat.

There are also plans this winter and spring to begin replacing some of the annual flower beds with perennial plantings. The landscaped areas are kept green by an irrigation system that uses the plant's effluent.

A member of the facility maintenance staff is charged with taking care of the landscaping, but the operators' pride in the plant shows when they pitch in to help with some of the work or simply stop on their way to pick up a piece of litter on the grounds.

The well-kept grounds are in line with the water authority's efforts to maintain a green operation. Those efforts are evident whenever members of the public take tours of the treatment plant and the 4,000 acres of constructed wetlands that are part of the final treatment step.

Visitors are greeted by a tree-shaded entry sign and an entry gate flanked by junipers and river birches. Planting beds lush in ornamental Yaku Jima grass and low-lying holly bushes add a welcoming touch.

Share Your Ideas

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The Clayton County Water Authority (CCWA) W.B. Casey Water Reclamation Facility in Jonesboro, Ga. was recently named Wastewater Plant of the Year by the Georgia Association of Water Professionals.

"If we go the extra mile, it encourages the staff to go that extra mile. When you pull into a facility such as ours and it's nice, neat and clean, it helps promote a certain pride in the staff. If you take pride in how it looks, then you take pride in how it operates."

CHRIS HAMILTON

Highly treated effluent is pumped from the CCWA treatment plants to the wetlands, where the plants and the soil act as a final filtration and microbial treatment system. The water passes through a series of wetland cells before rejoining the water supply in reservoirs. **tpo**



GTI Names Lever Design & Technical Sales Engineer

Mike Lever has joined Geomembrane Technologies Inc. as design & technical sales engineer. Based in Lexington, S.C., Lever brings 10 years experience to his position.



Mike Lever

CST Industries Forms CST Storage

CST Industries, Lenexa, Kan., has realigned Engineered Storage Products Co. and Columbian TecTank to form CST Storage. The new company will continue to manufacture glass-fused-to-steel and epoxy-coated modular steel storage tanks in its DeKalb, Ill., Parsons, Kan., and Winchester, Tenn., facilities.

ADI Systems Names Leao Manager of Biogas Applications

Josef Leao has joined ADI Group Inc. as manager of Biogas Applications. Leao, fluent in eight languages, brings 30 years experience in engineering, logistics and operations to the newly created position.



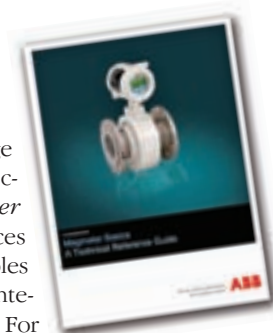
Josef Leao

Water Quality Lab Offers Wastewater Testing

Water Quality Testing Services, a division of Northern Lake Service Inc., is conducting front-line wastewater testing at its lab in Wisconsin. The facility offers BOD, TSS and fecal coliform testing services.

ABB Offers Flowmeter Reference Guide

ABB Measurement Products offers a 74-page reference guide for selecting and applying electromagnetic flowmeters (magmeters). *Magmeter Basics — A Technical Reference Guide*, introduces magmeters, summarizing such topics as principles of operation, construction, magnetic fields, maintenance, transmitters, installation and calibration. For a copy, contact Robert Mapleston at 800/922-2475, or go to www.abb.us/instrumentation.



NSF Introduces Flushable Claims Certification Program

NSF International has launched a certification program that provides third-party verification of consumer product claims that they can be safely disposed of via toilet flushing. The program provides a solution to many clogging issues associated with wastewater treatment systems. The NSF Flushable Consumer Products Certification Program addresses consumer products such as facial tissues, baby/cosmetic wipes, kitty litter, pet refuse bags, disposable diapers and feminine hygiene products. Certified products will bear the NSF Certified Flushable mark, indicating whether the products are suitable for a sewer system, septic system or both. Annual audits and periodic product testing is required to maintain an active listing on the NSF website, www.nsf.org/info/flushability, and retain uses of the NSF mark.

Calgon Carbon's UVT Division Receives ISO Certification

Calgon Carbon Corp.'s Ultraviolet Technologies division and its subsidiary, Hyde Marine Inc., received ISO 9001:2008 management system certification. The UVT division received the ISO 9001:2008 accreditation from the registrar Det Norske Veritas and the ANAB National Accreditation Board. The certification applies to the management system for the design, development, manufacture, delivery, installation, warranty support and after-market parts and services for ultraviolet water treatment and ballast water treatment systems.

RWL Acquires Aeromix Systems

RWL LLC has acquired a majority interest in Aeromix Systems Inc., manufacturer of water and wastewater treatment systems. Peter Gross will remain Aeromix's CEO.



Aeromix's CEO Peter Gross, left, and RWL's chairman Ronald Lauder.

Hall Joins Staco Energy as Marketing Manager

Jim Hall has joined Staco Energy Products Co. as marketing manager. A graduate of General Electric's manufacturing and Raytheon's advanced management programs, Hall has a Bachelor of Science degree from Bowling Green State University and an MBA from the University of Illinois. **tpo**

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their ability to degrade organic waste and eliminate noxious odor. When added to a waste stream it releases bacterial cells that begin breaking down protein, carbohydrates, fats, oils, grease and cellulose. The bacteria are capable of denitrification and phosphorus removal without the need for separate processes and typically eliminate noxious odor within a week of application. Byproducts of the bioaugmentation treatment are water, CO₂, which gases off, and some remaining inorganic solids. **504/400-1239; www.reliantwater.us.com.**

3. PURELINE INTRODUCES HP-1 UNIT GENERATOR

The HP-1 Unit electrochemical generator from PureLine Treatment Systems is designed to output up to 1 pound per day of ultrahigh purity (99.5 percent) chlorine dioxide, produced within a totally self-contained unit. The HP-1 offers offsite remote communication, allowing for on-off capability, process feedback control, programmable logic controller with color touchscreen operator interface terminal and an integrated distributed control system capability. **312/970-0276; www.pureline.com.**

4. O-Z/GEDNEY OFFERS OPTITROL MOTOR CONTROL STATIONS

Factory-sealed, explosion-proof and dust-ignition-proof Optitrol control stations and pilot lights from O-Z/Gedney are designed for the remote control of motors in areas where flammable gases are present. The units feature a heavy-duty enclosure that confines electrical arcing, preventing ignition of flammable atmospheres. The control stations are rated for Class 1, Division 1 and 2; Class II, Division 1 and 2; and Class III

hazardous locations. The stations also are rated NEMA 3 for outdoor use. **800/621-1506; www.o-zgedney.com.**

5. CHEMINEER OFFERS HIGH-EFFICIENCY XE-3 IMPELLER

The XE-3 axial flow impeller for heat transfer from Chemineer Inc. is designed for blending and solids suspension applications. The impellers are available in carbon steel, 316/316L stainless, high alloys and with a variety of coatings. **937/454-3200; www.chemineer.com.**

6. WEG RELEASES ENERGY SAVINGS CALCULATOR APP

The WEG Energy Savings Calculator application for BlackBerry smartphone devices from WEG Electric Corp. is designed to calculate return on investment and reduction of CO2 emissions when utilizing WEG variable-frequency drives and/or electric motors. The calculator, which can be accessed from the WEG Green website (www.weg.net/green), can create reports and calculations for all motors in a facility. **800/275-4934; www.weg.net/us.**

7. WEIDMULLER OFFERS HIGH-DENSITY DIGITAL ISOLATORS

ACT20X high-density digital isolators from Weidmuller feature a range of intrinsic safety signal conditioners, including modules that can convert and isolate digital signals to and from hazardous areas, as well as versions that isolate and drive digital actuators. Each module has an independent error alarm output for monitoring input signals and internal electronics. A dedicated, volt-free contact registers open/short circuits or internal errors for quick problem identification. **800/849-9343; www.weidmuller.com.**

8. ASSMANN OFFERS OPEN-TOP TANKS

Open-top molded tanks from Assmann Corporation of America are available in either virgin high-density cross-link or NSF/ANSI 61-certified linear polyethylene. Typically used as day tanks or mixing vessels, the flat-bottom vertical tanks are equipped with shoebox style covers and molded with a stiffening lip on top for tank rigidity. Tank sizes range from 30 to 680 gallons in a variety of colors. **888/357-3181; www.assmann-usa.com.**

9. LaMOTTE INTRODUCES SMART3 COLORIMETER

The SMART3 colorimeter from LaMotte features a waterproof housing, library of 75 pre-programmed tests and USB communications. The backlit display is loaded with seven languages. The instrument has a removable clear cell that protects the optical system from the elements. Users can select from a scrolling menu of pre-programmed test factors or set up their own user-defined groupings for routine analysis. New user tests can be added by the operator or downloaded from the manufacturer. Time- and date-stamped test data can be stored in the 500-test capacity data log. The USB port permits data transfer to a PC and powers the rechargeable NiCad battery. **800/344-3100; www.lamotte.com.**

PRODEX INTRODUCES BIOLOGICAL ACTIVITY ENHANCER

Biological Activity Enhancer from Prodex, a division of JSH International, is a liquid organic formula designed to stimulate microorganisms, improve sludge settling, produce cleaner effluent and increase methane gas production. Derived from a natural peat extraction process, BAE
(continued)

product spotlight

Pre-Engineered System Combines Screening and Grit Removal

By Ed Wodalski

The PISTA WORKS headworks system from Smith & Loveless combines screening, grit removal and grit washing in one integrated unit. There are five models in capacities from 0.5 to 7.0 mgd, the largest measuring 12 feet wide by 49 feet long.

The pre-assembled system is made of stainless steel and includes the PISTA 360 grit chamber with V-FORCE baffle, Smith & Loveless turbo grit pump, and PISTA TURBO grit washer with Tri-Cleanse Technology.

Components include ANSI-flanged connections, 6-mm fine auger screen, and manual bypass bar screen for removal of items such as disposable wipes and hygiene products. Two platforms allow easy access to the system. The unit has an epoxy-coated carbon steel skid support with concrete fill. It includes PLC-based controls with touchscreen, a color HMI interface, and a NEMA 4X operating panel.

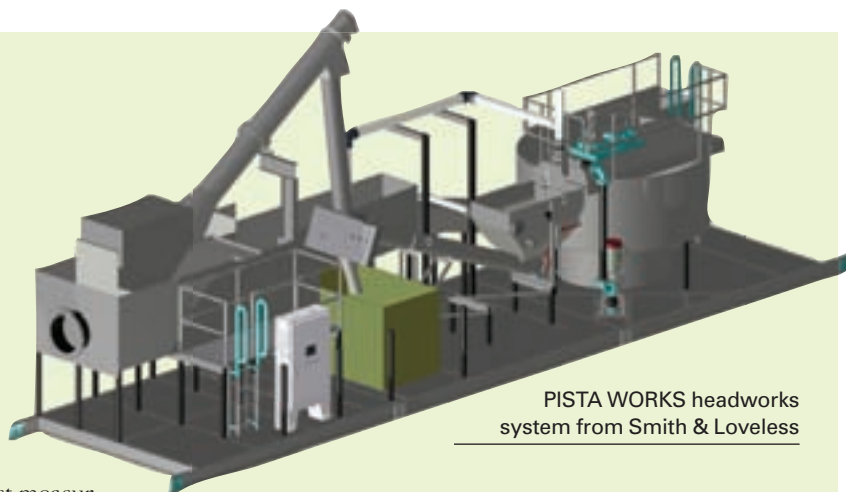
The V-FORCE baffle directs inlet flow into the chamber, ensuring proper vortex flow and maximum travel for the most effective grit removal. The outlet baffle directs flow out of the system and acts as a slice weir to control the water level in the main chamber and in the inlet channel. No other downstream flow control device is required. Velocity is sustained between 3.5 fps at peak flow and 1.6 fps at minimum flow with a 10:1 turn down.

The centrifugal grit pump is available in top-mounted vacuum-primed and remote-mounted flooded suction configurations. It has a heavy-duty, solid stainless steel shaft, heavy-duty bearings and mechanical seal.

The grit washer uses an inlet hopper to receive the mixture of water and grit from the second stage PISTA grit concentrator. Parallel plates in the settling zone of the hopper help retain fine grit, protecting downstream equipment from abrasive wear. Collected grit is washed to minimize odor, dewatered, and ready for disposal.

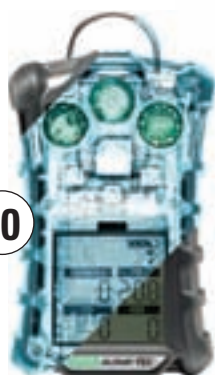
"The application we see with this unit is for plants that don't have a grit removal system or have a very simplified system," says Regina Rigsby Higgins, PISTA product manager. "We see this being a benefit for the smaller plant as more environmental regulations take effect."

The system is delivered ready to pipe. "That's the biggest benefit," Higgins says. "It's a plug-and-play system." Once installed, the unit automatically performs all grit removal. Minimal maintenance is required. **913/888-5201; www.smithandloveless.com.**



PISTA WORKS headworks system from Smith & Loveless

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14



15

can increase existing microbial populations and enhance their activity in both aerobic and anaerobic environments. **856/234-4540; www.prodexproducts.com.**

10. MSA OFFERS QUICKCHECK GAS DETECTOR SOFTWARE

The ALTAIR 4X gas detector from MSA features QuickCheck Station software, designed to bump-test both ALTAIR 4 and ALTAIR 4X gas detectors. **800/672-2222; www.msanet.com.**

11. GENERAL MONITORS INTRODUCES OPEN PATH GAS DETECTOR

The IR5500 open path gas detector from General Monitors features split range scale for ppm-meter and LEL-meter monitoring and is certified for operation at -67 degrees F. The system consists of an IR source and receiver, which continuously monitors for methane in both the 0 to 5,000 ppm-meter and 0 to 5 LEL-meter range. The detector's infrared sensor technology uses single-beam detection for improved accuracy and reduced drift. The sensor includes continuous self-check monitoring for fail-safe operation. Automatic gain control compensates for dirty optics, rain and fog. **800/330-9161; www.generalmonitors.com.**

12. SIEMENS INTRODUCES PROCESS CONTROL SYSTEM

The Clearlogx Process chemical feed system from Siemens Water Technologies Corp. is designed to enhance organic containment removal in water and wastewater, while improving membrane and conventional filter performance. The system controls the addition of acid, coagulant and chlorine dosing. **847/713-8458; www.water.siemens.com.**

13. SERFILCO OFFERS TRANS-O-FILTER

The Trans-O-Filter unit from SERFILCO Ltd. is designed to recirculate at flow rates of 3 to 10 gpm on fuel or hydraulic systems. The unit collects entrained moisture on a coalescing element until water droplets form large enough to drop to the sump for removal from a draw-off drain valve. Choice of media enables the user to select high dirt holding capacity depth cartridges or absolute media of pleated membrane to trap 1-micron particles. **800/323-5431; www.serfilco.com.**

14. RIV OFFERS GLADIO KNIFE GATE VALVE

The double-flange GLADIO knife gate valve from RIV features a solid AISI 316 stainless steel blade and unpainted flange threads for easy repair. Other features include self-cleaning housing, stainless steel screws and tie rods. The valve is available in 4-, 5-, 6-, 8- and 10-inch sizes. **www.riv-vg.com.**

15. HIGHLAND OFFERS HIGHDRO WASTEWATER STORAGE TANKS

HighDRO wastewater storage tanks from Highland Tank are available for aboveground or belowground installation and are designed to store a variety of contaminated wastewater. Volume ranges from 300 to 60,000 gallons. Tanks are made of heavy-duty carbon steel and available with high-solids epoxies, polyurethanes, rubber, PVC and other sheet linings. **814/893-5701; www.highlandtank.com.**

ALLMAX INTRODUCES OPERATOR 10 DATA MANAGEMENT SOFTWARE

The Operator 10 suite of operations data management and reporting software from AllMax Software Inc. provides a range of analytical and reporting options, enabling users to customize facility information, help ensure compliance and provide a historic picture of plant operations through centralized data storage. The software consists of water, wastewater and biosolids applications. Dynamic grid behavior allows for advanced sorting, filtering, grouping and column customization. **800/670-1867; www.allmaxsoftware.com. tpo**

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Freedom,

to evaluate and select your own **Odor Control** budget.

The screenshot shows the OdorTool.com website interface. At the top is a navigation bar with links: HOME, ABOUT US, OPEN SOURCE PROJECT CALCULATORS, CONTACT US, and LOGIN. Below the navigation bar is the OdorTool.com logo and a tagline 'Open Source Odor Control (OS2) Tool'. To the right of the logo are three small images of industrial tanks. Below the logo is a section titled 'PLEASE SPECIFY THE PARAMETERS FOR YOUR SOLUTION'. This section contains a form with the following fields and options:

- Parameters:**
 - Head office: [input field]
 - Head H2S concentration: [input field]
 - Head H2S peak concentration: [input field]
 - Head temperature range: [input field]
 - Head odor source:
 - ☒ Wastewater
 - ☐ Process Effluent
 - ☐ Pump Station
- Removal Efficiency:** [input field]
- Choose your Reactor:** [input field]
- Configure:** [input field]

At the bottom of the form is a 'Calculate' button.



To serve **you** better !

Pumps

By Benjamin Wideman

PRE-ENGINEERED PACKAGED STATION

The ReliaSource 6x6T above-ground lift station from Gorman-Rupp Co. is a fully customizable, compact and pre-engineered packaged system. It comes standard with all features of the 6x6 but with an additional three feet of height that allows for more options. The configuration accommodates more sophisticated controls like reduced-voltage solid-state starters and variable-frequency drives.

The added space also allows easier access to maintenance items. The system comes with two removable side door panels for access to pumps and motors and split-opening doors on the pump suction and control side. The doors are configured with the bottom half opening to the side and the upper gas-shocked and hinged door lifting overhead. This half also serves as an awning during maintenance. A fiberglass enclosure accommodates two Super T Series 2- to 6-inch pumps or two Ultra V Series pumps up to 4 inches. The taller enclosure allows increased hydraulic capability with flows to 1,475 gpm and pressure to 160 feet total dynamic head, as well as motors to 50

hp. **419/755-1011; www.grpumps.com.**



Self-priming chopper pumps from Vaughan Co.

SELF-PRIMING CHOPPERS

Vaughan Co. offers self-priming chopper pumps suited for lift stations, scum wells, portable cleanouts and retrofits of clogging pumps. The high-efficiency chopper-impeller design allows priming up to 24 feet. **360/249-4042; www.chopperpumps.com.**

DATA-LOGGING CONTROL PANEL

The Installer Friendly Series In-Site data-logging control panel from SJE-Rhombus lets users monitor up to 20,000 date/time-stamped events by plugging a flash drive into the USB port on the inner door. The pre-loaded software on the flash drive formulates system data, creating reports quickly in an easy-to-read format.

The panel logs any changes made to system settings and tracks service calls. Events monitored include pump run times, pump cycles, alarm conditions, power outages and more. The unit is available in simplex, duplex, demand-dosed and time-dosed models. Each panel has a NEMA 4X enclosure and comes with float switches, wiring diagrams, installation instructions and a flash drive with IFS In-Site software. **218/847-1317; www.sjerrhombus.com.**



Installer Friendly Series control panel from SJE-Rhombus



ReliaSource lift station from Gorman-Rupp Co.

PLUGS AND RECEPTACLES

Decontactor Series switch-rated plugs and receptacles from Meltric Corp. allow technicians to quickly connect or disconnect power to pump motors. Pumps can be serviced or replaced without an electrician on site, allowing pumps to get back online faster. The plug and receptacle are UL rated for Motor Circuit Disconnect Switching and are an NEC-approved line of sight disconnect up to 60 hp.

Safety features protect from live parts and arc flash injury even when disconnecting in overload conditions. Pressing an off button on the receptacle safely disconnects power before the plug can be removed. Once the plug is removed, a safety shutter maintains a dead front on the receptacle. The disconnected plug provides visual verification of de-energization and is easily locked out, allowing the motor or pump to be serviced without the need for voltage testing. **800/433-7642; www.meltric.com.**



Decontactor Series plugs and receptacles from Meltric Corp.



Tornado rotary lobe pumps from NETZSCH

SELF-PRIMING VALVELESS PUMPS

NETZSCH Tornado rotary lobe pumps are positive-displacement, self-priming, valveless units offering high performance, reliability, and maintenance in place.

They are designed for intermittent or continuous operation, provide gentle pumping, and are suited to transfer, process and dosing applications.

The pumps offer high reliability through NETZSCH Gearbox Security System Technology, which provides a positive separation between the pump head/product seals and the pump gearbox to eliminate gearbox contamination in case of seal failure. Compact construction permits a small installation and maintenance envelope. Pump capabilities include high suction lift, flows up to 4,400 gpm, differential pressures up to 85 psi, dry running and reverse flow. **610/363-8010; www.netzschusa.com.**

SCREW PUMPS

Schreiber incorporates the Archimede-dean screw pump concept in the Tube-Mounted Screw Pump and Open-Flight Screw Pump. The concept provides variable capacity at a constant speed up to a design maximum. The Tube-Mounted Screw Pump transports liquid inside a stationary tube, simplifying structure and eliminating grouting. The units are factory assembled. Pumps can be set at a fixed angle or the lower end can be supported by a hoist to vary the pump angle and for maintenance access.

The Open-Flight Screw Pump transports liquid using a concrete trough. This non-clog pump is typically installed at a 30- or 38-degree angle. The pump has a variable capacity at a constant speed up to its maximum. Pumps use a single-row spherical roller, self-aligning, combination radial/thrust lower support bearing with a minimum L-10 life of 100,000 hours.

Lower bearing lubrication requires only a transparent oil reservoir and feed tube to provide oil by gravity, without pressurized grease sys-



Tube-Mounted Screw Pump and Open-Flight Screw Pump from Schreiber

tems. A simple pillow block or flanged bearing provides radial support at the upper shaft. **205/655-7466; www.schreiberwater.com.**



PUMP STATION LEVEL CONTROLLER

The PSL pump station level controller from Greyline Instruments has a non-contacting ultrasonic sensor, isolated 4-20 mA output and six programmable control relays for pump control, pump alternation and for level alarms. It is designed for sewage lift stations, wet wells and storage tanks.

An automatic pump run time logging and reporting system helps operators to plan pump maintenance

and identify "lazy" pumps before they fail. The system includes the Greyline software PSL Remote for Windows. Operators can prepare and save calibrations in advance and download to the PSL directly through a password-protected RS232 interface, or dial-up PSL pump stations through regular phone lines and modems to adjust calibration and observe level and relay states in real time. **888/473-9546; www.greyline.com.**

SUBMERSIBLE SEWAGE PUMP

The Little Giant 20S from Franklin Electric Company is a 2 hp submersible sewage pump engineered to handle effluent and wastewater transfer with high efficiency and long-term dependability. The product has an energy-efficient PSC motor, rugged brass impeller, powder-coated housing, and upper and lower ball bearings. **888/956-0000; www.lgpc.com.**



Little Giant 20S from Franklin Electric Company



DURABLE PACKING

The PE1082 packing from Palmetto combines ePTFE/graphite and Palmetto Zenar with a break-in lubricant to offer durable packing that is easy on the shaft. The packing suits gritty slurry applications like wastewater treatment. Users can combine PE1082 with other Palmetto packings depending on the type of slurry, shaft speed and stuffing box pressure. Braid construction is interwoven for performance at tempera-

tures to 500 degrees F, pH is from 1-13, and pressure to 500 psi in pumps (2,500 psi in plunger pumps). Shaft speed is 2,000 fpm. **800/445-4406; www.palmettopacking.com.**

SMART SENSING

SmartSense Pulse intelligent pump monitoring from Colfax Corp. fits near the bearing on a pump to gauge temperature and vibration. Measuring 2.4 inches long, 1.6 inches wide and 1.3 inches deep, the monitor has at-a-glance LEDs that indicate pump performance and provide maintenance alerts. **804/560-4070; www.colfaxcorp.com.**



SmartSense Pulse pump monitoring from Colfax Corp.



L-Frame progressing cavity pumps from Moyno

CAVITY PUMPS

L-Frame progressing cavity pumps from Moyno handle liquids from clean, thin viscous products to corrosive, abrasive slurries and sludges in wastewater treatment. Standard flange models have a modular design with pin-type universal joint for easy

maintenance. Open-throat models are available. Features include non-pulsating metered flow, vibration-free operation, and on-site maintenance. The pumps handle capacities to 450 gpm and pressures to 2,100 psi. They can handle entrained air and gases without vapor locking. **877/486-6966; www.moyno.com.**

WIRELESS SHAFT ALIGNMENT

The Easy-Laser E710 wireless shaft alignment system from Alignment Supplies offers wireless Bluetooth operation, color graphics, and Endurio Power Management, which provides infinite operating time and eliminates battery life issues. The device's integrated battery automatically charges itself from four ordinary C-cell batteries so users never have to stop an alignment for exhausted battery power. **800/997-4467; www.alignmentsupplies.com.**



Easy-Laser E710 shaft alignment system from Alignment Supplies



331LC duplex control panel from Control Works

DIGITAL LEVEL CONTROL

The 331LC duplex control panel from Control Works offers digital level control in a stainless steel NEMA 4X enclosure. It has one panel for 208, 240 or 480V, three-phase pumps with overload protection up to 32 amps each (10 hp maximum at 208V, 10 hp maximum at 240V, 20 hp maximum at 480V).

The unit has a CW6CDC controller that operates based on a 4-20 mA signal, a solid-state alternator relay for even run time, run lights, elapsed time meters, lag delay circuitry, seal leak lights, hand/off/auto selector switches, alarm horn, and high-level flashing red alarm beacon with a dry contact for telemetry connection. Lightning arrestor and modular pedestal options are available. **513/831-9959; www.controlworksinc.com.**

CENTRIFUGAL BYPASS PUMP

The DV-325c 12-inch centrifugal pump from Rain for Rent is designed for efficient bypass pumping. It handles flows to 8,500 gpm, suction lift up to 28 feet, and maximum head of 220 feet. It has a solids handling capability of up to 4.75 inches. The sound-attenuated enclosure reduces noise as low as 72 decibels at 23 feet. The 350 hp Tier 3 engine burns 13 gallons per hour at 1,800 rpm (5,500 gpm at 140 feet total dynamic head) and comes with a galvanized skid to reduce maintenance. Electric drive is optional. **800/742-7246; www.rainforrent.com.**



DV-325c 12-inch centrifugal pump from Rain for Rent



REMOTE DATA COLLECTION

The VIBNODE online condition monitoring system from LUDECA with a General Packet Radio Service communication link allows data from the motor and pump to be transferred to OMNITREND software, allowing e-mails, texts or pages to be sent out when an alarm is triggered.

The GPRS is a non-voice value-added service that allows information to be sent and received across a

VIBNODE monitoring system from LUDECA

mobile telephone network. This allows the motor and pump to be remotely monitored for looseness, misalignment, bearing defects, imbalance, pump cavitation, temperature, flow and pressure. **305/591-8935; www.ludeca.com.**

CENTER-PORTED PUMPS

PX1510 and PX810 center-ported Advanced Series Pro-Flo X Brahma pumps from Wilden Pump & Engineering feature a flanged 3-inch or 2-inch top inlet and bottom discharge. The flow path uses flap valves for maximum solids passage. The pump comes with a Pro-Flo X air distribution system and efficiency management system that optimizes operation with the turn of an integrated control dial, allowing users to select the desired efficiency point and flow rate. **909/422-1730; www.wildenpump.com.**



PX1510 and PX810 Advanced Series Pro-Flo X Brahma pumps from Wilden Pump & Engineering



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VERTICAL PUMPS

Vertical pumps from SRS Crisafulli serve stationary applications such as sewage digesters and lift stations. Pumps are custom-built for the customer's unique application and to specifications for discharge volume, total dynamic head (TDH), solids-passing capabilities, and heights from collection to discharge points.

The company offers 133 standard models in flows up to 18,000 gpm, TDHs up to 280 feet, and spherical solids-passing capabilities up to 5.5 inches. The pumps are designed to perform in demanding environments. All models are submersible centrifugal pumps that range in size from 2 to 24 inches; require no priming, check valves, suction pipes, or screens; and are self-drained. All-steel construction supports long and reliable life. **888/817-7011; www.crisafullipumps.com.**

Vertical pumps from SRS Crisafulli

ing, check valves, suction pipes, or screens; and are self-drained. All-steel construction supports long and reliable life. **888/817-7011; www.crisafullipumps.com.**

VARIABLE-SPEED CONTROLLER

The C100A variable-speed controller from Fluid Metering offers manual speed adjustment using a front-panel-mounted rotary dial and electronic speed control via a 4-20 mA signal from an external source. Other features include IR compensation, current limiting circuit, and factory-set minimum and maximum speed adjustment. The controller includes transient voltage protection and an AC fuse. **800/223-3388; www.fmipump.com.**



C100A variable-speed controller from Fluid Metering



K series blowers from FPZ

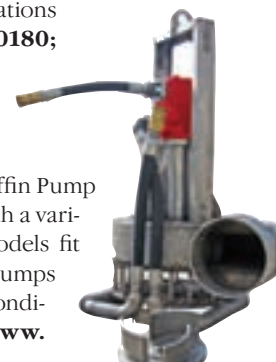
REGENERATIVE BLOWERS

K series blowers from FPZ use regenerative blower technology for extremely quiet, low-maintenance operation. Continuous pressures to 12.6 psi and air-flows over 1,500 cfm can be obtained. Sizes range from 1/3

hp to 60 hp. Single-phase options up to 10 hp are available. FPZ motors are inverter duty and tropicalized, making them suited for aeration. Optional silencer locations maximize installation flexibility. **262/268-0180; www.fpz.com.**

STAINLESS STEEL PUMPS

Hydraulic submersible pumps from Griffin Pump & Equipment range from 4 to 24 inches, with a variety of impeller designs. Special 6-inch models fit standard manholes. The stainless steel pumps handle flows up to 20,000 gpm and head conditions up to 140 feet. **713/671-7000; www.griffinpump.com. tpo**



Hydraulic submersible pumps from Griffin Pump & Equipment

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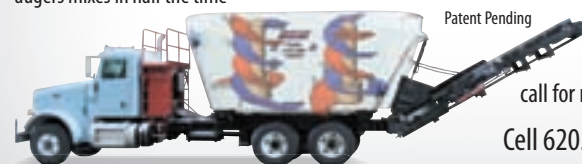
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Solving costly clogging issues

Problem

Household items clogged the pump impellers in the Inkster (Mich.) lift station every 28 hours and, in some cases, within 10 minutes of reinstallation. During downtime, sewage was diverted to a retention pond, then vacuumed and transported to the treatment plant. The city considered decommissioning the station and just using the retention pond. While searching for a long-term solution, officials tried several options that included a mix flush valve system. It didn't work.

Solution

A proposal from **Crane Pumps & Systems** suggested installing three **Barnes 4SHVB 10 hp vortex solids handling pumps**. The city accepted them on a 60-day trial. The recessed vortex impellers handle 3-inch spherical solids and stringy solids, even at low-flow, high-head operation. Pumpout vanes protect the mechanical seal.

Inverter duty-rated motors and steep performance curves make the pumps suitable for variable-speed operation. The pump shaft, all fasteners, and the large lifting bail are stainless steel. The external coating is corrosion resistant.



RESULT

The city purchased the pumps, which have not clogged in 10 months. Maintenance is minimal. **937/778-8947; www.cranepumps.com.**

Double disc pump reduces maintenance

Problem

Failures of the two progressive cavity pumps at the East End Wastewater Treatment Plant in Portland, Maine, was costing the city \$28,000 annually in repairs, not including labor for dismantling and assembling the pumps four times per year. The pumps, one operating and one on standby, transferred thickened primary sludge at 4 to 8 percent solids for 8 to 10 hours per day. The Portland Water District needed a way to reduce the frequent high maintenance costs.

Solution

Penn Valley Pump conducted a one-year trial with its 6-inch Model 6DDSX76 double disc pump.

The self-priming unit pumps 500 gpm, handles 2-inch solids, and runs dry without damage. Its seal-less design has no stuffing box, mechanical seals, check valves, or fouling problems. After six months of running the pump exclusively, it was torn down and inspected. Penn Valley found no visible signs of wear. The process was repeated six months later with identical results. During the trial, the pump required no maintenance or repair. The district then purchased the unit.



RESULT

The pump has operated without maintenance or parts replacement. Compared with the progressive cavity units, the district saved more than \$70,000 in repair costs over four years. The payback period was 15 months. **800/311-3311; www.pennvalleypump.com.**

Pump sharply reduces maintenance time

Problem

The multiple progressing cavity sludge pumps failed frequently at the Thames Water plant in Dorking, United Kingdom. Operators worked for two-and-a-half days to disconnect the pumps and replace the rotor, stator, and connecting rod assembly. "We needed a way to improve efficiency and reduce downtime," says sewage operator Gavin Parker. "It took four hours to de-rag these pumps and eight hours to disassemble them for maintenance."

Solution

Thames Water installed the **EZstrip sewage pump from NOV Monoflo**. The pump's split coupling and detachable feed chamber give direct access to the coupling rod area. Operators strip, maintain, and replace pumping elements and drive train items without disconnecting the pump and without any dismantling space. The pump also fits easily into the same space as the previous pump.



RESULT

"We've reduced our maintenance time from hours to minutes," says Parker. "Pump disassembly now takes 30 minutes, saving \$562.50 in labor costs. Our de-rag time is down to 15 minutes, saving us \$273.75." Compared with traditional progressing cavity pumps, the EZstrip pump will deliver more than \$16,700 in savings over its life. **281/200-1200; www.ezstrip.com.**

Eddy-current drives handle over-voltage

Problem

The St. Joseph (Mo.) Water Protection system is near a power station on the Missouri River, and the line output experiences occasional fluctuations. The wastewater treatment plant had 15 variable-frequency drives, but most were not functioning. “We had multiple 18-month-old 300 hp VFDs quit on us because they didn’t have a fail-safe to address over-voltage,” says superintendent Don Gilpin. “Then we had to explain to the Missouri Department of Natural Resources why we were bypassing wastewater treatment for a week. We needed a more reliable and economical answer.”

Solution

The city purchased six **Dynamatic eddy-current drives from Drive Source International**. The units have a flange-mounted fixed-speed AC motor and an air-cooled, adjustable-speed magnetic clutch or eddy-current coupling. The magnetic field determines the torque transmitted from the input rotor to the output rotor. A controller varying the clutch current allows it to transmit only enough torque to operate at the desired speed. Transmitting torque at variable speeds produces a smooth response that eliminates shock and loading.



RESULT

With no high-voltage electronics in front of the motors, over-voltage is no longer a problem. “We did an annual cost and reliability evaluation of our different pump and air-handling drives,” says Gilpin. “The cost of maintaining the eddy-current drives is \$40 a year for brushes. Every two to three years, we soapstone the contacts to clean them, and that’s it. We would have spent millions replacing the VFDs.” **800/548-2169; www.drivesourceusa.com.**

Mono-port impeller eliminates pump clogging

Problem

The City of Rancho Santa Fe, Calif., battled blockages caused by disposable wipes that prevented its Smith & Loveless underground Custom Series pump station from operating at full capacity. The station had two 4C2A 4-inch non-clog flooded-suction rotating assemblies at 20 hp handling 500 gpm at 85 feet of total dynamic head. “We pulled each pump at least once a week,” says collection systems manager Rick Russell.

Russell thought the wipes built up in the pumps when the station’s variable-frequency drives ramped down to low speed during the night. A closer look showed that the wipes were building up inside the impellers and binding the pumps. “We tried various ramp speeds and RPM ranges to level out the station, but they never made much difference,” he says.

Solution

Smith & Loveless technicians recommended retrofitting the X-PELLER, a single-port impeller designed for high-trash volumes and low-flow conditions. The unit expels high volumes of stringy material, rags and other trashy items.



RESULT

“We haven’t pulled a clogged pump since we changed the impeller six months ago,” says Russell. “It was a simple, effective solution.” **913/888-5201; www.smithandloveless.com.**

Cake pump system offers compact solution

Problem

The Harpers Ferry & Bolivar (W.Va.) Public Service District Waste Water Treatment Plant used drying beds and open-air dewatering before disposing of the cake in a landfill. To meet new regulations, the district needed a more compact, efficient system.

Solution

The district selected a **cake pump system from seepex Inc.** that included a BN 30-6LT progressive cavity pump feeding 2,200 gpm at 720 psi to a belt press. A lime-feed system enables operators to create Class A biosolids. Dewatered cake at 16 to 20 percent solids falls into the hopper of a BTI 17-12 progressive cavity pump. A load cell system turns on the pump, which shuts off when the belt stops feeding the hopper.

The dry-run protection system includes a Telkonet SmartEnergy control unit that turns off the pump if it reaches the set point temperature. The thermal motor protection device shuts off the pump if the motor temperature reaches unsafe levels. A discharge pressure ring protects the discharge piping

(continued)



against failure from over-pressure. A custom control panel monitors the sensors and shows the load cell weight level, shutoff button, cake output temperature, lime-feed signal, and various fault signals for the sensors.

RESULT

"The pumps are running without issue, and the control system is easy to adjust and monitor," says plant supervisor Jimmy Williams. **937/864-7150; www.seepex.com.**

Centrifugal pumps purify wastewater

Problem

NieuWater wanted to add a pure-water plant to its wastewater treatment facility in Emmen, The Netherlands, to process effluent into ultrapure water for the Netherlands Mineral Oil (NAM) Co. The company injected steam into wells to liquidize and extract heavy, viscous oil in Schoonebeek Field. The water needed to be ultrapure. Finding the proper purification technology was crucial to the success of the project.

Solution

NieuWater selected advanced technology reverse osmosis (RO) pumping equipment from SPX Flow Technology. The package included more than 60 frequency-regulated, vertical set-up centrifugal RO Johnson pumps. They draw effluent through five layers of dual-pass RO membranes in 20-foot-long housings. The purification surface area is 200,000 square feet. An anti-scaling medium prevents membrane fouling, but should contamination occur and increase resistance, the pumps continue to run at the same capacity. Pipe forces have little effect on pump calibration. Proper calibration prevents unnecessary loads and vibrations, reduces maintenance, and extends service life to 25 years.

The water then passes through an electrodeionization unit to remove the last mineral ions. The combination of membrane filtration and ion exchange uses an electrical current to regenerate the resin.



RESULT

The plant went online last autumn, pumping 2.6 mgd of ultrapure water four miles to storage tanks at the NAM site. **800/252-5200; www.spxft.com. tpo**

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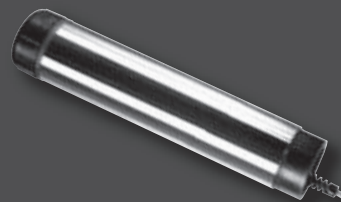
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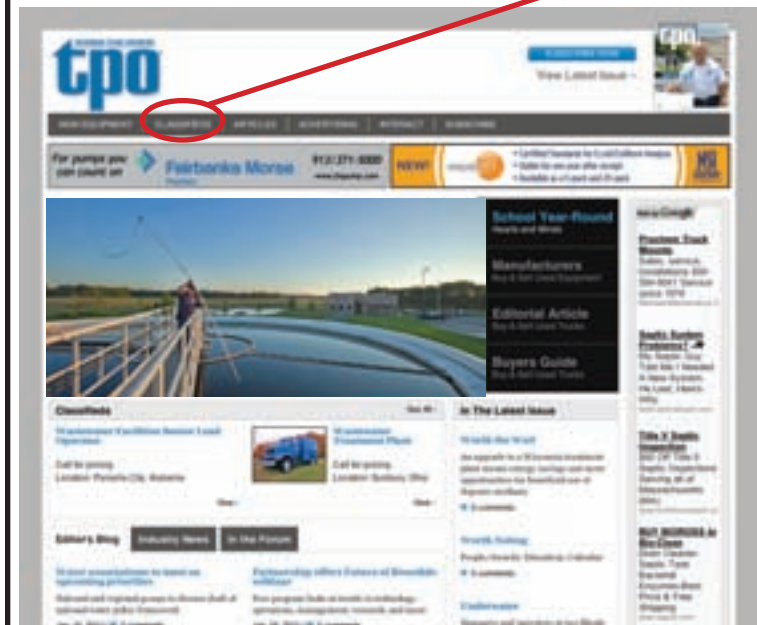
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Colorado

The Rocky Mountain Water Environment Association has an Industrial Wastewater Treatment Seminar on March 25 in Golden, Colo. Visit www.rmwea.org.

Georgia

The Georgia Association of Water Professionals has a Customer Service Training Seminar on April 18 in Macon. Visit www.gawp.org.

New England

The New England Water Environment Association has an Asset Management Seminar on April 20. Visit www.newea.org.

New York

The New York Water Environment Association has these courses:

- March 3 – Nitrogen Removal, Brewerton
- March 16 – Nitrogen Removal, Bergen Point
- March 17 – Anaerobic Digestion, Bergen Point
- March 21-24 – Troubleshooting O&M, Old Forge
- April 4-5 – Nitrogen Removal, Batavia
- April 6 – Anaerobic Digestion, Little Falls
- April 27 – Asset Management, Chenango

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Ohio

The Ohio Water Environment Association has a Government Affairs Workshop on March 10 in Lewis Center. Visit www.ohiowea.org.

Texas

The Texas Water Utilities Association has these courses:

- March 8 – Basic Wastewater, Gatesville
- March 8 – Basic Wastewater, Waco
- March 15 – Utilities Management, Greenville
- March 15 – Basic Wastewater, Carrollton
- April 12 – Wastewater Collection, Carrollton
- April 19 – Utilities Management, San Marcos

Visit www.twua.org.

Virginia

The Virginia Water Environment Association has Industrial Waste and Pre-treatment Seminars March 1-2 in Charlottesville. Visit www.vwea.org.

Wisconsin

The Wisconsin Department of Natural Resources has these courses:

- Feb. 28-March 4 – General Wastewater Treatment, Introduction and Advanced, Chippewa Falls
- March 15-17 – Lab, Intro, Fond du Lac
- March 21-25 – General Wastewater Treatment, Introduction and Advanced, Madison
- March 28-29 – Activated Sludge, Introduction, Oconomowoc
- March 30-31 – Activated Sludge, Advanced, Oconomowoc
- April 5-6 – Primary Treatment, Introduction and Advanced, Chippewa Falls
- April 12-13 – Iron and Zeolite, Green Bay
- April 12-13 – Lab, Advanced, Fond du Lac
- April 19-20 – Ponds and Lagoons, Introduction and Advanced, Wausau
- April 19-21 – Surface Water Certification, Appleton
- April 26-27 – Mechanical Sludge Handling, Introduction and Advanced, Appleton

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

The University of Wisconsin Department of Engineering-Professional Development is offering these courses:

- March 21-22 – Upgrading Your Sanitary Sewer Maintenance Program, Madison
- March 23-25 – Wastewater Pumping Systems and Lift Stations, Madison

Visit www.epdweb.engr.wisc.edu. **tpo**

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CALENDAR OF EVENTS

March 12-15

South Carolina Environmental Conference, Myrtle Beach Convention Center, Myrtle Beach. Visit www.sc-ec.org.

March 15-16

Georgia Association of Water Professionals 2011 Industrial Conference and Expo, Callaway Gardens Convention Center, Pine Mountain. Visit www.gawp.org.

March 21-24

Illinois Water Environment Association WaterCon 2011 Conference and Expo, Crowne Plaza Hotel and Conference Center, Springfield. Visit www.iweasite.org.

March 27-29

North Carolina AWWA WEA Annual Spring Conference, Wilmington Convention Center, Wilmington. Call 919/784-9030 or visit www.ncsafewater.org.

March 27-30

Missouri Water Environment Association/AWWA Joint Annual Conference, Osage Beach. Visit www.mwea.org.

March 27-April 1

Kentucky Water and Wastewater Operators Association 2011 Conference, Galt House Hotel and Suites, Louisville. Visit www.kwwoa.org.

April 5-8

Water Environment Association of Texas, Texas Water 2011, Fort Worth. Visit www.weat.org.

April 5-8

Water Environment Association of Utah Annual Conference, The Dixie Center, St. George. Visit www.weau.org.

April 10-12

Water Environment Federation,

Disinfection 2011, Hyatt Regency Cincinnati, Cincinnati, Ohio. Call 703/684-2441 or visit www.wef.org.

April 10-12

Water Environment Association of Ontario Technical Symposium and Exhibition, Westin Harbour Castle, Toronto. Visit www.weao.org.

April 10-13

Alabama Water Environment Association Annual Conference, Perdido Beach Resort, Orange Beach. Call 205/349-0067 or visit www.awea-al.com.

April 12-15

California Water Environment Association Annual Conference, Ontario Convention Center, Ontario. Call 510/382-7800 or visit www.cwea.org.

April 16-20

British Columbia Water & Waste Association Annual Conference & Trade Show, Kelowna. Visit www.bcwwa.org.

April 17-20

Maritime Provinces Water & Wastewater Association Annual Seminar, Westin Hotel, Halifax, N.S. Visit www.mppwwa.ca.

April 19-20

Georgia Association of Water Professionals Spring Conference & Expo, Macon. Visit www.gawp.org.

April 26-29

Alaska Water Wastewater Management Association Statewide Conference, Hilton Anchorage. Visit www.awwwma.org.

April 30-May 4

Florida Water Resources Conference, Gaylord Palms Resort, Kissimmee. Visit www.fwrc.org.

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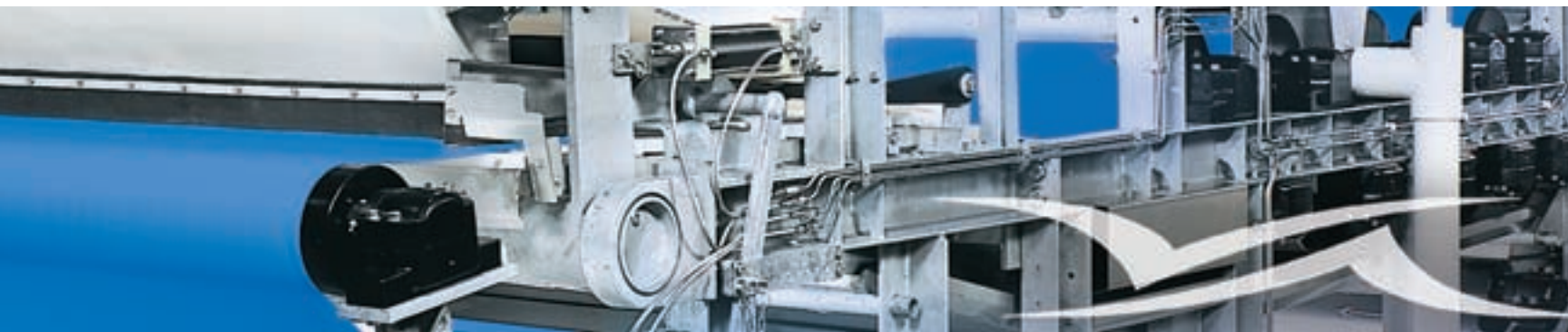
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