

TREATMENT PLANT OPERATOR

tpo™

DEDICATED TO MUNICIPAL WASTEWATER PROFESSIONALS

www.tpomag.com
FEBRUARY 2013

Lab Detective:
Investigating bulking sludge

PAGE 32

PlantScapes:
Ornamental plantings
in Augusta, Ga.

PAGE 26

Looking Deep

**NATE TILLIS BRINGS TECHNICAL EXPERIENCE
AND A MYSTICAL APPRECIATION FOR
WATER TO HIS ROLE IN BELOIT, WIS.**

PAGE 36

Nate Tillis
Operations and
maintenance supervisor
Beloit, Wis.

How We Do It:
Energy reporting in
New Castle, Colo.

PAGE 40



Be Right™

WE MAKE WATER ANALYSIS SIMPLER.

For more than 60 years, we've been at the crest of the industry – finding solutions that help you best manage your water.

Water analysis has to be right. You deserve complete solutions you can be fully confident in. Hach is your resource for expert answers, outstanding support, and reliable, easy-to-use products.

Rediscover Hach at hach.com/rediscover



IN THE TRADITION OF GROUNDBREAKING INNOVATIONS COMES... FLYGT EXPERIOR™

Welcome to a new era in wastewater pumping. Where engineering excellence and a pioneering spirit combine with an unmatched understanding of your needs. The result is Flygt Experior, a uniquely holistic experience that combines state-of-the-art hydraulics, motors, and controls.

Today, Flygt Experior combines N-technology hydraulics and its adaptive functionality, premium efficiency motors and SmartRun – the all-new intelligent control. Flygt Experior comes from years of listening to you and applying our knowledge and expertise, to develop the most reliable and energy-efficient wastewater pumping. It is therefore the ultimate in our commitment to you.

Flygt Experior™
Inspired by you. Engineered by us.



DESIGN | FUNCTION | PERFORMANCE

SONIC-PRO®

HYBRID ULTRASONIC FLOWMETER



Selectable Doppler or Transit Time
Non-invasive Clamp-on Transducers
Works with Clean or Dirty Fluids
"Smart" External Communications

ALL NEW! T-TRACK MOUNTING SYSTEM
Pipe Capacity of 0.5" to 100".
NEMA 4x Quick Disconnects



Blue-White®

5300 Business Drive, Huntington Beach, CA 92649 USA
714-893-8529 • fax: 714-894-9492

sales@blue-white.com • www.blue-white.com

advertiser index

FEBRUARY 2013

 Aerzen Aerzen USA 19	 Komline-Sanderson Komline-Sanderson 61
AMWELL, A Div. of McNish Corp. 35	Kruger USA 58
 Ashbrook Simon-Hartley Ashbrook Simon-Hartley 55	Kuhn North America, Inc. 59
BASF Corporation – Water Solutions Division 21	Kusters Water 9
 BDP Industries BDP Industries, Inc. 41	Lakeside Equipment Corporation 63
 Blue-White Industries 4	 NAWT NAWT, Inc. 54
 Carylon Corporation 57	NETZSCH NETZSCH Pumps North America, LLC 27
 Dragon Products, Ltd. 17	Noxon North America, Inc. 8
 Flo Trend Systems, Inc. 39	Nutri-Ject Systems, Inc. 20
 Flygt – a Xylem Brand 3	 OVIVO OVIVO 5
 Fournier Industries, Inc. 42	 Penn Valley Pump Co., Inc. 25
 Hach Company 2	Prime Solution, Inc. 35
Headworks, Inc. 11	Roto-Mix, LLC 54
 Huber Technology, Inc. 7	s::can Measuring Systems, LLC 61
Hydro International 51	Schaner's Wastewater Products 61
INFILCO Infilco Degremont, Inc. 27	 Smith & Loveless, Inc. 43
IPEC Consultants Ltd. 42	Thermal Process Systems, Inc. .. 31
 JDV Equipment Corporation 16	Thern, Inc. 59
	 Vaughan Company, Inc. 29
	VFOLD INC. 49
	Vogelsang 47
	Weir Specialty Pumps / WEMCO Pump 62
	 Westech Engineering, Inc. 64
	CLASSIFIEDS 61

Every day is Earth Day.™

"We're met with a new challenge each day. Whether it's the sewer or water department ... we take our jobs very seriously, and the key thing is knowing that we're in compliance and not polluting our waters."



Jeff Chartier
An Original Environmentalist
SUPERINTENDENT
Town of Bristol (N.H.) Sewer
and Water Department

tpo

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

FREE subscription at www.tpomag.com

inspiring
stimulating
motivating



Savored by municipal wastewater professionals everywhere.

Get your fill for free. Subscribe at tpomag.com

“Creating Value In Water”

- Carrousel® Systems
- Headworks & Screens
- Anaerobic Digestion
- Aeration and Aerobic Digestion Systems
- Membrane Systems
- Sedimentation / Clarifiers

200 years of Heritage

Brckett Green®
Cinetik®
Christ Water Technology®
Eimco Water Technologies®
Enviroquip®
Jones + Attwood

ovivowater.com



features

- 12 TOP PERFORMER – BIOSOLIDS: BIG ON PERFORMANCE**
The plant team in the small Iowa city of West Liberty applies top-shelf management methods in operating an award-winning biosolids program.
By Ted J. Rulseh
- 18 HEARTS AND MINDS: FIXING FLOATABLES**
Passaic Valley Sewerage Commission teaches young students and guides adult learners on the path to environmental awareness.
By Briana Jones
- 22 TOP PERFORMER – OPERATOR: “WE ARE ENVIRONMENTALISTS”**
Howard Carter promotes and deploys green technologies to help people understand the value of wastewater treatment.
By Doug Day
- 26 PLANTSCAPES: LIVING COLOR**
Ornamental plantings help a Georgia treatment plant create eye appeal for visitors and for motorists on a major highway.
By Jeff Smith
- 28 IN MY WORDS: THE ULTIMATE REUSE**
Effective community relations helps a Texas city win support for direct reuse of wastewater to shore up drinking water supplies in the face of severe drought.
By Ted J. Rulseh
- 32 LAB DETECTIVE: WHEN THE NUMBERS DON’T ADD UP**
An investigation of bulking sludge reveals the presence of filamentous bacteria and suggests a solution based on improving maintenance and operating practices.
By Ron Trygar
- 34 GREENING THE PLANT: GOING GRIDLESS**
Inland Empire Utilities Agency installs a biogas-powered fuel cell and signs a power purchase agreement to reduce reliance on utility power.
By Lisa Balcerak
- 36 TOP PERFORMER – OPERATOR: LOOKING DEEP**
Nate Tillis brings technical experience and a mystical appreciation for water to his role as O&M supervisor at the clean-water plant in Beloit, Wis.
By Ted J. Rulseh
- 40 HOW WE DO IT: MEASURE AND MANAGE**
An energy reporting tool that constantly monitors electric power consumption and demand pays dividends for a Colorado treatment plant.
By Scottie Dayton
- 42 WEF ANNOUNCES 2012 OPERATIONS CHALLENGE DIVISION WINNERS**
By Ted J. Rulseh
- 44 PRODUCT FOCUS: BIOSOLIDS MANAGEMENT AND HEADWORKS**
By Craig Mandli
- 48 CASE STUDIES: BIOSOLIDS MANAGEMENT AND HEADWORKS**
By Scottie Dayton



departments

- 8 LET’S BE CLEAR: YOU OPERATE A POWER PLANT**
The world is coming to recognize the potential of clean-water plants to provide not just clean water but clean, renewable energy.
By Ted J. Rulseh, Editor
- 10 LETTERS**
- 52 PRODUCT NEWS**
Product Spotlight: Phosphorus control system
By Ted J. Rulseh
- 56 INDUSTRY NEWS**
- 60 WORTH NOTING**

COMING NEXT MONTH: MARCH 2013

Product Focus: Pumps

- Let’s Be Clear: Quit calling it sludge
- Top Performer – Biosolids: Self-contained solution in Boise, Idaho
- Top Performer – Operator: Joe Underwood, Muscle Shoals, Ala.
- Top Performer – Agency: Advanced treatment in Marathon, Fla.
- How We Do It: Chemical phosphorus optimization in Beaver Dam, Wis.
- Greening the Plant: Geothermal energy in Philadelphia, Pa.
- Tech Talk: Enhancing treatment with sequenced aeration
- Hearts and Minds: Educational field days in Chicago, Ill.
- PlantScapes: Plantings and artwork in Dunedin, Fla.
- In My Words: Total odor control

on the cover

For Nate Tillis, operations and maintenance supervisor in Beloit, Wis., treating wastewater is a calling. His appreciation for water comes from his studies of kung fu and Eastern religions. (Variable-speed drive motor control by ABB.) (Photography by Dennis Dooley)



Looking *to* REPLACE
your LIFT STATION
GRINDER?

you FOUND
THE SOLUTION

THE ORIGINAL

Rotamat® RoK4 Vertical Screen

- **Protects** equipment downstream
- **Low** maintenance
- **Ideal** confined space solution
- Flows up to **6 MGD** in a single unit
- **Available** in lengths up to 40 feet
- **Patented** design
- **Hundreds** of units installed

Learn more at
huberforum.net/TP0
solutions@hhusa.net • 704.990.2055

SOLUTIONS FOR:



SCREENING



GRIT



SLUDGE

HUBER
TECHNOLOGY
WASTE WATER Solutions

NOXON

NOT just another
centrifuge...



... with 9 different sizes and a series of options and alternatives, we can offer close to 30 configurations, customizing the equipment for the application instead of trying to force the application to fit the machine.

NOXON North America Inc., Concord, ON
(416) 843-6500 PG@noxon.com
www.noxon.com



DEDICATED TO MUNICIPAL WASTEWATER PROFESSIONALS

Published monthly by COLE Publishing, Inc.
1720 Maple Lake Dam Rd., PO Box 220, Three Lakes, WI 54562

Call toll free 800-257-7222 / Outside of U.S. or Canada call 715-546-3346
Mon.-Fri., 7:30 a.m.-5 p.m. CST

Website: www.tpomag.com / Email: info@tpomag.com / Fax: 715-546-3786

SUBSCRIPTION INFORMATION: A one year (12 issues) subscription to TPO™ in the United States and Canada is FREE to qualified subscribers. A qualified subscriber is any individual or company in the United States or Canada that partakes in the consulting, design, installation, manufacture, management or operation of wastewater treatment facilities. To subscribe, return the subscription card attached to each issue, visit tpomag.com or call 800-257-7222.

Non-qualified subscriptions are available at a cost of \$60 per year in the United States and Canada/Mexico and \$150 per year to all other foreign countries. To subscribe, visit tpomag.com or send company name, mailing address, phone number and check or money order (U.S. funds payable to COLE Publishing Inc.) to the address above. MasterCard, VISA and Discover are also accepted. Include credit card information with your order.

ADDRESS CHANGES: Submit to TPO, P.O. Box 220, Three Lakes, WI, 54562; call 800-257-7222 (715-546-3346); fax to 715-546-3786; or email nicolel@colepublishing.com. Include both old and new addresses.

Our subscriber list is occasionally made available to carefully selected companies whose products or services may be of interest to you. Your privacy is important to us. If you prefer not to be a part of these lists, please contact Nicole at nicolel@colepublishing.com.

ADVERTISING RATES: Call 800-994-7990 and ask for Phil or Kim. Publisher reserves the right to reject advertising which in its opinion is misleading, unfair or incompatible with the character of the publication.

EDITORIAL CORRESPONDENCE: Address to Editor, TPO, P.O. Box 220, Three Lakes, WI, 54562 or email editor@tpomag.com.

REPRINTS AND BACK ISSUES: Visit www.tpomag.com for options and pricing. To order reprints, call Jeff Lane at 800-257-7222 (715-546-3346) or email jeffl@colepublishing.com. To order back issues, call Nicole at 800-257-7222 (715-546-3346) or email nicolel@colepublishing.com.

CIRCULATION: 76,492 copies per month.

© 2013 COLE PUBLISHING INC.

No part may be reproduced without permission of publisher.



let's be clear

You Operate a Power Plant

THE WORLD IS COMING TO RECOGNIZE THE POTENTIAL OF CLEAN-WATER PLANTS TO PROVIDE NOT JUST CLEAN WATER BUT CLEAN, RENEWABLE ENERGY

By Ted J. Rulseh, Editor

Wastewater operators have spent many hours telling the public how their plants make two great products: Clean water and valuable fertilizer/soil conditioner.

Now there's a third: clean energy. Of course, making electricity and heat from digester methane (biogas) is not at all new. But these days the bar is being raised. It's no longer enough for plants to conserve energy and make some for themselves. Now the goal is to make plants energy self-sufficient or, better still, net producers of energy.

Indeed, that filthy water flowing into the headworks looks more like fuel every day.

Think of the potential impact tens of thousands of clean-water plants can have on the nation's energy picture. Cities and villages are major consumers of energy, and an Electric Power Research Institute study found that in midsize cities, 30 to 40 percent of electricity is used by water and wastewater utilities.



What if clean-water plants could achieve or surpass net zero energy? The demand on the nation's electrical grid would decline (or grow more slowly). Carbon emissions would decrease significantly. And the fuel used to produce this energy is clean — chemically the same (but for process impurities) as the natural gas that is becoming a preferred source for utility power generation.

Yes, digester methane belongs in the list of the nation's renewable energy sources, right there with wind, solar thermal, solar photovoltaic and geothermal.

MORE THAN CONSERVATION

Energy initiatives at clean-water plants began with conservation: doing the same work with less energy. Of course that's a worthy aim and is part of the pathway to net zero energy. (This issue of TPO reports on an excellent energy- and demand-reduction program in New Castle, Colo., enabled by energy reporting software).

Then came solar and wind energy — clean-water plants often have large properties, removed from central cities and

residential areas, where it makes sense to install wind turbines and solar panels. This, too, contributes to self-sufficiency.

But the real engine lies mixed in with the influent stream — the organic matter that treatment plants are designed to remove. That wastewater contains significant energy, and most treatment plants have little things called anaerobic digesters to extract it in the form of methane. The more precious energy becomes, the more wasteful it looks to flare and thus waste that fuel.

And as long as those digesters are there, why not feed them more and produce more gas and more energy? Increasingly, treatment plants are doing just that. Suddenly, all sorts of organic materials we've called "wastes" are sources of fuel.

Yes, digester methane belongs in the list of the nation's renewable energy sources, right there with wind, solar thermal, solar photovoltaic and geothermal.

MODEL PERFORMERS

East Bay Municipal Utility District in California (profiled in *TPO* last December) is one agency that has moved boldly into energy production. The plant adds food and process wastes to its digesters, and, as a result, already makes more energy than it can use and sells excess power to the local utility. By 2020, EBMUD expects to create twice as much electricity as it needs.

And digester methane can do more than just fuel combined heat and power systems. In New York City, the Newtown Creek Wastewater Treatment Plant (see August 2011 *TPO*) plans to sell its digester gas — cleaned and compressed — to a local utility for use as home heating fuel.

It's only a tiny step from there to using purified digester gas as fuel for compressed natural gas (CNG) cars, trucks and buses — potentially creating a new frontier in clean vehicle technology.

NEW OUTLOOK

There may not be "gold in that tar sewage," but there's lots of energy, and that's a commodity worth extracting and using.

Chances are that the day you came to work in a clean-water facility you never thought of yourself as operating a power plant. But, to the extent your facility made use of digester methane, you did. And if current trends continue, your own facility and thousands of others will look more like power plants every year. It's just another way the industry and the profession add significant value to our society. **tpo**

BIOSOLIDS SOLUTIONS



Centrifuges

Sludge Dryers

ATAD Process

DAF Thickeners

Rotary Drum Thickeners



KUSTERS-WATER

a division of KUSTERS ZIMA

For more information call **864.576.0660**
or visit **kusterswater.com**

Equipment By:

WASTE-TECH | **HI-TECH**

TREATMENT PLANT OPERATOR
tpo

It's your magazine.
Tell your story.

TPO welcomes news about your
municipal wastewater operation for future articles.

Send your ideas to editor@tpomag.com

Enjoys both sides

In response to your column, "Which Side of the Fence?" (*TPO*, November 2012): As a lifetime career, I have enjoyed both sides of water treatment for almost 38 years. For me, water and wastewater treatment are loved equally well, as each has its own qualities and rewards.

Operations and management of each utility protects the health of the public at large. Both prevent pollution that could cause sickness or even death to humans and animals. The bottom line is that we protect all forms of higher life by working with the most important substance on earth: water.

Gary V. Freeman, CAO
Director of Utilities
Town of Lake Placid, Fla.

Fascinated with wastewater treatment

In response to your column, "Which Side of the Fence?": I work at a wastewater treatment plant, specifically the Fairborn (Ohio) Water Reclamation Center. We changed the name many years ago from the Fairborn Wastewater Treatment Plant to emphasize the more positive aspect of what we do.

Yes, we treat wastewater, but more important, we reclaim "used" water, doing just what would happen in the environment if not for the volume of used water and the concentration of foreign material that society generates. I have never worked on the drinking water side of the equation, so although I recognize its importance, I can't specifically comment.

I am fascinated by my job in that I've learned about the existence of a whole "microverse" of recyclers that keeps renewing the environment for future generations. I will never tire of observing what comes into our system and then walking to the outfall where we discharge to the Mad River and look at the clean water we feed into the river. There are so many variations in what the microlife can do, depending on what comes in, the volume, changes in temperature, and so forth, that it's a continual, fascinating learning process. I am very content to be where I am.

Frank D. Barosky
Technical Supervisor
Fairborn Water Reclamation Center

View from both sides

I hold Ohio Class III Water and Class IV Wastewater Operator certifications and have been in the business for 34 years. I have had these types of conversations several times over the years.

Which side is more mentally challenging and stimulating? There is no doubt about this one — it is wastewater. Groundwater drinking sources are about as boring as it gets. Once the chemical dosages are initially set, daily life becomes quite mundane. Surface water sources are a little more interesting, since the biology in the water body experiences seasonal changes and can create some challenges.

Wastewater, on the other hand, is challenging and stimulating on a daily basis. It requires a much larger skill set and takes much longer to master. Working with a biological living system is a daily challenge, not only due to seasonal changes but also due to varying influent loads and internal recycling of pollutants. It not only requires more extensive monitoring and troubleshooting, but also greater mechanical effort to maintain the roughly three times more equipment than is found in a similar-sized drinking water plant.

Which feels more intrinsically rewarding? The feeling of reward is proportional to the amount of effort and skill required to produce a good product. Need I say more?

Does the public seem to understand and value one side more than the other?

Understandably, it is water. People are familiar with and tuned in to their water, especially the water they drink. While water treatment is also taken for granted by many, it is not nearly as mystical and misunderstood as wastewater treatment.

You can savor a cold drink of water or enjoy a nice warm shower, but when it turns into wastewater, the "nice" quickly goes away. I have given many plant tours over the years, and the people who visit a wastewater plant are truly amazed and sum it up by saying, "I had no idea!" Unfortunately few people take the time to think about wastewater.

I offer you the following: "Bathe in it, drink it, turn turbines with it, flush it, sail on it, freeze it, boil it, process steel and chemicals with it, load it with detergents, dye your hair in it, fill your goldfish bowl with it, do whatever you want with it, but for goodness sake, please clean it up when you're through!" (Author unknown).

Bob Brown
Manager
Kent (Ohio) Water Reclamation Facility

Prefers the wastewater side

My primary background is in treatment plant operations (licensed in both water and wastewater). I was later given the added responsibilities of the entire Public Works department, which includes our treatment plants, but I must confess I remain an operator at heart. My enjoyment comes from assisting the staffs with troubleshooting their plants and getting the best possible advantages and disadvantages, as well as enjoyable aspects and headaches.

Personally, I prefer the wastewater end because the bulk of the operations take place outside, and I prefer the opportunity to work outdoors as opposed to the water plant, which in our case is mostly an indoor operation.

I find them both equally rewarding and challenging to be a part of. As far as public perception, "out of sight, out of mind" is what comes to mind. If I try to get funding for a dump truck, everyone knows what function and purpose that truck serves. The challenge comes when you have to try and sell the idea to replace some aspect of the treatment plant that most people have never heard of (such as replacing the screening material for the raw water bar screen).

As long as potable water comes out of the tap and the wastewater goes down the pipe, people largely do not pay much attention, unless their user fees increase. After 25+ years, I am still proud to be a part of this industry, and I am very glad and thankful for the opportunities it has given me.

James E. Didawick
Superintendent of Public Works
Town of Woodstock, Va.

Science plays a part

In response to your question about which career path to choose (water or wastewater), I believe water professionals look at three areas that will decide our direction. The first is the pay. To be honest, we must support our families by having a decent-paying job.

Second, we are looking for a place to feel wanted or part of a team. Water and wastewater treatment is a team sport. We all depend on each other to get the job done. Whether it is drinking water production or reclaiming water for the environment, we all want to feel that we had a part in something bigger than ourselves.

Third, water treatment is the science of chemistry for the most part. Wastewater treatment is the science of biology for the most part. Biology and chemistry are vital parts of each system. However, the way you feel about

either science may determine which direction you take. In either case, we love what we do and take pride in the products we produce.

For myself, I enjoy the biological challenges that treating wastewater brings. It changes all the time. Studying microorganisms under a microscope is fascinating. I love watching the motion of the organisms and figuring out how to keep them performing at peak levels. This challenge changes all the time due to many circumstances we may not control as operators. To see a low-pollutant product leaving our facility makes me proud, especially knowing others downstream from us will be using that water for their purposes.

Steven Hardeman, MBA
Utilities Superintendent
Norman (Okla.) Water Reclamation Facility

Big on education

I received my copy of *TPO* yesterday and noticed our interview was included ("What's Flushable? What Isn't?," December issue). I thank you for including this in your magazine to further spread the word on the issue of non-dispersibles in wastewater.

I also read your column in the same issue ("Driving Home a Simple Point") and feel I must apologize for not adequately describing the educational efforts we at the Portland Water District, and many other utilities, have done and continue to do every day.

We have produced bill stuffers, newspaper articles, cable TV programs, no-flush campaigns in the communities, trade journal articles, technical sessions at training classes, and presentations at regional EPA meetings.

We have updated our websites, worked with local universities to develop topic videos, canvassed neighborhoods, educated business owners, met with municipal representatives, and more. During the legislative process the question of customer education arose, and we produced a 45-page document (double-sided) that included a summary of the communication efforts we at PWD had made over a five-year period.

We agree that education is an important part of the non-dispersibles issue. However, it is only part of the solution. Unfortunately, the response from INDIA (association for the disposable wipes industry) has had a similar tone, suggesting utilities need to take on the responsibility to inform customers. To do this, the message has to be consistent.

Our contact with customers and a recent joint marketing focus group highlighted confusion due to our "flush only toilet paper" message and the labeling of products as "flushable" by manufacturers. We also feel a point-of-sale education effort in the retail environment could be a critical component, and we hope to see this in the future.

Any public information campaign has to be consistent, and I do feel our message should be "flush only items that are dispersible, like toilet paper." This could include truly flushable or dispersible products, but this requires coordination with INDIA and other manufacturers.

Our legislative efforts, cooperative efforts with INDIA, labeling, product design, equipment upgrades, manual intervention, our pump clog SOP, and communication and education are all components of our efforts. Again, my regrets in not highlighting fully the efforts our industry has made and continues to make daily with education, but it is only one tool in the chest as we work to end this interference with our critical sewerage infrastructure.

Thank you,

Scott Firmin
Director of Wastewater Services
Portland (Maine) Water District



The Headworks® Mahr® Bar Screen sets the standard for the wastewater treatment industry, and leads an impressive lineup of screening equipment for a wide variety of applications. Coarse screens, fine screens, conveyors and compactors — Headworks offers solid screening performance.

headworksusa.com | +1 713.647.6667

**ALL OF OUR
SCREENS**

**ARE
H'D
(HEAVY DUTY)**

Headworks®

QUALITY THAT NEVER QUILTS™



The West Liberty (Iowa) Wastewater Treatment Plant. (Photography by Mark Tade)

Big on Performance

THE PLANT TEAM IN THE SMALL IOWA CITY OF WEST LIBERTY APPLIES TOP-SHELF MANAGEMENT METHODS IN OPERATING AN AWARD-WINNING BIOSOLIDS PROGRAM

By Ted J. Rulseh

FOR A FACILITY SERVING A POPULATION OF 3,300, the City of West Liberty (Iowa) Wastewater Treatment Plant handles large flows and produces a high biosolids volume. That's because a major turkey processor accounts for nearly 60 percent of the plant's flow and by itself contributes some 3,400 pounds of BOD per day.

That organic content from West Liberty Foods, processor of about 23,000 turkeys per weekday, boosts biosolids production to 310 dry tons per year. Producing that material and moving it to local farms has been a challenge at times, but the plant team has met it successfully, on the way winning the 2011 Biosolids Award for Exemplary Management Practices among small plants from the Iowa Water Environment Association.

David Clark, project manager and area manager for CH2M HILL OMI, which operates the plant and the biosolids program, leads a team that distributes material in both liquid and solid forms to about 450 acres of corn, soybean and hay ground per year.

It's a simple yet effective program that since 1991 has applied sound management principles to deliver a quality Class B product that helps farmers while operating free of public complaints.

LONG PARTNERSHIP

West Liberty is a rural community about 20 miles southeast of Iowa City. For 22 years, the city has run its treatment plant under a public-private partnership with CH2M HILL OMI, the operations arm of the CH2M HILL consulting engineering firm. "We're in the second year of a 10-year contract, which means we'll be around for at least another eight years," says Clark.

The plant is designed for 2.16 mgd and sees average flows of 1.38 mgd – equivalent to flow from a residential population of about 24,000. Wet-weather flows were a substantial challenge until the 2009 addition of an 800,000-gallon stormwater tank.

"Before that tank was installed, we had problems with the sludge blankets in the clarifiers getting out of control," says Clark. "High-flow rain events would exceed the clarifiers' hydraulic and solids loading capacity. Now, with the addition of the stormwater tank, we are able to ensure better process control."

Today, flows within the plant's design parameters go directly into the headworks; any excess flow is diverted automatically to the stormwater tank. When the high flow subsides, the tank automatically drains to the headworks.

The influent first passes through a fine screen (Lakeside Equipment Corp.) that removes particles 0.25 inch or larger. Flow then passes into two aerated grit tanks where grit is removed by a WEMCO Hydrogritter system. Two screw pumps (Lakeside) then convey the liquid to a Carrousel oxidation ditch (Ovivo). After settling in three final clarifiers, the effluent is discharged to Waspinonoc Creek (the plant permit requires no disinfection).

THE SOLIDS SIDE

Sludge wasted from the oxidation ditch is pumped to six aerobic digesters (580,000 gallons total capacity) that achieve 52 percent volatile solids reduction in a 30-day detention time. The digested material at about 1 percent solids is dosed with polymer and pumped to a 2.5-meter gravity belt



Equipment operator II Brian Goldesberry, left, and biosolids coordinator Ken Riley take biosolids samples from the gravity belt thickener (PHOENIX Process Equipment Co.).



profile



West Liberty (Iowa) Wastewater Treatment Plant

POPULATION SERVED:	3,300
FLOWS:	2.16 mgd design, 1.38 mgd average
TREATMENT PROCESS:	Extended aeration activated sludge (oxidation ditch)
BIOSOLIDS PROCESS:	Gravity belt press thickening, aerobic digestion
BIOSOLIDS VOLUME:	340 dry tons annually
BIOSOLIDS USE:	Land application
WEBSITE:	www.cityofwestlibertyia.com
GPS COORDINATES:	Latitude: 41°34'00.16" N; longitude: 91°15'06.64" W

The West Liberty team includes, from left, biosolids coordinator Ken Riley, equipment operator II Brian Goldesberry, CH2M HILL manager David Clark, equipment operator II Chris Gerstbrein, and lead operator Craig Juergens.

geotextile tubes, which dewater to 8 to 10 percent solids. Plant personnel operate the liquid application program, and a local contractor handles the solid program.

INTO THE FIELDS

Overseeing the entire program is biosolids coordinator Ken Riley, whose team also includes Brian Goldesberry and Chris Gerstbrein, both equipment operators II, and Craig Juergens, lead operator/lab analyst.

"We like to stay within a 10-mile radius of the plant to keep our fuel costs and labor costs down," says Riley. "We have never charged for the material. We have more farmers than we need, and the only marketing is word of mouth, farmer to farmer."

The team hauls liquid biosolids to farms using two semi-tractors pulling 7,200-gallon-capacity trailers (typically carrying 6,000 gallons per load). At the farms, a TerraGator applicator (Ag-Chem Equipment) with a 2,000-gallon tank applies the material to the soil surface using pressurized discharge over a deflector plate.

"We typically get three TerraGator loads out of each trailer load," says Riley. "By the time one trailer is empty, the next truck will be pulling in, and the other one goes back for another load."

In 2011, the team land-applied 218 dry tons of liquid biosolids covering 414 acres at an average application rate of 0.53 dry tons per acre. The typical solids content was 2.3 percent. At that rate, farmers received plant-available nutrients in amounts of:

- 25 pounds per acre nitrogen
- 26 pounds per acre phosphorus
- 14 pounds per acre potassium

"We apply the material in spring and fall. About 70 percent is applied in fall. The issue we have in springtime is that when we want to get out into the fields, so do the farmers. The window of opportunity is very limited."

KEN RILEY

thickener (PHOENIX Process Equipment Co.) in a process that boosts the solids content to as high as 4 percent.

The dewatered biosolids then go into two concrete storage tanks: a 275,000-gallon unit with coarse-bubble aeration and a 500,000-gallon unit with a jet mixing system. When those tanks fill to capacity between land application seasons, material is stored in a 1-million-gallon geotextile tube on a concrete pad on the plant property.

The two storage methods mean the city actually operates two land application programs – one for liquid material and one for solid material from the



A 75-foot-long EcoTube dewatering container (US Fabrics) is filled with biosolids for storage. Fill height is 7 feet.

SACKING IT TO SOLIDS

In springtime, biosolids production at the West Liberty Wastewater Treatment Plant outstrips the plant team's ability to deliver material to local farms. A few years ago, the biosolids team looked at adding to the plant's 775,000 gallons of concrete tank storage.

"When the engineers did our facilities plan to expand the plant, they included the added capacity, but when the plant project went out for bid, it came in over the engineers' estimates," says area manager David Clark of CH2M HILL OMI. "So we had to cut in certain areas, and one area where the engineers cut was the liquid storage of biosolids. We really needed the extra storage, so as a backup we put in a dewatering pad and purchased geotextile tubes. Instead of spending a couple hundred thousand dollars to put in another concrete tank, it cost only \$50,000 to put in a concrete pad and drainage system."

The supplementary storage system has been in place since 2009. The EcoTube containers from US Fabrics provide both storage and dewatering. The permeable tubes dewater the material to 8 to 10 percent solids. The 80- by 75-foot pad is surrounded by curb and gutter and has a drain system that delivers water that escapes the tubes to the plant headworks.

"At those rates we're not meeting the needs of the crop – the farmers have to supplement with other fertilizers," says Riley. "The reason we don't apply at agronomic rates is that with the liquid product, with its low solids content, we would have to cover the field multiple times, and that raises the issue of soil compaction with the farmers."

"We apply the material in spring and fall (and to a limited extent in summer on hay land). About 70 percent is applied in fall. The issue we have in springtime is that when we want to get out into the fields, so do the farmers," he says. "The window of opportunity is very limited. Typically, we don't get all the material out in spring that we would like to, and that's where the geotextile bags come in."

MORE CONCENTRATION

The city contracts with Dvorak Farms for application of the solid material from the tubes. "When we get all our permanent storage filled up, we use the bags to get us through until fall," says Riley. "Typically, the bags will sit anywhere from four to eight weeks before they get cut open and land-applied. If we fill up a bag early in the year, say in May or June, it's going to sit until probably September."

David Clark of CH2M HILL manages the West Liberty Wastewater Treatment Plant. The team hauls liquid biosolids to farms in spring and fall.



"When we land-apply the thicker material, there's a cost savings in hauling 10 percent solids versus around 3 to 4 percent. Because we contract for that service with a local farmer, the money we spend stays in the local economy."

KEN RILEY

"We work with our contractor to coordinate that. He provides all the labor and equipment, and he also owns one of the main sites where we land-apply. He keeps fields available for us. When the material is ready to be land applied, we use a utility knife to cut a hole in the bag, and the contractor starts removing material. As we need more material, we work our way down along the bag."

"The contractor uses a front-end loader and loads the material into a side-dump semi-trailer that has a cover on it to prevent spillage. He takes it out to the application site and dumps it there, and then uses a manure spreader to apply it to the fields."

Clark notes that biosolids from the geotextile tubes are applied agronomically. "In 2011, we land-applied 120 dry tons agronomically over 45 acres," he says. "The typical application rate was 2.67 dry tons/acre, and at that rate the crops received 110 pounds per acre nitrogen, 115 pounds per acre phosphorus, and 60 pounds per acre potassium." The typical solids concentration of the material from the geotextile tubes was 8.3 percent.

Trusted By Communities



For Over 50 Years

One Princeton Ave. Dover, NJ. 07801 Tel: (973) 366-6556 Fax: (973) 366-3193

www.jdvequipment.com

Riley observes, "We're unique in the use of the geotextile tubes. We are among very few facilities in the state that use them on a regular basis. When we land-apply the thicker material, there's a cost savings in hauling 10 percent solids versus around 3 to 4 percent. Because we contract for that service with a local farmer, the money we spend stays in the local economy."

KEEPING CLOSE TABS

The West Liberty team keeps meticulous records on its program and does regular sampling of both the farm field soils and the product itself.

"On the biosolids side, every quarter we get a sample analyzed for nutrients and heavy metals," says Clark. "Also once a quarter, we get a sample tested for fecal coliform to make sure it meets the requirements for Class B material. On the soils side, we take a core sample from each site and test it to make sure the soil has the proper pH."

If the farmer requests it, the team will order an agronomy report on the soil. "We send a sample away to a lab, and the results tell us if the soil is low on lime, or anything else that the ground needs to be productive," Riley notes. "It helps the farmers determine what their ground needs. It's a service we perform gratis as part of operating a quality program, and it makes the farmers very happy."

Each year, as required, the team prepares a complete annual report on the program that describes the program history, lists all farmers receiving material, provides the sampling schedules, tells how land requirements were determined, describes application methods and site management practices, and more. A copy of the report goes to the Iowa Department of Natural Resources and the regional office of the U.S. EPA.

RUNNING SMART

The team keeps a close eye on its internal functions, too. Riley and his team perform all basic maintenance (such as oil and filter changes) on the



Ken Riley checks the programmable logic controller (Allen-Bradley/Rockwell Automation) that controls activated sludge return rates from the clarifier.

"In our effluent that goes out into the creek, the BOD is about 1 mg/L, TSS is about 2 mg/L, and ammonia is essentially zero. All that loading coming in is being converted to sludge, and our issue is keeping up with production."

DAVID CLARK

trucks and the TerraGator unit. "It's all set up in our computerized maintenance management system," says Riley. "It automatically prints out work orders for required maintenance on the vehicles."

Always looking to improve, the team plans to solicit bids to replace the TerraGator unit, which has performed well but is 20 years old. A longer-term possibility being explored is replacement of the gravity belt thickener with a belt filter press or rotary fan press, which would yield a higher-solids cake product.

Meanwhile, the treatment plant performs effectively despite the high loadings from the turkey processor. Clark notes that West Liberty Foods has a pretreatment system that includes four dissolved air flotation (DAF) units for removal of TSS and fats, oils and grease. Wastewater from the turkey operation contains about 500 mg/L BOD, and the total influent to the plant averages about 450 mg/L BOD.

Nonetheless, says Clark, "In our effluent that goes out into the creek, the BOD is about 1 mg/L, TSS is about 2 mg/L, and ammonia is essentially zero. All that loading coming in is being converted to sludge, and our issue is keeping up with production."

Farmers, the citizens of West Liberty, and the award judges at the Iowa WEA all would attest that Clark and his team are keeping up just fine. **tpo**

more info:

CH2M HILL

888/242-6445
www.ch2m.com

Lakeside Equipment Corporation

630/837-5640
www.lakeside-equipment.com
(See ad page 63)

Ovivo

801/931-3000
www.ovivowater.com
(See ad page 5)

PHOENIX Process Equipment Co.

502/499-6198
www.dewater.com

Rockwell Automation

414/382-2000
www.rockwellautomation.com/industries/water

US Fabrics, Inc.

513/271-6000
www.usfabricsinc.com

Weir Specialty Pumps/ WEMCO Pump

801/359-8731
www.weirpowerindustrial.com
(See ad page 62)

Severe Duty Engineered



Mobile Water Transfer Pumps



Roll-off Vacuum Boxes



Centrifugal Pumps



Liquid Tight Roll-off Boxes



Agitators



Trash Pumps



De-Watering Baskets



Water Storage Tanks



Two Container Roll-off Trailers

Dragon is here.

Ready inventories, convenient financing, and technical assistance – Dragon gives you what you need to solve challenges and succeed. We know your goal is about successful projects and advancing your business. Dragon is here to meet your goals. Make it happen.



U.S. owned and operated. Founded in 1963.

1-800-231-8198

www.dragonproductsltd.com

Fixing Floatables

PASSAIC VALLEY SEWERAGE COMMISSION TEACHES YOUNG STUDENTS AND GUIDES ADULT LEARNERS ON THE PATH TO ENVIRONMENTAL AWARENESS

By Briana Jones

Teaching environmental awareness via Internet video messaging doesn't sound like the kind of thing a sewerage commission would do, but that's exactly what the Passaic Valley Sewerage Commission (PVSC) of Newark, N.J., is doing.

"We've had different age groups use Skype to interact with our staff on skimmer boats," says PVSC executive director Wayne J. Forrest. "Skimmer boats on the rivers, streams and bay remove pollution from the waterways. One of the components of the in-class curriculum is for the students to Skype with the captains of the skimmer boats while they're out on the water."

The captain gives an overview of the skimmer vessel and how it operates. The camera pans around to different parts of the boat to show students how the vessel skims debris. The students get to ask the captain questions, which are usually about the types of wildlife the captain sees on the water and the type of debris that is skimmed.

PVSC's educational outreach program includes in-class multimedia presentations to elementary, middle and high school students in Essex, Union, Passaic, Bergen and Hudson counties. "Public education is something that can easily be overlooked at a wastewater treatment facility, which is why PVSC has made it a priority," says PVSC commissioner Kenneth J. Lucianin.



PHOTOS COURTESY OF PVSC

Student volunteers help with stream bank cleanup as part of the PVSC Education Outreach Program.

The in-class education program and their River Restoration cleanup program have won a total of 24 local and national awards since 1999.

ENVIRONMENTAL AWARENESS

The classroom curriculum focuses on floatables and the importance of keeping them out of the area's waterways. "We show kids the concept of a watershed," says Tom Pietrykoski, director of public affairs. "How even if their school isn't next to a waterway, it's important not to litter because that trash will eventually find its way into the waterway and to our facility." The wastewater treatment plant averages 260 mgd. With 1.4 million residential users, keeping ahead of the waste in waterways is a must.

The program reaches 25,000 to 30,000 students per year. "In 2011, we hit an all-time high, providing instruction to 194 classes, totaling more than 32,000 students," says Forrest. "From 2002 to the present, we've provided this curriculum to over 200,000 students."

The curriculum is an environmental education awareness program geared for

Stream bank cleanup projects are part of a broad water and resource education curriculum.

What's Your Story?

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



the age group of the students. "Whether it's an elementary, middle or high school class, the curriculum is designed accordingly to provide those students with awareness of the environment and keeping the environment clean," Forrest says.

Along with Skype messaging, staff members use PowerPoint slides to display images and information about floatables, waterways and shoreline cleanups. "We also introduce the concept of stormwater management to students in order to demonstrate the environmental benefits of those methods," says Pietrykoski.

Bridget McKenna, PVSC's chief operating officer, adds, "The program brings a perspective, especially to young children, to start thinking about the consequences of just throwing their trash in the street or disposing of chemicals in the wrong way and how that connects to their own environment and their own quality of life and recreational uses of the waterways around them.

"It gives them an early awakening to what really happens to the water in their house and how much work it takes to clean that water."

WATERWAY RESTORATION

Once students complete the in-class curriculum, they take part in the River Restoration waterway cleanup program. "We follow up the classroom component with an actual stream bank cleanup with the students to reinforce the concepts they learned in the classroom and show them how important their daily actions are on the PVSC operation and keeping our waterways clean," says Pietrykoski.

Forrest observes, "I've been out on many of the cleanups with the students and they take it very seriously. We're educating these students who are soon going to be young adults and leaders of our municipalities, states and country. If we instill in them the importance of protecting the environment, they will carry it forward for many years to come.

"We see results from the educational program. When we go back to an area to do a cleanup, it's not as polluted as it was on a previous occasion. I like to attribute that to the educational efforts where our students were out telling others not to pollute as they have been in the past."

CITIZEN SCIENTISTS

In-class presentations and waterway cleanups are



A 50-foot skimmer vessel patrols Newark Bay for floating debris under the PVSC River Restoration Program.

"We see results from the educational program. When we go back to an area to do a cleanup, it's not as polluted as it was on a previous occasion. I like to attribute that to the educational efforts where our students were out telling others not to pollute as they have been in the past."

WAYNE J. FORREST

geared for students in grades K-12, but PVSC has a program in the works for mature learners.

"The Passaic River Stewardship Training Program is a 20-week training program for which adult volunteers who want to become citizen scientists will sign up," explains Pietrykoski.

(continued)



Mind Blowers



NEW!

Aerzen Turbo Blower

+

Delta Hybrid Blower

=

Ultra Energy-Efficient Air

Now the choice is yours! Optimize your process efficiency by selecting the Turbo and Hybrid technology to ensure the reliability of your process.



Turbo+Hybrid



To learn more, visit www.aerzenusa.com

108 Independence Way • Coatesville, PA 19320 • (610) 380-0244
inquiries@aerzenusa.com



PVSC staff members remove heavy debris from Newark Bay.

PVSC partnered with Rutgers University Cooperative Extension of Essex and Passaic counties and the New Jersey Department of Environmental Protection to introduce the program in September 2012.

"The program is aimed at adult laypersons who have an interest in and knowledge of the Passaic River and its importance to the quality of life in their communities," says Pietrykoski. "The basic training course provides an introduction to the knowledge and skills that any citizen needs to communicate about environmental issues and to work with other members of their community to resolve local problems.

"There will be the training program with a minimum of 60 hours of classroom instruction with additional field trips and fieldwork within the Passaic River watershed. It will impact knowledge about the design of rain gardens and other stormwater best management practices, the basics of rainwater harvesting, stream bank restoration strategies, and ways to repopulate native flora in green spaces."

After training and classroom instruction, participants will commit to 60 hours of volunteer service with PVSC on an issue significant to the community and its relationship to the Lower Passaic River.

Touching young learners and adults alike, PVSC is making its mark on the Passaic River Valley community.

"The kids are part of a big puzzle," says Pietrykoski. "The work they're doing in school and on the riverbanks is just as important as the work we're doing here at PVSC and just as important as what our elected officials are doing. Without any one of those components, none of us would be successful." **tpo**

See Both Sides

Now there's a magazine for the drinking water side of the house. *Water System Operator™ (WSO)* — with the same emphasis on the people who make it all work. It's designed to help water operators:

- Receive recognition celebrate successes
- Learn new technologies and methods
- Advance in the profession
- Share best practices



Get your subscription at wsomag.com —
free to qualified professionals.

WHATEVER IT TAKES!



1-800-798-4205

NUTRIJECT.COM

TURNKEY BIOSOLIDS MANAGEMENT • BIOSOLIDS TRANSPORTATION • DREDGING •
DIGESTER AND LAGOON CLEANING • HIGH PRESSURE WATER BLASTING • BIOSOLIDS APPLICATION WET/DRY •
WATER PLANT RESIDUALS • LAGOON AERATION REPAIRS



Your partner for sustainable solutions in water treatment

BASF understands today's global water management challenges and is responding by delivering world-class technologies and sustainable solutions. From water production, through water use, through water purification, BASF has leveraged its expertise and extensive capabilities to protect, conserve and sustain the earth's most precious resource, that being water. As the world's leading chemical company, we are dedicated to your success by bringing to you over 100 years of comprehensive experience, technology, innovation and commitment. At BASF, we create chemistry.

www.watersolutions.basf.com

 **BASF**

The Chemical Company

‘WE ARE ENVIRONMENTALISTS’

HOWARD CARTER PROMOTES AND DEPLOYS GREEN TECHNOLOGIES
TO HELP PEOPLE UNDERSTAND THE VALUE OF WASTEWATER TREATMENT

By Doug Day

HOWARD CARTER WANTS PEOPLE TO KNOW THAT WASTEWATER treatment plants are in the business of protecting — not polluting — the environment. He sees promoting green technology and energy efficiency as ways to help change the public’s perceptions.

“The industry, at least in the past, did a very poor job of promoting what we do,” says Carter, director of the Water Resource Recovery Division for Saco, Maine, on the Atlantic coast just south of Portland. “The industry has tended to stay out of sight, out of mind,” until a main broke or a combined sewer overflowed.

“You’ve seen a whole paradigm shift in the industry, which is a great thing,” Carter says. “We are environmentalists.” Using renewable energy helps demonstrate that to people. It also saves money: the Saco Water Resource Recovery Facility has cut its heating oil use by 88 percent since the winter of 2004-05, from about 8,000 gallons per year to 1,000 gallons.

“We’re trying to get the next generation to appreciate water,” Carter says, in much the same way efforts in the 1970s convinced people to stop littering. “It may take 20 years,” he says, “but we have to start somewhere.”

WELL RECOGNIZED

Under Carter’s leadership, the Saco treatment facility has received several awards including:

- U.S. EPA National First Place Award for combined sewer overflow control program excellence, 2000
- U.S. EPA Region 1 Operations & Maintenance Excellence Award, 2002



Howard Carter, director of the Water Resource Recovery Division in Saco, Maine, believes in teaching younger generations to appreciate water. He’s shown checking a GIS map of the city collections system. (Photography by Tim Byrne)

- Certificate of achievement from the Maine Department of Environmental Protection for energy efficiency, 2008
- George W. Burke Jr. Facility Safety Award from the Water Environment Federation and New England Water Environment Association, 2009

Carter won NEWEA’s 2012 William G. Hatfield Award for his own outstanding performance and professionalism, and received the eco-Excellence award in 2011 from ecomaine, a nonprofit, municipality-owned waste management company. He was recently inducted as a WEF Fellow.

“It’s recognition of everyone involved,” says Carter. He notes that the awards also help bring attention to protecting the environment. Along with his goal of having his facility become energy neutral, or even an exporter of power, Carter wants people to better understand the importance of water and wastewater treatment.

STARTING SMALL

Carter admits the plant staff at first was not as enthusiastic as he is about energy efficiency and green technologies. “Eventually, people started coming around and embraced the concept,” he says.

Saco started its Energy Committee in 2005, when it was considering installation of a large wind turbine at its landfill. However, Carter and other committee members selected a small 1.8 kW Skystream microturbine from Southwest Windpower. “Instead of doing a meteorological study for a large turbine for about \$40,000, we bought the microturbine for \$8,000 and the staff installed it,” he says (see article in *TPO*, July 2009).



"We're trying to get the next generation to appreciate water. It may take 20 years, but we have to start somewhere."

HOWARD CARTER

Howard Carter and his team have earned numerous recognitions for the Saco treatment plant's performance.

profile



Howard Carter, Saco (Maine) Water Resource Recovery Facility

POSITION:	Director, Water Resource Recovery Division
EXPERIENCE:	19 years
DUTIES:	Lead management staff, interact with city management, oversee customer service, billing, plant licensing and purchasing
EDUCATION:	Environmental Science, Southern Maine Community College
CERTIFICATIONS:	Grade 5 (highest) wastewater operator, Grade 3 collection system operator, Class II water treatment and distribution licenses, certified solar thermal installer
MEMBERSHIPS:	Maine Wastewater Control Association; NEWEA (past president of both)
GOAL:	Make the facility energy neutral and eventually an energy exporter
GPS COORDINATES:	Latitude: 43°29'46.04" N; Longitude: 0°26'14.67" W

FROM NUCLEAR SUBS TO WASTEWATER

A career in wastewater was not the first choice for Howard Carter. He spent 12 years as an apprentice pipefitter/mechanic and supervisor for the Portsmouth (N.H.) Naval Shipyard, doing repairs and modernization on nuclear submarines. His civilian position was eliminated along with hundreds of others in a workforce reduction. But that offered an opportunity to get a college education.

With a 4-year-old and a newborn at home in the early 90s, he decided to look into it. "They had me take one of those aptitude tests, and it came up with wastewater so I checked it out," he recalls. "I like to do things with my hands and I'm into new ideas, so it was a perfect career path for me. I never regret one moment of going into this field." He began his wastewater career in Old Orchard Beach, Maine, relocated to Saco in 1994, and is now director of the Water Resource Recovery Division.

While it may not be a career a lot of people think of first, Carter doesn't know many people who have left the clean-water industry once they got into it. "It's a great group of folks, pretty much down to earth," he says. "Everybody shares information. We have strong associations in both water and wastewater to share ideas and thoughts." And he appreciates the job security: "They're certainly not going to outsource these jobs to China."

The wind turbine doesn't make a big dent in the plant's \$6,500 monthly power bill — it only generates about \$70 worth of electricity. But it did help draw the public's attention and build support for more green technologies, including effluent heat recovery, solar installations, and sky tubes for lighting.

Carter emphasizes that only so much can be done at a smaller plant like Saco's activated sludge secondary treatment facility with biological nutrient removal, serving 4,800 connections with an average flow of 2.4 mgd (4.2 mgd design). But the plant has certainly done its share to lead the city's efforts to improve efficiency.

"You've seen a whole paradigm shift in the industry, which is a great thing. We are environmentalists."

HOWARD CARTER

A new fire station commissioned in 2011 is also using geothermal and other energy-efficient designs and just received LEED certification. The city is designing a new Public Works facility that will incorporate many of the same concepts.

Those are the types of things Carter has been doing in his own life for about 20 years. "I have geothermal and solar thermal at my home," he says. He hasn't added photovoltaic panels, but he did orient the house facing south to better capture the sun when he does decide to add them.

EFFLUENT THERMAL

In winter 2010, the Saco Water Resource Recovery Facility joined the growing number of treatment plants using effluent heat recovery. The \$336,000 system was designed by Woodard & Curran and purchased from Nyle Systems in Brewer, Maine. With three 10-ton compressors, it heats and

The community of nearly 19,000 has converted its downtown street lights to LEDs, bought an electric car, replaced refrigerators and computer monitors in city offices with energy-efficient models, and installed a 50 kW wind turbine at its new transportation center and Amtrak station, built with all recyclable, local materials and with geothermal heating and cooling.



Mechanic II Andrew Whitaker (center) and lab technician Stacy Thompson confer with Carter before leaving to check a pump malfunction at a substation.

cools a new \$3.5 million, 3,070-square-foot process building and a 2,400-square-foot maintenance garage that includes chemical storage.

Carter says effluent thermal technology has been around for more than a decade and is just another version of geothermal. "Now it seems to be the thing to do, and why wouldn't it be? Everyone has all that water going through their plants; they might as well utilize it."

Saco's effluent runs around 70 degrees F in summer; the coldest ever recorded in past years was 48 degrees. "That's a perfect range for geothermal," he says. As a heat pump, the system transfers energy from the effluent to heat buildings in winter, and does just the opposite in summer to provide cooling.

While it's impossible to compare energy use at the old process building to the new facility, the effluent thermal has nearly eliminated fuel oil use at the treatment plant. Only a small administration building still uses oil heat, and total oil use has been cut by nearly 90 percent. As part of the construction project, the city installed a \$48,000 power correction system: poor power quality can increase energy use and damage equipment.

YEARS OF INVESTMENT

Since 2005, the Saco Water Resource Recovery Facility has spent nearly \$490,000 on various renewable energy sources and more efficient equip-

ment. The result has been annual savings of nearly \$70,000 with a simple pay-back of about seven years.

The 680-square-foot headworks building is heated with two sets of 30 solar thermal panels (Viessmann) that heat a pair of 80-gallon water reservoirs to serve the radiant heating system. The panels were purchased locally from Saco Solar and installed by staff and a local contractor. "That building hasn't used any fuel oil in five years," notes Carter.

"There's a lot of energy in the water flowing through these facilities that we have yet to tap into."

HOWARD CARTER

The plant's new administration building, garage and process buildings use SolarSheat solar air units (Your Solar Home) for supplemental heat. Each of these units, also purchased locally at an installed cost of \$30,000, can heat up to 1,500 square feet. Ambient air is drawn into the units by a fan, heated by solar energy, and discharged at ceiling height. "Those have been very economical," says Carter. "We have them installed here, at Public Works, and at the fire station."

Solar lighting, in the form of Solatube International light tubes purchased at Saco Solar, serves the process building, the garage and a pump station. Carter calls them "the neatest things in the world." Also called sky tubes, they collect and amplify natural daylight through pipes coated with reflective material.

"It's good natural light so we've been able to turn off a lot of fluorescent lights unless it's real cloudy," Carter says. Since the staff is on site only during the day, no other lighting is needed about 70 percent of the time.

All light fixtures at the facility were upgraded during the construction of the new buildings. Nearly 70 high-efficiency LED and fluorescent fixtures from various companies were installed indoors and outside at a cost of \$16,000. All process motors in the facility and at the 31 satellite pumping stations use variable-frequency drives (Toshiba); more than 75 have been installed over the years with electricity savings of about 15 percent.

MORE TO COME

Carter also points to new, promising developments that can help the wastewater industry and the environment, such as technologies to capture ammonia and phosphate for fertilizers and microbial fuel cell technology that can generate electricity through chemical energy created by microorganisms. "There's a lot of energy in the water flowing through these facilities that we have yet to tap into."

He believes promoting efficiency and green technology will help bring more attention to the critical infrastructure that is now being ignored. "The roads and bridges get their recognition, as they should," he says. "It's the stuff that's out of sight, out of mind that is really starting to fail throughout this country. If we don't start putting some more money into it, we're going to be in a world of hurt eventually." **tpo**

more info:

Solatube International, Inc.
888/765-2882
www.solatube.com

Southwest Windpower
928/779-9463
www.windenergy.com

Toshiba International Corp.
800/231-1412
www.toshiba.com/ind

Viessmann Manufacturing Company, Inc.
800/387-7373
www.viessmann.com

Woodard & Curran
800/426-4262
www.woodardcurran.com

Your Solar Home Inc.
905/503-2713
www.yoursolarhome.com

Attention Treatment Plant Operators

Let us pump
your sludge.
Then you be
the judge.

Put our pump to the test. There's
no cost to you. Take the PVP
Challenge and prove it to yourself.



We are so confident in our pumps' ability to reduce your overall maintenance and labor costs that we will let you take one for a test drive... for FREE. You provide the application and we'll provide the unit. It's that simple! PVP Double Disc®, Positive Displacement pumps feature:

- Seal-less, gland-less, oil-less design for zero routine maintenance.
- Will run dry indefinitely without damaging the pump.
- Passes solids up to 2 inches in diameter and full-line semi-solids.
- Fewer moving parts means less need for repairs or maintenance.
- Patented Maintain-in-Place design reduces downtime and lowers maintenance costs.



Step 1-Suction Cycle.



Step 2-Discharge Cycle.

The PVP Difference

The repair of progressive cavity or rotary lobe-style pumps can be complex and costly. Our Double Disc® Pump system will operate up to 10 times longer in the same application and cost up to 70% less to repair when the need occurs.

Swap Your Pump

Install one of our pumps and put it to the test. There's no cost to you. PVP Double Disc®, Positive Displacement Pumps are designed to handle the toughest sludge challenges.



Toll Free: 800-311-3311
PennValleyPump.com



Oxbow Lake is part of the Phinizy Swamp floodplain system next to the constructed wetlands that provide tertiary treatment at the JB Messerly Water Pollution Control Plant.

Living Color

ORNAMENTAL PLANTINGS HELP A GEORGIA TREATMENT PLANT CREATE EYE APPEAL FOR VISITORS AND FOR MOTORISTS ON A MAJOR HIGHWAY

By Jeff Smith

The JB Messerly Water Pollution Control Plant stretches for more than a mile along a major thoroughfare into the City of Augusta, Ga. It's also next to the area's largest airport and is one of the first things visitors see when they arrive in town.

"It didn't make the most favorable impression," says Allen Saxon, assistant director of water and waste. So when a major upgrade and conversion from conventional activated sludge to the modified Ludzack-Ettinger process was planned in 2010, the city budgeted funds to landscape the area between the plant and the roadway.

COLORFUL PLANTINGS

A local contractor strategically planted colorful azaleas, purple cone-flower, yellow-flowered lance-leaved coreopsis, white oakleaf hydrangea, big blue monkey grass and American beautyberries. Crepe myrtle and other shrubs joined the mix, all layer-planted on a low, rolling berm along the entire length of the plant.

Species with similar watering needs were clustered to simplify irrigation and maintenance. Ground cover and mulch complement sod laid along the right-of-way, which varies from 20 to 100 feet wide. "It's a non-industrial look that catches the eye," Saxon says. "It was all part of the strategy."

The plan was not to disguise the plant (46.1 mgd design) but to put eye-catching features in front that deflect attention. "It has really been an effective approach," says Saxon. And thanks to a Georgia Department of Transportation grant, an additional \$50,000 was available to extend the landscaping to a nearby intersection, where cars sit at a stoplight with the plant in full view.

WETLAND TREATMENT

Of even greater pride to the city and its wastewater facility contract operator, ESG Operations, is 360 acres of constructed wetlands that provide ter-

tiary treatment. Built between 1990 and 2003, the wetlands are part of the Phinizy Swamp Nature Park, a 1,100-acre preserve that serves as headquarters, laboratory and visitor center for the Southeastern Natural Sciences Academy.

Consisting of twelve 30-acre cells with an effluent holding time of seven days, the wetlands are included in the nature park's trail system. With free access to the public from sunrise to sunset, more than eight miles of improved trails with foot bridges and observation decks allow viewing of all kinds of wildlife. Alligators, beavers, turtles and frogs are commonly seen, as are migrating waterfowl, birds of prey, egrets and blue herons.

ESG project manager Paul Tickerhoof says the wetlands began as a pilot study of tertiary treatment inspired by Jorge Jimenez, principal of a local con-

"We take a lot of pride in our facility and in what we do. We wanted the plant and the streetscape to reflect that pride."

PERCY NOLAN

sulting firm, Zel Engineers. Jimenez saw a similar installation at a treatment plant he visited while vacationing in Florida. Upon his return, he convinced Augusta officials that the process would benefit the JB Messerly plant.

"The initial wetland had only four cells with equalization ponds and a distribution canal designed for future expansion," says Tickerhoof. "Based on results of the pilot study of about three years, we installed the additional eight cells and a polishing pond."

PUBLIC TOURS

ESG assistant project manager Percy Nolan says that through a partnership with the Academy, a nonprofit committed to environmental sustainability of the 314-mile Savannah River, the plant hosts more than 60 tours each

Boost Your Productivity in Sludge Dewatering

DehydriTM Twist Boosted Sludge Dewatering Using Piston Press Technology

- Combines plate filter press efficiency and centrifugal productivity
- Easy operation and high performance
- Achieve up to 40% dry content through an entirely automated process from mixed digested sludge
- Up to 30% reduction in sludge bulk compared to conventional dewatering

INFILCO

Infilco Degremont, Inc. – 8007 Discovery Drive, Richmond, Virginia 23229 • (800) 446-1150

www.degremont-technologies.com

A partnership with Bucher Unipektin



HEADWORKS | BIOLOGICAL | SEPARATIONS | MEMBRANES | OXIDATION DISINFECTION | BIOSOLIDS | INDUSTRIAL SYSTEMS



Views from around the treatment facility, as well as the ponds, wetlands, and distribution canal.

year for the general public, Boy Scout troops, teacher workshop attendees and students. "They get to see the nature park and treatment plant from a total watershed approach," he says.

The goal is to educate the community about the beauty of nature and the value of responsible environmental stewardship. Nolan observes, "We take a lot of pride in our facility and in what we do. We wanted the plant and the streetscape to reflect that pride." **tpo**

Share Your Ideas

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

TORNADO[®] T2 Rotary Lobe Pump New Metal Lobe / Rubber Liner Design!



- Ground-breaking timing / drive design
- Full service-in-place
- Replaceable liner
- Lowest life cycle cost
- Cartridge seal technology
- Exceptional performance
- Superior durability
- Low pulsation
- Compact and robust

NETZSCH

NETZSCH Pumps North America, LLC
Tel: 610-363-8010
email: TORNADO@netzsch.com
www.netzschusa.com/T2

The Ultimate Reuse

EFFECTIVE COMMUNITY RELATIONS HELPS A TEXAS CITY WIN SUPPORT FOR DIRECT REUSE OF WASTEWATER TO SHORE UP DRINKING WATER SUPPLIES IN THE FACE OF SEVERE DROUGHT

By Ted J. Rulseh

The lake that supplies drinking water to Brownwood in Central Texas was at historic low levels last summer, and the city looked for alternatives.

The most attractive turned out to be direct reuse — treating wastewater effluent to make drinking water. The city is proceeding with plans to build a direct-reuse treatment plant costing \$6 million to \$8 million.

Brownwood is a city of about 20,000 close to the geographic center of Texas. Its industrial base includes Kohler, 3M and Superior Essex plants that together employ about 2,200 people and need quality water to continue operating.

David Harris, director of utilities, is not concerned about any public revulsion over what some might label as “toilet to tap” recycling. For years, Harris and other city officials have made it a priority to keep their community informed about the importance of water and wastewater treatment systems. Now the city is reaping the rewards in public support for what on the surface would seem to be a controversial approach. Harris shared the city’s experiences in an interview with *Treatment Plant Operator*.

tpo: How serious are the city’s drinking water supply issues?

Harris: Most communities in Brown County get their water from Lake Brownwood, a 7,400-acre lake created in 1930. Last year, the lake reached its all-time low level. In spring, as it was getting drier and drier, we started water restrictions on irrigation — first Stage 1, then Stage 2, and finally Stage 3, which allows watering only one day a week for limited hours at night. We also started looking for other options for our water supply.

“When we looked at everything available to us, we saw that we had this beautiful, crystal-clear treatment plant effluent that just dumps into a little creek and goes away.”

DAVID HARRIS

tpo: What alternatives were available?

Harris: There is no major or minor aquifer in the county near where we are. There are some shallow water sources, but they’re not reliable — in a real drought, they quickly dry up. There is some salt water really deep down, but its quality is worse than ocean water. It’s not really a viable option. There is an aquifer about 20 miles south of us. It has a lot of water and it’s not too deep, but the water has radon in it at about seven times the EPA maximum level.

Another option was that the rules for using surface water say you can go a quarter-mile downstream of the wastewater treatment plant, and pull water out of the receiving stream and treat it. The problem is that then you get into water rights issues. Once that water comes out our 36-inch outfall into South



David Harris, director of utilities, leads a wastewater treatment plant tour for the Brownwood High School FFA chapter.

Willis Creek, it becomes part of the waters of the state, and I don’t own it. I would have to apply for water rights to get my water back.

tpo: Does the wastewater treatment plant produce water for reuse now? Is there a market for irrigation water?

Harris: We have a regional wastewater treatment plant that serves Brownwood, a prison, a youth correctional facility, and the City of Early, with a population of 2,800. The capacity is 454 mgd, and we now treat about 2.5 mgd. We reuse effluent on site for all plant functions, and we conserve 16 to 18 million gallons of potable water per year. As for irrigation, there are a lot of pecan orchards in the area, but none of them are close to the wastewater plant. There’s a golf course, but it’s about five miles away.

tpo: What led to the decision to explore direct reuse?

Harris: We have these major industries that need water and that we really can’t afford to lose. It would almost destroy the town to lose those 2,200 jobs. When we looked at everything available to us, we saw that we had this beautiful, crystal-clear treatment plant effluent that just dumps into a little creek and goes away.

We have years and years of analysis on it. We have a 10-15-3 permit [BOD-TSS-ammonia]. We have a Carrousel system — an extended aeration oxidation ditch — with standard circular clarifiers and tertiary sand filters. We get

(continued)



UNMATCHED RELIABILITY

For over 50 years, Vaughan Chopper Pumps have offered **guaranteed** performance in the toughest applications. See why the original chopper pump is still unmatched:

- Manufactured in the USA • Expedited Pumps and Parts • Guaranteed Performance in Writing
- Superior Life Cycle Costs • Multi-Million Dollar Inventory • 30+ Proven Patents
- Hardened Wear Components Standard • Special Materials Available Include: CD4MCu, 316SS, Chrome Iron, and Alloy 20
- Free Trial Program Available!

Experience Ease of Maintenance With Vaughan Chopper Pumps.



Heat Exchanger



Scum



Screenings



Digester Recirculation



QUALITY CHOPPER PUMPS SINCE 1960.

phone: (360) 249-4042 FAX: (360) 249-6155
email: info@chopperpumps.com web: www.chopperpumps.com

some amazing quality water. Our ammonia is 0.1 to 0.3 mg/L, BOD less than 2 mg/L, and TSS from 0.5 to 1.5 mg/L.

The chemical analysis showed nothing of concern. We have a big industrial pretreatment program. We ran a test of our effluent against primary drinking water standards, just as it goes through the Parshall flume and out. We passed for everything except nitrates, which were about 24 mg/L, versus the standard of 10 mg/L. But that's treatable. We started looking at whether we could reuse that water.

tpo: How did you proceed with devising a direct reuse solution?

Harris: We hired an engineer who had done significant work on our wastewater treatment plant and did feasibility studies. We put some ideas together and met with the Texas Commission on Environmental Quality. We talked to half a dozen of their staff people and told them what we were thinking. They looked at us kind of glassy-eyed because nothing like this had been done before.

We showed them our analysis and our history. A lot of their people were familiar with our treatment plant. In working with them we found that direct reuse was feasible and that they would support it with some heavy regulation. The reuse plant would have to meet a very high standard. It would have to follow a multiple-barrier approach, which basically means you need redundancy on everything. For example, if a surface water plant would normally have one disinfection zone, we would have two, so that if one would fail we would still have full treatment. Really, we had to design two water plants but get credit for one.

tpo: What kind of treatment is envisioned for the effluent?

Harris: It will be membrane ultrafiltration followed by reverse osmosis (RO). We probably wouldn't need the RO to meet the requirements, but we included it for the public relations value and for the guarantee that we'll remove some of the constituents in wastewater that are not in surface water — the salt, dissolved solids and pharmaceuticals. The RO will pull those substances out, as well as the nitrates.

We'll have chlorine disinfection as well. Everything will be disinfected before we get to the filtration. We'll also have UV light treatment, which breaks down a lot of the microconstituents everybody is worried about, and also kills *Cryptosporidium* and *Giardia*. And we'll have activated carbon cartridge filters. Activated carbon is like the super-magnet for a variety of low-molecular-weight chemicals that might squeak through RO. It also helps with the taste of RO water. It's a very advanced system.

tpo: How would you describe the process of working with the TCEQ on this first-of-its-kind project?

Harris: We've been under a review-as-you-go process. We didn't want to get caught up in designing the whole plant, turning in a 500-page document, and then waiting six months for them to send 500 pages of questions back. We meet with them every few weeks and get their blessing on our methods of treatment. They want to approve the specific membranes and all the specific components. The review is very intense. We have already arranged for funding from the Water Development Board. Assuming we receive approval from the TCEQ, our city council will have to make the decision whether to proceed or not.

tpo: Will the city still use Lake Brownwood as its primary drinking water source?

Harris: Yes. The reuse plant will have a 1.5 mgd capacity, which equals about 30 percent of our annual running average water use. We will blend that with treated lake water to add some alkalinity, keep the corrosivity of the water down, and give it a more familiar taste.

tpo: How have you gone about getting the community on board with this project?

Harris: We talked to all the industries, who know they need water to keep their businesses open. It's the same with the schools. We have a college here in town and they want to water their athletic fields and play soccer.

I've spoken at meetings of Lions, Rotary and Kiwanis clubs, some of them multiple times, to explain what we're doing and why. I've been on the local talk radio station. We have a local newspaper and an online newspaper that people follow closely. We've had public meetings and presentations. At one meeting we showed an animated video on ultrafiltration. One of the review engineers from TCEQ came to town and did a presentation on the plant. Brownwood News Online recorded that on video and put it on YouTube.

tpo: What sort of credibility with the public did the city have going into this project?

Harris: Our community relations didn't start last spring. It started years ago. For years, we've done tours of the wastewater treatment plant. We take the freshman and sophomore biology classes from the high schools. Many students have toured the wastewater plant, some of the kids we trained years ago are now adults.

The Chamber of Commerce has a program called Leadership Brownwood. Each year, they select 25 to 30 people who are young professionals,

"When people see you doing what you say you're going to do, when you're open and honest, they trust you. If you give people all the information, they will generally make good decisions."

DAVID HARRIS

mid-level managers at the industries, or college professors, and they go through a six-month program to learn about the community. They go to the water plant, the wastewater treatment plant, the landfill, city hall, the county courthouse. Every time we get new council members, we take them to all the locations, so they understand what we do.

tpo: What else have you done to teach people about water and wastewater?

Harris: I went to the store and got six bottles of water. I dumped five of them out in the yard. Then I went to the wastewater plant and filled a bottle with what comes in through the headworks. I filled another with water from the middle of the process, and another from after the clarifiers, and another after the sand filters. I also took a bottle of lake water.

Then I would show people. I've only had one person tell the difference between our wastewater effluent water and bottled water. When they look at it, they say, "I don't see why we can't drink it." With lake water, we're looking at about 8 to 15 NTU turbidity. Our plant effluent averages 0.68 NTU. So when I say "wastewater effluent," hundreds of people in town know what that is, and they talk to others about the presentations.

tpo: Have your community relations programs paid off in other ways?

Harris: Yes. For example, last year, when we had to restrict water use so severely that trees started dying and people lost their grass, they got concerned. They've really done well to do what it takes to conserve. They water plants with their bath water. They take the cold water they run before shaving and put it in jugs to water the trees. That's the level of community support we have. Last year we cut our water usage by 24.5 percent. I was amazed.

tpo: What's the main lesson your experience teaches about community relations?

Harris: When people see you doing what you say you're going to do, when you're open and honest, they trust you. If you give people all the information, they will generally make good decisions. **tpo**

Do You Want to Reduce Your...
Ammonia Concentration?
Polymer Consumption?
Biosolids Management Budget?

We've Got an **App** For That!

Thermal Process Systems' SNDR™

Process Advantages

- Additional 20-30+% VSR Destruction POST Anaerobic Digestion
- Exceptional Ammonia Reduction in Filtrate
- Improved Dewatering
- Significant Reduction in Polymer Consumption
- Reduced Hauling and Disposal Costs
- Odor-free Solids

State of the Art System Design

- Product Stability in a Single Reactor
- Proven Field Performance
- Retrofit or Ground-Up Solutions

Call **219-663-1034** for a Free Analysis of Your Biosolids Management Needs



THERMAL PROCESS SYSTEMS

627 East 110th Ave • Crown Point, IN 46307 • Phone 219-663-1034 • www.thermalprocess.com

When the Numbers Don't Add Up

AN INVESTIGATION OF BULKING SLUDGE REVEALS THE PRESENCE OF FILAMENTOUS BACTERIA AND SUGGESTS A SOLUTION BASED ON IMPROVING MAINTENANCE AND OPERATING PRACTICES

By Ron Trygar

The plant operator was at his wits' end. The sludge just wouldn't settle, no matter how he tried to control it. Solids wash-out was a regular event, causing the effluent to be out of compliance with state TSS, BOD and fecal coliform regulations.

To keep the solids from overflowing the clarifier weirs, the plant was wasting large amounts of solids to the aerobic digesters. The plant owner (who also owned the development the plant serves) was frustrated with the cost of hauling this excess sludge away. The lab detective learned of the operator's dilemma and scheduled a visit.

LOOKING AT HISTORY

The operator gave a summary of the plant's recent history. It served a small planned development (mainly residential, about 25 percent commercial). A strip mall contained a locally owned restaurant, a few shops, and a dry cleaner. The activated sludge plant operated in the extended aeration mode, designed to treat 80,000 gpd, but treating about 45,000 gpd on average. The collection system was only a few miles long and almost free of inflow and infiltration.

The influent is received in a flow-equalization basin, then fed into the first of several large aeration tanks operating in series. The final aeration tank discharges to a flow splitter box before two secondary clarifiers. Effluent flowed from these clarifiers to a chlorine contact tank and then to a land-application spray field site nearby.

In troubleshooting a treatment plant, the lab detective has learned that accurate data is very important. He travels with his own



Dissolved oxygen readings are shown on a Hach LDO meter and a YSI 556 multimeter.

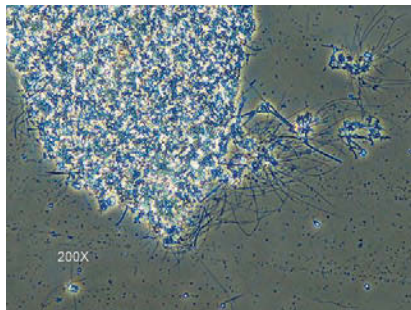
field instruments that he maintains and calibrates. Included in the array of meters is a colorimeter for testing nutrients like ammonia, nitrite, nitrate and orthophosphorus, and a multi-probe meter for in-tank readings of pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), temperature and conductivity. He also carries sample bottles for collecting samples of mixed liquor suspended solids (MLSS), foam or whatever else he might want to study later.

COMPARING READINGS

When an operator describes current operating conditions, the lab detective notes the operator's data, the types of instruments used to get the data, the operator's use of the meters, and the care and maintenance of the instruments. (In one instance, a plant operator-trainee did not realize that new DO probes are shipped dry and that electrolyte must be added to the probe before the first use. This gave some interesting DO readings to say the least!)

Side-by-side comparisons of parameters like DO with field instruments showed that the operator's DO readings were in proper range (1 to 2 mg/L) for aerobic treatment, although slightly on the low side. ORP showed a very low millivolt reading, indicating more reduced

PHOTOS COURTESY OF MICHAEL RICHARD, PH.D.



LEFT: Digital micrograph of floc and *H. hydrossis* filaments extending from floc (200x magnification). RIGHT: Digital micrograph of *H. hydrossis*-like filament. The sheath is visible in some filaments (1000x magnification).



chemical species present than oxidized species in the MLSS. Ammonia is one of the reduced chemical compounds that, when present in higher numbers than oxidizers (like DO), can cause ORP to be negative while the DO meter detects oxygen.

These are some of the pieces of data that do not always add up. One would believe that when there is measurable DO present, the ORP should be at least on the positive side of the millivolt scale. A quick check of the influent flow equalization (EQ) basin showed zero DO and -400 mV on the ORP meter, indicating a pretty septic raw wastewater. The odors coming from the EQ basin supported this theory.

With much of the data pointing to a low DO filament or a septicity filament — or both — causing the slow-settling sludge, the lab detective gathered some MLSS for microscopic analysis. Back at the lab, microscopic observation with a low-power objective revealed a very open and diffuse floc structure with excessive thin filaments extending from the floc.

He prepared and stained several smears using three staining procedures (Gram, Neisser and PHB), and subsequent results were all negative. The relative size of the filament, the location, the lack of attached growth and its staining reactions all pointed to a filament called *Haliscomenobacter hydrossis*, or *H. hydrossis*, as the cause of the slow-settling sludge.

One characteristic observed, but not common with *H. hydrossis*, is the formation of 'rosettes,' where the filament seems to radiate from a common central point and spread outward like a sunburst. Rosettes are commonly seen with other filaments like Thiothrix I and II, Types 0914 and 021N. Again, not all of the data added up.

CHOOSING THE REMEDY

When deciding a path for correcting a plant's problems, data like this becomes important. Several potential remedies can be derived from the above discussion, but which is the best course of action? Which will bring the facility into compliance quickly in the most environmentally friendly and cost-effective way?

The lab detective decided to consult with a few other folks in the wastewater industry — people who specialize in filament identification and write manuals on such topics. He sent samples to Dr. David Jenkins of David Jenkins and Associates, and Dr. Michael Richard of Michael Richard Wastewater Microbiology LLC, two authors of the *Manual on the Causes and Control of Activated Sludge Bulking, Foaming, and Other Solids Separation Problems, Third Edition*. This manual is a valuable reference tool in any lab detective's library.

Again, the diagnosis was debatable. Richard concluded that the filament appeared to be *H. hydrossis*, while Jenkins thought otherwise. Jenkins commented that it was an unknown filament that did not exhibit the characteristics of *H. hydrossis*.

So now what? The majority of evidence pointed to a bulking filament similar to but not definitively *H. hydrossis*. *H. hydrossis* can appear in activated sludge that is somewhat septic with low DO and elevated organic loading. Higher-than-normal organic loading can occur from septic influent wastewater, where fermentation occurs, producing volatile fatty acids that are readily metabolized by facultative anaerobic bacteria.

Other filaments were also present in the MLSS sample along with *Spirochetes*, bacteria with long, spiral-shaped cells. *Spirochetes* are commonly found in anaerobic environments and can be seen twisting and wiggling about under a higher-powered microscope.

Armed with this information, the lab detective recommended

aeration of the influent equalization tank and increasing the available DO in the plant aeration tanks. It was also necessary to pull the diffusers and clean and repair the broken diffusers, since this had not been done in several years. He also recommended proper operation of the influent flow EQ basin.

REDUCING SHOCKS

Flow equalization basins are designed to absorb the shock of diurnal fluctuations of flow. EQ basin liquid levels fill during high-flow periods and draw down during low-flow periods, allowing a constant medium flow into the treatment system. This steady flow reduces the chance of hydraulic wash-out of the clarifiers. The sludge age can be slowly increased, producing a heavier MLSS with greater numbers of flocculating bacteria than filament bacteria.

One would believe that when there is measurable DO present, the ORP should be at least on the positive side of the millivolt scale. A quick check of the influent flow equalization (EQ) basin showed zero DO and -400 mV on the ORP meter, indicating a pretty septic raw wastewater.

An important note about knowing the filament you are dealing with: The lab detective recommended against using chlorine or another biocide in the MLSS to combat the filaments. Since the filament most likely causing the bulking sludge has a sheath, excessive chlorine may be needed to penetrate the sheaths before killing the bacteria inside, all the while killing other unsheathed bacteria needed for treatment and probably causing a worse out-of-compliance situation.

The detective discussed these findings with the plant owner and operator, who developed an action plan. It included immediate changes to the influent EQ basin's aeration and flow control and scheduled aeration diffuser maintenance. The plan also included collection system cleaning and process control training.

The owner relayed this information to the state regulatory agency. With the plan in place, the solids stopped washing out of the clarifiers, the effluent cleared up, and the regulators were happy. The filaments decreased but were not yet gone entirely.

ABOUT THE AUTHOR

Ron Trygar is senior training specialist in water and wastewater at the University of Florida TREEO Center and a certified environmental trainer (CET). He can be reached at rtrygar@treeo.ufl.edu.

References

Manual on the Causes and Control of Activated Sludge Bulking, Foaming, and Other Solids Separation Problems. Third Edition. David Jenkins, Michael Richard and Glen Daigger. IWA Publishing, 2004.

Wastewater Microbiology: A Handbook for Operators. Toni Glymph, AWWA, 2005.

Special thanks to Dr. Michael Richard and Dr. David Jenkins for their input and assistance with this article. **tpo**

What's Your Lab Story?

The Lab Detective feature in *TPO* will help operators learn analytical techniques that help diagnose and solve treatment problems. Are you struggling with a process issue?

Send a note to editor@tpomag.com. Your question may become the topic of a future column.



Renewable energy company Anaergia operates and maintains the 2.8 MW biogas-powered fuel cell from FuelCell Energy under a 20-year purchase power agreement with IEUA. The utility expects to save \$25 million on electricity over the life of the project.

Going Gridless

INLAND EMPIRE UTILITIES AGENCY INSTALLS A BIOGAS-POWERED FUEL CELL
AND SIGNS A POWER PURCHASE AGREEMENT TO REDUCE RELIANCE ON UTILITY POWER

By Lisa Balcerak

When California's South Coast Air Quality Management District enacted part of Rule 1110.2 in 2008 covering operation of engines fueled by natural gas or biogas, Inland Empire Utilities Agency faced a challenge.

The agency had been using biogas from its wastewater treatment plant in Ontario, Calif., to run two 1.4 MW engine-generators, providing 30 percent of the plant's electrical needs. The new regulation forced the shutdown of one engine to meet emissions requirements.

IEUA had an energy independence plan to go gridless by 2020, relying heavily on renewable energy. To meet the new air-quality standards while taking full advantage of the plant's biogas, the agency had two choices: retrofit the existing engines or install a fuel cell.

"Fuel cells haven't had a long track record running on digester gas, so the power purchase agreement puts the performance risk on the provider."

TOM LOVE

The engines were nearing the end of their useful life, and future air-quality laws could further tighten emissions requirements. After a thorough evaluation, fuel cells became the clear winner.

"Southern California air regulations are continually becoming stricter, so that was a significant driving force in looking at an alternative technology," says Tom Love, general manager. "We felt fuel cells made the most sense because we don't anticipate any future problems long term on meeting stricter air-quality standards."

REGIONAL STEWARD

IEUA serves seven cities in western San Bernardino County and a population of 800,000. The Ontario plant is the largest of four the agency operates. The tertiary plant has a 44 mgd capacity but processes 28 mgd on average. The majority is recycled to irrigate parks, schools and golf courses, and the rest discharges to Prado Park Lake and Cucamonga Creek, and ultimately the Santa Ana River.

When California deregulated its energy market in 2001, IEUA began a renewable energy program with a goal to be fully off grid

power by 2020. The agency has added 3.5 MW of solar power and 1 MW of wind power and plans to install more.

"We've set a goal that during the peak energy period of the day (usually noon to 6 p.m.), we will have enough onsite renewable energy generation so we aren't purchasing electricity from the grid," Love says. "We've made significant progress in the last 12 months. In 2011, we were generating 30 percent of our electrical demands from renewable sources at our facilities. Today with the fuel cell online, we generate 60 percent." Biosolids are composted and sold in the community.

The fuel cell, solar panels, wind turbines and diversion of biosolids from landfill, along with recycled water delivery and groundwater recharge, have prevented emissions of more than 5,800 tons of volatile organic compounds and 186,000 metric tons of greenhouse gases. In October 2012, IEUA received the South Coast Air Quality Management District's 2012 Good Environmental Stewardship Award.

IEUA is also evaluating ways to improve process efficiencies such as repairing air leaks in ducting, replacing less efficient aeration panels, using more efficient lighting, and replacing pumps and motors with high-efficiency models.

PURCHASE AGREEMENT

IEUA could not afford to install a fuel cell on its own because it was not eligible for tax credits. After a year of evaluating partners and negotiating rates, IEUA signed a 20-year purchase power agreement (PPA) with renewable energy company Anaergia. Under the agreement, Anaergia owns, operates and maintains the 2.8 MW FuelCell Energy unit, and IEUA purchases the electricity.

The PPA eliminates IEUA's risk of operating the fuel cell. "We were certainly concerned about the risk," Love says. "Fuel cells haven't had a long track record running on digester gas, so the power purchase agreement puts the performance risk on the provider." If the fuel cell should fail, IEUA can terminate the agreement and switch back to



PRIME

ROTARY FAN PRESS

Dewatering Performance - Simplified

- Municipal
- Industrial
- Gas, Oil and Mining
- Septage
- Agricultural
- Grease Trap
- DAF
- Dewatering
- Conditioning
- Thickening
- Ancillary Equipment
- Mobile Systems
- Sludge Conveyors

Prime Solution, Inc., www.psirotary.com (269) 694-6666



grid power. Concerns about the reliability of fuel cells revolved around impurities in biogas. At Ontario, the gas is treated before entering the fuel cell.

The operations team, freed from maintaining the engine-generators, can now focus on the treatment process. "It has freed them up to work on other maintenance in the facility," says Love.

LONG-TERM SAVINGS

Fuel cell power now costs half a cent more per kilowatt-hour than grid power, but Love and his team looked at long-term savings. The PPA has a built-in escalator, so IEUA now pays 12.5 cents per kWh, escalating annually at 2.5 percent. Projections show the cost of utility power in California rising about 6 percent annually. IEUA anticipates saving \$25 million over the 20-year life of the project because the cost of grid power will increase faster than the cost of fuel cell power.

"We've been telling ratepayers that although it costs us more now, in the long term, we are getting independence from the variability of the cost of energy from the grid," Love says. "In the long run, we anticipate this will save ratepayers money." **tpo**

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.

Presenting a magazine for the drinking water side.

Designed to help water operators share best practices, receive recognition and advance in the profession.

Water System Operator. Free subscription at wsomag.com

sustainable excellence

Amwell-DuraMax Cast Stainless Steel Chain Products

provide high-strength, corrosion-resistant and abrasion-resistant chains, sprockets and equipment components for bar screens, grit collectors and rectangular collectors for all manufacturers, makes and models.

- Maximize performance, reliability and longevity
- Eliminate breakdowns, replacement costs and unscheduled maintenance outages
- 10 year chain and sprocket warranty
- Available for CS720S, CS715SS, H82 and H78 chains



AMWELL
DIVISION OF MENISH CORPORATION

DURAMAX

Ingenuity. Durability. Sustainability.

www.amwell-inc.com/duramax

LOOKING DEEP

NATE TILLIS BRINGS TECHNICAL EXPERIENCE AND A MYSTICAL APPRECIATION FOR WATER TO HIS ROLE AS O&M SUPERVISOR AT THE CLEAN-WATER PLANT IN БЕЛОИТ, WIS.

By Ted J. Rulseh

TREATING WATER IS MORE THAN A PROFESSION FOR NATE TILLIS.

You could easily say it's a calling. His deep appreciation for water comes from his studies of kung fu and Eastern religions, and from teachers who include actor and martial arts expert Bruce Lee and Taoism founder Lao Tzu.

"What really got me interested were the philosophical properties of water and the way people relate water to life," says Tillis, at age 32 the supervisor of operations and maintenance at the Beloit (Wis.) Water Pollution Control Treatment Facility. "It's said about water that when it's still, it takes on the visage of whatever is in it. But when it's moving, it's aggressive — it can deteriorate even the hardest of rocks."

It was perhaps the mystical attraction to water that led him to change focus during his technical college studies from health inspection to wastewater treatment. He earned an associate degree in Environmental and Pollution Control Technology from Milwaukee Area Technical College (MATC) and later a Grade 4 (highest) Wisconsin wastewater operator license.

After 10 years in operations and maintenance at the treatment facility in Waukesha, Wis., he moved to the Beloit plant, where he's just finishing his first year.

CHANGING COURSE

Tillis has come a long way from working in a Milwaukee pizza restaurant just after high school. "I didn't have any direction on what exactly I wanted to do," he recalls. "I had a new wife and a kid on the way, and I knew I had to do something." He struck up a friendship with the county health inspector who visited the pizza place, found that job prospect interesting, and enrolled at MATC to pursue a similar career.

The course work covered topics like food inspection, sanitation, bacteriology and epidemiology, but also air, soil and water pollution. "After my first semester, I gravitated toward water," says Tillis. "I enjoyed learning about the



Operations and maintenance supervisor Nate Tillis, Beloit Water Pollution Control Treatment Facility. (Photography by Dennis Dooley)

equipment and the processes, but I was also intrigued by water, not just as a resource but as a model for life.

"I had studied kung fu for several years, and I had studied Eastern philosophy. They both reference water as a model for how to live. There are so many amazing properties water has. Physically, it doesn't act the way we think it should. It has hydrogen bonds, and that changes everything: its boiling point, the fact that when it freezes it expands rather than contracts. It's a universal solvent. It has a neutral pH and a specific heat index of one. It's basically our ground zero for everything we measure."

UP THE LADDER

While in his first year of schooling, Tillis took a four-week internship in the wastewater department of a galvanizing company. That helped lead to his first full-time position, as a wastewater operator for a metal plating business.

He didn't wait long to start giving back to MATC: For the past eight years he has sat on the Advisory Committee for what is now the school's Environmental and Water Quality program. "Twice a year, they consult with graduates and people in the industry to keep the program current," says Tillis.

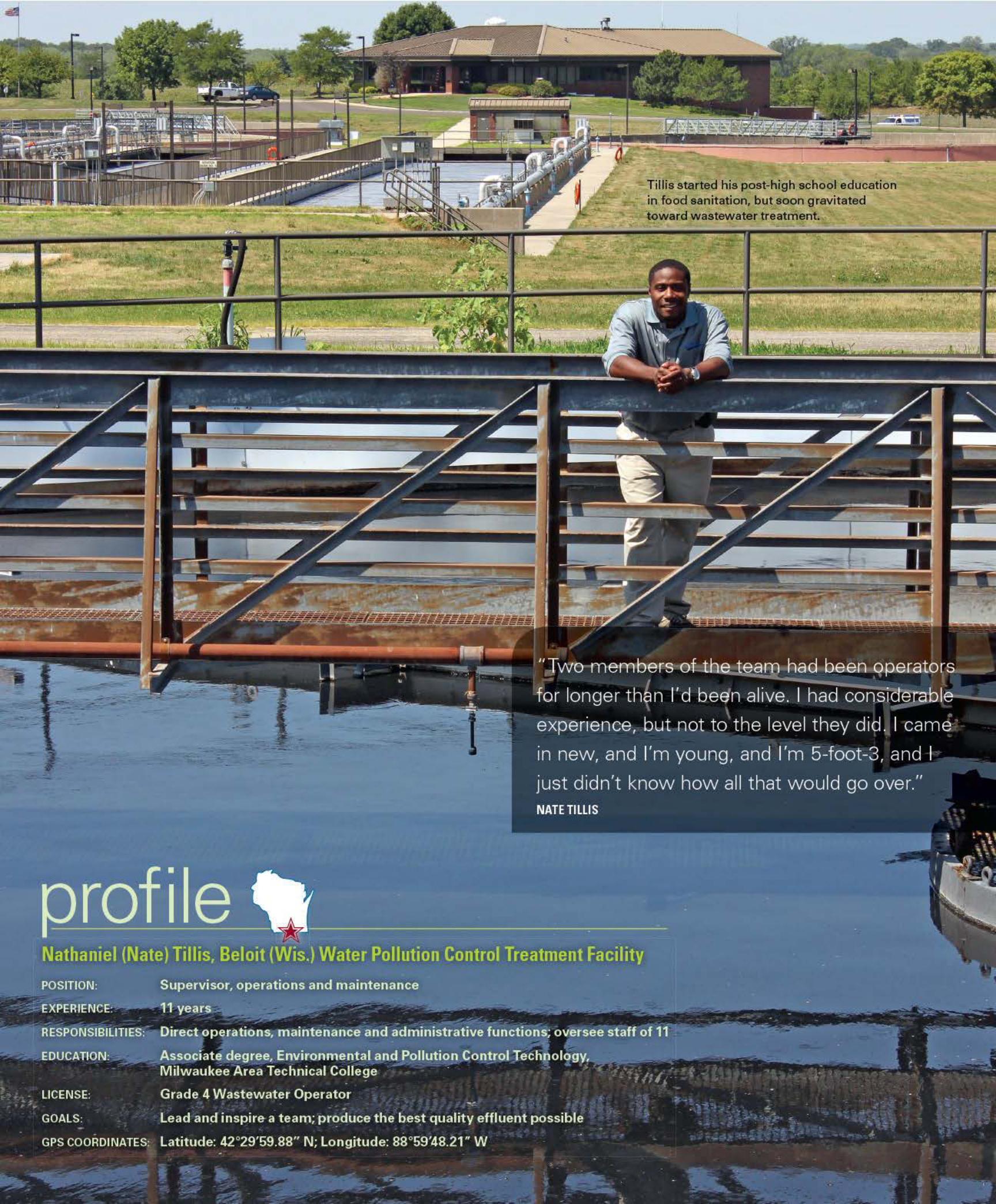
"I'm deeply interested in operator development," he adds. "In wastewater, there are a lot of

qualified professionals, but on average they're near the end of their careers. There aren't enough young people coming along, so I'm trying to make a difference in that area."

He is now enrolled at the University of Wisconsin-Parkside in a four-year Sustainable Management degree program.

TAKING A BIG STEP

After a year on the industrial side, Tillis was hired on at Waukesha. He made the move to Beloit — a role carrying much more responsibility — with confidence but a little trepidation as well.

A man, Nate Tillis, is standing on a metal walkway overlooking a large wastewater treatment facility. In the background, there are several large rectangular treatment tanks, a building, and a baseball field. The scene is set in a sunny, open area with green grass and trees.

Tillis started his post-high school education in food sanitation, but soon gravitated toward wastewater treatment.

"Two members of the team had been operators for longer than I'd been alive. I had considerable experience, but not to the level they did. I came in new, and I'm young, and I'm 5-foot-3, and I just didn't know how all that would go over."

NATE TILLIS

profile



Nathaniel (Nate) Tillis, Beloit (Wis.) Water Pollution Control Treatment Facility

POSITION:	Supervisor, operations and maintenance
EXPERIENCE:	11 years
RESPONSIBILITIES:	Direct operations, maintenance and administrative functions; oversee staff of 11
EDUCATION:	Associate degree, Environmental and Pollution Control Technology, Milwaukee Area Technical College
LICENSE:	Grade 4 Wastewater Operator
GOALS:	Lead and inspire a team; produce the best quality effluent possible
GPS COORDINATES:	Latitude: 42°29'59.88" N; Longitude: 88°59'48.21" W



Tillis and lab technician Joe Valerius test phosphorus and chlorine levels in the Beloit treatment plant microbiology laboratory (Hach DR/4000 U spectrophotometer).

"It was kind of daunting because I didn't know exactly what to expect," he recalls. "Two members of the team had been operators for longer than I'd been alive. I had considerable experience, but not to the level they did. I came in new, and I'm young, and I'm 5-foot-3, and I just didn't know how all that would go over."

It has gone over fine. From the start, Tillis worked hard to build rapport with his team members, who include:

- Environmental technician III Joe Valerius
- Certified wastewater operators Tim Cunningham, John Siam and Gary Zimmerman
- Maintenance technicians Pat Garvey, Gary Hallmann, Dave Hebb, Allen Hocking, Jeff Jones and Wayne Steurer
- Instrumentation and control technicians Scott Varney and Jerry McKeel
- Custodian Suzanne Parr

He's grateful to director of water resources Harry Mathos for acting as a mentor: "He's helped me learn how to deal with people. I had to coach a couple of employees soon after I got here, and he sat in on those meetings. We typically talk in the mornings about things that are going on in the plant. Above all, he taught me to keep a positive attitude. As a leader, you need to show some positivity for people to feed off of."

QUICKLY IMPRESSED

Arriving at the Beloit plant, Tillis found much to be positive about. "You come to our plant and it's stunning," he says. "I was surprised to see how clean and new everything looked — even though it's a relatively old plant. It was put online on Nov. 14, 1991, so now we're reaching the point where a lot of things have to be replaced."

The facility lies near Interstate 43, about two miles from the downtown riverfront site of the former treatment plant. That site still hosts the larger of two main pump stations that deliver influent to the new 11 mgd design (3.5 mgd average) plant. It's a gravity-flow conventional activated sludge process with sodium hypochlorite for disinfection before discharge through a two-mile pipeline to the Rock River.

While the mechanical systems may be old, the plant's operation is sophisticated, thanks to the SCADA system built by instrumentation and control technician Varney, using iFix software (GE). "It's basically designed to fit our

plant," says Tillis. "It's very intuitive. It's visually representative of the plant, and it has all the pertinent information that we want. When we need an upgrade, Scott can add it right on. When we want to look at specific data, he can give us access."

"Some plants use SCADA mostly for monitoring. We actually use ours for control. We can change the strength of our polymer. We can change our hypochlorite dosing. The vast majority of our pumps are run on variable-speed drives to save energy, save wear on the pumps, and enhance process control."

MEETING CHALLENGES

That's not to say life is without challenges. One immediate issue is the impending construction of a casino near the plant. While the casino will not be a big wastewater generator, its presence will require the plant to clamp down on odor.

To that end, the primary clarifier weirs have been boxed in, and control valves have been installed to reduce splashing and misting. In addition, a bio-filter (Bohn Biofilter Corp.) scrubs the discharge air from the plant's preliminary treatment building. The odorous air is forced underground and percolates up through several layers of gravel and rock media — the process uses no chemicals.

Also challenging are phosphorus limits being imposed by the state Department of Natural Resources. Tillis expects an interim limit of 0.4 mg/L to be in effect beginning in 2016 and a final limit of 0.1 mg/L to take effect by 2018.

Rather than add mechanical or chemical treatment, the plant is contemplating using the state's adaptive management program for phosphorus. That means creating green spaces between farms and the Rock River to capture runoff and its nutrients. "Once we know what our interim phosphorus levels will be, we'll determine the scope of our project — how many parcels we'll have to develop and how many people we'll have to contact," Tillis says.

Improvements are also in the works for the biosolids program. Historically, the plant has gravity-thickened aerobically digested biosolids for land application as liquid. A new 3-meter belt filter press (Ashbrook Simon-Hartley)

WATER WISDOM

Nate Tillis draws inspiration for his career and for life from sayings and teachings about water. Here are a few of his favorite quotations:

"Running water never grows stale. So you just have to keep on flowing."

— Bruce Lee

"Be like water making its way through cracks. Do not be assertive, but adjust to the object, and you shall find a way round or through it. If nothing within you stays rigid, outward things will disclose themselves."

— Bruce Lee

"The best of man is like water, Which benefits all things, and does not contend with them, Which flows in places that others disdain, Where it is in harmony with the Way."

— Lao Tzu



"The team members are the greatest resource at this plant. They know it. They've been here forever. They do the work. I'm support staff. I coordinate what they do, and the best way for me to do that is to listen to what they have to say."

NATE TILLIS

arrived in 2010, and the team is fine-tuning it with the aim of producing biosolids cake at 20 percent solids. Reaching that goal means increasing volatile solids destruction in the digesters. At present, the digesters operate in parallel; Tillis wants to operate them in series, instead.

"Our volatiles coming off the digesters have been in the 70 percent range," he says. "Based on what the experts tell me, there is a world of difference between 70 percent and 65 percent. We plan to feed into one digester and draw off the other. We'll have a gravity equalization line to keep both digesters at equal levels — we won't have to pump from one to the other."

OTHER CHALLENGES

Surprisingly, another challenge comes from the city engineering department's aggressive inflow and infiltration control program, which reduced average flows from 8 mgd to 3.5 mgd. "Our BOD loadings haven't changed, but we have more concentrated wastewater," says Tillis. "We're dealing with the challenge of being right on the precipice, of having limited leeway with our treatment because we no longer have the dilution we once did. It makes our process more susceptible to shock."

The most significant project in the offing is replacing the aging pumps at the two influent lift stations. The main station at the old treatment plant site contains five 250 hp Fairbanks Nijhuis centrifugal pumps that have been fitted with variable-frequency drives (ABB). The staff members have worked to optimize the pumps, but the ultimate solution is new pumps. They're developing a Request for Proposals in an effort to determine the best course of action. The other lift station uses old driveshaft-style pumps that will be replaced with dry-pit submersible pumps.

GREATEST RESOURCE

As he leads the team through these changes, Tillis treasures each member's contributions. "I have a personality where I seem to get along with everyone," he says. "First of all, you have to recognize that everyone has specific talents. No matter what their position is, they have value to contribute to the plant. How can you cultivate that? How can you get them to perform at their best?"

"It's important to have a good rapport with each member of your team so that you can talk to them as if they're not just co-workers but friends, too."

The Beloit plant team includes, from left, mechanics operator Gary Hallmann, maintenance technicians Allen Hocking and David Hebb, operator John Siam, instrumentation and controls technician Jerry McKeel, maintenance technician Jeff Jones, operator Gary Zimmerman, lab technician Joe Valerius, operations and maintenance supervisor Nate Tillis, and maintenance technician Wayne Steurer.

I try to take a certain portion of my day and talk to the employees.

"Something I learned from my mom is: 'If there is no reason to say no, your default answer should be yes.'"

When someone asks you a question, your answer should be, 'Let me check on it — yes, we can see about it.' Then if the result is not what they wanted, they'll at least know you tried — at least they'll know you heard them out.

"The team members are the greatest resource at this plant. They know it. They've been here forever. They do the work. I'm support staff. I coordinate what they do, and the best way for me to do that is to listen to what they have to say."

When times get tough, Tillis can draw on a resource close to home: "I have two amazing kids (Gavin, 12 and Ethan, 8). They love coming down here to the plant. They both want to be wastewater operators. They're my inspiration for everything I do." **tpo**

more info:

ABB Inc.

800/752-0696
www.abb.com

Ashbrook Simon-Hartley

800/362-9041
www.as-h.com
(See ad page 55)

Bohn Biofilter Corp.

520/624-4644
www.bohnbiofilter.com

Fairbanks Nijhuis

913/371-5000
www.fairbanksnijhuis.com

GE Intelligent Platforms

800/433-2682
www.ge-ip.com

Hach Company

800/227-4224
www.hach.com
(See ad page 2)

Dewatering Made Simple

Low Profile Roll-Off

Roll-Off Sludge Mate®

Self Dumping Hopper

Poly-Mate®

Front Loader

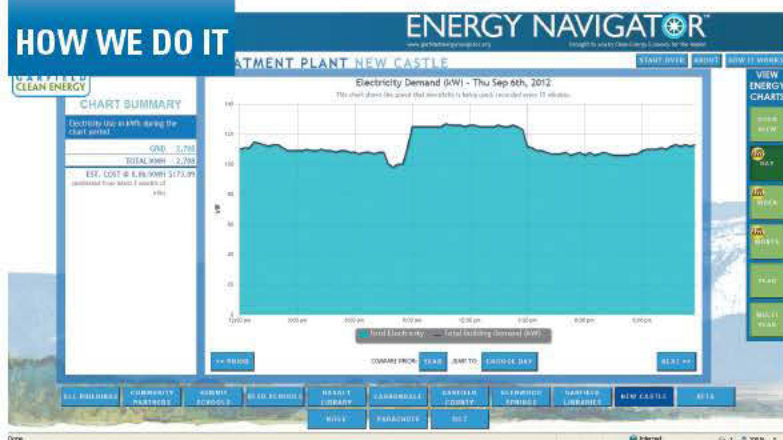
Trailer Mounted Sludge Mate®

Tipping Stand Sludge Mate®

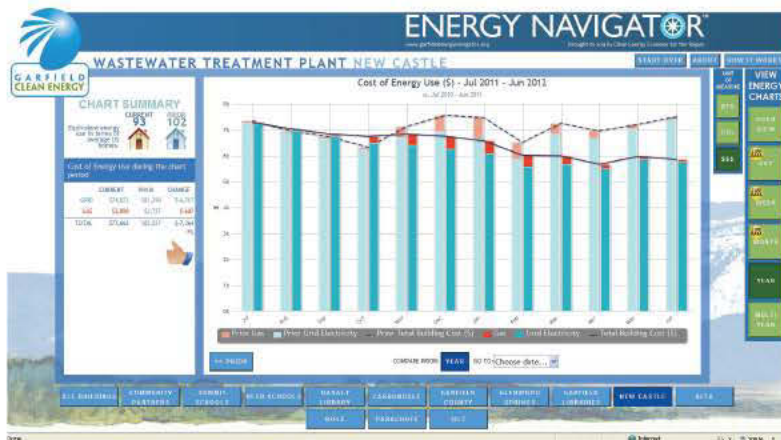
Call Now!

Flo Trend Systems Inc.
(713) 699-0152 • www.flotrend.com • sales@flotrend.com

HOW WE DO IT



LEFT: Energy Navigator's daily view charts the speed at which the New Castle (Colo.) Wastewater Treatment Plant uses electricity. The estimated cost of 6 cents per kilowatt hour averages the plant's peak demand and kilowatt hours usage charges. RIGHT: Utility bills generate the yearly view on Energy Navigator and serve as the plant's report card.



Measure and Manage

AN ENERGY REPORTING TOOL THAT CONSTANTLY MONITORS ELECTRIC POWER CONSUMPTION AND DEMAND PAYS DIVIDENDS FOR A COLORADO TREATMENT PLANT

By Scottie Dayton

An upgrade converted the 200,000 gpd New Castle (Colo.) activated sludge wastewater treatment plant to a 600,000 gpd Kruger AnoxKaldnes HYBAS system (integrated fixed-film activated sludge or IFAS) serving 1,600 homes and averaging 235,000 gpd.

Operators expected an increase in energy demand when the plant went online in September 2009, but the actual numbers surprised them. "We were primed and ready for some vehicle to help us reduce our energy consumption," says lead operator Eli Jennings.

Garfield Clean Energy (GCE)/CLEER, a nonprofit energy consulting firm in Carbondale, provided a solution as part of a U.S. EPA energy management pilot program. The company supplied current transformers to measure three-phase/480-volt incoming current, and an AcquiLite data acquisition server (Obvius) to upload the information to Energy Navigator, its Web-based energy-reporting tool.

The system, installed in April 2011, takes power usage views every 15 minutes, allowing operators to see spikes the next morning

Lead operator Eli Jennings uses the Energy Navigator's daily view to help spot operational patterns.

annual data management costs and for the reporting tool. The firm also arranged for operators and town officials to take part in a U.S. EPA pilot training program on energy management.

The plant upgrade included adding a pre-anoxic basin with internal recycle as part of the IFAS system, a 320,000-gallon, two-cell aerobic digester with Tideflex coarse-bubble "duckbill" diffused aeration, and a secondary clarifier. UV disinfection replaced chlorine. The



"We've had the system for more than a year now and still use the information daily to fine-tune operations. The exciting thing is our energy savings are projected to be \$10,000 for 2012 and our kilowatts of demand down 16 percent from 2010."

ELI JENNINGS

and modify procedures. In 2010, the plant's base year, the energy bill totaled \$82,000. By the end of 2012, peak demand dropped from 179 to 149 kW, a 16.8 percent reduction. The facility also saved 90,635 kWh or 7.8 percent. "We lowered our electric bill by \$11,294, but the figure includes a utility rate increase," says Jennings.

PLUG IT IN

CLEER (Clean Energy Economy for the Region) developed and manages Energy Navigator. A grant from GCE paid for the \$5,000 hardware package. The town's membership in GCE pays the \$900

original 100,000-gallon aerobic digester was converted to a biological odor control facility, but the two active and one redundant Spencer multistage centrifugal 40 hp blowers were piped to the new digester to save money.

"Xcel Energy bills us 4 cents per kWh and \$20 per kW of demand," says Jennings. "We wanted information on where we were spending that money." To install the hardware for transmitting live data, Xcel killed the plant's main power and ran the backup generator for an hour, enabling an electrician to install the current transformer loops. "It was an easy job," says Jennings. "Planning it took more time

Jennings throttles back the digester blower intake to lower amperage draw while starting the centrifuge. The procedure eliminates a demand spike.

than doing it." They mounted the data acquisition server in the plant's office.

CLEER energy engineer Mike Ogburn monitored the installation, then explained the company's website and Energy Navigator functions. "It's quite simple," says Jennings. "We can track daily, weekly, monthly, annual and multi-year trends in power consumption. Anyone with Internet access can see it. I use my smartphone at home."

TRACKING PATTERNS

"Aeration is our biggest energy hog," he says. "The first thing we noticed on Energy Navigator was huge spikes of demand when starting the centrifuge while the digester blower system was running." The old system was not tied to the SCADA system, so operators manually throttled back or shut down one or both blowers during centrifuge startup. The drop in the energy demand and usage was immediate.

"We're planning to upgrade the blower control system and add instrumentation in the new digester to improve our efficiency further," says Jennings.

At the same time, operators used the variable-frequency controls to reduce the speed of the active and redundant 100 hp blower in the IFAS system. They reduced dissolved oxygen (DO) in all the basins and digesters, slowing blowers to match demand. Smoothing out flow spikes to the equalization basin also help reduce energy usage.

"Daily views help us see operational patterns," says Jennings. "Knowing what time spikes occur is as important as the amount of the spike. We have so much automated equipment that we have to check the report's time stamp against our SCADA system to find out what was running when the spike happened."

Weekly live views enable operators to see peaks in demand, identify the days when they occurred, relate them to flows, and work to reduce them. Monthly views allow them to see daily energy usage and compare progress with the same month of the previous year. The yearly view, generated from utility bills, serves as the plant's report card.

ADDITIONAL BENEFITS

"Plants with \$20,000 or higher annual electric bills should think about live data driving operations," says Ogburn. "It makes sense because the usual savings are in the 10 percent range, but we've seen up to 40 percent."

CLEER's program to improve operations in buildings and even vehicle fleets fit in with the city's active energy management policy. The system also tracks temperature, Btu, solar electric production, and solar thermal data. "We've had Energy Navigator for more than a year now and still use the information daily to fine-tune operations," says Jennings. "The exciting thing is our energy savings are projected to be \$10,000 for 2012, and our kilowatts of demand to be down 16 percent from 2010." *tpo*



PHOTO COURTESY OF
NEWCASTLE WASTEWATER
TREATMENT PLANT

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.

Your Solution for Mobile Dewatering



Tractor Trailer Unit H&A Resource Mgmt.
Versailles, KY Tel: 859-873-3331



Pick-up Truck Compatible Unit



Skid Mounted System Thunder Bay Casino
Sacramento, CA Tel: 209-483-4118



MSD Environmental Inc. Mobile Unit
Centerville, OH Tel: 937-313-9314

BDP Industries' Mobile Belt Press Units have the following advantages:

- Waist level operation
- High discharge directly to truck
- Easy maintenance and cleaning
- Strong, galvanized tubular frame

Industry References: Synagro Inc., LWI, Inc.
MSD Environmental, Blue Heron, & Parker Agg.

Sales: 518-527-5417

Factory: 518-695-6851

Fax: 518-695-5417

Email: kelly@bdpindustries.com



Visit us at the
**2013
Pumper & Cleaner
Environmental Expo**
Booth #6151

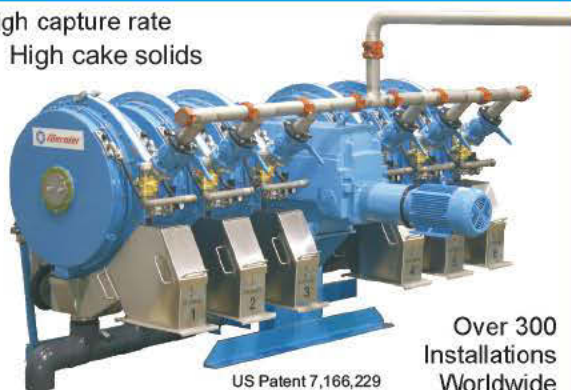
and
weftec® 2013
Booth #1620



www.bdpindustries.com

ROTARY PRESS DEWATERING

High capture rate
High cake solids



Over 300
Installations
Worldwide

US Patent 7,166,229

Low Speed, Low Power,
Low Maintenance,
Fully-Automated, Operator-
Friendly Municipal and
Industrial Applications



Since 1960

3787 Frontenac W., Thetford Mines, Qc., Canada

Tel: (418) 423-4241 Fax: (418) 423-7366

www.rotary-press.com

Represented across the U.S. and around the world



IPEC SCREENS Built to last



Municipal Wastewater Treatment Solutions

- Headworks fine screens
- Sludge thickening
- Washing & compacting
- Septage Receiving
- Scum screens
- Digester screens
- Small package WWTP screens

www.ipec.ca • sales@ipec.ca • 1.800.663.8409 • 2889 Norland Ave, Burnaby, B.C.

WEF Announces 2012 Operations Challenge Division Winners

By Ted J. Rulseh

The Water Environment Federation has announced the winners of the 2012 Operations Challenge, held at WEFTEC 2012 in New Orleans last October.



PHOTOS COURTESY OF WATER ENVIRONMENT FEDERATION.

The Division 1 winning team Terminal Velocity, representing the Virginia Water Environment Association and the cities of Franklin and Virginia Beach: From left, Operations Challenge Committee chair John Trofatter, team members Bobby Williams, Elijah Smith, Steve Motley, Steve Poe, Jason Truitt and Donnie Cagle, and WEF president Cordell Samuels.



The Division 2 winning ReWa Blackwater Bruisers, from the Water Environment Association of South Carolina and Renewable Water Resources in Greenville: From left, Operations Challenge Committee vice chair Stacie Metzler, team members Larry Camp, Russ Moore, Adam Harvey and Cain Massey, and WEF president Cordell Samuels.

FULL OF ENERGY.

[JUST DOESN'T USE AS MUCH]



PISTA 360
WITH V-FORCE BAFFLE™

95%
GRIT REMOVAL
DOWN TO 140 MESH
(105 MICRON) PARTICLE SIZE

Grit removal isn't much to look at. It's what's inside that counts. Inside every PISTA® Grit Removal System is industry-leading Smith & Loveless hydraulic vortex technology. If you're not impressed by the dramatic energy and installation savings, just refer to the superior 95% removal efficiency. Or, if money is your thing, try the industry's lowest lifetime system costs. The more you look closely at the PISTA®, the better it looks. **Feel the PISTA® pride.**

Get the facts on PISTA® and head-to-head grit system comparisons at GritTheFacts.com



Smith & Loveless Inc.

Above All Others.™

CALL 800.922.9048 VISIT SmithandLoveless.com

Biosolids Management and Headworks

By Craig Mandli

DRUM THICKENER

The ALDRUM G3 drum thickener from Alfa Laval increases solids load capacity up to 30 percent within the same footprint as the standard ALDRUM unit. The new feed zone provides lower polymer consumption, while Power Plates reduce power consumption by the ALDEC G3 decanter centrifuges. The Slimline design of the centrifuges and a smaller conveyor diameter provide room for more liquid in the pond and higher bowl wall pressures for a drier cake. **866/253-2528; www.alfalaval.us/wastewater.**



ALDRUM G3 drum thickener from Alfa Laval



Front Loader Hydrocyclone Combo degritting system from Flo Trend

DEGRITTING SYSTEM

Flo Trend's Front Loader Hydrocyclone Combo degritting system combines a gum-rubber-lined steel body hydrocyclone with a Front Loader Container Filter. Underflow from the hydrocyclone with concentrated wet grit is discharged into the container filter. The grit is then retained on the filters inside the container while water exits through discharge ports on the bottom of the unit. **800/762-9893; www.flotrend.com.**

FRONT-CLEAN BAR SCREEN

The Catenary bar screen from Fairfield Service Company is a front-clean, front-return configuration with no sprockets, bearings or shafts below the water. The cleaning rakes descend on the upstream side of the bar rack, then turn upward in a Catenary loop, without the use of sprockets. The cleaning rakes engage the bar rack at the channel floor and ascend on the upstream side of the bar screen. Maintenance can be performed without isolating or dewatering the channel. The versatile bar screen can accommodate heavy and varied debris loads.

The unit features a rugged stainless steel design, and options include drive sprocket shear pin or limit switch for mechanical overload protection. The bar screen includes a drive shaft mounted gear reducer or variable-frequency drive, and a dual head shaft model is also available. The unit is designed for municipal and industrial wastewater treatment plants. It can be inclined from 15 to 45 degrees in standard channel widths from 2 to 30 feet. **219/872-3000; www.fairfieldservice.com.**



Catenary bar screen from Fairfield Service Company



Model 3012 DSP screw press from BDP Industries

SLOW-TURNING PRESS

The Model 3012 DSP screw press from BDP Industries helps reduce labor related to drying beds, reed beds, bag filters and settling ponds. A positive displacement pump transfers feed slurry from the aerobic digester to the rotary drum thickener on the top of the press. Thickening before dewatering increases throughput.

Slow-turning operation and few moving parts reduce wear and maintenance. **518/527-5417; www.bdpindustries.com.**

FILTER PRESS

The Hy-Pack filter press from Beckart Environmental is available in capacities up to 125 cubic feet. It features polypropylene recessed plates rated at 100 psi, an automatic plate shifter and durable all-welded steel construction. The press helps minimize waste haul-out charges, produc-



Hy-Pack filter press from Beckart Environmental

ing 35-50 percent solids landfillable filter cake. The system is easy to use and fully automated, limiting plant labor for press setup, cake removal and maintenance. **262/656-7680; www.beckart.com.**



Chopper Pump from Vaughan Company

CHOPPER PUMP

The Chopper Pump from Vaughan Company is an economical solution for sewage and sludge pumping. It offers high efficiency, and reduces and conditions solids in pits with large amounts of rags and flushable consumer products. **888/249-2467; www.chopperpumps.com.**

INLINE GRINDER

The RotaCut RCX inline grinder from Vogelsang frees workers from entering digesters to direct and unclog the suction pipe. The grinder attacks heavy settled sludge, breaking down solids and homogenizing it to release the pumping unit's full suction capabilities. **800/984-9400; www.vogelsangusa.com.**



RotaCut RCX inline grinder from Vogelsang



Three Belt Press from Charter Machine Company

BIOSOLIDS PRESS

The Three Belt Press from Charter Machine Company offers a tower press arrangement of rollers for extremely high cake discharge and low maintenance while incorporating an independent third belt for the gravity deck portion. The gravity belt thickener (GBT) can be used as a thickening unit only. The low gravity deck enables the

operator to view the operation without a platform, saving space and cost. An open design provides easy access and simplifies cleanup. Hydraulic or pneumatic units are offered in a standard eight-roll model or a high-solids 15-roll model. **732/548-4400; www.chartermachine.com.**



DriBoss DBE-750 evaporator
from Dust Control Technology

height helps ensure short drift distances. The frame floats on polyethylene pontoons filled with closed-cell urethane foam so that even if a pontoon is punctured, it retains the buoyancy. A 75 hp submersible pump is attached. 309/693-8600; www.driboss.com.

POLYACRYLAMIDE FLOCCULANTS

Flocculant Technologies from the BASF Corporation – Water Solutions Division are designed to suit an array of sludge and process conditions. Polyacrylamide flocculants deliver higher cake solids, reducing transportation and land-fill costs, improving incineration efficiency and enhancing opportunities for beneficial reuse. 800/322-3885; www.watersolutions.basf.com.



Flocculant Technologies from
the BASF Corporation –
Water Solutions Division



Flo-Drum rotating screen
from Enviro-Care

ROTATING SCREEN

The Flo-Drum rotating screen from Enviro-Care features a double seal at the influent end of the screen basket that reduces bypass. An external spray and brush keep small solids contained in the basket. The basket is constructed of stainless steel perforated media that contains captured solids. There are three separate

washing functions: System One washes organics from the screen, System Two cleans the screen basket, and System Three cleans the dewatering zone. 888/805-5794; www.enviro-care.com.

DECANTER CENTRIFUGE

The Decanter Centrifuge from Noxon North America features a variable-frequency drive design that allows for fully electric drive packages with the same torque-generating characteristics as units that use hydraulic backdrives. The centrifuges can dewater a wide variety of sludges and slurries to higher solids concentrations and high-capture efficiency. 416/843-6500; www.noxon.com.



Decanter Centrifuge from
Noxon North America



Rotary Press from
Fournier Industries

ROTARY PRESS

The completely enclosed design of the Fournier Industries Rotary Press eliminates the need for odor containment and can easily be expanded from one channel to six to accommodate future flow rates. Sludge is first dosed with a polymer and passed through a variable-speed flocculator to improve settleability. It then enters

the circular dewatering channel that slowly rotates and uses back-pressure to dewater sludge through fine mesh screens on either side of the channel. Dry cake exits the press and drops to a collection bin, or is conveyed away. After dewatering, the press goes through a 5-minute wash cycle once per day. Operation is largely automated. 418/423-4241; www.rotary-press.com.

CHANNEL GRINDER

The Taskmaster Titan TM 14000 twin shaft channel grinder from Franklin Miller combines channel grinding with high flow capacity and low head-loss without rotating screens. The grinder employs two counter-rotating shafts. One cutter stack intermeshes with a larger-diameter second shaft, allowing large, bulky or round objects to be finely ground to protect pumps, filter presses and other downstream equipment. The grinder is equipped with a 3 hp or 5 hp motor and cycloidal gear drive, cutter cartridge technology, and a 14- by 12-inch up to 14- by 60-inch inlet cutting chamber for flow rates up to 8 mgd. 973/535-9200; www.franklinmiller.com.



Taskmaster Titan TM 14000
twin shaft channel grinder
from Franklin Miller



S3SHR hydraulic drive
submersible shredder pump
from Hydra-Tech Pumps

HYDRAULIC DRIVE

The compact S3SHR 3-inch hydraulic drive submersible shredder pump from Hydra-Tech Pumps features an open-vane shredder impeller with tungsten carbide cutting tip. It continuously rips and shears solids with 360-degree shredding action. Its compact size allows for use in tight spaces. There are versions for portable or fixed installations; a guide rail assembly is available for stationary applications. A variable-speed hydraulic drive can be used when electric power is hazardous or impractical. 570/645-3779; www.hydra-tech.com.

SCREENINGS COMPACTOR

The SLB Series screenings compactor from IPEC Consultants removes trash solids from primary effluent ahead of the biological process cells. The auger-style screen removes solids down to 500 microns, followed by washing and compacting. The unit consists of an auger with cleaning brushes attached along the rim, a fixed screen cylinder of perforated plate, a structured wedge wire element for extraction of pressate, an automatically operated cleaning shower, a solids discharge spout and a mechanical gear drive and motor. Influent is pumped to an inlet fitting, which directs flow to a screen cylinder. Solids are retained on the interior of the cylinder and are transported axially by the auger. Solids accumulate in the press zone cylinder, where a series of shower nozzles are directed to wash organic components during a compaction process. The final discharge solids exit in plug form to a disposal bin. Filtrate and wash water collects in the bottom of housing and drains to the downstream treatment process. 800/663-8409; www.ipec.ca.



SLB Series screenings compactor
from IPEC Consultants

(continued)

MACERATOR GRINDER

The Sludge Monster Grinder from JWC Environmental produces three times the torque and five times the cutting force of high-speed macerators to ensure smooth, reliable grinding of any debris. Available for 4- and 6-inch sludge lines, it is built to protect sludge pumps, heat exchangers, centrifuges and other dewatering equipment from clogging with rags and debris. It uses an energy-efficient 2 hp motor, consuming 27 percent less energy than a typical high-speed macerator. The low-speed design ensures long service life and low life-cycle costs. **800/331-2277; www.jwce.com.**



**Sludge Monster Grinder
from JWC Environmental**

DEWATERING PRESS

The Rotary Fan Press from Prime Solution simplifies dewatering by using continuous pressure differential technology. Units offer semi-automated operation, self-cleaning, low maintenance, long service life, energy efficiency, portability, and a minimal footprint. It has few mechanical parts and a slow revolution. **269/694-6666; www.psirotary.com.**



**Rotary Fan Press from
Prime Solution**

RAKE BAR SCREEN

Kusters Water offers FSM/WasteTech multi-rake bar screens that can be used in many screening applications. The multiple-rake design features lubrication-free lower bearings, a rake "step-over" feature, and individually replaceable bars that provide reliable, low-maintenance operation. Screen spacing as small as 2 mm is available. Materials include 304 or 316 stainless steel for low maintenance and long life. **800/264-7005; www.kusterswater.com.**



**FSM/WasteTech multi-rake bar
screens from Kusters Water**



**Screw press from
Schwing Bioset**

SCREW PRESS

With a wide range of dewatering features, the screw press from Schwing Bioset does not need to suspend operations for cleaning. Performance is the same from the smallest press to the largest. Dewatering results are similar to high-speed centrifuges but with lower energy and maintenance costs. The press is suitable for unattended operations. **715/247-3433; www.schwingbioset.com.**

SCREENING SYSTEM

The hydraulically operated telescoping boom and rake mechanism on the Hydronic T screening system from Lakeside Equipment cleans bar screens, trash racks and intake screens. Hydraulic cylinders pivot the boom and extend and retract the boom and rake. Single telescoping designs are typical, and multiple



**Hydronic T screening
system from
Lakeside Equipment**

telescoping sections are available to expand reach. For indoor headworks systems with deep channels or low headroom, fine and coarse screening options are available. **630/837-5640; www.lakeside-equipment.com.**

LIME AND BIOSOLIDS MIXER

The compact MBV lime and sludge mixer from Sodimate features orientable paddle blades that allow efficient mixing of the lime and dewatered biosolids coming from dehydration systems. It has a stainless steel construction for harsh applications, and can be combined with conveyors, pumps and lime feed systems for effective stabilization. The MBV can mix 0.5 to 15 tons/hr of dewatered biosolids. **773/665-8800; www.sodimate-inc.com.**



**MBV lime and sludge mixer
from Sodimate**



**BioCon Thermal Dryer
from Kruger USA**

THERMAL DRYER

The BioCon Thermal Dryer from Kruger USA processes biosolids into marketable products. The dual-belt dryer is designed for safe and efficient operation, creating a Class A end product dried to at least 90 percent solids. The product can be enhanced with particle-sizing equipment. The product is then screened to meet the specific size requirements. Depending on facility size, a bagging station or silo system can be provided for handling the dried product. The silo includes a conveyance system to transfer biosolids into commercial trucks for shipment. **919/677-8310; www.krugersusa.com.**

DUAL BELT PRESS

The three-stage TRIAD BPRM dual belt press from Pro-Equipment includes final polymer mixing, rotary drum thickening, dual belt dewatering and complete controls in a single package. This system can achieve solids concentrations from 16 to 18 percent with affordable polymer costs. The press consists of a structural frame and panels to support rollers, bearings and other ancillary equipment while assuring structural integrity and minimal corrosion. **262/513-8801; www.proequipment.com.**



**TRIAD BPRM dual belt press
from Pro-Equipment**



**Dewatering system from
PHOENIX Process Equipment**

SKID-MOUNT DEWATERING SYSTEM

The skid-mount dewatering system from PHOENIX Process Equipment provides biosolids dewatering capacities on conventional two-belt designs ranging from 300 to 3,000 pounds of dry solids per hour. The belt press, sludge pump, belt wash water booster pump, polymer system, compressor and master control panel are factory piped, wired and mounted onto a steel skid for plug-and-play startups. Three-belt designs use a two-stage gravity zone with an independent pre-thickening section mounted on top of the press. Skid-mounted systems with footprints as small as 4 x 15 feet are available. **502/499-6198; www.dewater.com.**

DECANTER CENTRIFUGE

DRYCAKE Decanter Centrifuge systems from Vanderbeken Enterprises separate the liquid from biosolids by centrifugal force. Heavier solids are conveyed along the bottom of the drum to the outlet chamber by an internal screw rotating at a slightly different speed. The liquid exits the opposite side, flowing over an adjustable weir. The centrifuges feature sectional split-case covers for ease of access, an independently driven solids scraper to prevent clogging by sticky cake, a zero-footprint hydraulic back drive for increased performance, and a high-speed DPC processor that reacts to biosolids conditions and delivers better dry cake. 877/379-2253; www.drycake.com.



DRYCAKE Decanter Centrifuge systems from Vanderbeken Enterprises



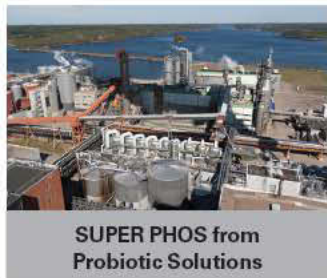
Longfill continuous bag system by PAXXO

BAGGING SYSTEM

The Longfill continuous bag system by PAXXO can connect to the discharge point of machines used to move, dewater or compact screenings and grit, which are then deposited in a continuous bag for odor containment and spillage control. The cassette is easy to seal, and the material and odors are trapped inside, reducing environmental and health issues and cutting down development of bacteria and fungus spores. 770/502-0055; www.paxxo.com.

MICROBIAL STIMULANT

SUPER PHOS from Probiotic Solutions starts out as food grade white phosphoric acid (tech grade) pre-complexed with organic acids to maximize availability to aeration basin microbes. It improves plant performance by maximizing phosphorus bioavailability with minimum P input. The product uses the company's Micro Carbon Technology as its base ingredient for maximum microbial stimulation in wastewater to increase treatment efficiency by reducing biosolids quicker, improving settleability, and raising dissolved oxygen levels. 800/961-1220; www.probiotic.com.



SUPER PHOS from Probiotic Solutions



ZICKERT Shark from WesTech Engineering

TANKS AND CLARIFIERS

The ZICKERT Shark from WesTech Engineering offers rectangular tanks and lamella plate clarifiers based on the forward and return movement of hydrodynamically designed rake sections. The concave faces of the sections transport the sediment toward a sludge pit. During return movement, the wedge-shaped parts of the sections slide under the sludge blanket, providing continuous and unidirectional transport of the sludge. The robust and simple design has few moving parts, can be powered by hydraulic or electric motors

and provides the same results whether it is pulled or pushed. It is also easy to install and maintain, offering complete sludge transport without dead zones or turbulence. 801/265-1000; www.westech-inc.com.

FINE SCREEN

The block design of the MC Fine Screen from Schreiber consists of two elements — straight or hook — that are interchangeable. It is a deep-channel traveling-band fine screen with depths up to 50 feet and widths up to 14 feet, including slot spacing to 1 mm. The screen is easy to maintain without dewatering due to the block design and absence of underwater moving parts. Filter elements are mounted on two stainless steel support shafts, with end caps making up separate blocks. Units can be custom configured and are completely assembled and bolted into place. The blocks can be removed in three easy steps for inspection and maintenance. 205/655-7466; www.schreiberwater.com. tpo



MC Fine Screen from Schreiber

38,000+

municipal and utility maintenance professionals read it every month.

Do you?

MUNICIPAL SEWER & WATER

A subscription is **FREE**. Visit mswmag.com

Maximum Digestion starts with maximum solids reduction.



The all-new solids-busting RotaCut RCX Inline Grinder powers through the heavy sludge & debris lurking at the bottom of a typical anaerobic digester.



VOGELSANG
ENGINEERED TO WORK

SLUDGE PUMPING SLUDGE GRINDING SLUDGE LYSING

(800) 984-9400 | vogelsangusa.com | sales@vogelsangusa.com

By Scottie Dayton

Temporary belt press provides relief

Problem

The dewatering equipment at the Grand Chute-Menasha West Wastewater Treatment Facility in Neenah, Wis., had to be offline during construction. Operators believed a 2-meter mobile belt press could process 150 gpm or more of autothermal thermophilic aerobic digested biosolids at 3.2 percent solids, but the unit was unavailable.

Solution

A demonstration of the 1.7-meter extended length (XL) **mobile belt press from Bright Technologies** proved the unit was adequate. Company representatives tested the biosolids before recommending a polymer, then suggested where to place the press for maximum efficiency and minimal labor. They also trained the operators.

RESULT

Over 16 weeks, the press processed 2,526,000 gallons at 200 gpm, producing 30 percent solids cake and operating at a 2,000 pounds per hour per meter loading rate. Dewatering occurred two days per week and less than 8 hours per day, thereby minimizing labor. **800/253-0532; www.brightbeltpress.com.**



Cake pump increases efficiency, saves energy

Problem

Dewatered biosolids fell onto a conveyor at the Delaware (Ohio) Wastewater Treatment Plant, then into dump containers needing frequent relocation by a front-loader to maintain even distribution. Spillage caused odors and required constant cleanup. Breakdowns were common.

Solution

The plant installed a load-cell-controlled, open-hopper, progressive-cavity **BTE 17-12 cake pump from seepex**. It conveys 14 to 18 gpm at 35 percent solids. The pitch, diameter and speed of the auger can be adjusted to match the application, while load cells automate the process. Sensors on the hopper detect the increase in weight and adjust the speed of the pump accordingly. Valves allow even distribution in the containers. The cake transfer piping also has a pressure sensor and dry run protection.

RESULT

The pump has run without problems for two years, resulting in a \$1,500 per square foot mean capital cost savings. **937/864-7150; www.seepex.com.**



Bar screen decreases plugging and matting

Problem

The Rittman (Ohio) Wastewater Treatment Plant averages 1.6 mgd with peak flows of 10 mgd. The manual bar screen with 1-inch bar spacings was in a chamber 30 feet below grade. Operators cleaned the rack using a rake and hoisted the debris out, but rags, fibrous material and plastics still entered the plant, plugging lines and pumps and settling in tanks.

Solution

Scott Ellsworth, an engineer with Environmental Design Group, selected a **Blue Whale micro bar screen with compactor washer and touch-screen control panel from OR-TEC**. Bogner Construction installed it. The 1/8-inch bar spacings capture 95 percent of debris. Screen rake teeth elevate screenings to grade, and a simple scraper mechanism sends them to the washer. Organics flow to the inlet waste stream, while screenings, compacted to 60 to 70 percent dry, are stored for disposal.

RESULT

Operators are freed from pulling pumps to clear rags, unwrapping fibrous material from rotating equipment, or manually cleaning the bar screen. "We are very happy with the performance of the bar screen and washer, and I'm a skeptic," says operator Rick Horton. **216/475-5225; www.or-tec.com.**



Slurry Dewatering Made Simple

Simple Design

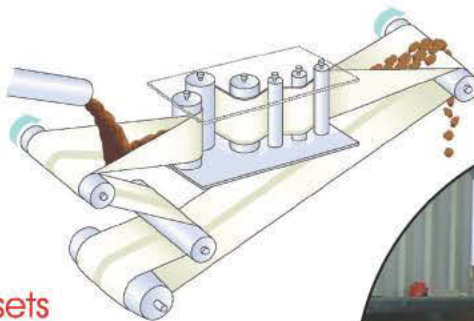
- Easily Operated
- Easily Maintained
- Built to Last
- Cost Effective

Forgiving Nature

- Forgiving of process upsets
- Continuous operation
- Automation available

The "V-FOLD™ Folding Belt Filter Press"

- a simple way to continuously dewater slurries with a patented folding belt system.
- now used on wastewater slurries including sewage, wine, slaughterhouse, food and cardboard.



V-FOLD



Folding Belt
Filter Press

For more information contact VFOLD Inc.
@ 877-818-3653 or visit our website:

www.vfoldinc.com

Filtration system saves \$12.6 million

Problem

A city in Morehouse Parish, La., needed to replace the primary clarifiers and upgrade the grit removal system at its 2 mgd, 80-year-old wastewater treatment plant. One option was building a new facility for a proposed \$14 million. The plant superintendent sought a more affordable alternative.

Solution

M2 Renewables scheduled a pilot test of two M2R MicroScreens. The filtration system captured 96 percent of 100 and larger mesh grit. After a week, it reduced influent BOD by 44 percent and TSS by 61 percent.

RESULT

The process enabled the plant to eliminate the clarifiers and grit removal system, and to remain where it was. It also saved the city \$15,000 annually in sludge hauling and \$12.6 million in capital, achieving a return on investment in less than one year. 816/824-9879; www.m2renewables.com.



Upgrade reduces polymer usage

Problem

The polymer system at the Woodstock (Ill.) Wastewater Treatment Plant was no longer economical. It used 7.8 pounds of polymer per ton of dry solids, producing cake at 14 percent solids. The 2-meter belt filter press dewatered 175 gpm at 2 percent solids. Plant superintendent Anne George looked for a cost-effective solution.

Solution

The city purchased the **ParaDyne system from EnPro Technologies.** After operators installed it, Energenecs personnel trained them to use it.

RESULT

Operators decreased the polymer feed rate from 1.9 to 1.4 gph and set the water flow rate at 480 gph, producing a polymer solution concentration of 0.3 percent by volume. This decreased polymer usage by 25 percent. 800/343-6337; www.energenecs.com.

(continued)



Bar screens prevent flooding

Problem

The two manual bar screens and pump station at the Sudbury (Ont.) Wastewater Treatment Plant are 90 feet underground. Two workers cleaned the screens three times per day, loading debris into a wheelbarrow and transporting it topside by elevator. During some high-flow events, debris plugged the screens, allowing water to rise 65 feet. A watertight door separated the screen room from the pump station.

Solution

As part of the station upgrade, consulting engineer R.V. Anderson Associates chose two **Mahr bar screens with submersible motors from Headworks**. Each screen handles 54 mgd with 1.18-inch bar spacing. Both units pivot out of the channel for easy maintenance.

RESULT

The screens require minimal attention. They improved operator safety during high-flow events, allowing them to focus on operating the plant. They also enhanced the pump station's efficiency and dependability. 713/647-6667; www.headworksusa.com.



Hybrid squeegees are cost effective and ergonomic

Problem

The Metropolitan Syracuse (N.Y.) Wastewater Treatment Plant treats an average of 84 mgd. Cleaning sludge and grit from 22 tank floors and outfall troughs was a physical strain for operators, and their squeegees didn't last long.

Solution

The mechanical maintenance coordinator purchased **Waste Blaster heavy-duty hybrid pusher-puller squeegees from Way Cool Product Co.** The ergonomic tools have stainless steel hardware with 24- or 36-inch-wide 12-gauge aluminum frames and 1/4-inch reinforced replaceable rubber blades. Fiberglass handles disconnect easily for disinfection and storage.

RESULT

Operators reported that the tools made cleaning easier and faster, reducing labor by one-third and saving the city \$11,000. The plant has 11 of the tools. 315/569-9974; www.waycoolproduct.com.



Pulsed hydraulic mixing system homogenizes sludge

Problem

The London (Ohio) Wastewater Treatment Plant pumped waste activated sludge to a gravity belt thickener before pumping it from a holding tank to the anaerobic digesters. Thickened sludge at 2.5 percent solids remained in the tank until 15,000 to 25,000 gallons accumulated, allowing solids and grease to float to the surface. The mixer in the holding tank failed to homogenize the batch. During pumping, water emptied first, causing problems in the digesters, while thicker sludge overwhelmed the pumps.

Solution

Operators installed a **PHI-300 controller and three Hydro-Pulse large-bubble forming plates from Pulsed Hydraulics**. They used an existing 7 hp compressor to deliver air at 50 psi to the controller, and set the forming plates on the tank floor.

RESULT

The system homogenized the batch in minutes and was more affordable than other solutions. Pumping and digester problems disappeared. 800/641-1726; www.phewater.com.



inspiring, stimulating, motivating

Savored by municipal wastewater professionals everywhere.

Get your fill for free. Subscribe at tpomag.com



GritCup™ & SpiraSnail™ Advanced Grit Washing System

Hydro
International



A New Spin on Grit!

Cost-Effective Performance

- 90% capture of all grit 106 micron and larger - guaranteed
- No washwater requirements
- Intermittent or continuous operation
- Fully enclosed system

For additional information call Hydro
International (503) 615 8130
or visit www.hydro-int.com



Reactor reduces ammonia levels

Problem

On race weekends, more than 250,000 fans converge on the Indianapolis (Ind.) Motor Speedway. Filtrate from anaerobically digested solids had ammonia concentrations of 800 to 1,200 mg/L with spikes to 2,000 mg/L, often causing exceedances of the wastewater treatment plant's effluent permit.

Solution

In April 2012, the facility started the storage nitrification denitrification reactor with **BiofiltAer from Thermal Process Systems**.

RESULT

The reactor achieved a 98 percent reduction in ammonia, destroyed volatile and total solids, and eliminated odors in the dewatering building and biosolids storage area. The process also reduced the volume of biosolids by 33 percent. 219/663-1034; www.thermalprocess.com.



Bar screen improves efficiency

Problem

Sand and rags frequently clogged the bar screen at the Havre (Mont.) Wastewater Treatment Plant, and grit flowing downstream reduced plant efficiency. The city wanted to replace the unit and implement odor reduction.

Solution

Officials chose the **RakeMax Multi-Rake bar screen from Huber Technology**. The system's configuration uses top and bottom covers to practically eliminate odors.

RESULT

The unit removed a high percentage of inorganics and grit, improving downstream processing and reducing stress on components. "The system works very well and requires such minimal attention that we almost forget about it," says plant superintendent Bill Dean. "We wish we had installed it 30 years ago." 704/949-1010; www.huberforum.net/TPO. tpo





1. NIDEC VERTICAL PUMP MOTORS

TITAN II 5812 and 5813 frame vertical motors from Nidec Motor Corp. have a cast iron frame and insulated bearings with shaft grounding provisions. Bearing and winding temperature detectors are available. Both frame sizes are custom built. The 5813 includes WPI and WPII (weather protected) enclosures ranging from 250 hp to 1,750 hp. The motor is available as hollow or solid shaft in both low and medium voltages. The 5812 has a fan-cooled enclosure for applications in severe-duty industries. Speeds range from 400 to 1,800 rpm and power ranges from 200 to 1,250 hp. **888/637-7333; www.usmotors.com.**

2. ENDRESS+HAUSER OPERATIONS APP

The operation app from Endress+Hauser is designed for iPhone, iPod touch and iPad mobile devices. The free app lets instrument engineers and maintenance technicians download operating instructions and technical information for Endress+Hauser instruments and analyzers and data from the Life Cycle Management program. **888/363-7377; www.us.endress.com.**

3. FRAKO UL, IEC CAPACITORS

UL and IEC capacitors from FRAKO AC Power Capacitors are engineered for power factor correction and harmonic filters and can handle continuous current up to 2.25 (60 Hz)/2.7 (50 Hz) times rated current. Features include self-healing, overpressure disconnect and segmented film technology. **262/618-2403; www.alliedindustrialmarketing.com/capacitors.php.**

4. RIG-A-LITE LED EXPLOSION-PROOF LIGHTING

XP LED series explosion-proof lighting from AZZ Rig-A-Lite is available in 2- and 4-foot lengths in multiple lumen packages. Features include 60,000 hour system life, corrosion resistance, and replaceable Class 2 Philips integral LED driver and circuit boards. **713/943-0340; www.rigalite.com.**

5. OPTO 22 UPGRADED I/O PROCESSORS

G4D32EB2-UPG and G4EB2 I/O processors from Opto 22 enable automation professionals to upgrade a legacy mistic or Pamux G4 digital I/O system on a serial network to operate as part of a modern, Ethernet/TCP-based control system without replacing or modifying existing I/O or field wiring. **800/321-6786; www.opto22.com.**

6. NILES STEEL TANK GLASS-LINE PIPE

Sludge Block glass lining from Niles Steel Tank is designed for ductile iron pipe used in wastewater treatment plants, minimizing the buildup of sludge and allowing clear passage within piping systems. Sizes range up to 24 inches in diameter. **269/683-1910; www.nilesst.com.**

7. XYLEM OPEN-CHANNEL UV SYSTEM

The WEDECO Duron open-channel ultraviolet disinfection system from Xylem eliminates the need for chemical-based disinfection while reducing energy costs. Designed for midsize to large open channels, the system delivers clean, safe, treated wastewater in a minimal footprint. **704/409-9700; www.wedeco.com/us.**



10



11

8. VAL-MATIC SWING-FLEX CHECK VALVE

The Swing-Flex check valve from Val-Matic Valve & Manufacturing Corp. features a smooth, unrestricted, full-flow design for sludge and slurries and non-slam performance. Valve sizes range from 2 through 48 inches with fusion-bonded epoxy interior and exterior for pressure ranges up to 250 psi. 630/941-7600; www.valmatic.com.

9. PENTAIR ALUMINUM CABINET PLATFORM

The Schroff brand NOVASTAR 19-inch aluminum cabinet platform from Pentair Technical Products is available in 46 standard models to accommodate multiple configurations for rack-mounted electronics and

instruments. Features include 180-degree door opening, grounding cables and connections on all tops, sides, doors and bases, equipment supports on side panels, cast aluminum top and bottom, choice of glass or perforated steel doors with optional steel and composite casters. 763/421-2240; www.hoffmanonline.com.

10. PREMIER MAGNESIA CEMENT SHRINKAGE ADDITIVE

PREVENT-C cement additive from Premier Magnesia prevents shrinkage and cracking by 90 to 100 percent when used in the construction or repair of water and wastewater treatment plants, reducing wastewater leakage and preventing waste from migrating into freshwater reservoirs or aquifers. 800/227-4287; www.premiermagnesia.com.

11. LARSON ELECTRONICS EXPLOSION-PROOF TANK LIGHT

The EPL-24BS-1X4-100 explosion-proof portable base stand tank light from Larson Electronics is Class I, Division 1, Groups C and D approved. The light provides 20,000 square feet of work area coverage with 36,000 lumens (400 watts) of light output and has a 23 7/8-inch removable light head with aluminum base. 800/369-6671; www.magnalight.com.

EXTech REMOTE CLAMP METER READINGS APP

The EX845 METERLINK industrial app from Exttech Instruments enables plant workers who use Exttech's EX845 clamp meter to remotely view and display readings from the meter on an Android phone or tablet from 30 feet away. 603/324-7801; www.extech.com.

(continued)

product spotlight

Phosphorus Control System Regulates Chemical Dosing in Real Time

By Ted J. Rulseh

While some wastewater facilities adjust their phosphorus-control chemical dose based on flow or by setting a fixed dose rate, the ability to adjust quickly for loading changes can reduce chemical costs significantly.

Hach Company now offers the **RTC101 phosphorus control system**, providing real-time control of chemical dosing that helps maintain consistent phosphorus levels in effluent. The system is designed as a turn-key solution with instruments and technology that work together for accurate control of phosphorus levels to chemical savings.

"What makes the unit so efficient in optimizing phosphorus levels are its pre-programmed algorithms," says Bob Dabkowski, applications development manager. "It is designed to determine the exact loading of phosphorus in a facility's influent water, allowing for automatic dosing to what is needed."

"It's cruise control for chemical phosphorus removal. If you need to meet a phosphorus limit by dosing alum or ferric chloride, the system controls in real time exactly how much you need to dose in order to hit your effluent setpoint."

"In a typical application involving ferric addition, we measure the effluent phosphate leaving the plant and pull in a flow measurement from the SCADA system. Based on how much phosphate they want leaving the plant, our algorithms crunch the math every minute and tell the plant how much ferric chloride to dose."

"So if the effluent setpoint is 0.6 mg/L phosphate, that's what they type into the face of the controller. And it will ramp up and ramp down as the system changes. It's just like if you're going down the highway and set your cruise control for 55 mph."

The RTC101 can be used for open (feed forward) and closed loop (feed back) control of the chemical dose. The chemical feed pump is controlled continuously via a 4-20 mA signal or a dry contact relay.

Both outputs can be used together: if the dose determined by the controller is below the pump minimum flow rate, the system will switch from 4-20 mA control to relay control automatically. If the phosphate or flow input is disrupted, the unit automatically refers back to previously created profiles to ensure that effluent compliance is maintained until the signal is restored. 800/227-4224; www.hach.com.



Depend on the Leader

Composting **ROTO-MIX** Performance

Waste Pro Series Mixers quickly and efficiently process food waste, cardboard and yard waste.



Take time today, call for more information!



5000 Cyclone Compost Series with double flighted twin vertical augers mix in half the time.

Patent Pending

Staggered Rotor Industrial Series Mixers All mixers available in truck, trailer or stationary.

Patented Staggered Rotor



Watch action videos on-line
www.rotomix.com

Cell 620.408.8330

MADE IN U.S.A.

ROTO-MIX® LLC • 2205 E. WYATT EARP
DODGE CITY, KS 67801
620.225.1142 • FAX 620.225.6370

product news



12. SENSOREX FLUID MONITOR

The TX-3000 pH/mV transmitter from Sensorex Corp. monitors changes in process fluids, displaying pH or oxidation-reduction potential and temperatures. The line-powered monitor can be programmed on site to measure pH or ORP. A large backlit LCD screen displays both parameters simultaneously. Two adjustable Hi/Lo relay contacts deliver results to automated process control systems. 714/895-4344; www.sensorex.com.

13. WATSON-MARLOW CHEMICAL INJECTION PUMP

The 520R high-pressure chemical injection metering pump from the Watson-Marlow Pumps Group offers flows to 55 gph and pressures to 100 psi. The tube element and pump head design enables the unit to be utilized in applications requiring accurate metering, dosing and transferring of harsh chemicals, including sodium hypochlorite, ferric chloride, sodium bisulfate, fluoride, carbon and lime slurries, polymers, aqueous ammonia, potassium permanganate and caustic slurries. 800/282-8823; www.wmpg.com.

14. CW SEALED ROCKER SWITCHES

IP68-rated, heavy-duty rocker switches from CW Industries are made for use in harsh environments and resist dust and liquids. Rated at 25 amps 12VDC, the GRB-1X4 and GRB-2X4 series switches are available in SPST, SPDT, DPST and DPDT with maintained, momentary and center-off functions. 215/355-7080; www.cwind.com. tpo

UPCOMING TRAINING & EVENTS



NAWT

National Association of Wastewater Technicians

YOUR SOURCE
FOR REAL LEARNING

Inspector Training and Certification:

February 23-24, 2013 - Indianapolis, IN
Pre-Expo NAWT
info@nawt.org

April 4-5, 2013 - (TBA) Oregon
Contact: Belinda Rasmussen
(541) 389-6692 or info@o2wa.org

NAWT Vacuum Truck Technician:

February 24, 2013 - Indianapolis, IN
Pre-Expo NAWT
info@nawt.org

March 6, 2013 - Ruidoso, NM
N-MOWA • Jace Ensor at (575) 937-8304
or nmowa.president@gmail.com

Operation and Maintenance Training Certification:

February 6, 2013 - Kearney, NE
NOWWA - Contact: Jason Orton at
(402) 476-0162 or jason@h2oboy.net

Principles of Septic System Design

February 23-24, 2013 - Indianapolis, IN
Pre-Expo NAWT
info@nawt.org

Visit www.nawt.org for information on all upcoming courses.

-- Watch the NAWT website and industry publications for updates --

For more information call:
800-236-6298

WWW.NAWT.ORG

- ✓ New & Used Equipment
- ✓ Videos and Podcasts
- ✓ Online Exclusives
- ✓ Discussion Forum
- ✓ Free Subscription
- ✓ Digital Editions
- ✓ Article Reprints

tpomag.com

wso

WATER SYSTEM OPERATOR

FREE subscription at wsomag.com

Our energy conscious solutions provide long-term sustainability.

Our technologies ensure the lowest life-cycle costs.

We supply every technology so there is no need to compromise.

We have the knowledge and experience to identify the best solution for your specific needs.

We are the value and performance leader.

Biosolids Covered this Entire Page Until We Dewatered Them.

There are 21 major sludge types with thousands of variations.
The Good news is, there's an Ashbrook Simon-Hartley solution for each and every one of them.
Why just choose equipment when you can have a proven solution from Ashbrook?



WINKLEPRESS®



KLAMPRESS®



AQUAbelt®



CQ Rotary Drum Thickener



Manor Filter Press

Ashbrook Simon-Hartley is now part of Alfa Laval. Together, we deliver a market-leading portfolio of products and solutions for municipal and industrial water and wastewater applications.

Ashbrook Simon-Hartley®

Extra! Extra!

Want More Stories?

Get extra news,
extra information,
extra features with

Online Exclusives

Exclusive online content for
Treatment Plant Operator

www.tpomag.com/online_exclusives



See Both Sides

Now there's a magazine for the drinking water side of the house. *Water System Operator*™ (WSO) — with the same emphasis on the people who make it all work. It's designed to help water operators:

- Share best practices
- Learn new technologies and methods
- Receive recognition
- Advance in the profession
- Celebrate successes

Get your subscription at wsomag.com —
free to qualified professionals.

industry news

Headworks receives WBENC certification

Headworks received certification from the Women's Business Enterprise National Council as a nationally recognized Women's Business Enterprise. The certification enables the company to bid for opportunities where funding has been specifically designated for minority businesses.

Pepperl+Fuchs receives product certification

Pepperl+Fuchs received UL Class I, Division 2, ATEX Zone 2 and IEC-Ex Zone 2 certification on its 15- and 19-inch industrial panel products. The product line includes the PC8200 series panel PCs, KM8200 series monitors with integral KVM and RM8200 series remote monitors.

Warren Rupp promotes vice presidents

IDEX Corp. and Warren Rupp promoted Bill Jones to vice president of operations, East Asia, promoted Shawn Fortune to vice president of supply chain and operations, and promoted Shane Wiltanger to director of operations, responsible for management of the Warren Rupp factory. Jones will be responsible for the IDEX Technology Services facility in Suzhou, China, and Fortune will be responsible for the manufacturing process, including the sourcing, purchasing and inventory management functions of Warren Rupp.

Xylem acquires Heartland Pump

Xylem acquired privately held Heartland Pump Rental and Sales. Heartland, based in Carterville, Ill., has been a strong business partner with Godwin in dewatering pump rental, services and systems design since 1995. Godwin is part of the Xylem group. Heartland has 100 employees with branches in Indiana, Mississippi and Tennessee. Terms of the transaction were not revealed.

Purafil hires water, wastewater market specialist

Purafil added Ni Wei, also known as Wills Ni, as its water-wastewater market specialist for Asia, serving as a central communication point for customers and manufacturing representatives relating to wastewater sales in China. His responsibilities will progressively include Southeast Asia, covering Japan and Korea. Ni has seven years of industry experience.

Ludman names CFO, vice presidents, manager

Ludman Industries named Jeff Butcher chief financial officer and Alan Severns as vice president of sales. The company also named Richard Horsfield executive vice president, overseeing all sales, engineering, operations and marketing procedures, and appointed James Q. Adams global sales and marketing manager. Butcher has 18 years experience with a bachelor's degree in accounting. Severns has 20 years of sales and engineering experience with a bachelor's degree in mechanical engineering.

Adedge names applications engineer

Adedge Water Technologies named Khushbu Karan applications engineer, responsible for sales engineering support, proposal preparation, system design, project scoping and execution of water treatment projects. She has a bachelor's degree in chemical engineering and a master's degree in management science.

FCI releases product, services catalog CD

The FCI flow/level measurement product and services catalog CD release 13.0 from Fluid Components International assists engineers in specifying the right flow, level or temperature instrument for improving plant process control lines or increasing OEM equipment performance. The catalog is available at www.fluidcomponents.com/cd.

Danfoss launches fluids controls website

Danfoss launched DanfossDirect (www.danfossdirect.com). The website features an online configuration tool that enables users to custom design a complete valve package and order direct. The tool also makes suggestions for proper coils and accessories based on the user's valve selection. **tpo**

Municipal & Industrial MAINTENANCE SERVICES



SEWER & CATCH BASIN CLEANING Single and double-pump jet-vac combination units with line jetting capabilities of 175 gpm. Catch basin cleaning available with per hour or per basin pricing.



SEWER TELEVISION INSPECTION

We have the CCTV equipment and experienced technicians to perform any type of mainline or service lateral inspection you need. Powered by the latest computers and software.



WET/DRY VACUUMING Jobs that used to take days are completed in hours. Our custom-built vacuum vehicles can quickly cleanup the toughest, dirtiest material, no matter where it's located..

Other Services Available:

- Sewer Joint/Lateral Sealing
- GPS/GIS Data Collection
- No-Dig Cipp Point Repairs
- Manhole Rehabilitation
- Digester/Tank Cleaning
- Pit, Pond & Lagoon Cleaning
- Sludge Dewatering
- Water Blast Cleaning and much more.

All Work Backed by Our Unmatched Guarantee: You must be satisfied or you pay absolutely NOTHING for our services.



Call Toll Free **1-800-621-4342**
CARYLON CORPORATION

2500 W. Arthington Street ▪ Chicago, IL 60612 ▪ Fax: 312-666-5810

Visit Us On the Web: www.caryloncorp.com





Service | Value | Responsibility

www.krugerusa.com

KRÜGER

Expanding The Possibilities

IFAS Process That Offers Highly Adaptable Configurations And A Smaller Footprint

Kruger's AnoxKaldnes™ Hybas™ is an integrated fixed-film activated sludge (IFAS) process that can provide improved ammonia and total nitrogen removal in existing basins.



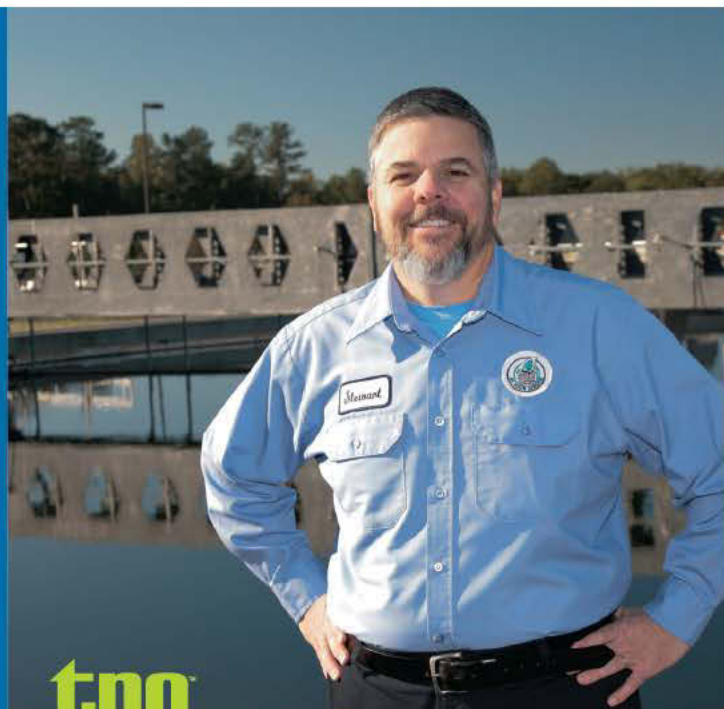
VEOLIA
WATER
Solutions & Technologies

Every day is Earth Day.™

"I was named a Water Environment Federation Water Hero — professionals who 'protect public health and the environment by cleaning the world's water day after day.' But it was a good crew of operators who pulled together as a team. It was great to work with such fine people."

Jimmy Stewart
An Original Environmentalist

CHIEF OPERATOR (2000-08)
Shoal Creek Water Reclamation Facility,
Clayton County (Ga.) Water Authority



tpo

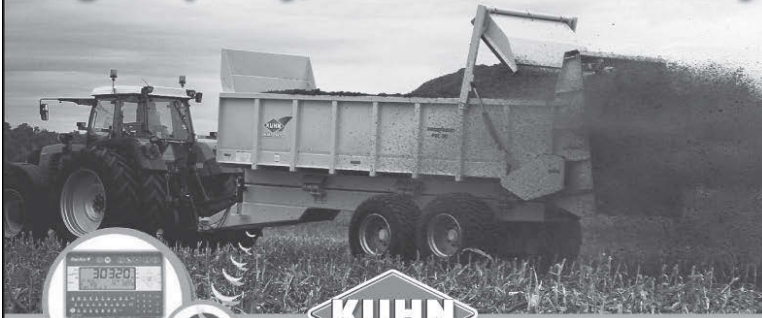
Read about original environmentalists like Jimmy each month in *Treatment Plant Operator*.

FREE subscription at tpomag.com

COLE PUBLISHING INC.

Proudly Serving the Environmental Service Industry Since 1979

High Capacity, Unmatched Versatility



Invest in Quality!

PSC ProSpread Commercial Box Spreaders

610, 710 & 810 heaped cu. ft. capacities

- Monitor and document application rates and locations with Digi-Star Nutrient Tracker™ and GPS technology
- Consistent, even spreading of a broad range of solid and dry, flowable material with your choice of discharge options



Vertical Beaters



Spinner Discharge



Horizontal Beaters

Call today for information on Kuhn Knight industrial spreaders
Kuhn North America • Brodhead, WI • 608-897-2131

Competitors can pass you by like a rocket ship attached to a skateboard.

Become the **rocket** ship.



Buckle your helmet!



February 25-28, 2013
www.pumpershow.com

Treatment Plant MAINTENANCE MADE EASY



**Portable
and
Affordable!**

Be a hero and take command of your treatment plant maintenance with a Commander Davit Crane by Thern.

- Safely and easily lift:
- Aerators • UV Panels
 - Pumps and Mixers • Trash Baskets • Manhole Covers
 - Virtually anything weighing up to 3,000 lbs. and beyond

To see our complete line of davit cranes and winches visit us online at www.thern.com



1-800-843-7648
5712 Industria Park Road,
Winona, MN 55987

LEAVE THE HEAVY LIFTING TO US

people/awards

The **Fort Knox (Ky.) Wastewater Treatment Facility** received OSHA Star status under Kentucky's Voluntary Protection Program, administered by the Kentucky Department of Labor's Occupational Safety and Health Program.

The **San Antonio Water System (Texas)** received the Award for Excellence in Innovation from the Water Environment Research Foundation in part for its innovations in wastewater treatment.

Robert Nerenberg, Ph.D., of the University of Notre Dame, received the Paul L. Busch Award from the Water Environment Research Federation Endowment for Innovation in Applied Water Quality Research. The prize is awarded for research that could dramatically decrease operational costs at wastewater treatment facilities.

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

education

Alaska

The Alaska Department of Environmental Conservation is offering these courses:

- Feb. 4-8 – Intermediate Wastewater Treatment Training, Anchorage
 - Feb. 21-22 – Electrical Troubleshooting and Preventive Maintenance, Anchorage
 - May 22-23 – Pumps and Pump Systems: Specifications, Installation and Operation, Anchorage
- Visit www.awwma.org.

Florida

The Florida Water Environment Association (FWEA) has a Utility Management Seminar on Feb. 21 in Gainesville. Visit www.fwea.org.

The FWEA Air Quality Committee (AQC) will hold a March 7 workshop dealing with odor control solutions in wastewater. A team of nationally recognized experts from top engineering firms will take part. Visit www.fwea.org/air_quality_workshop.php for more information.

In addition, an FWEA Air Quality Committee forum has been set up on LinkedIn with the aim to provide information and education around odor control for the water and wastewater fields. To join the group and ongoing discussions, visit www.linkedin.com/groups/FWEA-Air-Quality-Committee-4758341?gid=4758341&trk=group-view-button.

The Florida Water & Pollution Control Operators Association will hold its annual Spring State Short School March 25-29 at Indian River State College in Fort Pierce. Visit www.fwpc.org.

Kansas

The Kansas Water Environment Association is offering these courses:

- Feb. 1 – Wastewater Preparation, Phillipsburg
- Feb. 8 – Small Wastewater Systems, Dodge City
- Feb. 13-14 – Utility Management Skills, Independence
- Feb. 14 – Wastewater Stabilization Lagoons, Liberal
- Feb. 20-21 – Wastewater Workshop, Parsons
- Feb. 26 – Special Topics-Emerging Contaminants, Dodge City
- Feb. 28 – Special Topics-Corrosion, Dodge City
- March 6 – Intro to Water and Wastewater Conveyance, Phillipsburg
- March 6-7 – Topics in Wastewater, Kansas City

CALENDAR OF EVENTS

Feb. 4-6

New York Water Environment Association Annual Meeting and Exposition, New York Marriott Marquis. Visit www.nywea.org.

Feb. 23-26

Water Environment Federation Disinfection and Public Health Conference 2013, Hyatt Regency Indianapolis, Indianapolis, Ind. Visit www.wef.org.

March 10-13

American Water Works Association and Water Environment Federation Utility Management Conference, Renaissance Phoenix Glendale Hotel & Spa. Visit www.wef.org.

March 18-21

Illinois Water Environment Association and Illinois Section-AWWA WATERCON 2013, Crowne Plaza Hotel, Springfield. Visit www.isawwa.org.

March 23-27

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

April 7-9

Water Environment Association of Ontario Technical Symposium, Toronto Congress Centre, Toronto. Visit www.weao.org.

April 7-10

Alabama Water Environment Association Annual Conference, Perdido Beach Resort, Orange Beach. Visit www.awea-al.com.

April 14-18

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

April 16-19

California Water Environment Association Annual Conference, Palm Springs Convention Center. Visit www.cwea.org.

April 20-24

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

April 28-May 1

Arkansas Water Works and Water Environment Association Annual Conference, Hot Springs. Visit www.awwwea.org.

April 29-May 2

Alaska Water Wastewater Management Association Annual State Conference, Anchorage Hilton Hotel and Conference Center, Anchorage. Visit www.awwwma.org.

May 5-8

Residuals and Biosolids 2013: Emerging Opportunities for Sustainable Resource Recovery, Nashville (Tenn.) Convention Center. Visit www.wef.org.

May 14-17

Central States Water Environment Association Annual Conference, Monona Terrace, Monona, Wis. Visit www.cswea.org.

- March 14 – Small Wastewater Systems, Fort Scott
 - March 15 – Special Topics-Membranes, Dodge City
 - March 19 – Special Topics-Corrosion, Medicine Lodge
 - March 21 – Special Topics-Ultrasound and Ultraviolet, Medicine Lodge
- Visit www.kwea.net.

Michigan

The Michigan Water Environment Association is offering the following courses:

- Feb. 18-22 – General Wastewater Treatment Intro and Advanced, Chipewewa Falls

BUSINESSES

Portable restroom business FOR SALE. Operating in central Florida, 35+ years. Great customer base, service reputation and revenue stream of \$250-\$300,000 annually. Equipment includes 700 like new units, 12 handicaps, 10 sinks, 3 service trucks, 2 trailers etc. Turn key \$325,000 cash. Inquire D.M. Andrews P.O. Box 491271, Leesburg, FL 34749-1271. No phone calls please. (PT03)

Well established family owned portable toilet business for sale in Michigan, northern Macomb County. Turn key business with over 25 years in business and loyal customers. One 2008 450-Ford with Best stainless 360/140 tank, less than 100,000 miles. 130 plus units, 4 handicap, 4 stand alone sinks, 8 units with sinks built in, 2 flushable units and lots of extra parts. 586-405-0965. (P02)

FOR SALE: Septic Pumping Business in central Wisconsin. Includes 2,500 gallon septic truck, over 3,000 loyal customer base and growing. Lots of potential. Owner wants to retire but will provide consulting and training for a reasonable transition period. Cell: 608-547-3267. (P04)

DEWATERING

Belt filter press with ss-controls, Ashbrook Winklepress, 2M, immediate availability. Purchase as is, \$80,000 or turn key (priced on request). 803-796-9231, SC. (P02)

FOR RENT: JWI mobile filter press units, 90-100 cubic foot, 225 psi feed w/ belt conveyer. CALL Tim Stapleton at: 606-465-7955 or email tstapleton@pressuretechinc.com. (P05)

EDUCATION

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

MISCELLANEOUS

UV DISINFECTION EQUIPMENT: Attention: Small wastewater treatment plant owners and operators. Possible use with Fish Farms. Portable, or very easy installation. Brand new product. US patent pending. callagher@sbcglobal.net, www.thefecalfighter.com. (oBM)

- May 14 – Lab Practice Seminar, location TBA
Visit www.mi-wea.org.

Ohio

The Ohio Water Environment Association is offering these courses:

- March 7 – Government Affairs Workshop, Lewis Center
- May 9 – Collections System Workshop, Grove City

Visit www.ohiowea.org.

Wisconsin

The Wisconsin Department of Natural Resources is offering these courses:

- Feb. 18-22 – General Wastewater Treatment Intro and Advanced, Chipewewa Falls
- Feb. 26-27 – Primary Treatment Intro and Advanced, Madison
- March 5-6 – Anaerobic Digestion, Stevens Point
- March 7 – Anaerobic Digestion Advanced, Stevens Point
- March 12-13 – Phosphorus Removal Intro and Advanced, Green Bay
- March 14 – Paper Industry Wastewater Treatment, Green Bay
- March 19-20 – Trickling Filters and RBCs Intro and Advanced, Chipewewa Falls

Visit <http://dnr.wi.gov>.


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

- March 20-22 – Wastewater Pumping Systems and Lift Stations, Madison
- April 23-25 – Nutrient Removal Engineering: Phosphorus and Nitrogen in Wastewater Treatment, Madison

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

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

s::can
Intelligent. Optical. Online.



**microstation for
wastewater monitoring**
888.694.3230 www.s-can.us

**MUNICIPAL
SEWER
&
WATER**



**Dig into
our pages.**

Each issue shows you:


- New technologies that boost efficiency and drive out costs.
- Tips for building a stronger, more productive staff.
- Bargains on a wide range of tools and equipment.
- And much more.

Plus, you'll learn from other successful people in your industry – how they do it, and how you can, too.

**FREE Subscription –
sign up today!**

800.257.7222
www.mswmag.com


Map It!



TPO classified ads are pinpointed on a map for conveniently locating where the equipment is.

Go to
tpomag.com/classifieds/place_ad

Got STRUVITE?
**PREVENTS & REMOVES
MINERAL DEPOSITS.**



**Our Struvite
and Polymer
Dispersion
Chemistries Are...**
**Safe.
Proven.
Neutral pH.**

Schaner's Wastewater Products
800-933-9109
www.schaners.com
The Leader in Polymer Cleanup & Belt Filter Press Anti-Blinding Systems.

**Rebuilds
Parts**



Belts



K-S Komline-Sanderson
1 800 225 5457
www.komline.com



WEMCO® Pumps & Systems

WEMCO® Hydrogritter® components are designed as a system to optimize each piece of equipment - both mechanically and hydraulically - to consistently produce long-term, high performance grit removal automatically with unmatched reliability and low operating and maintenance costs.

The grit pump's job is to pump the abrasive, destructive grit slurry to the cyclone without clogging or wearing out. The WEMCO® Model C severe duty pump for continuous duty or the WEMCO® Model CE heavy-duty pump are superbly designed to do so.

First choice for wastewater and sludge

*WEMCO® Pumps & Systems...
As mentioned in the West Liberty
Wastewater Treatment Plant
article.*



WEMCO® Pumps & Systems

WEMCO® Pumps & Systems has the proven experience and track record in providing durability and performance unmatched by any others in the wastewater and sewage markets. WEMCO® Pumps & Systems has the right pumps and equipment for your specific applications.

*WEMCO® Pumps & Systems...
The first choice for wastewater
and sludge.*

Learn more at
www.weirpowerindustrial.com/Wemco
wsprfq@weirgroup.com
801 359 8731


Copyright © 2013, Weir Specialty Pumps. All rights reserved. WEMCO is a registered trademark of FLSmidth A/S Corporation.



WE TAILOR OUR SCREENING EQUIPMENT TO FIT YOUR NEEDS.

All wastewater treatment plants are not alike. That's why plant designers prefer our *Raptor*® line of screening products, the innovative all-in-one units that screen, wash, convey and dewater screenings efficiently, capturing more fine solids and long fibers than other available screens. *Raptor*® products are adaptable to a wide range of configurations, giving you more choices for better performance in your unique application. They are preferred among plant operators for their simple operation, ease of use, and minimal maintenance. When performance counts, count on the industry leader for more than 80 years—Lakeside Equipment Corporation.

Speak to one of our experts at 630.837.5640, email us at sales@lakeside-equipment.com, or visit www.lakeside-equipment.com for more product information.



Cleaner Water for a Brighter Future®



Raptor® Screening Products

- Fine Screen
- Micro Strainer
- Rotating Drum Screen
- Wash Press
- Septage Acceptance Plant
- Septage Complete Plant



WesTECH



General Filter

microfloc 

**Consulting engineers specify them, owners demand them,
and operators love them. WesTech is proud to bring back two
of the most trusted and respected names in water treatment.**

westech-inc.com/betterwater

Telephone 801.265.1000 | **westech-inc.com** | Salt Lake City, Utah, USA