

TREATMENT PLANT OPERATOR

# tpo™

DEDICATED TO MUNICIPAL WASTEWATER PROFESSIONALS

www.tpomag.com  
NOVEMBER 2013

**In My Words:**  
**Public outreach in Detroit**  
PAGE 30

## Finding the *Magic*

**DAN PETERSON WENT FROM THE MILITARY TO LEADING  
AN INNOVATIVE PLANT TEAM IN DURHAM, N.H.**

PAGE 34

**Fire Chief Project:  
Engaging the public  
in Arkansas City**

PAGE 9

Dan Peterson  
Plant Superintendent  
Durham, N.H.

DURHAM  
PUBLIC W

**Lab Detective:  
Chlorine breakpoint curve**

PAGE 44



A man with short brown hair and a beard, wearing a green short-sleeved button-down shirt, is holding a handheld DO sensor device. The device has a silver cylindrical body and a black handle with a cable attached. He is standing outdoors in front of a blurred background of industrial equipment.

# MYTH BUSTING

## YOUR STORIES OF FACT AND FICTION.

"We didn't think there was a way to get an accurate DO reading without lots of calibration. But the new LDO sensor from Hach comes calibrated from the factory—simplifying my life, and giving me more accurate readings."

At Hach, we are trying to re-think wastewater analysis. Help us bust common wastewater myths at: **[bustingmyths.com](http://bustingmyths.com)**



Be Right™





**SANITAIRE**  
a xylem brand

# LET'S SOLVE YOUR NUTRIENT REMOVAL NEEDS **RELIABLY.** LET'S SOLVE **WATER.**



**The Sanitaire® Bioloop® Oxidation Ditch is a huge leap forward in biological treatment systems,** delivering up to 50% better energy efficiency compared to mechanical aeration. Our proven Bioloop process combines Sanitaire diffused aeration, Flygt submersible mixing and overall process application, as well as instrumentation and process control from Sanitaire.

Adaptable to a wide range of flow and loading conditions for both new and retrofit applications, the Sanitaire Bioloop Oxidation Ditch sets the standard for efficiency, reliability and flexibility.





DESIGN | FUNCTION | PERFORMANCE

# SONIC-PRO®

HYBRID ULTRASONIC FLOWMETER



IP68  
NEMA 4X  
WASHDOWN  
CE  
ETL

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

## Dewatering Made Simple



Roll-Off Sludge Mate®



Poly-Mate®



Low Profile Roll-Off



Call us today at (713) 699-0152  
Or visit online [www.flotrend.com](http://www.flotrend.com)



## advertiser index

NOVEMBER 2013

Aeration Industries International	8	<b>HACH</b> Hach Company	2
<b>AERZEN</b> Aerzen USA	41	Hawk Measurement America	10, 46
Airmaster Aerator LLC	46	Headworks International	37
All-Star Products	22	Hoffman & Lamson, Gardner Denver Products	9
<b>AIMAX</b> Software AllMax Software, Inc.	62	<b>HUBER</b> Huber Technology, Inc.	7
<b>ATI</b> Analytical Technology, Inc.	23	<b>INFILCO</b> Infilco Degremont Inc.	21
Andritz Separation, Inc.	53	<b>JDV</b> JDV Equipment Corporation	65
<b>AQUA-AEROBIC</b> SYSTEMS, INC. Aqua-Aerobic Systems, Inc.	21, 39	<b>KELLERAMERICA</b> Keller America Inc.	67
Aquionics, Inc.	15, 17, 19	<b>Komline-Sanderson</b> Komline-Sanderson	66
<b>BASF</b> BASF Corporation – Water Solutions Division	51	Lakeside Equipment Corporation	31
Bionetix International	65	McNish Corporation	55
<b>Blue-White</b> Industries, Ltd. Blue-White Industries	4	<b>Nasco</b> Nasco	66
Brentwood Industries	63	<b>NETZSCH</b> NETZSCH Pumps North America, LLC	33
Cabot Norit Activated Carbon	29	<b>OVIVO</b> Ovivo USA, LLC	5
<b>Carylon Corporation</b>	47	<b>SANITAIRE</b> a xylem brand Sanitaire - a Xylem Brand	3
<b>ClearSpan</b> Fabric Structures	59	Schreiber LLC	27
<b>DRAGON</b> Dragon Products, Ltd.	11	Thern, Inc.	43
Environmental Dynamics International	22	Tuthill Vacuum & Blower Systems	33
<b>FLO TREND</b> SYSTEMS, INC. Flo Trend Systems, Inc.	4	United Blower Inc.	53
Ford Hall Company, Inc.	55	USABlueBook	68
<b>GD</b> Gardner Denver Gardner Denver	38	UV Superstore, Inc.	65
Geyser Pump Tech LLC	66	<b>Vaughan</b> Vaughan Company, Inc.	57
		Walker Process Equipment	59
		<b>CLASSIFIEDS</b>	66

Get  
Social  
with  
tpo

[www.facebook.com/TPOMag](http://www.facebook.com/TPOMag)  
[www.twitter.com/TPOMag](http://www.twitter.com/TPOMag)  
[www.plus.google.com](http://www.plus.google.com)  
[www.youtube.com/TPOMagazine](http://www.youtube.com/TPOMagazine)

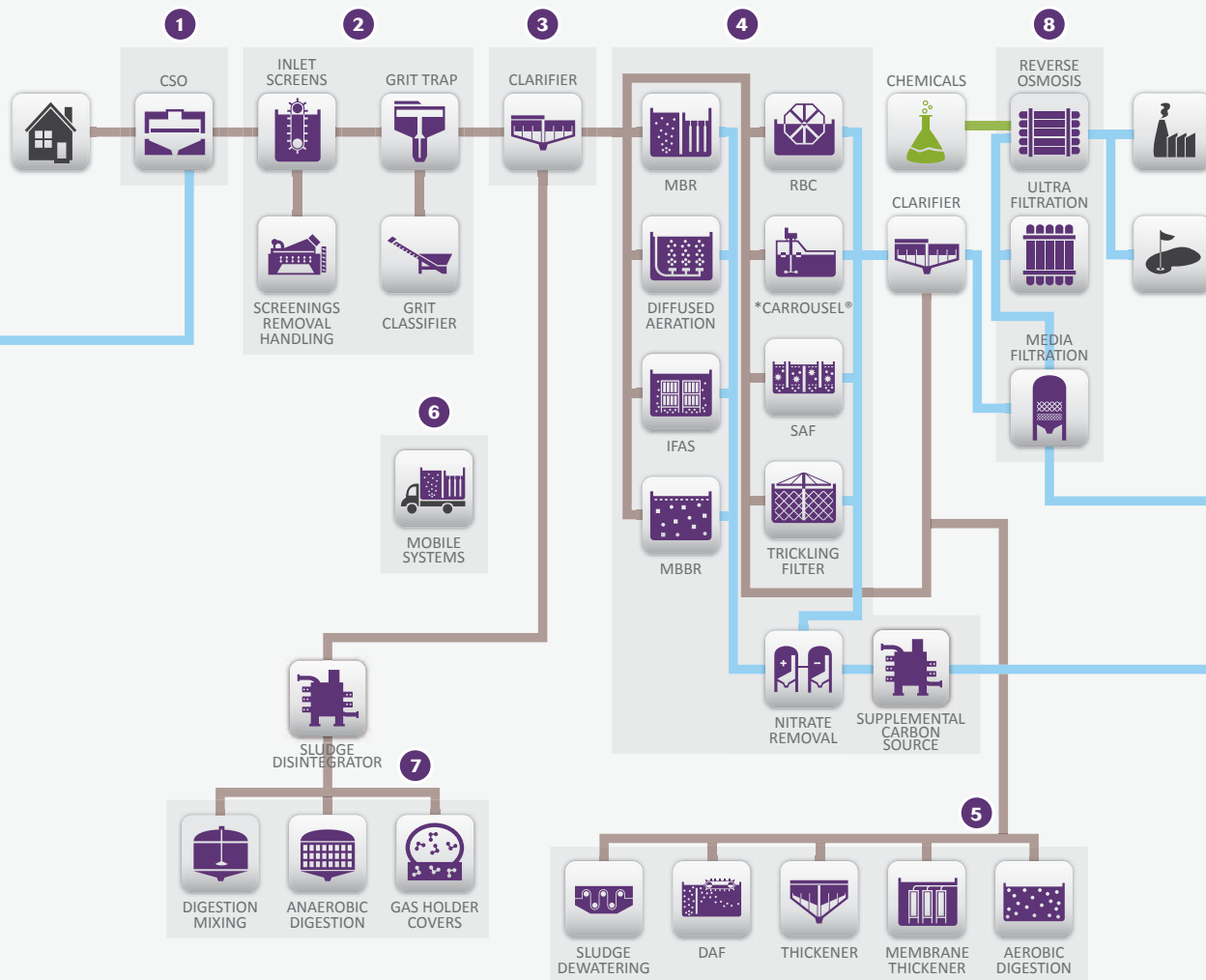




At Ovivo, we continually seek to formulate new methodologies to ensure extremely high levels of plant performance. We also work to develop and supply economic, efficient and environmentally friendly water treatment technologies.

## OUR SOLUTIONS MUNICIPAL WASTEWATER

- |  |                         |
|--|-------------------------|
| 1 - CSO Stormwater                       | 5 - Sludge treatment    |
| 2 - Headworks                            | 6 - Mobile systems      |
| 3 - Clarification \ sedimentation        | 7 - Anaerobic treatment |
| 4 - Aerobic treatment \ nutrient removal | 8 - Wastewater reuse    |



Scan the QR Code  
For further information

visit us online at :  
**ovivowater.com**

\*Carrousel® is a registered trademark of HaskoningDHV Nederland B.V



## features

### 12 TOP PERFORMER – PLANT: ALL BUSINESS

The treatment facility in Ishpeming, Mich., applies financial acumen across the board. The result is a plant that delivers quality effluent and makes operators' lives easier.

By Jim Force

### 18 HEARTS AND MINDS: SCHOOL'S OUT, CAMP'S OPEN

Students get a chance to extend their science education at annual summer program sponsored by a Pittsburgh-area clean-water agency.

By Pete Litterski

### 20 PLANTSCAPES: POWER MOWERS

Goats that feast on weeds and crops from effluent-irrigated fields help keep costs down and provide a curiosity for residents near a lagoon treatment plant in Utah.

By Jeff Smith

### 24 TOP PERFORMER – PLANT: FULL CIRCLE

Destin Water Users puts 100 percent of its wastewater effluent back to work as reclaimed water for irrigating residential, commercial and public spaces.

By Jim Force

### 30 IN MY WORDS: 'SILENT' NO MORE

The Detroit Water and Sewerage Department's public outreach program includes profiles of those who help protect local water resources.

By Ted J. Rulseh

### 34 TOP PERFORMER – OPERATOR: FINDING THE MAGIC

Dan Peterson went from a military career to leading an innovative team at a highly successful municipal treatment plant in Durham, N.H.

By L.K. Williams

### 40 GREENING THE PLANT: SIMPLE TO ADVANCED

Improvements ranging from new light fixtures to a breakthrough solar installation help a Colorado plant cut energy usage by nearly 20 percent.

By Doug Day

### 42 HOW WE DO IT: BETTER WAY TO FEED

A new method of polymer addition helps an Illinois plant produce drier biosolids and reduce polymer costs significantly.

By Scottie Dayton

### 44 LAB DETECTIVE: WHICH SIDE OF THE CURVE AM I ON?

The Lab Detective helps a clean-water plant understand the chemistry of chlorine in water and correct seasonal excursions in effluent coliform.

By Ron Trygar, CET

## COMING NEXT MONTH: DECEMBER 2013

### Product Focus: Energy Management and Sustainability

- Exam Tutor: Understanding pH
- Top Performer – Plant: Storm resiliency in Rahway, N.J.
- Top Performer – Operator: Pete Laramie, Fairhaven, Vt.
- Top Performer – Biosolids: Egg-shaped digester in Grandville, Mich.
- In My Words: Flood preparation in Lowell, Mich.
- Greening the Plant: Energy efficiency in Washington, Iowa
- PlantScapes: Wildlife habitat in Wichita, Kan.
- In My Words: Flood response and emergency planning in Lowell, Mich.



24



30



12



12

## departments

### 8 LET'S BE CLEAR: HAIL TO THE CHIEF

The Fire Chief Project continues in print and online. Feel free to share your activities that contribute to the project's key goals.

By Ted J. Rulseh, Editor

### 9 FIRE CHIEF PROJECT IDEA OF THE MONTH: ENGAGING THE COMMUNITY

By Ted J. Rulseh

### 10 EDITOR'S CHOICE: FIND OTHER USEFUL AND TIMELY INFORMATION ON THE TPO WEBSITE

### 48 PRODUCT FOCUS: WASTEWATER TREATMENT SYSTEMS

By Craig Mandli

### 54 CASE STUDIES: WASTEWATER TREATMENT SYSTEMS

By Craig Mandli

### 60 PRODUCT NEWS

Product Spotlight: Nitrogen removal system uses less energy, no carbon source

By Ed Wodalski

### 62 INDUSTRY NEWS

### 64 WORTH NOTING

People/Awards; Education; Calendar of Events

### on the cover

Dan Peterson, plant superintendent at the Durham (N.H.) Wastewater Treatment Facility, gets excited about testing technologies, making the highest-quality effluent possible, and meeting the challenges of nitrogen limits for the Great Bay, a unique salt marsh and estuary. (Photography by Elizabeth Frantz)

34







WE ARE THERE *for* YOU  
EVERY STEP OF THE WAY

AWARD WINNING *service*



See for yourself at  
[huberforum.net/service.html](http://huberforum.net/service.html)

[service@hhusa.net](mailto:service@hhusa.net) • 704.949.1001

**SOLUTIONS FOR:**



**SCREENING**



**GRIT**



**SLUDGE**

- Experienced **Factory Trained** Service Technicians
- **Fully Stocked North American** Parts Warehouse

**HUBER**  
**TECHNOLOGY**  
WASTE *WATER* Solutions



# Hail to the Chief

THE FIRE CHIEF PROJECT CONTINUES IN PRINT AND ONLINE. FEEL FREE TO SHARE YOUR ACTIVITIES THAT CONTRIBUTE TO THE PROJECT'S KEY GOALS

By Ted J. Rulseh, Editor

I hope you've been enjoying the Fire Chief Project Idea of the Month in recent issues of *TPO*. There we highlight operators doing things that further the project's two key aims:

- **Raise clean-water operators to the status of the fire chief**
- **Make kids grow up wanting to be clean-water operators**

You can read more examples of the Fire Chief Project in my editor's blog on the *TPO* website ([www.tpomag.com](http://www.tpomag.com)). Look under the "Most Recent" heading — the articles listed at the upper right of the home page. Feel free to share your activities that would tend to contribute to the Fire Chief Project's objectives. Send me a note to [editor@tpomag.com](mailto:editor@tpomag.com).



Speaking of the Fire Chief Project, one way to elevate the stature of clean-water workers is to be proactive about publicity for them. This month's "In

My Words" column highlights the Detroit Water and Sewerage Department and strides it has made toward building appreciation for the people who operate the city's and the region's water and wastewater systems.

The Faces of Wastewater series is something almost any community could replicate. Profiles of operators in various roles could be posted on the community website, as in Detroit's case. Another alternative for agencies in smaller communities would be to offer these profiles to the local newspaper. As a former weekly paper editor, I can attest that such submissions would stand a good chance of being published.



Care to guess which article from *TPO* has received the most "hits" on the magazine website at [www.tpomag.com](http://www.tpomag.com)? It's a piece by our Lab Detective columnist Ron Trygar explaining sludge volume index (SVI).

In fact, technical articles of this general nature are popular in *TPO*. Operators seem hungry for information about wastewater physics, chemistry, biology and math. Look for another article along these general lines in the December issue. Under the heading of "Exam Tutor," Trygar has written an article that explains the vagaries of pH. It includes a short series of multiple choice questions similar in character to what you might see on a licensing exam. We hope you enjoy this article and would welcome your comments on it.



Can you imagine a science-fiction horror novel set in a wastewater treatment plant? Now you don't have to. A story in this month's issue describes Dodge Winston's self-published book, *The Wastewater Plant*, a tale that combines a science experiment gone bad, a government plot and a collection of personalities on a clean-water plant crew. Check out the article and consider ordering the book at the online sites mentioned.



As always, *TPO* welcomes your comments on the magazine — what we're doing well and what we can do better. We're about to enter our sixth year of publishing the magazine, to generally great feedback. We often hear operators say that of all the trade magazines they see each month, *TPO* is the one they really read. That's nice to hear — but how can we serve you even better? Please send your suggestions to [editor@tpomag.com](mailto:editor@tpomag.com). I promise to respond — and you just might find your suggestion turning into an actual change in the publication. We're quite responsive that way. **tpo**

## What is Really Going On Beneath the Surface?



### Process-Engineered Ditch and SBR Solutions



Actual 2.2mm Bubble Size

Optimum Size for Oxygen Transfer Per EPA

- Reliable Triton Aerator/Mixer Allows for Strict Process Control
- Deep Aeration and Mixing Allows for Small Footprint
- Dual-Function Control of Nitrification/Denitrification Modes for Stringent BNR Compliance



**Aeration Industries®**  
[www.aireo2.com](http://www.aireo2.com)



©2013 AII LLC, All Rights Reserved.

# Engaging the Community

By Ted J. Rulseh

**A** Kansas city is taking what looks like an old-fashioned town hall approach to renewing a focus on wastewater and water infrastructure.

In a bylined article in the *Arkansas City Traveler* newspaper, city manager Nick Hernandez outlined a "Water Grows Our Future" initiative that covers the city's wastewater collection and treatment, water treatment and distribution, and stormwater management programs.

In September, the city commission hosted a community forum on the topic. "Water is vital to the success of nearly every part of our life," Hernandez wrote. "When we get up in the night for a glass of water and turn on the tap, clean, drinkable water flows from the faucet. While we were sleeping, our local businesses continued to use water for the production of their products, allowing jobs for our friends and neighbors.

It is an uninteresting fact of modern life until, one day, no water comes out."

Hernandez went on to observe that residents often take water-related systems for granted until there is a major problem, like a water main break, sewage backup or flood.

"A well-maintained, reliable water infrastructure system is vital to Arkansas City," Hernandez wrote. "Yet despite its importance, our aging water infrastructure system has suffered from a lack of investment, delayed maintenance and insufficient resources. ... Like the homeowner who postpones repairs until the roof leaks, we jeopardize our entire local economy when we fail to maintain and upgrade our existing water infrastructure." He asked:

- Do we as a community understand how we got here?
- Is our community committed to addressing our aging and failing water infrastructure in a way that will last another 50 to 100 years?
- Are we willing to pay for it?

"If steps are not taken now to address the infrastructure needs at hand, the community will not grow, and if it is not growing, it is declining. Join us for a communitywide discussion to help us all to answer the questions above."

Engaging the public in this way helps further the aims of The Fire Chief Project:

- **Raise clean-water operators to the status of the fire chief**
- **Make kids grow up wanting to be clean-water operators**

**For more on The Fire Chief Project, visit the blog at [www.tpomag.com](http://www.tpomag.com)**

**Send ideas for The Fire Chief Project to [editor@tpomag.com](mailto:editor@tpomag.com)**



**The** world's most advanced energy management system.

**One** hundred percent designed, built and tested in the USA.

**You** benefit from 45% energy savings through advanced technologies.

**Want** green technology to take your aeration plant to the next level?

**Hoffman and Lamson.com**



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](mailto:editor@tpomag.com)**





## ORCA Sonar System

No other system can out-perform HAWK's highly innovative ORCA Sonar!

The ORCA can be used in all applications, from water clarifiers to mining thickeners.

### Advantages

- Improved Underflow
- Chemical Control
- Overflow Clarity Improvements
- Improved Operator Effectiveness



Our sales and support team are here to help.

Contact us to learn how we can provide solutions for your level measurement needs at 978-304-3000 or [info@hawkmeasure.com](mailto:info@hawkmeasure.com).

[www.hawkmeasure.com](http://www.hawkmeasure.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](http://www.tpomag.com) / Email: [info@tpomag.com](mailto: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](http://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](http://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](mailto: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](mailto: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](mailto:editor@tpomag.com).

**REPRINTS AND BACK ISSUES:** Visit [www.tpomag.com](http://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](mailto:jeffl@colepublishing.com). To order back issues, call Nicole at 800-257-7222 (715-546-3346) or email [nicolel@colepublishing.com](mailto:nicolel@colepublishing.com).

**CIRCULATION:** 76,492 copies per month.

© 2013 COLE PUBLISHING INC.

No part may be reproduced without permission of publisher.



## editor's choice

## Find other useful and timely information on the TPO website

TPO aims to bring you stories that help you and your plant perform better. Now we do more of the same at [www.tpomag.com](http://www.tpomag.com). There you'll find stories that appear only online — and that are current, because they're not subject to the lead times involved in the print magazine. Here are a few online exclusives recommended by the TPO editorial team:



### MUNICIPAL DISINFECTION MARKET GROWS AS UV SEGMENT EXPANDS

Driven by rising demand for water reuse, the market for disinfection systems is expected to reach \$2.96 billion globally in 2019, according to Frost & Sullivan. While chlorine-based products will continue to dominate, UV systems will grow rapidly. "There is population growth and increased industrialization, leading to a rise in demand for water, but what isn't growing is the amount of water available on the planet," says Wayne Lem, market manager for TrojanUV.

### TURNING BROWN GREASE INTO BIOFUEL

In the movement to turn wastewater treatment plants from cost centers to profit centers, grease could play a significant role. RPM Sustainable Technologies is introducing a new process to convert brown grease into biodiesel fuel. A co-byproduct, glycerol, could have applications as a building block for high-end chemicals and other products.



### MRWA CREATES FREE APPS FOR WASTEWATER INDUSTRY

Clean-water operators are always looking to simplify technical measurements and data collection. Now, smartphones could become valuable tools for streamlining operations. The Missouri Rural Water Association is rolling out a series of 10 free apps for Android and iPhone devices that can help operators make easy calculations.

### 'FLUSHABLE' PRODUCTS: SILENT KILLER OF UTILITY BUDGETS AND REPUTATIONS

Protecting your collection system and treatment works from sanitary sewer overflows and blockages has become more difficult over the last few years. Many kinds of wipes on the market claim to be flushable but in reality clog lift station pumps. In fact, several utilities have shown that claims of "sewer and septic safe" are false. Here's what utilities and the wipes industry are doing about it.



### \$300 MILLION WAKE-UP CALL LEADS TO STREAK OF ACCOLADES

The non-compliance lawsuit filed against the Wayne County (Mich.) Downriver Wastewater Treatment Facility in the mid-1980s was a shock to the communities it served, but also a wake-up call. "We had a massive non-compliance streak back then, and the lawsuit by the EPA was a hard pill to swallow," says Firooz Fath-Azam, P.E., plant superintendent. "But it forced the realization that regular investments in this facility were not only necessary, it would be less expensive in the long run."

Check out all these stories at [www.tpomag.com/ec/2013/November](http://www.tpomag.com/ec/2013/November)

# 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](http://www.dragonproductsltd.com)





Paul Altobello, Ishpeming Area Wastewater Treatment Facility lead operator, checks the Krofta Air Dissolving Tube, used in the facility's dissolve air flotation treatment system. (Photography by Cory Dellenbach)

# All *Business*

THE TREATMENT FACILITY IN ISHPEMING, MICH., APPLIES FINANCIAL ACUMEN ACROSS THE BOARD. THE RESULT IS A PLANT THAT DELIVERS QUALITY EFFLUENT AND MAKES OPERATORS' LIVES EASIER.

By Jim Force

THE ISHPEMING AREA JOINT WASTEWATER TREATMENT Facility in Upper Michigan is a popular place. Next-door neighbor Negaunee is about to send its wastewater to the plant for treatment. The facility's Class A Exceptional Quality biosolids compost is in demand for local landscaping. And its staff loves working at the plant because several process improvements have made operations easier and safer.

In part, facility director Debbie Pellow attributes the plant's success to its administrative structure, consisting of a board that deals only with wastewater. "We supply treatment to the City of Ishpeming and to Ishpeming Township and are governed by the Ishpeming Area Joint Wastewater Treatment Board," Pellow says. "Our board members must apply for the position. They bring an inherent interest and understanding for wastewater to the job. As a result, our board emphasizes keeping our employees safe."

She says staff members like their jobs and tend to stay on for the long haul. Pellow has been at the plant since 1992. Paul Altobello, lead operator, and Mike Junak, operator, have been there since 1991, and Darren Kotajarvi, operator, since 1994. The staff also includes Marc Hillman, operator, and Melissa Richards, lab technician. "Absolutely, it's a great place to work," says Altobello.

## EFFECTIVE REMOVAL

Opened in 1986, the Ishpeming plant handles an average flow of 1.0 mgd

and is designed for 2.34 mgd. The plant accepts wastewater from the City of Ishpeming (population 6,470) and Ishpeming Township (population 3,522). The city and township maintain their own collection systems: "We're responsible for it once it hits the gate," says Pellow.

Wastewater flows by gravity to a wet well 23 feet below plant grade and is pumped in a single stage up to the headworks by four 50 hp pumps (Fairbanks Nijhuis). A center-flow band screen with 3/8-inch openings (Ovivo) removes rags and trash. An aerated chamber removes grit. Ferrous chloride is added to remove phosphorus, enabling the plant to meet a stringent phosphorus removal standard for its receiving stream, the Carp River, classified as a sensitive trout habitat.

There are no primary clarifiers.

After the headworks, the flow passes to a pair of horseshoe-shaped oxidation ditches, each one rated at 1.1 mgd. The ditches (Ovivo) are equipped with four surface aerators with mechanical splash dual impellers. Allen-Bradley variable-frequency drives (Rockwell Automation) control the aerators accord-

"We were paying and paying and using up landfill space. Why produce a product and then not use it?"

**DEBBIE PELLOW**





Ishpeming operators got a rare look at the inside of a clarifier when this unit was drawn down for rebuilding.





The team at the Ishpeming Area Joint Wastewater Treatment Facility includes, front row, from left, Melissa Richards, lab technician; Deborah Pellow, director; Darren Kotajarvi, operator; back row, Mike Junak, operator; Paul Altobello, lead operator; Marc Hillman, operator; Ian Altobello, summer student.

# profile



## Ishpeming (Mich.) Area Joint Wastewater Treatment Facility

<b>BUILT:</b>	<b>1986, numerous upgrades since</b>
<b>SERVICE AREA:</b>	<b>City of Ishpeming, Ishpeming Township</b>
<b>POPULATION SERVED:</b>	<b>10,000</b>
<b>FLOWS:</b>	<b>2.34 mgd design, 1.0 mgd average</b>
<b>TREATMENT LEVEL:</b>	<b>Secondary</b>
<b>TREATMENT PROCESS:</b>	<b>Oxidation ditch</b>
<b>RECEIVING STREAM:</b>	<b>Carp River (tributary to Lake Superior)</b>
<b>BIOSOLIDS:</b>	<b>Aerobic digestion, in-vessel composting</b>
<b>AWARDS:</b>	<b>Outstanding Operation and Maintenance, U.S. EPA Region 5, medium-sized secondary plant, 2005</b>
<b>ANNUAL BUDGET:</b>	<b>\$890,000 (2013 operations)</b>
<b>GPS COORDINATES:</b>	<b>Latitude: 46°29'29.35" N; Longitude: 87°41'19.52" W</b>

ing to the dissolved oxygen content in the ditches. Return activated sludge (moved by Fairbanks Nijhuis pumps) mixes with influent at the head of the biological process.

"Normally, we operate one ditch at a time, but with the Negaunee wastewater coming on stream, we may need to operate both," says Altobello. Treated water flows to two new clarifiers with full-radius skimmers and energy dissipating feed wells, each 65 feet in diameter.

In the chlorination/dechlorination chamber, oxygen is added before the flow passes to the river. Ishpeming uses hypochlorite for disinfection and

sodium bisulfite for dechlorination. Some of the effluent water is used in the plant; in fact, the plant uses city water only for drinking, showers and washing.

The wastewater treatment process achieves high levels of removal — 95 percent of BOD and TSS, 85-plus percent of phosphorus and essentially complete ammonia removal. "Our nitrification performance is unbelievable, especially considering our cold climate," says Altobello. All of the treatment processes are covered. The average lows in January and February are -5 degrees F, and the city's monthly record lows for November through March are all well below zero (the coldest ever recorded was -34 in 1979).



The facility's biosolids compost is popular with area residents.

## FROM SLUDGE TO COMPOST

Settled solids from the process pass to dissolved air flotation thickeners, and the thickened sludge (2 to 4 percent solids) is pumped to one of four aerobic digesters. "Anaerobic digestion would convert most of the organics to create methane," explains Altobello. "We need the organics as fuel for the composting process, so we use aerobic digestion for the waste solids. We want as much organic content in the solids as possible."

A pair of 1-meter belt filter presses (Ashbrook Simon-Hartley) dewater the biosolids — dosed with a polymer — to about 15 percent solids. The pressed cake is mixed with wood chips, then placed in an in-vessel composting system (Engineered Compost Systems). The system is housed in a sepa-





Paul Altobello takes a sample from the chlorine contact chamber.

rate building with five composting bays (vessels), each 12 feet high by 14 feet wide and about 50 feet long.

An RSview32 SCADA system (Rockwell Automation) enables the plant staff to automatically monitor and control the processes, and the composting system is connected directly to Environmental Composting Systems in Seattle, Wash., so that both the plant staff and company technicians can monitor the composting time and temperatures.

### CONTINUOUS IMPROVEMENTS

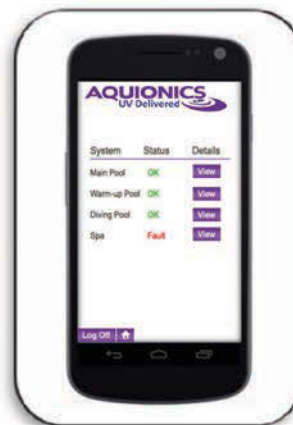
The plant's sterling performance and operator satisfaction result from a number of process improvements, some suggested by the staff, others emanating from inspections by Michigan OSHA (at the plant's invitation), and all supported by the wastewater board.

"When our operators come up with a better way of doing something, we give it very serious consideration," says Pellow. She points out that with a 23-foot-deep wet well, cleaning with hand rakes was difficult. In 2007, the board authorized \$200,000 to install an automatic influent screening system. "We don't have to haul buckets up 23 feet anymore," says Altobello. The screen comes all the way up to the headworks floor, eliminating the need for operators to enter a confined space.

## What If...

There was a way to monitor your UV system anytime, anywhere?

## There Is!



## Introducing UVConnect

**AQUIONICS**  
UV Delivered

P: 859.341.0710

[www.aquionics.com](http://www.aquionics.com)

A HALMA COMPANY  
Aquionics UV Delivered™ is a trademark of Aquionics.

**30**  
YEARS  
1983-2013

In the blower room, once a very noisy place, staff members now can hear themselves talk. That's due to the recent addition of positive displacement blowers (Kaeser) and noise enclosures. The room is so quiet now that a recent Michigan OSHA inspection determined that ear protection was not required.

Because the April 2013 OSHA inspection was voluntary, the plant was able to correct safety issues without being assessed penalties. "We found the money necessary to act on the recommendations resulting from the inspection," says Pellow. "They recommended several safety steps, including different types of ladders for entry into our digesters."

The old ladders were a short step-ladder type. OSHA recommended longer, more stable ladders with safety chains, and the team made the switch, adding to a positive, safe environment for employees. The facility hasn't recorded a lost-time accident in more than 27 years.





Melissa Richards, lab technician.

Operators had a hand in two other significant changes. “We wanted a better skimming system on the clarifiers,” says Altobello. “The old ones didn’t skim the full radius of the clarifiers, and the water just didn’t look good.” Skimmers now sweep the entire surface of the clarifiers. The facility has combined shifts so that a full crew is on hand during the day. “It makes it easier for us to get big projects done,” Altobello says.

## AN EXCELLENT PRODUCT

The Ishpeming staff members are fond of the in-vessel composting system. Since startup in February 2011, it has proven simple to operate and environmentally friendly. “There are just two little blowers to maintain,” says Altobello. Adds Pellow, “It’s the right thing to do for the environment.”

Ishpeming’s is the only all-weather in-vessel composting system in Michigan and one of just two like it nationwide. Dewatered cake and wood chips are mixed to reach a density of 29 to 34 pounds per cubic foot of material. Then the mix is allowed to “cook and cure” in the site-built insulated concrete vessels.

Temperature probes are inserted into the inside walls of each composting bay. The composting atmosphere is tightly enclosed, and the heavy, pressurized bay doors are opened with a special hydraulic system supplied as part of the technology. The doors are lifted onto an overhead track and slide from side to side to open the vessel completely and avoid damage to the door as material is unloaded.

## A NUMBERS PERSON

Most wastewater professionals start out in the clean-water business and add management skills as they progress through their careers. It’s the opposite for Debbie Pellow, director of the Ishpeming Area Wastewater Treatment Facility. She started out as the bookkeeper for the plant in 1992 and moved up to interim director in 1998 when the treatment authority couldn’t find a wastewater manager with financial acumen. By 2000 she had her Class D wastewater license and the director’s job was hers for keeps.

“We have a talented operations staff,” she says. In turn, she is free to focus on management, including finance, purchasing, human resources and agency relations.

The annual budget reflects an accountant’s discipline. The treatment facility’s two customers — Ishpeming city and township pay for service not based on flow volume but according to the pounds of BOD, TSS, ammonia and phosphorus in the influent. Against income, Pellow and the staff plan for annual operating and capital expenditures and for a contribution to a replacement (sinking) fund.

“We transfer money to the fund every year,” Pellow says. “It’s invested and needs to be enough to cover equipment replacement needs in the future. As with everyone, employee benefits are probably our biggest challenge.”

The business sense at Ishpeming has led to new revenue streams. Biosolids composting, for example, has brought in \$5,000 to \$7,000 a year in the two years since the plant started selling the material.

Lab service is another. When the State of Michigan shut down its network of laboratories, Ishpeming was quick to purchase the equipment from the local university that provided the service and go into the business itself.

Today, the plant’s laboratory performs basic wastewater testing for other municipalities and mines in the area, as well as potable water testing for municipalities and private well owners. Pellow estimates the activity amounts to \$45,000 to \$50,000 in revenue per year.

Septage treatment is another income source. The goal at Ishpeming is to limit cost increases each year to two percent or less. To Pellow and her staff, it’s a number just as critical as the values in the plant’s discharge permit.



Debbie Pellow

The aeration components and control system are located at the backs of the vessels in an aeration hallway. Heat from the vessels keeps the hallway warm even in extreme cold. The control system closely monitors the process and, along with a unique aeration design, optimizes compost stabilization and pathogen reduction.

The material heats to 131 degrees F or higher for three straight days with no breaks to ensure the required pathogen reduction. The material must also maintain 113 degrees F for 14 nonconsecutive days to meet vector attraction reduction requirements. The total process takes about 50 days and yields a product that achieves Exceptional Quality (EQ) status.

## more info:

**Alfa Laval Ashbrook  
Simon-Hartley**  
800/362-9041  
www.as-h.com

**Engineered Compost  
Systems (ECS)**  
206/634-2625  
www.compostsystems.com

**Fairbanks Nijhuis**  
913/371-5000  
www.fairbanksnijhuis.com

**Kaeser Compressors, Inc.**  
877/596-7138  
www.kaeser.com

**Krofta Engineering Limited**  
www.kroftaengineering.com

**Ovivo USA, LLC**  
512/834-6000  
www.ovivowater.com  
(See ad page 5)

**Rockwell Automation**  
414/382-2000  
www.rockwellautomation.com/  
industries/water

**Screen USA**  
770/433-2440  
www.screenusa.net

### Ishpeming (Mich.) Area Joint Wastewater Treatment Facility PERMIT AND PLANT PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
<b>BOD</b>	200 mg/L	3 mg/L	21 mg/L monthly 31 mg/L daily
<b>TSS</b>	250 mg/L	3-5 mg/L	30 mg/L monthly 45 mg/L 7-day avg.
<b>Ammonia</b>	20 mg/L	< 0.09 mg/L	10 mg/L daily
<b>Phosphorus</b>	4 mg/L	< 0.69 mg/L	< 0.80 mg/L monthly

After the cure cycle, a Trommel screen (Screen USA) removes the larger wood chips, which are simply recycled and used in the next batch. Ishpeming generally fills two bays each month. In winter, the cured compost is stored in a covered barn-like building. In the warmer months, it is sold to residents for gardening and landscaping. Any remaining product is taken by Moyle Trucking, a local landscaping firm.

Moyle uses it for landscaping and top dressing of wildlife feedlots, according to Sean Francis, project manager with the company. "We blend the compost with topsoil — about 25 percent compost to 75 percent soil," he says. "It adds nutrients to the topsoil. We've been using it for a couple of years now and it's a good product. It's good to put it to use."

The system is highly cost effective versus Ishpeming's old method of landfilling the sludge cake. The plant was paying \$38.50 a ton in landfill tipping fees and about \$60,000 a year in total landfill fees and hauling costs. With the tipping fees increasing to \$58.50 per ton, the facility faced landfill costs of about \$120,000.

"In contrast, our chip costs are about \$45,000 a year," Pellow says. "We were paying and paying and using up landfill space. Why produce a product and then not use it?" The savings have allowed the facility to act on yet another operator suggestion and obtain a second compost loader. "Now we can use one loader for screening and the other for loading the vessels," says Altobello. "Plus we have one for backup if necessary."

### NEGAUNEE NEXT

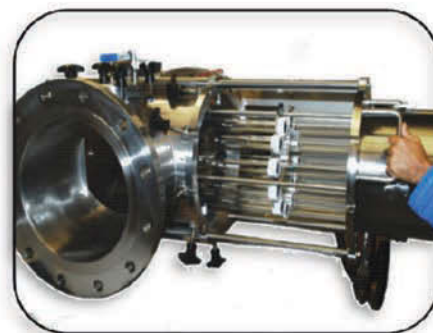
The plant's wastewater flows and compost production will soon increase significantly: Sometime in winter or spring of 2014, the facility will begin receiving wastewater from the neighboring city of Negaunee, bringing the average daily flow to around 1.5 mgd. Average design flow will be increased to 5.5 mgd, mainly by addition of a third clarifier and retrofitting and recommissioning of the plant's two original clarifiers.

The agreement to send Negaunee's flow to Ishpeming has been discussed for some time. A recent study of treatment options showed that complete rehabilitation of the Negaunee treatment plant would raise user rates

## What If...

There was a closed vessel unit that was single ended, resulting in a smaller footprint, and full access for maintenance?

## There Is!



## Introducing InLine+SE

**AQUIONICS**  
UV Delivered

P: 859.341.0710

www.aquionics.com

A HALMA COMPANY  
Aquionics UV Delivered™ is a trademark of Aquionics.

**30**  
YEARS  
1983-2013

from \$21.26 to about \$50 a month, and partial rehabilitation still would raise rates to more than \$43 a month.

Sending Negaunee wastewater to Ishpeming will increase rates to \$27.68 a month and capitalize on the \$2 million already spent by Negaunee to accommodate the change. The switch will occur as soon as a new 5-mile feeder line from Negaunee is completed.

"This was the most cost-effective option," says Pellow. Studies show a \$336,000 annual savings in operations and labor costs for wastewater treatment at Negaunee, enabling the city to pay for its bonds for the Ishpeming connection with the savings. The move will also generate more revenue for the Ishpeming facility, reducing monthly payments from Ishpeming city and township. Says Pellow, "Having the three communities together will save everybody money." tpo



# School's Out, Camp's Open

STUDENTS GET A CHANCE TO EXTEND THEIR SCIENCE EDUCATION AT ANNUAL SUMMER PROGRAM SPONSORED BY A PITTSBURGH-AREA CLEAN-WATER AGENCY

By Pete Litterski



PHOTOS COURTESY OF ALCOSAN

When school lets out for the summer in the Pittsburgh area, parents who think education shouldn't be shelved until fall have a variety of options for their children — including the Allegheny County Sanitary Authority (ALCOSAN) annual Summer Science Camp.

The four-session summer program gives more than 100 students in grades 4-8 a chance to learn about the sciences of wastewater treatment and engineering. Two sessions are geared to grade 4-5 and two for grade 6-8. The program, which just completed its tenth year, is open to students in Pittsburgh and the other 83 communities ALCOSAN serves.

## CONNECTED WITH SCHOOL

Twila Simmons-Walker, manager of wastewater education, says the program is closely aligned with Pennsylvania's science curriculum. "We learned very early that if we did not design our classroom presentations to the state standards, we were not going to be as successful," she says. "So when we began to design a summer program, we decided that if you're calling it summer enrichment, you really should have it relate to their curriculum in the classroom."

"We show them the controls where the operators can manage what is going on throughout the plant. It's about a two-hour tour, and we expose them to the operators and their roles: the mechanics, technicians and tradespeople who work there."

DAVE BROWN

The camp's classroom curriculum focuses on hand-on activities.

Simmons-Walker says ALCOSAN's wastewater treatment plant on the banks of the Ohio River is a great laboratory for focusing on science, technology, engineering and math (STEM) education: "It's not hard to relate to the curriculum when you consider the STEM focus we have here. There are labs, engineers, processes and technicians."

Although the program at first focused on tours and instruction by treatment personnel, the summer camp has evolved. "We went to more of a hands-on approach based on what we heard from students, from local educators and from some of the after-school programs we were working with," Simmons-Walker observes.

There are no fees for the camp. Students bring their own lunches (except on Friday when pizza is served) and the classes meet from 9 a.m. to 3 p.m. Parents are asked to commit to having their children attend all five days of their sessions. Parents also attend an orientation geared just to them before the summer program starts.

## TOURING THE PLANT

ALCOSAN has a paved space where it sets up a large tent for the summer program and equips it with all the equipment students



Summer Science Camp instruction aligns closely with school curriculum.



The camp includes in-the-field experiences like stream testing, as well as treatment facility tours.

need to work on projects ranging from pH testing to building model water-sheds. But the program also has access to the treatment plant itself. Dave Brown, manager of operator training, works closely with Simmons-Walker on the program and says a big part of the first day is helping the students understand what the treatment plant does and how.

"We usually take them on a plant tour so they can track the process from the wet well to the discharge," Brown says. "We show them the controls where the operators can manage what is going on throughout the plant. It's about a two-hour tour, and we expose them to the operators and their roles: the mechanics, technicians and tradespeople who work there."

Brown, a certified operator who served as a chief supervisor for a decade before moving into training, leads tours for all new employees as part of his regular duties: "You often see the same surprise and sense of awe in their eyes as you get in the kids."

After the tour, Simmons-Walker and summer college interns "ease the students into our focus for the year." For 2013, the focus was, "Engineering Is Science, Too." Planning for 2014 began as the tents were being taken down after the final class of 2013.

## REPEAT LEARNERS

The official enrollment target for each one-week camp session is 30 students, but Walker will enroll as many as 35 students. Even though the 30-by-30-foot tent is the main classroom, the students go where the instruction can be most effective. "There are times we come in for some presentations," Simmons-Walker says. "For this program to work, we need the entire plant to work with us. Everybody helps in some way to make it feasible for the kids to be here."

Although it's often the parents' idea to sign students up for the camp the first time, many students come back in subsequent summers because they take an interest. Once they complete the program, "A lot of them will come back with their families in September for our annual Open House," Simmons-Walker says. "They want to show their parents what they learned."

Brown, who has a degree in environmental resource management from Penn State University, joined ALCOSAN as a shift supervisor/engineer in the treatment plant. He adjusts his technical presentations to the grade level and students' interests. He and Simmons-Walker have worked together on the Summer Science Camp since its inception.

# What If...

There was a drinking water system that did not require an action spectra correction factor?

# There Is!



## Introducing InLine+D

**AQUIONICS**  
UV Delivered

P: 859.341.0710

[www.aquionics.com](http://www.aquionics.com)

A HALMA COMPANY  
Aquionics UV Delivered™ is a trademark of Aquionics.

**30**  
YEARS  
1983-2013

## THE 'WOW' FACTOR

"Some of them pick up a little more on it than other groups," Brown says. "They want more information; they ask some really good questions. In that case, I'll explain a little more to them about the biological process. When they leave primary treatment, I tell them to look at that water and I tell them that's how we used to release it. Now, when we go to secondary treatment, I say, 'Look at the water,' and they say, 'Wow!'" **tpo**

## What's Your Story?

**TPO welcomes news** about your public education and community outreach efforts for future articles in the Hearts and Minds column. Send your ideas to [editor@tpomag.com](mailto:editor@tpomag.com) or call 715/277-4094.





A nanny goat and two kids pass a grit box cover (two treatment lagoons are in the background).

# Power Mowers

GOATS THAT FEAST ON WEEDS AND CROPS FROM EFFLUENT-IRRIGATED FIELDS HELP KEEP COSTS DOWN AND PROVIDE A CURIOSITY FOR RESIDENTS NEAR A LAGOON TREATMENT PLANT IN UTAH

By Jeff Smith

**D**arwin Hall isn't necessarily happy about the publicity his 1.6 mgd natural treatment plant in Southern Utah has been getting, but he's willing to concede that having goats that help with plant maintenance is a curiosity to many people.

Two television stations have contacted him to do documentaries. Newspapers and other media have done stories or expressed interest. Hall, plant superintendent for Ash Creek Special Service District near Hurricane, Utah, says it started when a local reporter driving past the plant saw lots of goats grazing inside the fenced 340-acre site. She stopped to inquire, took pictures and wrote a story. "Now we have people coming out of the woodwork wanting to see our plant," says Hall.

"Before the goats, burning and spraying for weeds took a substantial part of the maintenance and operation budget."

## DARWIN HALL

The district first tried sheep, but they didn't range well on the heavy rip-rap slopes of the lagoons, and finding someone to shear the wool was difficult. So in 1986, the district got rid of the sheep, bought seven nanny goats and borrowed a billy — all Boer crossbreeds that are bred for meat rather than milk production. "That small beginning grew into over 100 nannies with an average 200 percent kid crop," says Hall.

More than 120 goats roam the banks of the seven-lagoon facultative system. They eat the weeds and save the Ash Creek district nearly \$20,000 annually on weed control. "Before the goats, burning and spraying for weeds took a substantial part of the maintenance and operation budget," says Hall.

## FAST BREEDERS

The district first tried sheep, but they didn't range well on the

The goats are raised by the district's farm manager, Kim Spendlove, who serves as caretaker and veterinarian. Besides checking on the goats daily and keeping predators like coyotes and stray dogs away, he finds the goats easy to keep: "They are real friendly and will eat hay right out of your hand."

The goats graze freely in pastures between the lagoons but need supplemental feeding of hay in winter and during dry spells. Spendlove occasionally gives them shots for pink-eye or colds, and he makes sure they have salt blocks available. Natural birthing in the pastures keeps the herd at the targeted level of 125 nannies. About 150 goats are sold on the market each February.



Irrigating an alfalfa field (Ash Creek Special Service District office in the background). *(continued)*



# Class A Biosolids Solutions

## 2PAD Two-Phase Anaerobic Digestion System

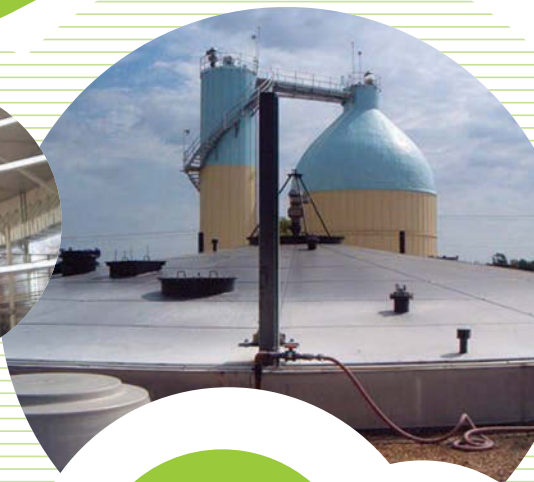
FOR CLASS A BIOSOLIDS and ENERGY from COGENERATION

- Net producer of green electricity with zero carbon footprint
- Reduces total hydraulic retention time
- Maximize volatile solids destruction and gas production
- Heat recovery system minimizes energy requirement

## INFILCO

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

[www.degremont-technologies.com](http://www.degremont-technologies.com)



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



OR IN OTHER WORDS...

WATER TESTING AND TREATMENT SUPPLIES, LABORATORY SUPPLIES,  
SAFETY SUPPLIES, WASTEWATER TREATMENT SUPPLIES, AND SO MUCH MORE AT  
**UNBEATABLE PRICES!** BECAUSE BEING OVERCHARGED IS NO JOKE.

Shop 24/7 | 877-271-1946 | [AquaOnDemand.com](http://AquaOnDemand.com)

Solutions by Aqua-Aerobic Systems. © 2012 Aqua-Aerobic Systems, Inc.

**AQUA**  
ON DEMAND

Your online source for all things water.™





## IRRIGATED FEED

Spendlove harvests 200 acres of alfalfa, oats and triticale each year on the plant property. The sale of crops nets about \$40,000, and annual sale of goats adds nearly \$18,000. "I also run the lagoons, but they are pretty much self-

The Ash Creek team includes, from left, Randy Stevens, electrician; Darrel Humphries, financial officer/human resources; Jason Stevens and Gary Wilcox, inspectors; Logan Murphy, operator; Greg Kleinman, pretreatment coordinator; Darwin Hall, superintendent; Blair Gubler, assistant superintendent; and Heath Ruesch, operator.

running, especially when you have the goats to keep the weeds out for you," says Spendlove. "I really enjoy it." All effluent from the plant is used to irrigate the 200 acres of crops. During the cold months, effluent is stored in a lagoon for irrigation between March and December.

Despite Hall's reservations about the attention his plant is getting, he acknowledges with humor the many awards the district and his 10-member staff have received. Most recent have been the Water Environmental Association of Utah's Best Lagoon award to the district, and the Operator of the Year to Spendlove.

Hall jokes that it seems whenever anyone finds time in the day to apply for an award for another staff member, a plaque shows up. Hall is proud of the innovative ways the district reduces costs and cooperates with its member communities of Hurricane, La Verkin and Toquerville: "The staff members at Ash Creek all strive to treat and use the treated water to provide the best quality of life to our customers." **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 715/277-4094.

**ENVIRONMENTAL DYNAMICS INTERNATIONAL**

**Design**  
**Supply**  
**Install**  
**Maintain**

**Aeration for Life™**

**NOT JUST ANOTHER DIFFUSER COMPANY**

**Aeration for Life** delivers *total service* from concept to installation and maintenance.

Complete aeration solutions from EDI allow you to focus on your expertise. Let us worry about oxygen, mixing, and KW consumption.

With almost 40 years of experience, we've delivered over 6000 solutions in over 100 countries across 7 continents.

**TO LEARN MORE PLEASE CALL OR VISIT**  
877.334.2478 | [www.wastewater.com](http://www.wastewater.com)

**Aeration for Life™**

**15th Year Anniversary**

**H Series**  
**REGENERATIVE BLOWER**

All-Star is celebrating their 15th year anniversary by introducing the "H" series blowers as standard\*

**"H" Series Temperature Comparison**

	<b>All-Star</b>	<b>Competition</b>
<i>Motor Insulation</i>	355° F	265° F or 315° F
<i>Bearing Grease</i>	380° F	280° F
<i>Seal</i>	500° F	280° F

\* No additional charge for these premium features

- 1/4 to 30 HP
- Pressure to 11.5 psig
- Flow to 900 SCFM
- Oil-free clean air
- Vacuum or Pressure
- Single and Two Stage Models

Registered and approved by one or more of these standards agency

**ALL-STAR™**  
Process Blowers  
Vacuum Pumps  
Process Compressors

Visit All-Star at [www.all-star-usa.com](http://www.all-star-usa.com) for additional details and assistance in selecting the best regenerative blower for your applications as well as viewing All-Star's other products.



## Dissolved Ammonia Monitor

### Proven Measurement Approach



The Q46N uses relative chemistry that converts ammonia in solutions to a stable monochloramine compound equivalent in concentration to the original ammonia level. The measurement is then made with a proven amperometric sensor.

#### FEATURES

- New Approach to On-Line Ammonia Measurement
- Total Ammonia Measurement
- Optional Free and Monochloramine Measurement

## Toroidal Conductivity

### Non-Contacting Conductivity System



The Q46CT Monitor employs an inductive (toroidal) sensor that allows measurement in difficult samples with virtually no maintenance. The toroidal sensor is a molded assembly made from Noryl, an engineering thermoplastic with excellent resistance to both strong acids and strong bases.

#### FEATURES

- Good Performance in Dirty Applications
- Multiple Monitoring Configurations
- Easy Calibration

## Automatic Sensor Cleaner

### Reliable D.O. measurement

**Q-Blast**



The Q-Blast System with reliable D.O. measurement uses either optical or membrane sensors. The Q-Blast D.O. System is ideal for aeration control systems, resulting in improved process performance and energy savings!

#### FEATURES

- The Q-Blast package includes the monitor and the cleaner air supply which are factory assembled for easy installation
- Choice of using either optical or galvanic membraned sensors
- Power Options include Universal 100-240 VAC or 12-24 VDC

## Total Chlorine Measurement

### Amperometric Measurement



The Q46H/79 provides highly accurate measurement of total residual chlorine down into the parts per billion range. Total Chlorine is measured using EPA recommended method for reaction of the sample with buffer and KI.

#### FEATURES

- Direct Reading Membraned Amperometric Iodine Sensor
- High Accuracy and Sensitivity Down to PPB
- 2-Assignable 4-20 mA Outputs for Chlorine, Temp or PID

## Toxic & Combustible Transmitter

### Internal Data Logger



Model D12 Gas Transmitters provide the ultimate in application flexibility. Loop-powered or 3-wire models with on-board relays are available, as are both combustible gas and universal toxic gas versions. Digital communication using Hart™ or Modbus™ protocols are available.

#### FEATURES

- Interchangeable "Smart Sensors"
- Internal Data-Logger
- Optional Sensor Daily Auto-Testing

## Portable Gas Leak Detector

### Interchangeable "Smart Sensors"



PortaSens II C16 Detector provide a flexible tool for locating the source of toxic gas leaks from storage cylinders, process machinery, gas generation equipment or piping systems. Smart interchangeable sensors allow one instrument to be used for a variety of gas detection requirements. Data-logger come standard.

#### FEATURES

- Interchangeable "Smart Sensors" for Over 30 Gases
- Internal Sample Pump and External Sampling Wand
- One-hand Pistol Grip Design

# A Gas-Phase Approach to Sulfite Measurement



## Keep Chemical Costs Under Control

### ATI's Model - Q46S/66 Sulfite Monitor

The Q46S/66 Sulfite Monitor takes a unique approach to the measurement, employing a unique gas phase method to continuously monitor sulfite values without contact between the sensor and the water sample.

### ATI's Sulfite Monitor Features:

- Sulfite ion is measured selectively by conversion to sulfur dioxide.
- Measurement is made without contact between sample and sensor, eliminating the potential for sensor fouling.
- Power options include 115 or 230 VAC, 50/60 Hz.
- Relays are programmable for setpoint, deadband, and time delay.
- Internal sequencing and relay system for automated sample line cleaning.
- Communication options for Profibus-DP, Modbus-RTU, or Ethernet-IP.

800-959-0299

[analyticaltechnology.com](http://analyticaltechnology.com)

**ATI**  
Analytical Technology





# Full Circle

DESTIN WATER USERS PUTS 100 PERCENT  
OF ITS WASTEWATER EFFLUENT BACK TO WORK  
AS RECLAIMED WATER FOR IRRIGATING  
RESIDENTIAL, COMMERCIAL AND PUBLIC SPACES

By Jim Force



Erica Magera, laboratory technician, collects a water sample from the reuse spigot. (Photography by Jeff Gammons)

## profile

### George French Water Reclamation Facility, Destin, Fla.



<b>BUILT:</b>	<b>1973</b>
<b>AREA SERVED:</b>	<b>6 square miles</b>
<b>POPULATION SERVED:</b>	<b>20,000 winter; 60,000 summer</b>
<b>FLOW:</b>	<b>6 mgd design</b>
<b>TREATMENT LEVEL:</b>	<b>Tertiary</b>
<b>TREATMENT PROCESS:</b>	<b>Oxidation ditch, mixed-media filtration</b>
<b>RECEIVING STREAM:</b>	<b>All effluent reused</b>
<b>BIOSOLIDS</b>	<b>Aerobic digestion, land application</b>
<b>ANNUAL BUDGET:</b>	<b>\$11 million (water, wastewater, reclamation, O&amp;M)</b>
<b>WEBSITE:</b>	<b>www.dwuinc.com</b>
<b>GPS COORDINATES:</b>	<b>Latitude: 30°23'43.39" N; Longitude: 86°28'41.11" W</b>

THE HEAVY RAINS THAT FLOOD STREETS AND WASH out beach parties in Destin, Fla., don't bother Richard Griswold. In fact, they can make him happy, since the precipitation fills his utility's underground storage and recovery system with water, which then can be used for irrigation around the community.

"Storage is critical," says Griswold, general manager of Destin Water Users Inc. (DWUI). "Unlike drinking water, which follows a preset law of supply and demand, there are no guidelines for reuse. It's a different animal altogether. Demand can exceed supply. We need to make the supply of reclaimed water reliable; otherwise, people will not use it."

That's why rainy days are welcome within Griswold's agency and its George French Water Reclamation Facility. "We anticipate oncoming rain days and figure out what we can do with the water," he says. "On a normal day, 100 percent of the wastewater we treat is going out as reclaim. We look for heavy rainfall days when we can actually store water for future reuse."

#### SIMPLE PROCESS

While total water reuse and the underground recharge system set Destin apart from many other utilities, the agency's water and wastewater treatment infrastructure is fairly typical. At six square miles in area, Destin sits on a densely populated island between Choctawhatchee Bay and the Gulf of Mexico on the Florida Panhandle. About 20,000 residents live there in winter, but the population swells to 60,000 during the summer fishing and tourism season.

The community draws drinking water from the Upper Florida Aquifer, which Griswold says is both "sweet" and prolific. DWUI operates five deep coastal wells and partners with other communities on an inland wellfield. Each well has its own chlorine injection system, and after onsite disinfection, the water is pumped into the distribution system. Total flow is about 6 mgd.

The community's wastewater enters the treatment plant through two step screens (Spaans Babcock). The water then flows into an equalization basin and is pumped to a series of racetrack-type oxidation ditches (WesTech) for biological treatment. From the ditches, the water flows to six circular clarifiers outfitted by WesTech.

Three screw pumps (Spaans Babcock) lift the clarified water to six mixed media traveling bridge filters (four by Infilco Degremont, two by Ovivo) which are followed by chlorination. Almost all of the treated water is reused for irrigation by the homeowners, commercial property owners, condomin-



Samples taken throughout the plant are checked for pH and chlorine levels.

"Unlike drinking water, which follows a preset law of supply and demand, there are no guidelines for reuse. It's a different animal altogether. Demand can exceed supply."

**RICHARD GRISWOLD**



Kevin Peck, wastewater operator, checks the oil level on the aerator on oxidation ditch No. 5.



## AMONG THE BEST

Richard Griswold will tell you that his staff at Destin Water Users Inc., is tops in the field. In addition to Griswold, who is general manager, the team includes Paul Reese, plant manager; Terri Stewart, lead operator; and Monica Autry, engineering manager.

Stewart was named Florida Operator of the Year in 2011, and in 2012 won the prestigious William D. Hatfield Award for outstanding performance and professionalism given by the Florida Water Environment Association.

"She is capable, reliable, competent, all admirable traits," says Griswold. Stewart, 55, started her career in the clean water profession at Destin Water Users in March 1995.

Today, she is responsible for the operation, process control and maintenance at the George French Water Reclamation Facility, a job she loves because she is "helping to protect the environment and taking care of the community."

Griswold points to Hurricane Katrina as an example of Stewart's dedication and concern for others. "In 2005, Florida sent 150 utility workers to help the State of Mississippi recover from the devastation wrought by Hurricane Katrina," he says. "Three of this number were female, and Terri was one."

She's not finished yet. Her goal and challenge is to see Destin's new aquifer storage and recovery facility become permitted and operational, "so more recycled water can become available to the community and people can use it any time."



The Destin Water Users Inc. team includes, bottom to top, Paul Reese, plant manager; Jason McGlaughlin, wastewater operator; James Bramblett, wastewater operator; Terri Stewart, wastewater operation superintendent; and Eric Polk, maintenance technician.



ium developments and golf courses. It is stored either in above-ground tanks (6.75 million gallon capacity) or in a new underground storage and recovery basin. A portion is returned to the treatment facility for equipment washdown.

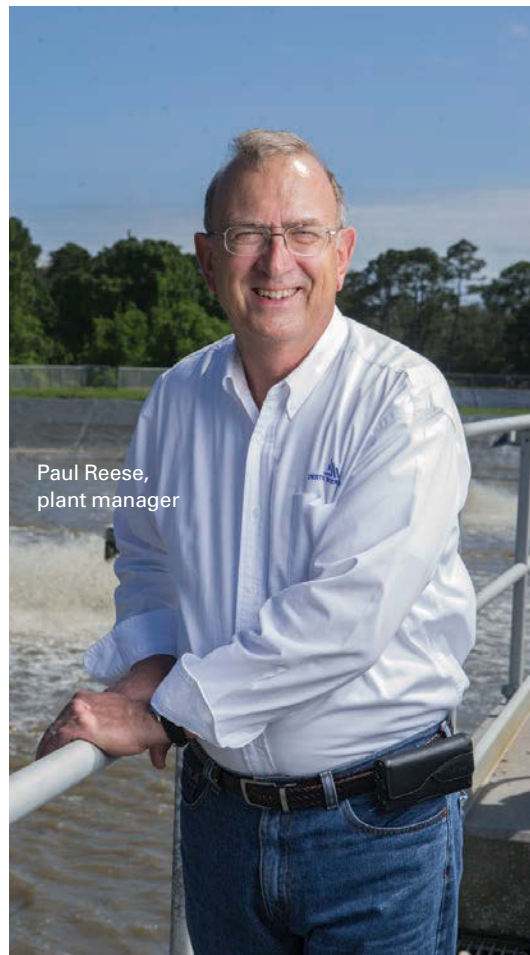
Aerobic digesters process the biosolids. Waste solids are thickened with polymer and then dewatered to a 15 percent cake on a belt filter press (Ashbrook). The material is hauled to a privately operated land application site, shared with several other treatment agencies, where it is recycled as a soil amendment for hay crops.

## RECOGNIZED FOR EXCELLENCE

Destin has been honored with a 2000 U.S. EPA Region 4 reclaim water Award of Excellence and has been recognized many times for its safety record by state and regional organizations. "It's part of our culture," says Griswold. "We talk about safety on the first day and every day. All our managers are responsible for it. We just make it happen."

Destin has a safety committee, important enough to have its own charter within the DWUI utility. The committee's goals aren't just the usual statements about the number of lost time accidents. "We don't focus on that," says Griswold. "Rather, our concern is identifying the issues that endanger our employees and the public, and how we can minimize those."

It's an approach that differs quite a bit from the time when Griswold joined the utility 14 years ago. "Back then, safety was just left up to the employees, and the budget for safety was zero," he says. "When I came here, the big issue was which department was going to pay for the yellow paint to mark safety hazards. Now we put safety in the budget. The directors approve it without much discussion, and the program is off and running."



Paul Reese,  
plant manager

The utility's maintenance program is also undergoing modernization. For years, according to Griswold, Destin has relied on experienced plant operators to maintain the pumps and other equipment, but that history is slipping away as older employees retire. DWUI is replacing that institutional memory with a more programmatic asset management program.

"In the old days, department managers simply knew what had to be done," he says. "That worked fairly well because we had employees who knew everything they needed to know. Now we're building a database. We started by using GIS, but as asset management software developed, good packages became available to use." Destin chose a system from Cityworks.

Griswold's operation has taken a similar step-by-step approach to energy consumption. "We had an audit, but the report really didn't recommend anything we weren't doing," he says. "We've looked at aeration and diffusers, but it's a hefty cost at first and the payback is 20 years."

*(continued)*

**IT'S WHAT'S BELOW  
THE SURFACE  
THAT MEANS THE MOST**

- Rotating bridge provides mixing independent of aeration
- Achieves BNR within a single basin
- 100% aeration turndown capability
- Energy savings of 30% or more over conventional systems
- Easy maintenance — serviceable without dewatering
- Reactor continuously adapts to variable load conditions
- Highly flexible controls with real-time monitoring of nutrients
- Ease of installation
- Patented process control system (US 7,416,669 B1)

**SCHREIBER**  
**CSR**  
CONTINUOUSLY SEQUENCING REACTOR

**Pure Ingenuity**

When it comes to energy savings in wastewater treatment, we make things very clear using pure ingenuity.

**SCHREIBER**  
schreiberwater.com





The George French Water Reclamation Facility.

George French Water Reclamation Facility PERMIT AND PERFORMANCE			
	INFLUENT	EFFLUENT	PERMIT
<b>CBOD</b>	160-220 mg/L	1.5 mg/L	20 mg/L
<b>TSS</b>	N/A	0.5 mg/L	5.0 mg/L
<b>Nitrates</b>	N/A	4.9-9.9 mg/L	12 mg/L
<b>pH</b>	N/A	6.9-7.8	6.5-8.0

“We spend a lot of time with our customers on how best to conserve. Overwatering is as bad for a landscape as underwatering. Our reuse coordinator goes out and helps set timers on residential watering systems.”

**RICHARD GRISWOLD**

Instead, Destin has installed variable-frequency drives nearly everywhere and uses soft starts on pumps and other machinery. “We’ve also looked at our buildings, upgrading insulation to reduce HVAC costs, and converting to LED lights where we can,” says Griswold. “We’re taking the low-hanging fruit, doing a little bit at a time.”

**AQUIFER STORAGE AND RECOVERY**

The underground storage and recovery system is Destin’s pride and joy. “We started working on it in 2000,” says Griswold. Work has proceeded slowly, in parallel with development of the regulations, but at present seven wells are operating, each at 250 gpm in and out.

Above-ground storage is expensive and requires space. “We have a shallow aquifer here,” Griswold explains. The storage wells are about 160 feet deep, and the entire soil complex is sand. “It’s an excellent storage system. The reclaimed water forms a bubble around the tip of the well.” As the bubble grows, Destin hydrogeologists can identify the interface between the reclaimed water and the natural groundwater, which serves as a barrier to saltwater intrusion. As demand exceeds supply, the bubble can be tapped to provide additional reclaimed water.

“Anyone who thinks they can design a new reclaimed water system and make it efficient doesn’t know what they’re talking about,” Griswold says. “You can’t plan for all the conditions you’ll face. You don’t see these lessons in the textbooks, where there’s more information on how to make reclaimed water than what to do with it. There are no guidelines for reuse, no annual average days. Demand can exceed supply. You guess and hope you’re right.”

In addition to the underground storage capacity, DWUI works with customers on water conservation. “We’ve learned the value of conservation of reclaimed water,” Griswold says. “We spend a lot of time with our customers on how best to conserve. Overwatering is as bad for a landscape as under-

The plant uses an Archimedes screw lift pump (Spaans Babcock).



watering. We talk about that. Our reuse coordinator goes out and helps set timers on residential watering systems.”

That’s just one of the reclaimed water lessons the Destin utility has learned. Another is the value customers place on reclaimed water. “Customers value reclaimed water more than they do drinking water,” Griswold maintains. “We had a huge drinking water outage here at one time and didn’t get a single call or complaint from our customers. But when we had an issue with the reclaimed water system, the phone rang constantly. People were mad. I’ve learned that a reliable supply of reclaimed water is critical to the success of the system.”

Which takes the discussion back to rainfall. Because of the need to keep the reclaimed water supply at adequate levels, Destin keeps a close eye on the weather. “We get 52 to 58 inches of rainfall a year,” Griswold says. “It’s been pretty normal lately.” But just to be safe, DWUI has installed its own weather station. That way, Griswold says, there’s no need to rely on outside sources for vital data. **tpo**

**more info:**

**Alfa Laval Ashbrook  
Simon-Hartley**  
800/362-9041  
[www.as-h.com](http://www.as-h.com)

**Cityworks**  
801/523-2751  
[www.cityworks.com](http://www.cityworks.com)

**Infilco Degremont Inc.**  
800/446-1151  
[www.degremont-technologies.com](http://www.degremont-technologies.com)  
(See ad page 21)

**Ovivo USA, LLC**  
512/834-6000  
[www.ovivowater.com](http://www.ovivowater.com)  
(See ad page 5)

**Spaans Babcock, Inc.**  
905/884-1100  
[www.spaansbabcock.com](http://www.spaansbabcock.com)

**WesTech Engineering, Inc.**  
801/265-1000  
[www.westech-inc.com](http://www.westech-inc.com)



## PURITY FOR LIFE

Your company will improve her environment by purifying wastewater throughout her life. Cabot Norit Activated Carbon's technology will keep her air fresher. Cabot is the premier manufacturer of odor control carbons. Independent tests show that Cabot's DARCO H<sub>2</sub>S has by far the lowest cost per pound of H<sub>2</sub>S removed. You play a key role in her little world. Cabot can help.



Air



Water



Chemicals



Pharmaceuticals



Beverages



Food

**CABOT** 

NORIT ACTIVATED CARBON

[norit.com](http://norit.com)



# 'Silent' No More

THE DETROIT WATER AND SEWERAGE DEPARTMENT'S PUBLIC OUTREACH PROGRAM INCLUDES PROFILES OF THOSE WHO HELP PROTECT LOCAL WATER RESOURCES

By Ted J. Rulseh

**M**ary Alfonso believes water and wastewater are the “silent utilities” in most communities, largely unnoticed and not appreciated until something goes wrong.

As public affairs manager for the Detroit Water and Sewerage Department (DWSD), Alfonso is part of an effort launched 16 years ago to raise the profile of water and wastewater services in Detroit and in the surrounding communities and counties that are the department's wholesale customers.

Alfonso is part of a Public Education Work Group that earned the 2012 Educational Professional of the Year Award from the Michigan Water Environment Association. It was the first time the MWEA gave the award to a group, rather than to one person.

The Public Education Work Group is part of a much larger public outreach effort that seeks to raise awareness of cooperation between the DWSD and its partners and of the contributions made by people in a variety of professions who take care of the wastewater and water systems. Alfonso talked about the outreach program in an interview with *Treatment Plant Operator*.

**tpo:** How did this public outreach program get started?

**Alfonso:** The collaborative approach started on the wastewater side in 1997, which was about 10 years before I got here. In 2003 we established a similar partnership on the water side. A main reason for forming those partnerships was to enable us to operate as more than an entity that delivered a bill. We wanted to build relationships with the people we served so that we could work together on common issues.

DWSD serves the City of Detroit but also wholesale customers, which are surrounding cities and counties. We realized that we all wanted the same thing: to provide excellent service to our customers in the most effective and efficient way we could. We all had a stake in the system, whether wholesale or retail customers.

In 1997, we decided to try to bring a group together as we were creating a long-term combined sewer overflow program. We formed the Wastewater Steering Committee. It started to enhance trust between customers and the DWSD.

**tpo:** What exactly is the Wastewater Steering Committee and what does it do?

**Alfonso:** The Wastewater Steering Committee consists of one representative each from the DWSD and three wholesale customers. It's an umbrella under which we have smaller work groups. We have a Best Practices Work Group, a Rates Work Group and a Wet Weather Work Group. We also have a Public Education Work Group that straddles both the wastewater and water sides.

**tpo:** Why did DWSD and its partners launch a public education initiative?

**Alfonso:** There had been long-standing perceptions that it was a case of Detroit against the suburbs, or the suburbs against Detroit. That was really frustrating, because we had been collaborating on a lot of issues for years. We weren't always successful in getting out the good stories about how we worked together.

Another reason we started this was that water and sewer are often the silent utilities. You turn your tap and water comes out; you flush your toilet and the waste goes away. People don't think about where it goes and what has to be done to it, or



Mary Alfonso

“I was happy to showcase the work done by all the people who manage our systems. It brings a different perspective — suddenly people realized that we have committed, dedicated employees who work around the clock to make sure the system is safe and is working up to its potential.”

MARY ALFONSO

what it takes to get the water to your tap. There are people who work 24/7 in many fields — engineers, scientists, the people who install and fix the pipes, the people who test the water to make sure it's safe and meets all the government requirements, and the people who make sure wastewater meets effluent limits and is clean enough to return to the receiving water. So we decided to do some self-promotion and self-publishing and tell our side of the story.

**tpo:** What is the structure and function of the Public Education Work Group?

**Alfonso:** I serve as the lead representing the DWSD. There is also a member from the Michigan Department of Environmental Quality, as well as representatives from several wholesale customers. We meet six to eight times a year.

The main initiatives are keeping and developing relationships with all our retail and wholesale customers and working to develop solutions to shared challenges. Sometimes through the work group we get input or suggestions from customer communities that make us think about things differently. Sometimes that improves the way we approach the problems. It becomes a shared solution, as opposed to DWSD or the customer communities being on their own.

(continued)



All trademarks owned by Lakeside Equipment Corporation.  
© 2013 Lakeside Equipment Corporation.



## FLEXIBILITY IS ONLY ONE ADVANTAGE OF OUR CLOSED LOOP REACTOR PROCESS

**We have more than 45 years of experience in oxidation ditch technology and more than 2000 installations.** Lakeside's CLR process offers a variety of wastewater treatment options, including several operational modes, nitrogen and phosphorus removal, and an adaptable configuration, providing maximum flexibility with consistently high quality effluent. The CLR process is simple to operate and can be configured in several shapes, including the conventional racetrack, folded U-shape or concentric multichannel designs. Lakeside's staff delivers full service from initial concept through construction to plant operation. The result: reliable results with minimal operator attention and maintenance. When performance counts, count on the industry leader for more than 80 years!

Speak to one of our experts at 630.837.5640, email us at [sales@lakeside-equipment.com](mailto:sales@lakeside-equipment.com), or visit [www.lakeside-equipment.com](http://www.lakeside-equipment.com) for more product information.



Cleaner Water for a Brighter Future®



### CLR Process Components

- Magna Rotors
- Velocity Control Baffles
- Rotor Covers
- Level Control Weirs
- E.A. Aerotor
- Process Monitoring and Control Systems



“There had been long-standing perceptions that it was as case of Detroit against the suburbs, or the suburbs against Detroit. That was really frustrating, because we had been collaborating on a lot of issues for years.”

MARY ALFONSO

**tpo:** What channels do you use for connecting with your public?

**Alfonso:** We have an online Outreach Portal at [www.dwsdoutreach.org](http://www.dwsdoutreach.org). There is a public page and a registered user login. The registered user side is for people who are actually part of the outreach program. There we store meeting minutes and other documents so they're accessible to all the people who are registered users of the system.

I also produce two newsletters. One is “In the Flow,” a quarterly newsletter we send to our wholesale customer base and to all the elected officials who live in the service territory where DWSD or our customers have a footprint.

Twice a year I also put out a “Detroit Residential Newsletter” for our retail customers. It's more Detroit focused, but we still share the collaborative approach we've taken with our wholesale customers over the years, so people can see that we work together. We deliver that newsletter by email to neighborhood community organizations, block clubs and similar groups. We also attend many meetings of those groups, and I pass out copies of our publications to people there.

**tpo:** Tell us about the Operation Clean Water initiative. What does that encompass?

**Alfonso:** Operation Clean Water was an idea that came from Public Education Work Group. The aim was to put stories into mainstream media as well as local media in the communities we serve. Once a year in planning, we look at what we need to focus on. Generally, we try to push out three to four articles a year. The articles go onto the Outreach Portal. We've been fortunate to have the MWEA publish our articles on a pretty regular basis. And our wholesale customers can take the articles and reuse them, such as if they have newsletters in their communities.

One of our first articles was “Managing the Storm.” Detroit, like most older cities, has a combined system, as do many of our wholesale customers. The story is about how we work when we know there's a storm coming. It's really a team effort. It's Detroit and our community partners monitoring the weather and in communication constantly making sure those flows are held so they can be treated before release to the environment.

**tpo:** What have you done to raise awareness of the people responsible for the collection and treatment systems?

**Alfonso:** We publish a series of Faces of Wastewater and Faces of Water profiles. We wanted to showcase people in the various positions. We did several series of profiles on the water side, and then we moved over to the wastewater side and have done two series there. The profiles also serve as an education tool to tell people about career opportunities in our industry.

**tpo:** What has been the reaction to the Faces profiles?

**Alfonso:** The first series was so successful that we immediately thought we were on to something and decided to keep going with it. Some of our customer communities have taken those stories and posted them on their websites.

**tpo:** What is the reaction to the Faces series from the people you profile?

**Alfonso:** They're excited. They've never been involved in something like this before. Some of them were very shy in the beginning, but once they understood what we were trying to do, we had really good participation.

I was happy to showcase the work done by all the people who manage our systems. It brings a different perspective — suddenly people realized that we have committed, dedicated employees who work around the clock to make sure the system is safe and is working up to its potential. It's a legacy to



Members of the Detroit Water and Sewerage Department Public Education Work Group include, from left, Teresa Weed Newman, customer outreach project manager, Project Innovations; Chip Tischer, community liaison, Oakland County Water Resources Commissioner's Office; Trude Noble, marketing manager, Wade Trim consulting engineers; Mary Alfonso, public affairs manager, DWSD; Blaine Wilson, Web editor, DWSD; and Jodi Peace, senior environmental quality analyst, Michigan Department of Environmental Quality. Others include Mark Steenbergh, community services manager, Wastewater Services Division, Macomb County Public Works; Brent Avery, operations manager, Macomb County Public Works; Allan Schneck, public services director, City of Rochester Hills; Angela Ayers, environmental planner, Southeast Michigan Council of Governments; and Amy Mangus, leader, plan implementation, Southeast Michigan Council of Governments.

maintain it and operate it well for all those who come after us. Water is a pretty vital part of everyday life.

**tpo:** In the big picture, how would you describe the results of your outreach program and the Public Education Work Group?

**Alfonso:** I would say our communities are better informed and more knowledgeable. People are more engaged, and they know they have opportunities to air issues, raise concerns and bring a recommendation on how we can improve our relationships.

Four times a year we have meetings of the Technical Advisory Committee (TAC) on the water side with attendance of 60 to 80 people. The Wastewater Steering Committee meets two to three times a year, and those meetings are attended by DWSD and county representatives. We break into smaller groups and go through exercises that help us focus and plan for going forward: things we want to work on, things we may not have thought about, things that need attention. It's a very open forum.

**tpo:** What advice would you give to other clean-water agencies about the importance of reaching out to the public?

**Alfonso:** People really need to know what you do. Whether you serve 20,000 people or millions, it's important to make people aware of the vital service you provide and make sure they understand how important it is to protect and preserve it, and to support the people who show up every day and do the jobs they do. **tpo**

## PERFORMANCE FROM THE INSIDE OUT

The Qube™ blower package, featuring our powerful Qx™ blower is quiet (< 75 dBA). That, coupled with its high efficiency and compact footprint, makes it the perfect low-cost quick delivery solution for pneumatic conveying.



To learn more, call **1-800-825-6937**  
for your nearest representative or  
visit [www.tuthillvacuumblower.com](http://www.tuthillvacuumblower.com).



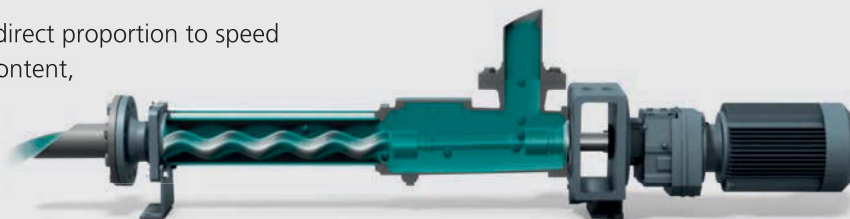
Excellence at work. Excellence in life.

## NEMO® Progressing Cavity Pumps and TORNADO® T2 Rotary Lobe Pumps

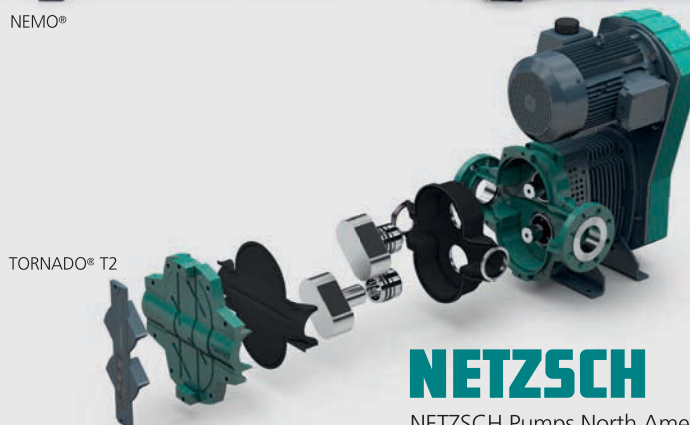
The right pump for your job - from one source!

- Smooth operation, low pulsation and steady flow in direct proportion to speed
- Handles products with low to extremely high solids content, including abrasive material
- Perfect for shear sensitive products
- Capacities from a few gph up to 2,200 gpm
- Pressures up to 1080 psi; 3400 psi in special designs
- Wide viscosity range from 1 mPas up to 3 million mPas
- Temperatures from 5° F to 570° F
- Maintenance friendly, low life-cycle cost

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



NEMO®



TORNADO® T2

# NETZSCH

NETZSCH Pumps North America, LLC  
Tel: 610-363-8010  
email: [PUMPS@netzsch.com](mailto:PUMPS@netzsch.com)  
[www.netzschusa.com/ads](http://www.netzschusa.com/ads)

NETZSCH Pumps & Systems – Solutions Dan Peterson can trust ■  
*See top performer article in this issue!*



# FINDING THE MAGIC

DAN PETERSON WENT FROM A MILITARY CAREER TO LEADING AN INNOVATIVE TEAM AT A HIGHLY SUCCESSFUL MUNICIPAL TREATMENT PLANT IN DURHAM, N.H.

By L.K. Williams

YOU CAN HEAR THE PASSION IN DAN PETERSON'S VOICE WHEN HE speaks about his product. As superintendent of the Durham (N.H.) Wastewater Treatment Plant, he gets excited about testing technologies, making the highest-quality effluent possible, and meeting the challenges of nitrogen limits for the Great Bay, a unique salt marsh and estuary.

He likes to compare influent and effluent quality in glass jars in front of college students who tour the plant. Occasionally, he adds a glass of tap water. "A lot of times, they have trouble telling the difference," he says. "The product we produce keeps me interested in this job. There is magic here; I just get excited about it."

For his dedication and outstanding work in the Durham plant, Peterson received the U.S. EPA 2012 Regional Wastewater Treatment Plant Operator Excellence Award. His nomination came from the New Hampshire Department of Environmental Services Wastewater Engineering Bureau.

## LEARNING PROCESS

Durham is home to the University of New Hampshire. The 2.5 mgd activated sludge treatment plant serves the student body and about 12,000 residents. "Throughout the year, the college population can make it a very difficult treatment system to operate," Peterson says. "When the kids are in, it's great, everything's online, but if they go away, especially on Christmas break, it's like someone turns off the light switch. You lose half your flow and half your loading, but you're still trying to keep the system at 100 percent because of the cold weather. Over summer break, we're running great on half the tanks. Then the students come back all at once. We have to think ahead of time and slowly bring systems online."

Peterson and his team of four have adapted their system through this and other obstacles. The team includes Daniel "Max" Driscoll, chief operator;



Dan Peterson, wastewater superintendent at the Durham Wastewater Treatment Facility. (Photography by Elizabeth Frantz)

Nick Shonka, laboratory technician; Lloyd Gifford, process operator; and Steven Goodwin, lead mechanic. Driscoll and Gifford each have more than 24 years' experience, Goodwin has nine and Shonka has two. Peterson, who has worked in wastewater since he enlisted in the U.S. Air Force after high school, has been at Durham for six years.

The Durham team is responsible for 20 miles of sewers, three pump stations and the treatment plant, which uses the modified Ludzak-Ettinger (MLE) process. The system includes two rectangular primary clarifiers, four aeration basins, two secondary clarifiers with Envirex Tow Bro solids collectors (Siemens Water Technologies) and two chlorine contact tanks.

Flow is mixed and moved by a mixer and recycle pump (Flygt, a Xylem brand), four pumps (Netzsch Pumps North America), four new blowers (APG-Neuros), two return activated sludge pumps (Hayward Gordon) and one wasting pump (Tuthill). For basic analytics, the team uses DO probes (Hach), an ORP probe (GLI) and an iFix SCADA system (GE Intelligent Platforms). Disinfection is achieved with hypochlorite and sodium bisulfite, with caustic soda for pH adjustment. Effluent discharges to the Oyster River, which feeds the Great Bay estuary.

## TEAM SOLUTION

The team controls solids processing in two primary tanks and one secondary storage tank, using three primary feed pumps (Penn Valley Pump Co.), a secondary sludge pump (Tuthill), a gravity belt thickener and belt filter press (Ashbrook Simon-Hartley) and a dry polymer feeder (Acrison).

In 2008, the plant's biosolids contractor required the team to fill larger containers (60 cubic yards on 18-wheel trailers instead of 30 cubic yards) to maximize efficiency in transporting material to a composting facility. "Before, all we had was the single discharge chute off of our belt filter press," says Peterson. "When it dumped into the roll-off containers, we pushed them



profile

Peterson, right, talks with TV technician Jonathan Carlson of Insituform Technologies during a sewer lining project.

## A PLAN FOR SAVINGS

When the Durham Wastewater Treatment Plant operators are not creating their own solutions, they are upgrading their facility with more efficient technologies. Taking advantage of more than \$50,000 in incentives from Public Service of New Hampshire, the Public Works Department in 2011 replaced dual-lobe positive displacement blowers with turbo-type centrifugal blowers.

"Because the blowers were such energy savers and made the process more controllable, they 'sold' very easily," says Dan Peterson. The drives were networked into the SCADA system, which matches blower speed to operating requirements.

Last spring, the community voted to approve a \$2.5 million bond toward replacing 26-year-old biosolids dewatering equipment.

"It's still a good piece of equipment for its

age, but due to the openness of the process with sulfides and moisture content in the environment, key components have been slowly deteriorating," says Peterson.

The advantages of the new screw presses include energy efficiency, a contained system that minimizes odor, and automation that requires less operator attention. A side benefit is dryer and lighter biosolids that cost less to remove and transport. A solar wall installed to supplement heating will help lower long-term operating costs.

These upgrades were forged through a Facilities Update Plan developed with help from the Wright-Pierce engineering firm. "This tool has just made the job so much easier," says Peterson, who is grateful to have a council and community that are supportive of green initiatives.

### Dan Peterson, Durham (N.H.) Wastewater Treatment Plant

**POSITION:**  
Plant superintendent

**EXPERIENCE:**  
29 years

**DUTIES:**  
Oversee operation of plant, pump stations, collection lines

**EDUCATION:**  
Community College of New Hampshire

**LICENSES:**  
Grade IV wastewater, Grade II collection systems, Grade II lab

**GOAL:**  
Keep striving to produce the best effluent possible

**GPS COORDINATES:**  
Latitude: 43°07'56.25" N;  
Longitude: 70°52'57.92" W





forward and moved them back to level it off, but now that we were going with a trailer, we had no way to distribute any of the material without actually moving the trailer itself.”

So the team and Dave Cedarholm, town engineer, debated ideas. “We tossed around the cost of commercial levelers, and everything was way out of our budget, so we and especially Steve Goodwin came up with a design. We installed a reversing conveyor over the container that moves on a track, supported by beams inside the garage bay in the solids processing building.”

Peterson estimates the home-grown device saved \$20,000 over a commercial solution.

## PUSHING THE LIMITS

That innovation aside, Peterson calls the plant’s treatment system the team’s biggest achievement. Before he was superintendent, the plant at times had trouble meeting its permit pH requirement. The Wright-Pierce engineering firm designed the MLE system in 2006 to recoup alkalinity and lower ammonia to less than 0.5 mg/L. Even then, discussions were beginning about nitrogen levels in the Great Bay.

Peterson wanted to know what the system could do about the nitrates. “We had the tools that the engineers already put in place, so let’s push the plant to the limit,” he recalls thinking. “Let’s really see what we can make this plant do.”

The team did a lot experimenting for a couple of years. To reclaim the carbon source lost when the university students moved out, the system bypasses the primary clarifier during those times. “We have a very good step screen [Huber] that removes 90 percent of the rags, and a good grit system,” Peterson says. “We put an ORP probe in our selector, and we tied that in with

our recycle pump. When we had low ORP numbers, our recycle pump would speed up and return much more of the solids to break down those nitrates.”

Over time, the process has improved: “Last year we had it dialed in really good. It was a 6.3 mg/L rolling average total nitrogen April through September. It’s been fun to see how close to the edge we can push the plant to get to the numbers without blowing permit. It’s a real fine balance there. The treatment plant is not really set up for nitrogen removal.”

To help get the plant equipped for nitrification, the town approved a four-stage pilot Bardenpho aeration system. Peterson notes that regulatory authorities are issuing permits for nitrogen at 8 mg/L and that they may decide that is not low enough. “I can do 8 mg/L but the plant is not really designed for that,” he says. “The permit could be lowered to 5 or even 3 mg/L.”

## COMMUNITY SUPPORT

“A nitrification pilot was already pretty much budgeted because we knew this was coming a few years ago. The town wants to be proactive, to be ahead of the game.” The planning team included Peterson; Todd Selig, town administrator; Michael Lynch, Public Works director; Cedarholm; and the Wright-Pierce engineering firm. The consultants designed the pilot, which was to begin last summer.

Peterson notes that Durham’s college town status means the plant at most can take down only one tank to nitrify. “We’re looking to have a four-stage system with two trains,” he says. “When students are out, we’ll just have to run a single train. It will give us much more flexibility and hopefully deni-



The Durham plant team includes, from left, Steve Goodwin, lead mechanic; Max Driscoll, chief operator; Dan Peterson, wastewater superintendent; Nick Shonka, lab technician; and Lloyd Gifford, lead processing expert.

trify and come up with really low nitrogen numbers. Regardless what permit numbers we do get, we’ll build it and design it for the lowest possible number, which is 3 mg/L.”

## IN SERVICE

Peterson’s background in the water sector goes back to his days in the military. In 1983, fresh out of high school in Cumberland, Wis., he was uncertain of his career path. He trusted his local Air Force recruiter: “He told me, ‘I’ve got the perfect job for you — you can be an environmental support specialist.’”

The work included water and wastewater treatment and the promise of travel. He was initially assigned to Pease Air Force Base in Portsmouth, N.H. Over seven-and-a-half years, he ran the base’s trickling filter plant with digesters and sand beds. When the base closed, he left the Air Force and kept working at the plant under a government contract.

“I had to keep the wells and water treatment plant going even though it was a ghost town. It was very eerie. You could lie down in the middle of the road and not worry about getting hit by any vehicles.” Eventually the city of Portsmouth took the plant over, and Peterson was involved in decision-making for an upgrade of the plant to activated sludge with a sequencing batch reactor to serve a brewery.

“That was my first real experience being an operator, sitting in on the process with the engineers who got that contract,” he says. “I really learned a lot.” He mastered the new process quickly and worked for Portsmouth from 1993 to 2007. “It was a great place; I loved working for the city,” he says. “If the job hadn’t come open in Durham, I’d probably still be there.”

## A PURPOSEFUL TEAM

Once onboard in Durham, Peterson encouraged all the operators to become licensed. “I pushed for that to get them that extra education,” he says. “If they want to advance on anything, it’s always out there for them.” In the daily routine, he doesn’t micromanage — they all know their jobs and “most of them are older than me.”

Peterson relies especially on Driscoll, chief operator: “Without him I would be lost around here because he really takes care of the day-to-day operations. Driscoll competed on a Water Environment Federation Operations Challenge Division 1 team last year.”

*(continued)*



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  
HD  
(HEAVY DUTY)**



QUALITY THAT NEVER QUILTS™





Peterson makes adjustments at a pumping station.

As superintendent, Peterson is responsible for substantial paperwork, but he's not fond of sitting at a desk: "To be honest, I like going out there and doing anything in the yard, like cleaning tanks or processing solids or whatever needs to be done. During the summer I might go out on the truck and jet a line or two. I was brought up in a home where you don't ask somebody to do something you're not willing to do yourself. We're all here as one team. Regardless of your job title, we're all here for one purpose: to make the best possible effluent that we can."

Peterson maintains a link to the military, serving in the New Hampshire Air National Guard for the last 17 years. He receives regular training on technology, such as mobile reverse osmosis water purification systems, and he deploys to various locations so that he finally gets to travel.

## more info:

**Acrison, Inc.**  
201/440-8300  
[www.acrison.com](http://www.acrison.com)

**Alfa Laval Ashbrook  
Simon-Hartley**  
800/362-9041  
[www.as-h.com](http://www.as-h.com)

**APG-Neuros**  
866/592-9482  
[www.apg-neuros.com](http://www.apg-neuros.com)

**Flygt - a Xylem Brand**  
704/409-9700  
[www.flygtus.com](http://www.flygtus.com)

**GE Intelligent Platforms**  
800/433-2682  
[www.ge-ip.com](http://www.ge-ip.com)

**Hach Company**  
800/227-4224  
[www.hach.com](http://www.hach.com)  
(See ad page 2)

**Hayward Gordon**  
905/693-8595  
[www.haywardgordon.com](http://www.haywardgordon.com)

**Huber Technology, Inc.**  
704/949-1010  
<http://huberforum.net>  
(See ad page 7)

**Insituform Technologies**  
800/234-2992  
[www.insituform.com](http://www.insituform.com)

**NETZSCH Pumps  
North America, LLC**  
610/363-8010  
[www.netzschusa.com](http://www.netzschusa.com)  
(See ad page 33)

**Penn Valley Pump Co., Inc.**  
800/311-3311  
[www.pennvalleypump.com](http://www.pennvalleypump.com)

**Siemens Water  
Technologies Corp.**  
866/926-8420  
[www.water.siemens.com](http://www.water.siemens.com)

**Tuthill Vacuum &  
Blower Systems**  
417/865-8715  
[www.vacuum.tuthill.com](http://www.vacuum.tuthill.com)  
(See ad page 33)

"A couple of years ago, I did two weeks in El Salvador," he recalls. "We were working for the National Guard on a clinic out in the middle of nowhere, doing some plumbing. It was eye-opening. You really don't know what you've got until you see something like that first-hand." **tpo**

# WHAT CAN IQ DO FOR YOU?



Smart made simple  
with total control at  
your fingertip



 <p><b>Safety/Environmental</b></p> <ul style="list-style-type: none"> <li>• Sound Levels</li> <li>• People Protection</li> <li>• Energy Usage</li> <li>• Compliance</li> <li>• Standards</li> </ul>	 <p><b>Facility Manager</b></p> <ul style="list-style-type: none"> <li>• Downtime/Runtime</li> <li>• Warranty</li> <li>• Wear</li> <li>• Programming</li> <li>• Ease of Installation</li> <li>• Flow/Vacuum</li> </ul>	 <p><b>Engineer</b></p> <ul style="list-style-type: none"> <li>• Technical Specifications</li> <li>• Flow/Vacuum</li> <li>• Simplicity</li> <li>• Quality</li> <li>• Reliability</li> <li>• Programming</li> </ul>
--	---	---

- Blower packages from 7.5–100 hp
- Pressure to 15 PSI
- Vacuum to 16 Hg"
- Air flow to 1400 ICFM per package
- AirSmart Controller
- Sequence any configuration of units

**GD**  
GARDNER DENVER

To learn more, come see us at **WEFTEC in booth 1412** or visit [www.iqblower.com](http://www.iqblower.com)



# TIME'S UP ON SAND FILTRATION

AQUA MEGADISK™ CLOTH MEDIA FILTER  
TREATS UP TO 24 MGD IN A SINGLE UNIT



The Aqua MegaDisk™ to the left  
of the original AquaDisk®.

**The Aqua MegaDisk™ filter offers *mega* capacity, reliability and performance while operating in a small amount of space.**

- 80% less footprint than sand filters with comparable capacity
- Utilizes the exclusive OptiFiber® cloth filtration media
- Low energy consumption
- Continuous filtration even during backwash
- Ideal for deep bed filter retrofits, new plants, expansions and microscreen replacements



All Aqua-Aerobic technologies provide a "green" advantage which can include lower energy consumption to reduced water usage.



**AQUA-AEROBIC SYSTEMS, INC.**

[www.aqua-aerobic.com](http://www.aqua-aerobic.com) | 815-654-2501



# Simple to Advanced

IMPROVEMENTS RANGING FROM NEW LIGHT FIXTURES TO A BREAKTHROUGH SOLAR INSTALLATION HELP A COLORADO PLANT CUT ENERGY USAGE BY NEARLY 20 PERCENT

By Doug Day

“We’re starting to reap some of the benefits,” says Virgil Turner. He’s talking about the Montrose Wastewater Treatment Plant, which has seen a 175 percent reduction in the cost of energy since 2008 — saving the plant some \$70,000 in a \$1.3 million annual budget.

“We’ve been doing quite a bit with our wastewater plant,” says Turner, director of innovation and citizen engagement for the City of Montrose, population 19,000, in the high desert of the Uncompahgre Valley of western Colorado.

The cost-saving measures include water conservation, high-efficiency lighting, upgrades to large motors and an advanced solar photovoltaic system.

## FOCUS ON UTILITIES

A regional drinking water plant serves the area, but Montrose has its own wastewater plant. When Turner began working for the city in 2005, he noticed that nobody in city government had the job of focusing on energy use: “As I was looking at the budgets of all our departments, the utility line item really stood out to me, particularly the wastewater treatment plant, which was running around \$213,000 annually. That was a pretty good chunk of our budget.”

Built in 1984, the activated sludge facility has a design capacity of 4.32 mgd and average flows of 2.1 mgd. One money-saver was reduc-



“Getting to look out the window at the snow covered mountains is part of our salary,” says Virgil Turner, director of innovation and citizen engagement for Montrose.

tion of the plant’s influent load through a citywide education effort that has cut water consumption by 25 percent over the last two years.

After the 2008 recession hit, the city got more serious about energy savings. “Across the city, we were able to cut back about 10 percent,” Turner says. “We didn’t do much other than making people aware that keeping lights on or running heaters when they didn’t need to was costing us money. With everyone keenly aware of our budget issues, people really started to pay attention to it and started thinking about things differently.”

At the wastewater plant itself, the simple measures reduced the utility costs by 8 percent to just under \$200,000. One step was to cut back on outside lighting. “The entire complex was lit up, but we didn’t normally have people there when the lights were running,” Turner says. As a remedy, the lights were placed on timers so now they burn only as needed.

The plant team also made changes in the aerated grit chamber. “The plant superintendent had never been happy with the amount of grit trapped in the chamber,” says Turner. “He started experimenting with aeration rates and found that lowering the aeration actually improved grit separation. He kept pushing it and finally turned off the aeration. That saved us quite a bit.”

## JOINING FORCES

In 2009, Montrose signed a joint city and countywide energy efficiency performance contract with Ameresco. One task was an evaluation of energy use at the treatment plant. Again, the efforts started small. Several small maintenance and equipment buildings that staff members used infrequently have wall-mounted electric space heaters. These were fitted with twist timers like those on hotel hot tubs to help limit how long they would operate.

“If the thermostat is calling for heat but nobody is there to turn the twist timer, no heat comes on,” says Turner. “We used to set those thermostats at 70 degrees or so, and the buildings were heated even if nobody was in them for weeks at a time.”

All the fluorescent lights were switched from T12 to the higher-efficiency T8 lamps. “We typically saw an 18-month payback from those changes,” Turner says. “We also installed occupancy sensors on the lighting controls. Those weren’t huge savings, but we’re seeing the accumulated benefits.”

## LOOKING TO EQUIPMENT

After taking care of the easy sources of savings, the team looked at the large motors throughout the plant. “We’d been talking for



Virgil Turner, left, and Brian Donowho, director of operations for BrightLeaf Power, discuss the concentrated solar units, which use a dual tracking system to help reach 70 percent efficiency.

PHOTOS COURTESY OF MONTROSE WASTEWATER TREATMENT PLANT



Concentrated photovoltaic panels that include a waste heat capture system will save the Montrose plant about \$8,000 a year on electricity costs.

"I'm a real advocate of renewable energy. One of the important principles is that the cost of renewables is typically higher than conventional electricity. In order to make sense, you really have to work on your energy efficiency first."

**VIRGIL TURNER**

years about adding variable-frequency drives," says Turner. "We had them on our sludge pumps, but we have three 40 hp screw pumps that move the effluent into oxidation ditches, and one or two are running most of the time."

VFDs from ABB Industrial Drives were added to the screw pumps, while others from Siemens were installed on nine oxidation ditch rotors. The VFD project cost about \$80,000 but yielded 12 percent savings on electricity and a six-year payback. Up next is an evaluation of VFDs for the aeration pumps on the four digester cells.

#### FACING THE SUN

Solar energy is another big contributor to efficiency. On the roof of the digester building sit 28 small photovoltaic solar arrays that manufacturer BrightLeaf Power calls the most efficient solar energy units on the market. The specially designed concentrated solar units have a dual tracking system to follow the sun. They also capture waste heat for cogeneration, making them 70 percent efficient, according to BrightLeaf, versus about 18 percent for a typical flat-panel system.

Besides turning the sun's energy into electricity, each cell warms cooling fluid, which is pumped to the plant's truck bay for space heating. The plant team is looking at other solar cogeneration options in the future, such as hot water heating or supplementing a geothermal system.

"I'm a real advocate of renewable energy," says Turner, an alumnus of the Energy Execs program of the National Renewable Energy Laboratory. "One of the important principles is that the cost of renew-

ables is typically higher than conventional electricity. In order to make sense, you really have to work on your energy efficiency first.

"The system concentrates the sun's rays onto very small gallium arsenide chips, about the size of your pinkie fingernail, that were developed for use in space. It gives us the same amount of electrical conversion as traditional PV in a quarter of the space." The 23 kW system gets about 300 days of sunshine a year and is expected to save about \$8,000 a year on electricity.

It's part of a sound energy strategy that has reduced the plant's environmental footprint while helping keep costs down for residents and businesses. **tpo**



# Mind Blowers



**NEW!**

**Aerzen Turbo Blower**

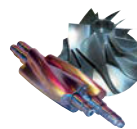
**+**

**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](http://www.aerzenusa.com)

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



# Better Way to Feed

A NEW METHOD OF POLYMER ADDITION HELPS AN ILLINOIS PLANT PRODUCE DRIER BIOSOLIDS AND REDUCE POLYMER COSTS SIGNIFICANTLY

By Scottie Dayton

The 17-year-old polymer feed system for biosolids at the Northside Wastewater Treatment Plant in Woodstock, Ill., was outdated and parts were no longer available because the manufacturer had gone out of business.

"The old unit was working flawlessly, but we worried that one day it would break down," says Anne George, plant superintendent. She budgeted for a new polymer feeder system, and EnPro Technologies won the bid. Two operators installed the company's ParaDyne polymer feed system in one day.

"It reduced our polymer usage by 13 percent," says George. "Because we've had the unit for less than a year, we're estimating an annual savings of \$1,350."

## TEARDOWN AND INSTALLATION

The 10.5 mgd (design) activated sludge plant treats 2.5 mgd from 18,000 residents. Before the polymer feed system was replaced, operators spent seven hours once a week pumping biosolids with 2 percent solids to a 2-meter belt press (Komline-Sanderson) at 175 gpm. Each ton was mixed with 16 pounds of Praestol K290 FLX flocculant (Ashland Chemical). Cake at 12 percent solids was stored on drying beds.

Before changing out the system, operators dewatered the biosolids. Then they cut the PVC piping to the polymer/biosolids mixer, unbolted it from the floor, and removed it with a forklift. The new system with a smaller footprint enabled the operators to line it up with the existing piping. "The swap went very smoothly," says George. "Everything is pre-piped and pre-wired."

As an electrician connected the 230-volt power to the belt press, George asked him to wire a signal that would shut down the press if it ran out of polymer. "If we missed changing

containers with the original system, the press kept running and we had a mess," she says. "The operators really appreciate that shut-off feature."

The next day, service personnel from Energenecs, an EnPro representative in Cedarburg, Wis., inspected the installation and programmed

"The non-impinging rotor definitely produces a better mix, and the operators say the system is simpler to use. They like seeing the polymer and water mixing in the chamber."

**ANNE GEORGE**

The ParaDyne polymer feeder (Enpro Technologies) enabled the Northside Wastewater Treatment Plant to reduce its polymer usage by 13 percent, increase cake solids from 12 to 14 percent, and save an estimated \$1,350 per year.

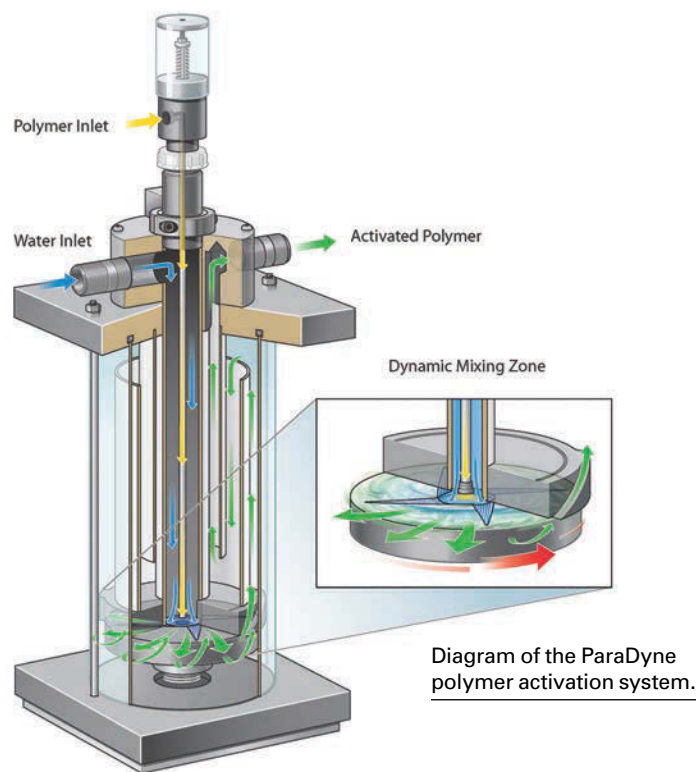


Diagram of the ParaDyne polymer activation system.



PHOTOS AND GRAPHIC COURTESY OF NORTHSIDE WASTEWATER TREATMENT PLANT



Anne George, plant superintendent, uses a polymer Drumstik to discharge polymer from a drum.

the parameters using settings from the original feeder. "Their visit was part of our purchase arrangement," says George. "They also trained our staff to program the control panel, which is simple and user friendly."

#### GETTING GOING

On startup, the service technicians reduced 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. The combination reduced polymer usage by 13 percent and increased cake solids content from 12 percent to 14 percent.

When activated, a non-impinging rotor controlled by a variable-frequency drive pulls polymer into the mixing zone at the bottom of a high-shear mixing chamber. The rotor creates high fluid shear between itself and stator plates to invert the polymer as it is introduced into the dilution water. The hydrated solution then flows through baffles in the chamber without recirculation to avoid fracturing polymer molecules. A stay-clean check valve spring beyond the flow path prevents it from gumming or clogging.

"The non-impinging rotor definitely produces a better mix, and the operators say the system is simpler to use," says George. "They like seeing the polymer and water mixing in the chamber. The old system hid the process under a stainless steel cover."

The operators made an important discovery at a local operators association meeting: Adrian Pino from the Village of Huntley told them he used a polymer Drumstik to discharge liquid from 55-gallon containers of polymer.

"It works like a straw and is much cleaner and easier than tilting the drum on a rock-it drum stand and allowing the polymer to gravity feed to the system," says George. "The Drumstik goes to the bottom of the container, so the operators don't have to lift it to pour out remaining polymer or move the drum onto the stand. That was hard on their backs."

They all like the unit. It was a good investment." **tpo**

#### 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](mailto:editor@tpomag.com) or call 715/277-4094.



**ENSIGN<sup>500</sup>**  
by **THERN**

Specifically designed with the water/wastewater industry in mind, this portable crane will easily handle lifts up to 500 lbs.

The Ensign joins a flock of Thern mixer lifts and pump hoists that are capable of lifting 500 to 3,000 lbs.

It's no wonder why industries all over the world . . .

**LEAVE THE HEAVY LIFTING TO US**



Winona, Minnesota  
[info@thern.com](mailto:info@thern.com) [www.thern.com](http://www.thern.com)



# Which Side of the Curve Am I On?

THE LAB DETECTIVE HELPS A CLEAN-WATER PLANT UNDERSTAND THE CHEMISTRY OF CHLORINE IN WATER AND CORRECT SEASONAL EXCURSIONS IN EFFLUENT COLIFORM

By Ron Trygar, CET

The discussion at the clean-water plant operators' meeting was the same as before: How will we prevent fecal coliform excursions this season? It seems to be a common topic at these meetings and normally comes up right before the change from summer to fall and spring to summer.

What could be causing the frequent out-of-compliance issues that only seem to occur in April and May, or October through November? The plant's managers were weary of having to sit in county commission meetings and explain why the state had levied fines on the facility for noncompliance with permitted fecal coliform discharge limits.

The Lab Detective was on a training mission in a nearby county when he was asked to attend a meeting of operators and managers at a plant that was having problems meeting coliform limits. Always one to oblige, he arranged to be at the meeting.

## GATHERING DATA

The meeting between operating staff, laboratory personnel, plant managers and engineers was very interesting. The group tossed



FIGURE 1: Empty chlorine contact tank showing iron-stained walls. The iron comes out of solution when in contact with an oxidizer like chlorine and adheres to the walls and tank bottom. It can be very difficult to remove.

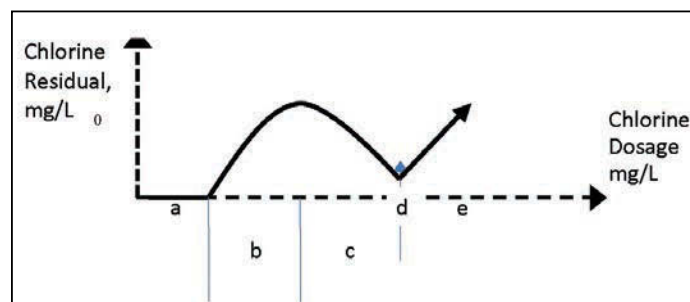


FIGURE 2: Chlorine residual breakpoint curve.

around many ideas about what to do in the coming season to maintain compliance and avoid costly fines and negative publicity. The detective gathered as much data as he could while listening to the banter across the conference room table. The data he gathered during the discussion:

- The facility is designed for 20 mgd.
- The average daily flow rate during the excursions is 12 mgd.
- The plant is a complete-mix activated sludge facility, using diffused aeration.
- There are no nitrogen or phosphorus limits in the discharge permit.
- The plant is required to monitor and report value for effluent total nitrogen.
- Effluent permit limits for CBOD and TSS are 30 mg/L annual average.
- Limits for fecal coliform are 200 cfu/100 mL annual average, 500 cfu/100 mL weekly average, 800 cfu/100 mL daily maximum.
- The plant uses anaerobic digesters for biosolids stabilization.
- The plant dewater biosolids on site; cake is trucked to landfill.
- The facility switched disinfection to sodium hypochlorite (12 percent solution) from gas chlorine several years ago.
- The facility had no coliform excursions when using gas chlorine.

Using the information from the meeting, the detective returned to his office to put the pieces of the puzzle together. Thinking back to the meeting, he recalled a question the operators asked the lab personnel: *Where on the breakpoint curve are we?*

## THE CHLORINE RESIDUAL BREAKPOINT CURVE

The breakpoint curve for residual chlorine is familiar to most all drinking water treatment plant operators, but not necessarily to wastewater operators. This is because most utilities that are required to provide chlorination disinfection to their public drinking water supply measure the residual as “free” chlorine residual. Providing free chlorine residual helps protect the public water supply from bac-

terial contaminants by maintaining a strong acid that can kill most pathogenic organisms.

Clean-water plant operators are normally required to maintain what is known as “total” chlorine residual, which may contain some free chlorine acid or not. One of the key factors in the kind of residual present in plant effluent is the amount of ammonia available. Let’s look at what happens when chlorine, water and ammonia get together.

When the plant described above used gas chlorine, the disinfection chemistry was pretty straightforward. Gaseous chlorine is very soluble in water. Most all gas chlorinator units have a water feed that provides a vacuum when the water is forced through a venturi in the chlorine ejector. The vacuum sucks the gas chlorine from the bottle and allows it to dissolve rapidly in the feedwater, quickly forming hypochlorous (HOCl) and hydrochloric (HCl) acids.

Of the two acids, the more powerful is the HOCl. HCl falls apart rapidly in the presence of water and forms  $H_3O^+$  (hydronium) and  $Cl^-$  (chloride). The HOCl is thought to contain a nascent oxygen atom that is the actual oxidizer (killer) of bacteria. Once the strong chlorine solution is formed after the ejector, the solution can be applied to the plant effluent.

Before any chlorine residual is seen, the applied chlorine reacts with any reducing agents that might be present in the effluent: organic material, dissolved iron or manganese, hydrogen sulfide and nitrite. Chlorine is very reactive: It readily oxidizes these reducing agents, and there is no residual seen at all (Figure 1). This is called chlorine demand, and it makes up the initial stage of the breakpoint chlorine curve (Figure 2, letter a).

## AMMONIA INTERACTION

After the chlorine demand has been met, the available chlorine begins reacting with any ammonia present. Most wastewater plants have ammonia entering with the influent wastewater, and some plants biologically remove or convert the ammonia as part of the treatment process. Treatment plants that use anaerobic digestion, including the facility described here, normally return supernatant from the secondary digester to the head of the plant, and this supernatant contains high amounts of ammonia.

Chlorine and ammonia bond together and make new compounds called chloramines. The amount of chloramine and what type of chloramine depends on several factors; the amount of chlorine and ammonia, pH and temperature of the water are just a few.

There are three types of chloramine: monochloramine, dichloramine and nitrogen tri-chloride (trichloramine). As chlorine is fed into the water that contains ammonia, monochloramine is formed first, and dichloramine forms as chlorine dosage increases. Trichloramine is not generally formed until the water pH drops significantly, to less than about pH 5.

Monochloramine and dichloramine do have disinfecting capability but not as strong as HOCl. For HOCl to become present, we need to feed enough chlorine to overcome (oxidize) the chloramines that were produced. On the breakpoint chlorine residual curve in Figure 2, we would now be in the “curve part” between b and c. If we measure chlorine residual using the total chlorine DPD reagent, we would now get a pink color, indicating that chlorine residual is present. If we use the DPD free chlorine reagent, we would still not see a pink color develop, since we have not yet reached the “breakpoint.”

As monochloramine and then dichloramine increase with a rising chlorine feed, we reach the “hump” of the curve. At a certain ratio of chlorine and ammonia, the amount of chloramine starts to decrease, since the chlorine is destroying (oxidizing) the dichloramine and monochloramine previously formed. The total chlorine

residual using the DPD reagent would now be decreasing.

Dichloramine decomposes first, then monochloramine. We get to a certain point where the residual bottoms out, still giving a pink color with the DPD reagent, but a very low residual amount. You’ll notice on the breakpoint curve in Figure 2, letter c, that the residual line does not actually reach zero before hitting the breakpoint at letter d. This area is where chlorine residual might be found using the DPD residual reagent, but is not actually true chlorine residual. Any chlorine that interacted with organic material present in the water forms chloro-organic compounds, which interfere with the DPD reagent and create a pink color — a false residual value, sometimes called “nuisance residual.”

## AFFECT OF PH

As chlorine dosage continues to increase, we enter the zone after the theoretical breakpoint (Figure 2, letter d) where free chlorine residual is now seen with the DPD free chlorine residual reagent. For every milligram of chlorine dosed per liter, we get an equal amount of free chlorine residual, mg/L (letter e, Figure 2).

The liquid’s pH value influences the type of chloramine present, as well as how much HOCl is produced. When effluent pH values are near 7.0, monochloramine and dichloramine can exist together. The dichloramine tends to be the stronger of the two and favors lower pH values, while monochloramine favors higher pH values.

The facility in this situation had switched from gaseous chlorine to sodium hypochlorite (strong bleach solution) and began experiencing problems certain times of the year. Sodium hypochlorite is usu-



**FIGURE 3:** Sodium hypochlorite feed pump for effluent disinfection. Draw-down tube can be seen in background right side.

Think of the HOCl as shooting the pathogens with a .44 caliber bullet — one shot and it’s dead! Think of the OCl<sup>-</sup> as a .22 caliber bullet. It might take many more hits with the .22 to effectively kill the coliform bacteria. All bacteria have an external slime coating, or layer, that must be penetrated by the disinfectant to effectively kill the cell.

ally about 12 to 15 percent available chlorine and is produced commercially for the water and wastewater industry. We find that the use of sodium hypochlorite tends to raise the pH of the liquid it is applied to; the sodium component is a high alkali metallic material.

As pH values rise, the amount of available HOCl produced at the ejector decreases, and the amount of hypochlorite ion (OCl<sup>-</sup>) increases. The HOCl is the stronger of the two and is the chlorine species we like to have present for killing bacteria. The higher the pH, the lower the amount of HOCl, and the higher the OCl<sup>-</sup>.

At pH 7, about 78 percent of the available chlorine is in the form of HOCl, and about 22 percent OCl<sup>-</sup>. At pH 8, just one pH unit higher, the available HOCl drops to about 22 percent, and the OCl<sup>-</sup> climbs to 78 percent, essentially trading percentage places.



Think of the HOCl as shooting the pathogens with a .44 caliber bullet — one shot and it's dead! Think of the OCl- as a .22 caliber bullet. It might take many more hits with the .22 to effectively kill the coliform bacteria. All bacteria have an external slime coating, or layer, that must be penetrated by the disinfectant to effectively kill the cell.

HOCl is a neutrally charged chemical (neither positive nor negative). OCl- is negatively charged, as is the slime layer of the coliform bacteria, so they tend to repel each other like the negative poles of two magnets. It takes more of the OCl- disinfectant and longer contact time to get the required inactivation of the coliform bacteria.

## FINDING ANSWERS

This is essentially where the facility was with its disinfection problem. The facility regularly had an effluent pH value of 8.0 to 8.2 since using sodium hypochlorite solution as the disinfectant. The effluent pH normally had been about 7.0 when using gaseous chlorine. The Lab Detective returned to the facility with the information he had found. In a meeting with the operators, he offered some options to resolve the problem.

First, ensure adequate contact time in the chlorine contact basin. Even in the monochloramine residual zone, coliform destruction can still occur with enough contact time. Second, ensure that the contact tank is clean and free of settled solids, even algae. Chlorine will react and oxidize solids, which create chlorine demand. Suspended solids can also provide a protective barrier for pathogens to hide from the disinfectant. Third, always ensure good mixing of the chemical with the water being treated.

During problem times of the year, feed more bleach, essentially raising the dosage of available chlorine. Feed some acid along with the bleach to maintain a pH of about 7.0 to 7.2. Try to stay in the dichloramine zone, near the "hump" of the curve, if electing to avoid reaching breakpoint.

Use caution when supernating the anaerobic digesters and avoid supernating during the peak flows of the day. The Lab Detective recommended returning this supernatant during times of low flow and returning this liquid slowly to avoid organic and hydraulic overload. Remember, the ammonia content in the supernatant will affect the amount and type of chloramine produced.

As this article was written, the facility staff reported to the Lab Detective that they had so far been in compliance by maintaining a slightly reduced pH. They did this by adding some sulfuric acid to the inlet of the contact tank and thoroughly cleaning the contact tank and hypochlorite feed pump discharge tubing and lines. They also checked the hypochlorite feed pump discharge flow rate using the pump system drawdown tubes to verify the actual flow from the pumps (Figure 3). By also following the anaerobic digester supernating recommendation, the facility can now maintain aeration tank dissolved oxygen much more effectively.

## 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](mailto:rtrygar@treeo.ufl.edu).

## References

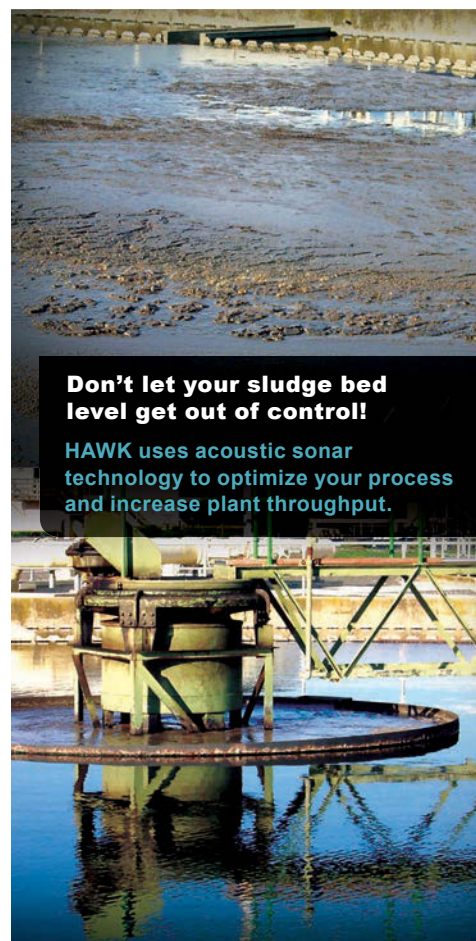
<sup>[1]</sup> "Chemistry of Water Treatment," Second Edition; Samuel Faust and Osman Aly; 1998 CRC Press LLC.

<sup>[2]</sup> "Water Chlorination/Chloramination Practices and Principles, M20," Second Edition, 2006 AWWA. **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](mailto:editor@tpomag.com). Your question may become the topic of a future column.



**Don't let your sludge bed level get out of control!**

HAWK uses acoustic sonar technology to optimize your process and increase plant throughput.



## Sultan Sonar System



Our sales and support team are here to help.

Contact us to learn how we can provide solutions for your level measurement needs at  
978-304-3000 or  
[info@hawkmeasure.com](mailto:info@hawkmeasure.com)

[www.hawkmeasure.com](http://www.hawkmeasure.com)



## NEW! TURBO Aerator.

High-Output Aeration, Using Less Energy.

Utilizing advanced technology, our new TURBO aerators provide high-capacity water movement with low-hp motors, resulting in maximum aeration and reduced energy costs. Effective in extreme conditions. Call for complete details.



**Airmaster Aerator L.L.C.**

888-813-3680 • [www.airmasteraerator.com](http://www.airmasteraerator.com)



# 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](http://www.caryloncorp.com)





# Wastewater Treatment Systems

By Craig Mandli

Wastewater treatment methods vary from open-air aerated chemically treated lagoons to moving-bed biological and membrane reactors. Here are several systems that are on the cutting edge of wastewater treatment technology.

## Aeration Equipment

### PROCESS AERATOR/MIXER

The surface-mounted Aire-O2 Triton process aerator/mixer from Aeration Industries International adapts to municipal and industrial treatment facilities. Its strong horizontal mixing and circulation capabilities are well suited for oxidation ovals. The mixer and blower operate independently, allowing airflow to be controlled, meeting process requirements without impact on mixing performance. It can send fine 2.2 mm bubbles to depths of 33 feet. **952/448-6789; www.aireo2.com.**



**Aire-O2 Triton process aerator/mixer from Aeration Industries International**



**AerGrid system from Aeration Technologies**

### COARSE BUBBLE AERATION SYSTEM

The AerGrid layout from Aeration Technologies provides flexibility to put aeration where needed. The system can be installed dry from a liquid surface in wet conditions and by divers, if necessary. In full-floor or tapered coverage, its efficiency improves as airflow increases. Basic elements include diffuser laterals attached to the bottom of the tank or basin by a patented yoke assembly fixed to the floor or maintained in position by ballast blocks. The system is durable, operates without maintenance and is nonclogging and self-draining. **978/475-6385; www.aertec.com.**

### EFFICIENT AERATOR

The Turbo X-Treme high-efficiency, floating/surface aerator from Airmaster Aerator is powered by an energy-saving 25 hp motor. It incorporates a turbo blower to achieve high-capacity water movement with aeration and mixing incorporated in a discharge manifold. It raises the dissolved oxygen level in the water while providing high-capacity water movement. **888/813-3680; www.airmasteraerator.com.**



**Turbo X-Treme floating/surface aerator from Airmaster Aerator**

## AERATION AIR/GAS FLOWMETER

The ST100 flowmeter from FCI – Fluid Components International offers a wide choice of communication options. It is suited for wastewater treatment service including aeration systems and digester gas. It is designed with a plug-in card replacement that can be changed out by technicians in the field to adapt to a plant's network communication needs. It has a graphical, multivariable, backlit LCD display, with a sophisticated readout that continuously displays all process measurements and alarm status. **800/854-1993; www.fluidcomponents.com.**



**ST100 flowmeter from FCI – Fluid Components International**



**FUCHS aerators from Kusters Water, a division of Kusters Zima Corp.**

## SELF-ASPIRATING AERATOR

FUCHS self-aspirating aerators from Kusters Water, a division of Kusters Zima Corp., are used in applications including lagoons, aeration basins, oxidation ditches and retrofits. A high-precision shaft design uses extremely tight tolerances and eliminates a lower guide or bearing. It is a lubrication-free, low-maintenance system. Each aerator can be installed on steel walkways, concrete walls or lagoon shores or provided with pontoons. The mounting design allows for easy retrieval for maintenance and inspection. **800/264-7005; www.kusterswater.com.**

## ASPIRATING JET AERATION SYSTEM

The AirJet aerator from Landia is suited for aerating oxidation ditches and lagoons. It maintains aeration efficiency, as clogging is eliminated with a heavy-duty chopper pump. This enhances durability and reduces maintenance. It does not require the tank to be drained. **919/466-0603; www.landiainc.com.**



**AirJet aerator from Landia**



**Lagoon Master aerator from Reliant Water Technologies**

## WATER-MOVING AERATOR

The Lagoon Master water-moving aerator from Reliant Water Technologies fluidizes sludge in a lagoon with a constantly moving current. This activates the indigenous bacteria, allowing them to digest all organic matter. The constant flow of water at the sludge level continuously mixes the entire water column, allowing nitrogen and ammonia gases to oxidize into the atmosphere. About 15 pounds of DO per hour is continuously injected into the water and sludge; there is no seasonal turnover. All is accomplished with a 4 hp drive. **504/400-1239; www.reliantwater.us.com.**

## HIGH-SPEED TURBOCOMPRESSOR

The HST 20 turbocompressor from Sulzer Pumps/ABS USA is a direct-drive, high-speed turbocompressor with built-in inlet and outlet air silencers (less than 70 dBA). It has high wire-to-air efficiency with advanced permanent magnet motors and digitally controlled magnetic bearings, an intuitive human-machine interface, advanced magnetic bearings and bearing control coupled with a self diagnostic control system. **800/525-7790; www.sulzer.com.**

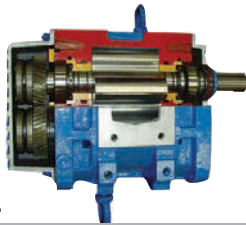


**HST 20 turbocompressor from Sulzer Pumps/ABS USA**

## Blowers

### TRI-LOBED AERATION BLOWER

Tri-lobed ZG Series aeration blowers from Eurus Blower provide for pressures up to 15 psi and flows to 3,750 cfm. They have integral-shaft ductile iron impellers, dual splash lubrication, precision ground helical timing gears, keyless gear locking assemblies, over-sized roller bearings, piston ring air seals, Viton lip seals, heavy-duty cast-iron housings to provide low vibration, and noise-reducing pulse control channel features. Packages include a high-efficiency integrated intake filter/silencer with washable polyurethane filter media, combination base and heavy-duty discharge silencer. **630/221-8282; [www.eurusblower.com](http://www.eurusblower.com).**



**ZG Series aeration blowers from Eurus Blower**



**H Series regenerative blowers from All-Star Products**

### HIGH-TEMPERATURE REGENERATIVE BLOWER

H Series regenerative blowers from All-Star Products include high-temperature components to combat premature blower failures, adding a temperature safety margin to ensure continued operation despite momentary high amperage or load conditions. Features include bearing lubricant rated 385 degrees F, Class H motor insulation

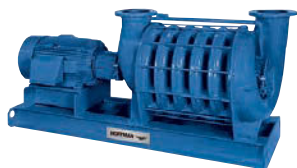
rated 355 degrees F and Viton seals rated 500 degrees F. **800/431-8258; [www.all-star-usa.com](http://www.all-star-usa.com).**

### HIGH-EFFICIENCY REGENERATIVE BLOWER

High-efficiency K Series regenerative blowers from FPZ are suited for applications that require low power consumption. The high-efficiency impeller maximizes blower airflow output at pressure, especially at pressures greater than 4.5 psig. Multiple horsepower options are available. Standard motors are suitable for use with variable-frequency drives so that blowers can operate at lower speeds to minimize power consumption. Compact design and low noise allow them to be installed without large acoustical enclosures. **262/268-0180; [www.fpz.com](http://www.fpz.com).**



**K Series regenerative blowers from FPZ**



**Multistage Centrifugal Blowers from Hoffman & Lamson, Gardner Denver Products**

### MULTISTAGE CENTRIFUGAL BLOWER

Multistage Centrifugal Blowers from Hoffman & Lamson, Gardner Denver Products, are designed for water and wastewater treatment applications requiring continuous low-noise operation with minimal maintenance. Primarily used for aeration

and aerobic digestion, they can be throttled via an inlet butterfly valve for controlling dissolved oxygen concentrations in wastewater. Exhausters can also be used in sludge digestion to exhaust the digester gases, for channel aeration and in filter backwash applications. **866/238-6393; [www.hoffmanandlamson.com](http://www.hoffmanandlamson.com).**

### MULTI-STAGE CENTRIFUGAL BLOWER SYSTEM

Multi-stage centrifugal blower systems from Universal Blower Pac are optimized for energy efficiency, and use DC motors with variable-speed controllers and Hibon-Ingersoll Rand Performer/High Performance series multi-stage centrifugal blowers. They include total process control

and acoustical enclosures. The optimized systems can be combined with EE-PAC high-efficiency screw blower systems for widely fluctuating process demands. Models are capable of airflow to 34,000 cfm and a pressure rise of 16 psig. **317/773-7256; [www.universalblowerpac.com](http://www.universalblowerpac.com).**



**Centrifugal blower systems from Universal Blower Pac**



**Cast-iron slide gates from Hydro Gate**

## Gates

### CAST-IRON SLIDE GATE

Cast-iron slide gates from Hydro Gate control the flow of fluid through openings under a face or seating head or under a back or unseating head. With a full-width dovetail seating surface, the intersection of faces at the four corners is metal-to-metal and does not require fasteners or brazing. This ensures a positive, accurate attachment of seating faces, eliminating leakage. Offered in square, rectangular or round flanges, gates use vertical and horizontal ribs to provide strength to meet the required design heads. **800/678-8228; [www.hydrogate.com](http://www.hydrogate.com).**

## Waste Elimination

### ORGANIC MATERIAL ELIMINATING COMPOUND

PX-109 from Byo-Gon is a nontoxic, noncorrosive, and 100 percent organic and biodegradable material for eliminating grease, odor and hydrogen sulfide from lagoons and sewage systems.

As a stimulant to enzymatic activity at the cellular level, it promotes rapid cell growth and consumption of organic material. ATP measurement technology proves increased microbial performance in all applications. **800/580-5509; [www.byogon.com](http://www.byogon.com).**



**PX-109 biological treatment from Byo-Gon**

## Lagoons/Lagoon Components

### LAGOON UTILITY BARGE

The Utility Service Barge from American Pleasure Products provides a safe work environment when working on the water. The 8- by 12-foot platform has high stability and flotation using two 12-foot by 23-inch-diameter pontoons. This barge is suited for servicing wastewater treatment ponds and lagoons and includes aluminum frame construction with stainless steel hardware. The deck is covered with a nonslip nickel-plate vinyl for stability and easy cleaning. A heavy-duty protective handrail is included. A heavy-duty outboard motor mount for small gasoline or electric motors is provided for maneuverability. Options include a 1,000-pound lifting crane. **989/685-2697; [www.aquacycleusa.com](http://www.aquacycleusa.com).**



**Utility Service Barge from American Pleasure Products**

(continued)



## PORTABLE SLUDGE BLANKET LEVEL DETECTOR

The Sludge Gun handheld sludge blanket level detector from Markland Specialty Engineering measures sludge interface levels in clarifiers, tanks and lagoons and helps to provide sludge level profiles. It allows users to eliminate unnecessary pumping or dredging and maintain preferred sludge bed depth. It uses high-intensity infrared light to detect concentrations from light flocs to thick blankets. As the sensor is lowered, it emits an audible tone that varies in volume and pitch depending on the density of solids. Sludge blanket and the overlying cloudy layer are located by observing depth markers on the cable. It is compact, weatherproof and convenient for boats or catwalks. **855/873-7791; [www.sludgecontrols.com](http://www.sludgecontrols.com).**



**Sludge Gun detector  
from Markland  
Specialty Engineering**

## MBBRs



**PuraMax MBBR system  
from Anua**

### HIGH-STRENGTH MBBR SYSTEM

PuraMax from Anua can pretreat a variety of waste streams. It is a moving bed biological reactor (MBBR) suitable for high-strength waste pretreatment. After a primary tank, biological treatment is achieved through an attached growth process. Recycled plastic biocarriers suspended in the tank, provide a large surface area for bacteria to attach and grow. An aeration grid supplies oxygen to the biofilm, along with the mixing energy required to keep the biocarriers suspended throughout the tank. Biosolids are naturally sloughed off the biocarriers and flow by gravity to a clarifier. **336/547-9338; [www.anua-us.com](http://www.anua-us.com).**

### HIGH-DENSITY BACTERIA MBBR PROCESS

The ActiveCell MBBR process from Headworks International uses thousands of polyethylene biofilm carriers operating in mixed motion within an aerated wastewater treatment basin. Each piece of media increases productivity by providing protected surface area to support the growth of heterotrophic and autotrophic bacteria within its cells. **877/647-6667; [www.headworksintl.com](http://www.headworksintl.com).**



**ActiveCell MBBR  
process from  
Headworks International**

### HIGH-AMMONIA MBBR SYSTEM

ANITA Mox from Kruger USA is a MBBR solution for treating wastewater streams with high ammonia concentrations (500-1,000 mg/L). Treatment plant sidestreams from dewatering of anaerobically digested sludge are a prime application. The process can remove nitrogen from these streams with only 40 percent of the aeration demand of conventional nitrification and without supplemental carbon addition. Continuous aeration control creates conditions



**ANITA Mox MBBR solution  
from Kruger USA**

for ammonia oxidizing and anammox bacteria to operate simultaneously in the biofilm of a single-stage reactor. **919/677-8310; [www.kruger-usa.com](http://www.kruger-usa.com).**

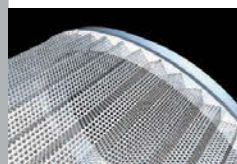
## BIOMASS CARRIER MBBR SYSTEM

BioSphere moving bed biological systems from Siemens Water Technologies incorporate a biomass carrier to provide a protected, high-surface-area environment for biofilm growth. The result is a system capacity increase of 200 percent or more while ensuring compliance with permit limits, within the existing plant footprint. It is suited for plant upgrades, retrofits or expansions of municipal and industrial wastewater treatment plants. It can achieve BOD<sub>5</sub> to less than 5.0 mg/L and enhanced nutrient removal of total nitrogen to less than 3.0 mg/L. **866/926-8420; [www.water.siemens.com](http://www.water.siemens.com).**



**BioSphere MBBR from Siemens  
Water Technologies**

## MBRs



**Rotamat RPPS STAR drum screen  
from Huber Technology**

### MBR SCREEN

The Rotamat RPPS STAR center-feed drum screen from Huber Technology uses a 1 mm or 2 mm pleated perforated plate geometry that enables the screen to increase throughput by 25 percent, allowing for a smaller footprint. The folded screen provides additional stiffness, critical to larger drum designs. **704/990-2055; [www.huberforum.net](http://www.huberforum.net).**

## MEMBRANE BIOREACTOR SYSTEM

The TITAN MBR membrane bioreactor from Smith & Loveless is for industrial, municipal and onsite applications. Designed with a small footprint, its flow capacities range from 5,000 gpd to 3 mgd. The system uses submerged S&L Flat-Plate membrane technology, which results in high-quality treatment, a long-lasting design and minimal operational requirements. Membranes are cleaned in place, requiring less chemicals, equipment and operator time. **800/898-9122; [www.smithandloveless.com](http://www.smithandloveless.com).**



**TITAN MBR membrane bioreactor  
from Smith & Loveless**

## Membrane/Media Filters



**Aqua BioMax dual-  
treatment system from  
Aqua-Aerobic Systems**

### DUAL-TREATMENT SYSTEM

The Aqua BioMax dual-treatment system from Aqua-Aerobic Systems combines rotating biological contactor technology and cloth media filtration. It uses vertically mounted, closely spaced RBC disks, providing a large surface area for biofilm growth. The disks are 40 percent submerged and rotate out of the wastewater to provide aeration for efficient BOD removal and nitrification. A cloth media drum filter follows

the RBC to collect and remove biological solids before effluent discharge. Features include low energy consumption, reduced maintenance and operator attention, a small footprint, low installation costs and a preassembled plant with integrated control panel. It is designed for low flow applications (up to 100,000 gpd). **800/940-5008; [www.aqua-aerobic.com](http://www.aqua-aerobic.com).**

(continued)



# 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](http://www.watersolutions.basf.com)

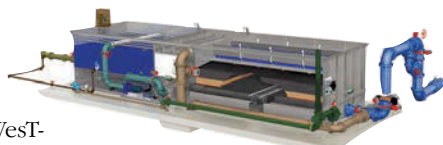
 **BASF**

The Chemical Company



## WATER TREATMENT PLANT

The Trident HS package water treatment plant from Westech Engineering provides multi-barrier protection for difficult-to-treat waters. It consists of packaged high-rate settling, adsorption clarification, mixed media filtration and optional UV disinfection. This allows it to handle very high turbidity and solids loading and achieve TOC reductions of up to 70 percent or more, all with a nearly 50 percent reduction in waste production. **801/265-1000; [www.westech-inc.com](http://www.westech-inc.com).**



**Trident HS package water treatment plant from Westech Engineering**

## Mixers

### HYBRID MIXER

The Amaprop 1000 hybrid mixer from KSB is engineered for biogas production, combining an agitator with the turbulence generation of a traditional mixer. It is optimized for each mixing task to ensure a specific flow volume. Use of multiple, properly positioned mixing units, each of which processes the reduced, diluted material created by other units, can help to prevent short circuiting flow paths. **804/222-1818; [www.ksbusa.com](http://www.ksbusa.com).**



**Amaprop 1000 hybrid mixer from KSB**



**GridBee GF Series electric mixer from Medora Corporation**

### ELECTRIC MIXER

The GridBee GF Series electric mixer from Medora Corporation can displace 30 to 50 hp of surface aerator mixing. It allows the aeration system to be dialed back to provide only the needed DO. At electric rates 10 cents per kWh, savings per mixer are about \$750,000 over 25 years. **866/437-8076; <http://waste.water.medoraco.com>.**

### IMPELLER-SHAFT ASSEMBLY

The Lightnin Clean Edge impeller-shaft assembly from SPX Flow Technology is for use where a non-ragging mixer impeller is indicated or needed. It sheds all fibrous debris while delivering high hydrofoil impeller performance. It includes a shaft guard design that eliminates buildup. No part of the wetted parts is a rag-collector. **800/252-5200; [www.spxft.com](http://www.spxft.com).**



**Lightnin Clean Edge impeller-shaft assembly from SPX Flow Technology**



**Turbo Mixer propeller mixer from Vaughan Company**

### VERTICAL PROPELLER MIXER

The Turbo Mixer propeller mixer from Vaughan Company is mounted vertically inside an 18-inch elbow. It can mix a pit with only one foot of liquid above the floor and incorporates an upper cutter above the propeller to stop wrapping and fibrous material binding and to protect the mechanical seal. It can be belt- or gearbox driven and can be used in anoxic zones, oxidation ditches and mixed liquor applications. **360/249-4042; [www.chopperpumps.com](http://www.chopperpumps.com).**

## Nutrient Removal

### CLEANING SYSTEM

The Weir-Wolf automated cleaning system from the Ford Hall Company is a stainless steel spring-loaded brush system for use on primary clarifiers, secondary clarifiers and thickeners, whether domed, covered or open to the elements. The system increases clarifier/thickener efficiency and improves performance of UV disinfection, screens and other downstream systems. It uses the existing skimmer with negligible increase in energy usage, amp or draw, and is a shovel-ready retrofit to existing clarifiers. **859/624-1077; [www.weir-wolf.com](http://www.weir-wolf.com).**



**Weir-Wolf automated cleaning system from Ford Hall Company**

### PHOSPHORUS CONTROL MODULE

The RTC101-P real-time control module for phosphorus from Hach Company continually monitors phosphorus levels and adjusts chemical dosing. The system responds automatically to load changes. The operator sets the desired effluent phosphorus value. **800/227-4224; [www.hach.com](http://www.hach.com).**



**RTC101-P control module from Hach Company**

### AMMONIA REDUCTION SOLUTION

Ammonia Guarder from Martech Research is a natural, biodegradable, microbial product designed to reduce ammonia. The blend helps to reduce phosphorus, nitrate/nitrites and COD. A feed pump can be used to introduce the product. **803/428-2000; [www.martechresearch.com](http://www.martechresearch.com).**



**Skid packages for digester gas boosting from Spencer Turbine Company**

### GAS BOOSTER SKID PACKAGE

Custom-designed skid packages for digester gas boosting from Spencer Turbine Company include a multistage centrifugal, stainless steel blower with anodized aluminum impellers. The explosion-proof motor is inside the blower casing, where it is cooled by the digester gas flow. The hermetic design has zero leakage for clean, odor-free delivery. Packages are delivered as turnkey modules. All components are interconnected and mounted on one skid. Each package has a control panel, isolation valves and other customized components such as intercoolers, aftercoolers, filters and separators. They handle pressures to 55 psig, volumes to 7,000 icfm and power to 150 hp. **800/232-4321; [www.spencerturbine.com](http://www.spencerturbine.com).**

## SBRs

### ONE-TANK SBR SYSTEM

The Sequence Batch Reactor (SBR) system from Nijhuis Water Technology completes all operations in one tank. Technicians can discharge batch volume in two to three hours per day. The system is suited for nitrification, denitrification and phosphorus removal, is easy to operate, and can handle flow and strength variations. The mainly soluble matter is removed by biological treatment. The system typically consists of a selector and an SBR tank with aeration, denitrification (if applicable), settling and discharge. The aerobic biological treatment process requires air, typically via fine-bubble bottom or surface aeration. The aeration is controlled by an oxygen measurement in the SBR tank. **312/300-4101; [www.nijhuis-water.com](http://www.nijhuis-water.com). tpo**



**Sequence Batch Reactor (SBR) system from Nijhuis Water Technology**

## Powered by Reliability

Performance guaranteed by experience

**ANDRITZ**  
Separation



As specialists in the water and wastewater industries, ANDRITZ Separation offers the most comprehensive portfolio of technologies and services designed to increase performance and profitability.

- Our belt filter presses are designed to reduce overall operating and maintenance costs. Our range includes 1.5 to 3.0 meters in width and from 6 to 14 pressure rolls, with low and high pressure formats designed for your operating conditions.

**Our other product offerings include:**

- Centrifuges
- Screens (Fine and Coarse)
- Filter presses (Plate and Frame)
- Thermal drying systems
- Conveying systems
- Gravity Belt and Drum Thickeners

ANDRITZ SEPARATION Inc.  
1010 Commercial Blvd. South, Arlington TX 76001, USA  
Phone: +1 (817) 465 5611, Fax: +1 (817) 468 3961, separation.us@andritz.com

[www.andritz.com](http://www.andritz.com)

**UB** UNITED  
BLOWER  
INC.

## THE POWER OF PROVEN TECHNOLOGY

United Blower, Inc has been in business since 1989 and is located in the Atlanta, GA area. UBI manufactures its own PD blower systems featuring tri-lobe PD blowers. UBI also manufactures high speed turbo blowers, gas compressors, regenerative and screw blowers, complete systems.



**"Quiet Pulse"**  
Compact PD Blower Package  
with 3 Panel Access



**Noise Enclosures**  
• Walk-In  
• Close-Fitting  
• Fiberglass

UNITED BLOWER  
1198 Airport Drive  
Ball Ground, GA 30107

Phone: 770-479-3000  
Fax: 770-479-3111  
E-mail:  
[sales@unitedblower.com](mailto:sales@unitedblower.com)



By Craig Mandli

## Turbo blower leads to energy efficiency

### Problem

Lakota Wastewater Treatment Plant in Lakehaven Utility District, Wash., sought to address rising energy costs and aging equipment. The 17-year-old 250 and 350 hp positive displacement blowers used for secondary treatment were noisy and inefficient and did not provide operational flexibility. Because the 250 hp blower could not meet low-flow aeration requirements, plant operators had to turn on the 350 hp blower, increasing power consumption.

### Solution

In 2008, the plant replaced the 250 hp blower with an **NX300 300 hp high-speed turbo blower from APG-Neuros**. The project was eligible for an Energy Grant from Puget Sound Energy (PSE). After thorough review of the estimated energy savings, PSE agreed to finance 70 percent of the project capital cost, providing a \$156,000 grant.

#### RESULT

The turbo blower saved more than \$86,000 per year in power consumption (at 7.5 cents per kWh), resulting in a 16-month payback. The blower can accommodate the plant's entire flow, eliminating the need to run the 350 hp blower. **866/592-9482; [www.apg-neuros.com](http://www.apg-neuros.com).**



## Rotary screw blower keeps DO levels down

### Problem

At its dairy processing facility in LeSueur, Minn., Davisco Foods produces 200,000 pounds of cheese, two tanker loads of cream and about 1.7 million pounds of whey each day. The wastewater treatment plant operates best when dissolved oxygen levels are 2 mg/L. Three multi-stage centrifugal blowers introduce the air. However, DO levels exceeded the target, consuming more electricity than necessary.

### Solution

Adding an **Atlas Copco ZS rotary screw blower** with variable-speed drive provided capacity flexibility. DO levels are maintained close to target. Davisco runs two multistage centrifugal blowers at 100 percent output (peak efficiency) and trims the additional flow requirements with the blower.

#### RESULT

Davisco achieves a target DO setpoint and uses substantially less electricity. In the first several weeks, a 36 percent reduction in electricity usage was observed. Davisco projects average annual energy savings in excess of 20 percent. **866/546-3588; [www.efficiencyblowers.com](http://www.efficiencyblowers.com).**



## Corrosion-resistant products meet safety concerns

### Problem

The City of San Miguel Cuyutlan in Jalisco, Mexico, needed fiberglass reinforced plastic products throughout the wastewater treatment facility to withstand high exposure to sulfur vapors.

### Solution

The plant team chose **Fibergrate Composite Structures**. The products offer durability, low maintenance and corrosion-resistance. The company provided Dynarail handrail, platforms using molded grating, stair treads and Dynaform structural components. Fibergrate products are lightweight for easier installation and offer slip resistance.



#### RESULT

Seeing the success of this project, the State of Jalisco and another nearby state decided to use Fibergrate for wastewater treatment plant projects. **800/527-4043; [www.fibergrate.com](http://www.fibergrate.com).**

## City turns to integral sludge reduction system to meet strict BNR limits

### Problem

The sequencing batch reactor process in Hilliard, Fla., could not consistently meet strict biological nutrient removal effluent limits due to high TKN loading and high infiltration. The treatment plant also did not have adequate sludge storage and handling.

### Solution

The city upgraded the plant to a **Fluidyne Corp. ISAM (Integrated Surge Anoxic Mix) process** with integral sludge reduction, built-in flow equalization, aeration and clarification, all in one process. The plant used the existing SBR basin as an integral part of the process, allowing a 50 percent increase in rated plant capacity while minimizing construction costs.

#### RESULT

The city meets all effluent limits of 3 mg/L TN, 5 mg/L BOD, 5 mg/L TSS and 0.2 mg/L phosphorus, while handling high peak organic and hydraulic loads. The system also substantially reduced biosolids and increased the solids content to up to 12 percent. **319/266-9967; [www.fluidynecorp.com](http://www.fluidynecorp.com).**



## Specially designed covers provide solution for odor issue

### Problem

A series of events and conditions caused the Bridgeport (Conn.) Water Pollution Control Authority treatment plant to develop a significant odor problem. Neighbors in condominiums and industrial/commercial operations complained.

### Solution

Management studied the problem, identified odor sources, evaluated solutions and chose to capture and treat odors using specially designed covers to capture odorous offgas and a carbon system to treat the odors. **Geomembrane Technologies provided retractable, structurally supported covers** over the plant's influent channel and primary clarifiers. A durable coated fabric cover is tensioned over a series of low-profile aluminum arches. The covers are gas-tight but can be quickly disconnected and retracted for access to tank internals. Rainwater automatically drains off the covers.



#### RESULT

This solution met the plant's requirements. Odors were controlled, budgets were met and the covers were installed with the primary clarifiers remaining in service. 506/449-0993; [www.gtcovers.com](http://www.gtcovers.com).

# McNISH

C O R P O R A T I O N

## CIRCULAR CLARIFIER DRIVES

Direct From Factory  
Aurora, IL USA

[www.mcnishcorp.com](http://www.mcnishcorp.com)

## City turns to pulse pumps to remove treatment plant grit

(continued)

### Problem

The 8.75 mgd wastewater treatment plant in Carrollton, Ga., was paying electricity and labor costs to operate eight continuously running conventional airlift pumps in the dual grit removal chambers. Each year plant operators had to bypass and drain the two chambers, removing up to 10 tons of built-up grit with buckets and shovels.

### Solution

Officials looked at replacing the conventional airlift pumps with **Pulse Pumps from Geyser Pump Tech LLC.** to maximize utilization of an existing grit classifier and portable tote dump containers. Operators retrofitted the grit chambers with eight 4-inch GHP units. The suction force of the airlift increased, and bigger grit was removed. There were no changes in local control panels or in programming of the plant's control system.



#### RESULT

The pumps now run for 20 minutes per day and use a 15 hp blower versus a 50 hp blower that had run continuously to drive the old airlift pumps. Grit from the basins is pumped and separated and full containers are hauled once every two weeks. The basins operate reliably, saving the city \$33,000 in electricity and \$8,600 in labor per year. 614/398-0960; [www.geyserpulsepumps.com](http://www.geyserpulsepumps.com).

## Transform your cleaning system with the new Weir-Wolf™!

The Ford Hall Company's Algae Sweep Automation weir cleaning system for clarifiers and thickeners has improved... has transformed into the **Weir-Wolf™!**

#### The Weir-Wolf™

**ELIMINATES** man-hour cost associated with daily hosing and weekly cleanings  
**ADDRESSES** safety concerns associated with entering the clarifiers for cleanings  
**OPTIMIZES** clarifier/thickener performance  
**ENHANCES** clarifier/thickener appearances  
**ASSIST** UV and disinfection systems  
**IMPROVES** TSS and sample readings to maintain compliance by providing constant cleaning

The Weir-Wolf is still designed to clean algae from secondary clarifiers but can also be used in municipal and industrial applications to remove debris and non-algae build up in primary clarifiers, intermediate tanks and thickeners; whether they are covered or open to the elements.



Ford Hall  
Company, Inc.

For more information, please visit our website [www.weir-wolf.com](http://www.weir-wolf.com) or call 800-928-2070



## Pretreatment system combats oily wastewater

### Problem

The Metaldyne aluminum die casting plant in Twinsburg, Ohio, produces aluminum valve body castings. A specially formulated die lubricant (oil and water emulsion) helps control the die temperature and facilitates the removal of castings during part ejection. However, oil from the die lubricant and glycol from the hydraulic fluid combined created a wastewater treatment challenge. The plant installed a membrane bioreactor (MBR) system to consume the glycol, but the membranes could not handle the oil and grease and became clogged within three weeks.

### Solution

**Koch Membrane Systems installed a KONSOLIDATOR 150 industrial wastewater system** with FEG PLUS tubular ultrafiltration membranes to pretreat MBR feedwater. Because of its ability to handle extremely high suspended solids and allow for mechanical cleaning, the system fits oily wastewater applications. The system removes solids and concentrates the waste 25 times, equivalent to a 96 percent reduction in water content.



#### RESULT

Removal of the solids enabled the bioreactor process to work smoothly. Wide variations in MBR permeate COD levels ranging from 1,500 to 12,000 mg/L were reduced to 30 to 300 mg/L. Offsite disposal of bioreactor waste was reduced, saving \$228,000 per year. **888/677-5624; [www.kochmembrane.com](http://www.kochmembrane.com).**

## MBR activated sludge system saves treatment expenses

### Problem

Abbyland Foods Inc. in Abbotsford, Wis., sought to increase production without overloading the city wastewater treatment plant. The city asked for funds from Abbyland to upgrade the plant to accommodate the increased production. In 2008 alone, Abbyland spent more than \$1.1 million treating wastewater through the city plant.

### Solution

**MSB Corporation proposed a membrane bioreactor-based return activated sludge system** with direct discharge.



#### RESULT

The company saved more than \$750,000 on wastewater treatment. The city avoided capital expansion, saving residents' tax dollars. Effluent permit limits were met, including lower phosphorus limits. **920/759-1100; [www.msbenvironmental.com](http://www.msbenvironmental.com).**

## Nutrient recovery removes struvite

### Problem

Since starting biological phosphorus removal, the H.M. Weir Wastewater Treatment Plant City in Saskatoon, Saskatchewan, Can., was seeing an increase in phosphorus and other nutrients from the solids handling process recirculating within the plant, increasing nutrient loads and causing a buildup of struvite in the main treatment process and in the dewatering lagoons. In 2010, a 12 km pipeline carrying digested biosolids to the lagoons became so clogged that it brought the system to a standstill. A second pipeline was also blocked, creating enough pressure in the force main to cause an emergency closure. After a costly process to locate the blockages and flush the struvite out, the facility still could not operate normally.

### Solution

The city implemented the **Pearl Nutrient Recovery Process from Ostara Nutrient Recovery Technologies** to solve the facility's struvite problem and restore plant reliability. The process includes a Pearl 2000 reactor with annual production capacity of 730 tons of Crystal Green, a slow-release fertilizer created from the harvested nutrients.



#### RESULT

The process reduced struvite buildup and plant maintenance issues, lowering operation and maintenance costs, and improving efficiency and reliability due to smaller supernatant nutrient load being returned for treatment. The city shares in the revenue from the fertilizer sales to help offset the system's capital costs. **604/408-6697; [www.ostara.com](http://www.ostara.com).**

## Product accelerates digestion rate in winter

### Problem

The operators at the wastewater treatment facility in Wentzville, Mo., sought better digester performance in winter. For the aerobic digester, cold means low volatile solids destruction and frozen soils that preclude land application of biosolids. The city wanted better settling material, increased decant and more space to waste sludge.

### Solution

The operators tested three chemical and biological products and chose **BIO ENERGIZER from Probiotic Solutions** for its ability to accelerate endogenous respiration by improving cell wall permeability, increasing biomass metabolism and reducing solids volume.



#### RESULT

The product provided up to 85 percent volatile destruction in 27 weeks and improved decants. It led to greater digester capacity, settleability and overall digester performance. **800/961-1220; [www.probiotic.com](http://www.probiotic.com).**

(continued)





## PROCESS MIXING SYSTEM

With over 750 worldwide installations Vaughan's Rotamix System is today's most cost effective means of mechanical hydraulic mixing, consisting of an engineered arrangement of floor mounted nozzles fed by a Vaughan Chopper Pump.

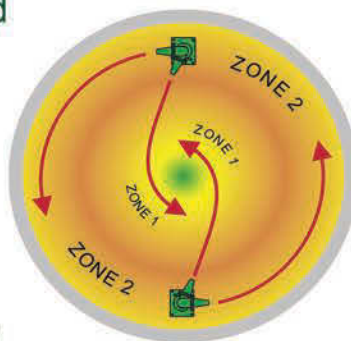


### APPLICATIONS:

Anaerobic Digesters  
Sludge Storage  
Sludge Blend  
TWAS  
Biosolids  
Anoxic Zones  
Acid Phase  
Equalization Basins  
Influent Channels  
Pump Stations  
CSO Tunnels  
FOG Reception  
Septage Receiving



- Over 50 years of expertise in every pump
- Reliable chopping action reduces solid size
- Reduced power options available
- Oversized shafting and bearings extend pump life
- Conditioning of solids increases surface contact and enhances volatile solids destruction



Dual-rotational zone mixing

- Offered in single and double nozzle configurations
- Designed for permanent fixed installation (no moving parts in the tank)
- Glass lined nozzle barrels protect against effects of abrasion and corrosion
- Mixing assemblies include a 10 year full warranty



**QUALITY CHOPPER PUMPS SINCE 1960.**

phone: (360) 249-4042 FAX: (360) 249-6155  
email: [info@chopperpumps.com](mailto:info@chopperpumps.com) web: [www.chopperpumps.com](http://www.chopperpumps.com)



## Continuously sequencing reactor cuts nutrient discharge

### Problem

For more than 15 years, Stafford County, Va., has operated a counter-current aeration system (Schreiber) with pre-anoxic reactor at the Little Falls Run and Aquia wastewater treatment facilities to comply with biological nutrient removal requirements (8 mg/L total nitrogen). In 2010, the county needed to upgrade both facilities to comply with stricter nutrient limits under the Chesapeake Bay Nutrient Reduction Strategy.

### Solution

The upgrades included several features to improve performance while minimizing capital and operating costs. One major improvement at both facilities was an upgrade to the counter-current aeration unit with a **continuously sequencing reactor (CSR) from Schreiber**, equipped with advanced control for nitrification, denitrification and enhanced biological phosphorus removal. At Aquia, post anoxic reactor tanks were installed downstream of the CSR to meet a total nitrogen limit of 3 mg/L.



### RESULT

The improvements enabled the county to achieve exceptional nutrient levels at each facility in 2012. Little Falls Run achieved effluent TN at 35 percent of its limit while operating at more than 50 percent of rated capacity. Aquia achieved effluent TN at 39 percent of its limit while operating at more than 60 percent of rated capacity. **205/655-7466; www.schreiberwater.com.**

## Dredge enables sludge removal from lagoon

### Problem

The City of Harlem, Mont., faced excessive lagoon sludge accumulation, hurting performance in its treatment system. The three-cell partially mixed aerated lagoon system, which discharges into the Milk River, was constructed in 1985.

### Solution

Stahly Engineering & Associates and the city conducted a lagoon survey in 2009, sampling each cell in multiple locations using a core sampler and calculating solids volumes. Water-Solve bid the project, financed by a grant from the Renewable Resource Grant and Loan program of the Montana Department of Natural Resources. **SRS Crisafulli provided the dredge, float line and operator/trainers.**



### RESULT

Montana Rural Water System's Dan Kramer offered a training program: Sludge Removal for Small System Wastewater Operators Workshop, a continuing education credit for Montana certified operators. The sludge removal project, completed in July 2013, is the initial step in a comprehensive facility upgrade. **800/442-7867; www.crisafullipumps.com.**

## Diffuser upgrade improves lagoon performance

### Problem

The City of Pea Ridge, Ark., has two aerated lagoons and four treatment cells. In 2012, the city exceeded its permit limits. The surface aerators provided insufficient oxygen and mixing to achieve adequate BOD and ammonia treatment. Due to the low oxygen transfer capacity of the surface aerators, the lagoons did not receive the necessary 4.6 pounds of oxygen per pound of ammonia to achieve the necessary nitrification. The surface aerators could not mix below the top 6 feet of water, leaving the bottom 2 feet oxygen deficient, causing anaerobic digestion that released ammonia to the water column aggravated the treatment problem.

### Solution

The city replaced the surface aerators with a **MARS Aeration System from Triplepoint Water Technologies** consisting of 30 aeration diffusers with positive displacement blowers and dissolved oxygen controls. Using fine-bubble technology, each diffuser produces 5 to 7 pounds of oxygen per horsepower hour, a 70 percent increase in oxygen transfer efficiency. Because the diffusers sit on the bottom, and have a central coarse-bubble tube, the entire water column is thoroughly mixed. Installation was completed without taking the lagoons offline.



### RESULT

Pea Ridge has met permits since startup and will save a projected 40 percent on operation and maintenance costs. **312/428-4634; www.triplepointwater.com.**

## Positive displacement blowers provide additional aeration

### Problem

The City of Rodeo, Calif., required additional aeration. The city and consultant Herwitt Engineering considered high-speed, direct-drive, oilless turbo blowers and high-quality VFD-driven positive displacement blowers.



## Solution

After a detailed study, the city chose **positive displacement blowers from United Blower** for high efficiency, low capital cost, low noise and compact footprint. The blower project received grant support from the local electric utility provided claimed efficiencies could be proven.

### RESULT

The utility was satisfied and paid the grant money. The city and engineer are well satisfied. **770/479-3000; [www.unitedblower.com](http://www.unitedblower.com).**

## Anaerobic digester expands treatment options

### Problem

Kline's Services in Salunga, Pa., serves wastewater customers in south central Pennsylvania and northern Maryland. The customer base includes food processors, restaurants, wastewater treatment plants and others. The company sought an alternative method to process residuals from its food processing customers.

## Solution

The company developed a three-phase food-to-fuel program to treat residuals. During the process, **Veolia Water Solutions & Technologies** evaluated the use of anaerobic digestion to treat residuals. Veolia designed a 1.23-million-gallon continuously stirred tank reactor able to handle 50,000 gpd, with a 22-day hydraulic retention time. Incoming wastes are deposited in four underground tanks in the processing building. Contents are metered into the digester next to the existing tank. Digestate is handled through an existing sequencing batch reactor.



### RESULT

The facility is in its fourth year and saves \$32,000 a year in heating oil costs. Once the methane digester is running at capacity, the company expects to reduce its \$90,000 annual electricity bill and receive revenues from excess energy sold back to the grid. **312/552-2887; [www.veoliawaterna.com](http://www.veoliawaterna.com). tpo**

“Our operators are special because they are committed to delivering the best quality water they can, and that’s what motivates them every day.”

Kirk Watson, Plant Supervisor,  
Aurora (Colo.) Water

## Pride. It speaks volumes.

Hear what operators like Kirk have to say each month in *Water System Operator*.

FREE subscription at [www.wsomag.com](http://www.wsomag.com)

# ClearSpan

fabric structures

**Sustainable design-build solutions for water treatment facilities, covered sludge beds & more!**

**MADE IN USA**

Buildings available up to 300' wide.

Low in cost per square foot.

Natural daytime lighting.

Easy to relocate.

Expandable.

Call one of our ClearSpan specialists today at 1.866.643.1010 or visit us at [www.ClearSpan.com/ADTPO](http://www.ClearSpan.com/ADTPO).



## EnviroDisc® Rotating Biological Contactor

**Lowest Installed Energy For the Right Process**



- Low Energy, Low Maintenance.
- Longest Successful Operating History of any RBC manufactured today.
- Used for Municipal, Industrial and Land Development Applications.

**Walker Process Equipment**  
[www.walker-process.com](http://www.walker-process.com)







#### 1. PSG DIAPHRAGM METERING PUMPS

Neptune Series 7000 mechanically actuated diaphragm metering pumps from the Pump Solutions Group are designed to handle clear liquids with viscosities ranging from water-like to 1,500 cPs. The triplex version features flow to 4,200 liters per hour with discharges to 58 psi. The pump heads are driven by a single motor but can inject chemicals in three different lines at the same time. **909/557-2900; [www.psgdover.com](http://www.psgdover.com).**

#### 2. JWCE GREASE RECEIVING, SCREENING SYSTEM

The Heavy Object Trap (HOT), model GRS, grease receiving and screening system from JWC Environmental has a variable bar screen with 1/2- and 1-inch spacings to capture and direct heavy objects, including rocks, silverware and trash into the debris basket. The largest basket can hold up to 2.2 cubic feet of material. The bar screen design and hot water washdown system prevents screen blinding for high flow rates of grease. The HOT system is available in six sizes with a maximum flow rate of 600 gpm and operating pressure of 15 psi and 4- or 6-inch pipelines. **800/331-2277; [www.jwce.com](http://www.jwce.com).**

#### 3. UNIVERSAL FLOW MONITORS VORTEX-SHEDDING FLOWMETERS

P420 vortex-shedding flowmeters from Universal Flow Monitors are designed for process water, membrane permeate, brine and corrosive fluids in water treatment, desalination and chemical treatment applications. The meters include models with wetted parts made entirely of PVC or CPVC for greater heat resistance. The CPVC body meter has a maxi-

imum operating temperature of 180 degrees F and the PVC meter has a maximum operating temperature of 140 degrees F. Both meters are available in five pipe diameters (1/2, 3/4, 1, 1 1/2 and 2 inches), providing a flow range from 12 to 200 gpm. **866/542-9641; [www.flowmeters.com](http://www.flowmeters.com).**

#### 4. KAESER HIGH-CAPACITY REFRIGERATED DRYERS

TK-TM series modular, high-capacity refrigerated dryers from Kaeser Compressors have air-side isolation valves, a cooling water control valve and cooling water isolation valves, enabling individual modules to be serviced without disrupting air flow. Service panels on the top, front and back allow for easy access. Each module has its own electrical disconnect switch. **877/596-7138; [www.kaeser.com](http://www.kaeser.com).**

#### 5. AALBORG ACRYLIC FLOWMETERS

The ACRX line of acrylic flowmeters from AALBORG feature interchangeable direct-reading scales for air, water, argon, oxygen, carbon dioxide, nitrogen, helium and hydrogen. Dual scales display flow rates in metric and English units. Optional scales available. The yellow back plate enhances readability and helps minimize eye fatigue. The meters are configured for inline 1/2-inch female NPT connections. They have a maximum operating temperature of 130 degrees F and maximum operating pressure of 100 psi. **845/770-3000; [www.aalborg.com](http://www.aalborg.com).**

#### 6. PALMER SOLAR-POWERED THERMOMETER

The solar-powered digital industrial thermometer from Palmer Instruments has a 1/2-inch high LCD screen and is mercury free. Models

with 4-20 mA transmitter capability are available. An adjustable angle fitting enables the meter to be rotated 180 degrees for best viewing. **800/421-2853; [www.palmerwahl.com](http://www.palmerwahl.com).**

## 7. THOMAS & BETTS INDUCTION LIGHTING FIXTURES

Hazlux induction lighting fixtures from Thomas & Betts include Fulham induction electronic ballast and lamps that deliver 100,000 hours of warm, white light. Operating range is -65 to 104 degrees F. The extreme-cold option operates at temperatures down to -85 degrees F. The lighting fixtures are suitable for use in Class 1, Zone 2, Groups IIA, IIB, IIC, Exn RII T3 (restricted breathing) and Division 2 Groups A, B, C and D areas. They also are rated for explosion-proof areas: Class 1, Division 1, Groups C and D, and Class II, Divisions 1 and 2, Groups E, F and G. **901/252-5000; [www.tnb.com](http://www.tnb.com).**

## 8. KOHLER 2,500 KW GENERATOR

The 2,500 kW (model 2500REOZDC) generator with V-16 engine from KOHLER Power Systems has a 60 Hz standby rating, 50 C cooling system, heavy-duty air cleaner and dual-bearing alternators. The generator is International Building Code (IBC) 2012 seismic certified for applications including hospitals, large data centers and water treatment plants. It also meets NFPA 110 requirements, providing power in less than 10 seconds. **800/544-2444; [www.kohlerpower.com](http://www.kohlerpower.com).**

## 9. SUMITOMO MACHINERY VIRTUAL PRODUCT APP

The PT Experience mobile iPad app from Sumitomo Machinery Corporation of America enables users to customize Cyclo Bevel BuddyBox

(BBB) power transmission products, visualize internal and external workings, and connect to company representatives and online resources. **800/762-9256; [www.smcyclo.com](http://www.smcyclo.com).**

## 10. INTERNATIONAL PRODUCTS ASSEMBLY LUBRICANT

P-80 RediLube from International Products Corp. provides temporary lubrication that can ease the assembly of tight-fitting parts. It is solvent-free, water-based, biodegradable, nontoxic and nonirritating to eyes and skin. **609/386-8770; [www.ipcol.com](http://www.ipcol.com).**

## 11. HEMCO EMERGENCY SHOWER

The emergency shower from HEMCO is designed to protect individuals working with hazardous chemicals. Constructed of one-piece fiberglass composite, the showers are fully assembled and ready for installation to water supply and waste systems. The unit includes a pull-rod activated shower and push-handle eye/face wash for immediate drenching of personnel who have been exposed to harmful chemicals. Options include grab bars, and hand-held body wash and curtains. The unit is ANSI and OSHA compliant. **800/779-4362; [www.hemcocorp.com](http://www.hemcocorp.com).**

## 12. AGRU AMERICA GEOSYNTHETIC CLAY LINER

GeoClay reinforced needle-punched geosynthetic clay liner from Agru America features a uniform layer of granular bentonite, encapsulated between two nonwoven geotextiles. GCL is designed for moderate to steep slopes and moderate to high load applications, where increased internal shear strength is required. **800/373-2478; [www.agruamerica.com](http://www.agruamerica.com).**

*(Continued on page 63)*

## product spotlight

### Nitrogen removal system uses less energy, no carbon source

By Ed Wodalski

The **DEMON** nitrogen removal system from **World Water Works** is designed for municipal and industrial wastewater streams with high ammonia concentrations (greater than 200 mg/L). The system's two-step process uses ammonia oxidizing bacteria (AOB) that convert half the ammonia to nitrite. A second biological process uses anaerobic ammonium oxidizing bacteria (anammox) to convert the nitrite and remaining ammonia into nitrogen gas, reducing energy usage by 60 percent. The system also produces 90 percent less biomass than traditional nitrogen removal processes. This is all accomplished in a single tank.

"The DEMON system is a shortcut in nitrogen removal," says Chandler Johnson, chief technology officer for World Water Works. Unlike conventional activated biomass processes that convert ammonia into nitrate, the DEMON (an acronym for DEamMONification) process requires no carbon source, such as methanol. "It's a very cost-effective upgrade for handling the side-stream treatment of high ammonia-laden streams coming from the dewatering step in the wastewater treatment pipe," he says.

Once dewatered, centrate is collected in a buffer tank and pumped into the DEMON reactor, where it is aerated and mixed. During the aeration period, ammonia is converted into nitrite and acid is formed. When pH drops approximately 0.02 to 0.05 units, aeration is stopped. Under anaerobic conditions, nitrites, combined with the remaining ammonia, are converted into nitrogen gas.

The conversion process causes pH to rise. When pH rises approximately 0.02 to 0.05 units, aeration is restarted. After six hours, the process is stopped, allowing bacteria to separate from the centrate. A 30-minute settling process leaves a clear supernatant, which is discharged. Settled bacteria remain in the reactor. The nitrogen removal cycle takes approximately eight hours.

"One of the key features is the biomass separation step that allows us to retain the slow-growing anammox granules and waste the AOB and NOB [nitrite-oxidizing bacteria], which we don't want to accumulate in the system," Johnson says.

Suitable for both new plant construction and retrofits, systems have been designed to handle flows from approximately 78,000 gpd of centrate up to 1.1 mgd of filtrate, depending on the size of the system, with even larger flows possible.

Simple to operate and maintain, the system has a blower that provides air and a mixer that helps combine the contents of the tank. "The technology is based on a sequencing batch reactor [SBR]," Johnson says, with the number of reactors – one, two or three – determined by the size of the treatment facility. **800/607-7973; [www.worldwaterworks.com](http://www.worldwaterworks.com).**

DEMON nitrogen removal system from World Water Works





### Atlantic Ultraviolet marks 50th anniversary

Founded in 1963 by Hilary Boehme and Tom Dituro, Atlantic Ultraviolet Corp. of Hauppauge, N.Y., celebrates 50 years of developing and manufacturing ultraviolet residential and commercial disinfection systems in 2013.

### Siemon receives environmental merit award

Siemon received the 2013 EPA Environmental Merit Award in the business category for demonstrating a sustained commitment to improving New England's environment and environmental achievements. Siemon received the award for achieving carbon negativity across all global operations, zero-landfill status through innovative waste management, yearly carbon output reduced by 16,885 metric tons, reduced water and electrical usage, as well as ongoing employee incentives.

### Aquionics names municipal regional manager

Aquionics named Bob English municipal regional manager. He will be responsible for promoting the company's drinking water, wastewater and reuse products in the Eastern United States.



Bob English

### Hydraulic Institute names director of education and training

The Hydraulic Institute named Mark J. Sullivan director of education and training. He will support Pump Systems Matter (PSM) and lead all strategic development, marketing and PSM educational programs as well as personnel certification initiatives.



### Thompson Pump relocates Mississippi branch

Thompson Pump & Manufacturing Co. relocated its southern Mississippi branch from Pass Christian to a larger facility in Biloxi. The 4,000-square-foot building is located on two acres near the I-10 corridor and is one of 21 Thompson branch offices nationwide.

### KOHLER Power Systems receives California approval

KOHLER Power Systems, manufacturer of generators up to 3,250 kilowatts, transfer switches, switchgear and related accessories, received preapproval from California's Office of Statewide Health Planning and Development for its large generator enclosures and tanks (1,250 to 2,000 kW). The enclosures also are International Building Code seismic certified.

### Toshiba completes control plant expansion

Toshiba International Corp. completed a \$20 million expansion of its control plant in Houston, Texas. The project provides 107,000 square feet of new manufacturing and office space.

### Detcon's TP-700 gas detector receives SIL 2 certification

Detcon's TP-700 hydrogen sulfide MOS gas detector is SIL 2 compliant with IEC61508:2010 Parts 1-7 after completing a third-party safety assessment.

### Brown and Caldwell receives safety award

Brown and Caldwell received the National Safety Council's 2013 Industry Leader Award. The award recognizes the top 5 percent member companies with the best safety performance.

### Asahi/America redesigns website

Asahi/America redesigned its product website, [www.asahi-america.com](http://www.asahi-america.com). The site offers engineers, designers, installers and plant managers technical and product information.



### Industrial Scientific sells Oldham

Industrial Scientific Corp. sold its Oldham fixed-point gas detection business to Industrial Safety Technologies. The sale includes Oldham's headquarters in Arras, France, along with support operations in China, Germany, India and the United States.

### FCI's ST100 flowmeter rated SIL compliant

The ST100 Series thermal mass air/gas flowmeter from Fluid Components International has been rated compliant for Safety Integrity Level (SIL) 1 service. The meter is classified as a Type B subsystem in accordance to IEC 61508-1 with a hardware failure tolerance of 0. **tpo**

## The Right Choice...

### Operations and Maintenance Software

**Operator10<sup>®</sup>**  
Water

**Operator10<sup>®</sup>**  
Wastewater

**Synexus<sup>™</sup>**  
Pretreatment

**Antero<sup>™</sup>**  
Maintenance

We specialize in O&M data management software. We give you more by providing world-class technical support that is fast and friendly.

800-670-1867
[www.allmaxsoftware.com/tpo](http://www.allmaxsoftware.com/tpo)

**FREE subscription at [wsomag.com](http://wsomag.com)**



### 13. McCLOSKEY INTERNATIONAL SPIRAL DRUM

The spiral drum option for trammel screen models from McCloskey International prevents spearing where elongated material is lifted and thrown through the screen opening. It increases control of material flow, maximizing material sorting per load. The drum is available on 500, 600 and 700 series trammels. **877/876-6635; [www.mccloskeyinternational.com](http://www.mccloskeyinternational.com).**

### 14. ADALET FLAMEPROOF SCREW COVER ENCLOSURES

The XJ\_X series of screw cover flameproof meter enclosures from Adalet feature 68 standard sizes approved to gas group IIB+H2 with an IP66 rating. The enclosures are available with solid cover or viewing windows. **216/267-9000; [www.adalet.com](http://www.adalet.com).**

### 15. SEL POWER QUALITY, REVENUE METER WITH IEC

The SEL-735 power quality and revenue meter with IEC functionality from Schweitzer Engineering Laboratories supports systems built from multivendor intelligent electronic devices (IEDs) networked to perform protection, monitoring, automation, metering and control. IEC 61850 features include up to six manufacturing message specification client sessions for logging and reporting data, the ability to publish and subscribe to generic object-oriented substation event (GOOSE) messages and support for device configuration using substation configuration language (SCL) and configured IED description (CID) files. **509/332-1890; [www.selinc.com](http://www.selinc.com).**

### 16. HAMMOND HINGED COVER ENCLOSURES

HJ H Series hinged cover metal (14- or 16-gauge steel) enclosures from Hammond Manufacturing Co. are environmentally sealed to NEMA Type 3R, 4 (IP66), 12 and 13 standards. Designed for wall or bulkhead mounting, applications include housing electrical and electronic equipment where dust and/or water protection is required. Sizes range from 4 by 4 by 3 inches to 16 by 14 by 10 inches. **716/630-7030; [www.hammondmfg.com](http://www.hammondmfg.com). [tpo](http://tpo)**

## Solutions for Water

**SLUDGE COLLECTION • SEDIMENT DREDGE  
SUBMERGED FIXED FILM • TRICKLING FILTERS • TUBE SETTLERS**

At Brentwood, our experienced staff will find solutions to your most difficult water and wastewater challenges. For over 40 years, we've continuously exceeded expectations by providing process design assistance, delivering the highest quality products, and supporting your projects from concept through completion.

**brentwoodindustries.com**  
waterinfo@brentwoodindustries.com  
610.374.5109

**BRENTWOOD®**

©2013 Brentwood Industries, Inc.

## Socially Accepted

**f** **t** **g+** **YouTube**

[facebook.com/TPOmag](https://facebook.com/TPOmag)  
[twitter.com/TPOmag](https://twitter.com/TPOmag)  
[plus.google.com](https://plus.google.com)  
[youtube.com/TPOmagazine](https://youtube.com/TPOmagazine)



## people/awards

The **Englewood/Littleton (Colo.) Wastewater Treatment Plant** received a Gold Level Award from the U.S. EPA for its biosolids program.

The **City of Boulder (Colo.) Wastewater Treatment Facility** received more than \$1 million in grants from the Colorado Department of Public Health and Environment to improve nitrogen removal. The improvements will help reduce nitrogen discharge levels and improve downstream water quality.

**Orianna Bretschger**, a researcher with the J. Craig Venter Institute, received a \$5 million grant from the Roddenberry Foundation to fund development of new wastewater treatment approaches based on microbial fuel cell technology.

The National Association of Clean Water Agencies (NACWA) presented the following **Kansas City Water Services** wastewater treatment facilities with Peak Performance Awards:

- **Westside Treatment Facility**, Gold Award
- **Fishing River**, Silver Award
- **Rocky Branch**, Silver Award
- **Todd Creek**, Silver Award

The **C.C. Williams** and **Wright Smith Jr. Wastewater Treatments Plants** (Ala.) received Platinum Peak Performance Awards from the NACWA.

These **City of Newark** employees and departments were honored by the Ohio Water Environment Association:

- **Darin Wise**, wastewater treatment plant superintendent, J.W. Ellms Award (for a person in an administrative or supervisory position, recognizing participation in conference activities, civic affairs and leadership).
- **Sewer Maintenance Department**, Safety Award, for collection systems with one to nine employees for 2012.
- **Ed Nutter**, safety and training coordinator for the Division of Water and Wastewater, inducted into the OWEA 5S, recognizing service above and beyond the call of duty to the industry and the organization.

*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](mailto:editor@tpomag.com).*

## education

### Alabama

The Alabama Water Environment Association is offering these courses:

- Dec. 17 – Collection System Operators Seminar, Tuscaloosa
- March 25 – Collection System Operators Seminar, Huntsville

Visit [www.awea-al.com](http://www.awea-al.com).

### California

The California Water Environment Association has a Collection Systems Benchmarking Seminar Nov. 13, location to be announced. Visit [www.cwea.org](http://www.cwea.org).

### Florida

The Florida Water Environment Association has a Fall Wastewater Process Seminar Nov. 5 in Winter Haven. Visit [www.fwea.org](http://www.fwea.org).

The University of Florida TREEO Center is offering these courses in Gainesville:

- Nov. 5-6 – Flow Meter Calibrations
- Nov. 13 – Energy Conservation at Water and Wastewater Treatment Facilities

- Nov. 14 – Science of Disinfection
  - Jan. 14-16 – Introduction to Electrical Maintenance
  - Jan. 21-23 – Process Control of Advanced Waste Treatment Plants
  - Feb 4-5 – Water Reclamation & Treatment Processes
- Visit [www.treeo.ufl.edu/wastewater-courses.aspx](http://www.treeo.ufl.edu/wastewater-courses.aspx).

### Georgia

The Georgia Association of Water Professionals has a Backflow Prevention Specialty Workshop in Marietta Dec. 11. Visit [www.gawp.org](http://www.gawp.org).

### Illinois

The Illinois Water Environment Association is offering these courses:

- Nov. 14 – Collection Systems Seminar, Lisle
- Nov. 21 – Biosolids Seminar, location TBA

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

### Michigan

The Michigan Water Environment Association has a Process Seminar on Nov. 6 in East Lansing. Visit [www.mi-wea.org](http://www.mi-wea.org).

### Missouri

The Missouri Water Environment Association has a Fall Technical Conference Nov. 7 in Columbia. Visit [www.mwea.org](http://www.mwea.org).

### New York

The New York Water Environment Association is offering these courses:

- Nov. 6 – Clarifier Optimization and Flow Measurement, Lyons
  - Nov. 7 – Clarifier Optimization and Flow Measurement, Ithaca
  - Nov. 8 – DMR-Electronic Reporting and Proper Completion, Rexford
- Visit [www.nywea.org](http://www.nywea.org).

### Ohio

The Ohio Water Environment Association is offering these following courses:

- Dec. 5 – Biosolids Workshop, Lewis Center
- March 13 – Government Affairs Workshop, Lewis Center
- May 1 – Collection Systems Workshop, Lewis Center
- May 21-22 – Operations/Lab Analysis Workshop, Lewis Center

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

### Pennsylvania

The Pennsylvania Water Environment Association is offering these courses:

- Nov. 1 – Confined Space/Personal Protection Workshop
- Nov. 6 – Laboratory Workshop

For locations, call 610/670-6072 or visit [www.pwea.org](http://www.pwea.org).

### Texas

The Texas Water Utilities Association is offering these courses:

- Nov. 4 – Wastewater Collection, Corpus Christi
- Nov. 19 – Calculations, Victoria
- Nov. 19 – Management, Gatesville

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

### Wisconsin

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

- Dec. 3-5 – Sanitary Sewer and Collection System Engineering
- March 24-25 – Upgrading Your Sanitary Sewer Maintenance Program
- March 26-28 – Wastewater Pumping Systems and Lift Stations
- April 15-17 – Nutrient Removal Engineering: Phosphorus and Nitrogen in Wastewater Treatment

Visit <http://epdweb.engr.wisc.edu>. **tpo**

## CALENDAR OF EVENTS

### Nov. 7-8

Missouri Water Environment Association Fall Technical Conference, Columbia. Visit [www.mwea.org](http://www.mwea.org).

### Nov. 12-13

Georgia Association of Water Professionals Fall Conference and Expo, Athens. Call 770/618-8690 or visit [www.gawp.org](http://www.gawp.org).

### Nov. 20-22

Indiana Water Environment Association Annual Conference, Indianapolis. Visit [www.indianawea.org](http://www.indianawea.org).

### Jan. 22-23

Water Environment Association of Texas Collection Systems Conference and Expo. Visit [www.weat.org](http://www.weat.org).

### Jan. 26-29

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

### Feb. 4-6

New York Water Environment

Association Annual Conference and Exhibition, New York Marriott Marquis. Visit [www.nywea.org](http://www.nywea.org).

### Feb. 25-28

Water Environment Federation 2014 Utility Management Conference. Call 703/684-2441 or visit [www.wef.org](http://www.wef.org).

### April 22-24

Alaska Water Wastewater Management Association Annual Conference, Centennial Hall, Juneau. Visit [www.awwma.org](http://www.awwma.org).

### April 27-30

Arkansas Water Works and Water Environment Association Annual Conference, Hot Springs. Visit [www.awwwea.org](http://www.awwwea.org).

### April 29-May 2

California Water Environment Association Annual Conference, Santa Clara Convention Center. Call 510/382-7800, ext. 115, or visit [www.cwea.org](http://www.cwea.org).



**JDV Equipment Corporation**  
Incorporating Ralph B. Currier Company

Committed to the design and manufacturing of superior quality waste water and water treatment equipment

## Trusted By Communities

Water Treatment



Anaerobic Digestion



Services



Solids Handling

## For Over 50 Years

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

[www.jdvequipment.com](http://www.jdvequipment.com)

## BIONETIX BIOLOGICALS

THE ENVIRONMENTALLY SAFE  
ALTERNATIVE TO CURRENT  
WASTE TREATMENT METHODS

Cost-effective, efficient, and environmentally friendly technology

### Biological Remediation of Environments:

specially selected microorganisms digest organic waste quickly and completely, without causing odors or noxious gases.

100% natural • non-pathogenic • non-hazardous - microorganisms degrade organic pollutants without further damage to the environment.

Grow and reproduce readily in the environmental conditions of organic waste to maximize biological activity.

- For those industries which treat their wastewater on-site prior to discharge to sewer systems.
- Enhance the treatment of waste in municipal wastewater.

**Bionetix International**  
21 040 rue Daoust  
Ste-Anne-de-Bellevue, Quebec, Canada  
H9X 4C7  
T 514.457.2914  
F 514.457.3589  
[www.bionetix-international.com](http://www.bionetix-international.com)  
e-mail: [support@bionetix.ca](mailto:support@bionetix.ca)

**Bionetix**  
INTERNATIONAL  
A Subsidiary of Cortec® Corporation

©Cortec Corporation 2013. Bionetix International is a subsidiary of Cortec® Corporation.



One Source for All Your UV Needs!!!

## The Best for Less!

TAK 55™  
UV Wastewater  
Lamps



Featuring Lamps Manufactured by



## Replacement UV Lamps & Quartz Sleeves for TAK 55™ Wastewater Systems

High Quality • In Stock • Best Value

**888.UV4.WWTP** (888-884-9987)

[sales@uvsuperstore.com](mailto:sales@uvsuperstore.com) • [www.uvsuperstore.com](http://www.uvsuperstore.com)





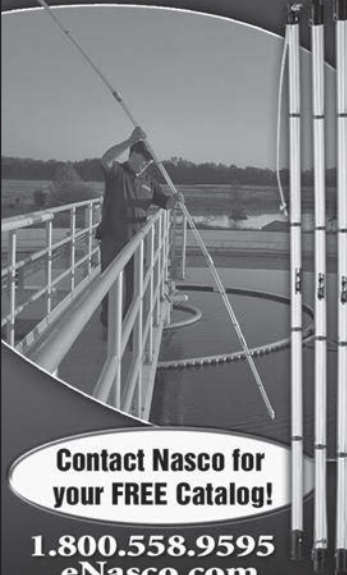
# TREATMENT PLANT OPERATOR tpo Marketplace Advertising

**The Sludge Judge®** Exclusive by *Nasco* Dedicated to Delivery

**Available in three versions:**

- Original Sludge Judge® (3/4" diameter)
- Sludge Judge II (1 1/4" diameter)
- Sludge Judge® Ultra (made of strong polycarbonate)

The Sludge Judge® will take accurate readings of settleable solids in a variety of liquids at any depth – clear 5-ft. plastic tubing that screws together – for waste water treatment, chemical, and food processing plants, and other facilities.



**Contact Nasco for your FREE Catalog!**

**1.800.558.9595**  
**eNasco.com**

**WWW.PUMPERSHOW.COM**




**PUMPER & CLEANER**  
**ENVIRONMENTAL EXPO**  
**INTERNATIONAL**

**Indianapolis**  
**FEBRUARY 24-27 2014**  
INDIANA CONVENTION CENTER

**REGISTER TODAY!**


Revolutionizing the pumping industry



**Geyser Pump**  
World Leader in Pulse Pumping,  
Mixing and Aeration technology

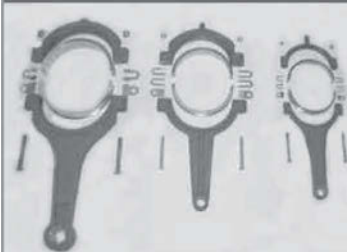
**Get your GRIT, RAS & WAS  
pumping under control**

**Stabilize your  
treatment plant!**




**CONTACT US TODAY.**  
Geyser Pump Tech, LLC  
614-398-0960  
[www.geyserpulsepumps.com](http://www.geyserpulsepumps.com)

**Rebuilds  
Parts**



**Belts**



**K-S Komline-Sanderson**

**1 800 225 5457**  
[www.komline.com](http://www.komline.com)

# TREATMENT PLANT OPERATOR tpo CLASSIFIED ADVERTISING NOVEMBER

## DEWATERING

4" Dia-Disk Double Diaphragm Pump: 5hp electric motor. Cost new - \$17,000. Completely rebuilt. Variable flow, 0-200gpm, low-stroke - won't shear polymer. PRICE \$7,500. Pictures are available upon request. Please call 910-738-5311. (oBM)

## EDUCATION

RoyCEU.com: We provide continuing education courses for water, wastewater and water distribution system operators. Log onto [www.royceu.com](http://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](mailto:callagher@sbcglobal.net), [www.thefecal-fighter.com](http://www.thefecal-fighter.com). (oBM)

## PARTS & COMPONENTS

For Sale: Hycor Influent Screen, Aurora Pumps, Odor Control Units. Contact John Lundy LCWSA 570-220-0802. Located in Montoursville, PA (o11)

## PUMPS

Two (2) 4" Thompson Double Diaphragm Pumps: 5hp electric motor, single phase. Cost new - \$9,000 each. Will sell both for \$5,000 or sell individually for \$3,000 each. Pictures are available upon request. Please call 910-738-5311. (oBM)

## TRAILERS-VACUUM/TANKER

4,000-gallon Lely Self-Contained Vac/Press Tanker: Isuzu motor, Fruitland RCF 500 vacuum pump, Evans tri-axle trailer with aluminum wheels. Excellent condition - \$27,500. Pictures are available upon request. Please call 910-738-5311. (oBM)

# 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](http://www.tpomag.com/online_exclusives)

# LEVELRAT

BY KELLER



The LevelRat by Keller is a non-fouling submersible level transmitter specifically designed for use in wastewater applications, with a unique Kynar diaphragm that provides a non-stick surface with superior strength to eliminate bulky protective cages.

Each LevelRat is built to order in the U.S. with custom ranges and cable lengths, all in 3 business days. Combined with guaranteed lightning protection on 4-20mA models, the LevelRat provides the best value in wastewater level measurement.

For more information on the LevelRat, contact Keller today.

# KELLERAMERICA

[WWW.KELLERAMERICA.COM](http://WWW.KELLERAMERICA.COM) 877-253-5537 [SALES@KELLERAMERICA.COM](mailto:SALES@KELLERAMERICA.COM)



**Joe Guinn**  
Wastewater Superintendent  
City of Decatur WWTP  
Decatur, TX



In the City of Decatur, TX, Wastewater Superintendent Joe Guinn and his team are dedicated to the efficient operation of the city's wastewater treatment plant. He's proud of his crew, and the hard work they put in every day at their 700,000-gpd facility. "I have the best operators in the state of Texas," boasted Joe.

**"When we needed a new belt for our filter press, you guys were right on top of it. You got us exactly what we needed."**

According to Joe, one of their facility's greatest sources of pride is the condition of their filter belt press. "It takes a *good* operator to keep a belt press as clean as ours," he praised. While proper maintenance is critical, so is timely replacement of filter belts due to their inevitable wear and tear. "When we needed a new belt for our filter press, you guys [at USABlueBook] were right on top of it. You got us exactly what we needed, in no time at all."

## Featured Products From **USABlueBook®**

**FREE USABlueBook Barbed Wire Camo Hat with the purchase of these bioaugmentation products.**

**Call 1-800-548-1234 and Mention Code ANK. Offer expires 12/31/2013.**

May not be used on previous orders or combined with other discounts or promotional offers.



### **USABlueBook Bioaugmentation Products**

- Maximize system performance and reduce costs
- Specific strains for collection systems and treatment plants

**Formula Nitro:** Removes ammonia, nitrite and nitrate, using selected strains of Nitrosomonas spp and Nitrobacter spp that function over a wider-than-normal range of pH values. Adaptation and selection techniques are employed, increasing toxic threshold limiting concentrations of ammonia, nitrate and nitrite, which inhibit growth of these sensitive microorganisms.

**Formula D-500:** Use for better sludge settling and dewatering, control of surface foam and filamentous growth, reduction of total sludge volume and improved plant performance. 1/2-lb water-soluble pouches in 25-lb container.

**Formula D-220:** Reduces grease and sulfides in sewers and lift stations, lowers grease control maintenance costs, reduces sewer corrosion while improving flow, and increases pump life. 1/2-lb water-soluble pouches in 25-lb container.



Formula Nitro



Formula D-220



Formula D-500

DESCRIPTION	STOCK #	EACH
Formula Nitro, 1 Gallon	46953	\$ 131.95
Formula Nitro, 5 Gallons	46954	594.95
Formula Nitro, 55 Gallons	46955	6,135.95
Formula D-500A for Large Plants	45044	281.95
Formula D-500C for Smaller Plants	45046	281.95
Formula D-220	45042	281.95

**USABlueBook®**  
**Get the Best Treatment™**

**See page 1607 in USABlueBook Catalog 124 for more information.**

**800-548-1234 • www.usabluebook.com**

