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Hearts and Minds:  
Learning partnerships  
in Warsaw, Ind.

PAGE 20

How We Do It:  
UV disinfection  
in Auburn, Ala.

PAGE 22

# Not Running Scared

Bob Bobik  
Operations Supervisor  
Lake Arrowhead, Calif.

GRASS VALLEY PLANT OPERATORS  
BEFRIEND TECHNOLOGY AND PRODUCE  
QUALITY RECLAIM WATER

PAGE 14

In My Words:  
Sustainability first  
in Tacoma, Wash.

PAGE 38



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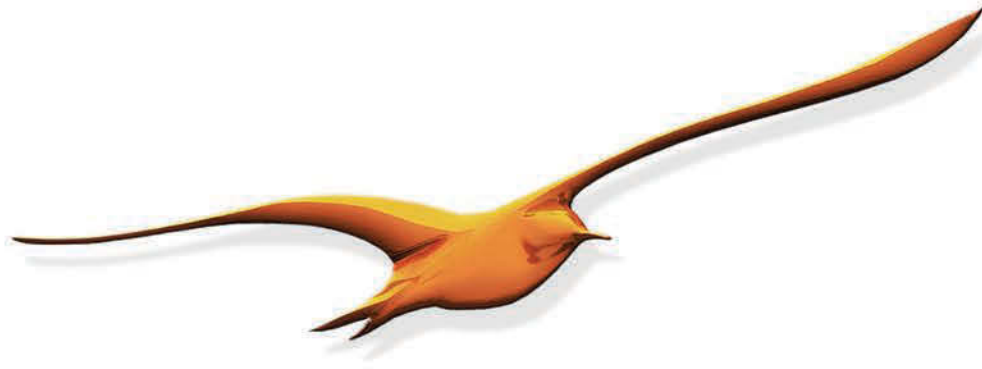
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## advertiser index

APRIL 2014

 Aerzen USA ..... 33	 Huber Technology, Inc. .... 7
 AllMax Software, Inc. .... 8	 JDV Equipment Corporation ..... 45
 Analytical Technology, Inc. .... 13	 Keller America Inc. .... 3
 Blue-White Industries ..... 4	 Komline-Sanderson ..... 51
 Environmental Dynamics International ..... 11	 Kuhn North America, Inc. .... 37
 Flo Trend Systems, Inc. .... 4	 LaMotte Company ..... 47
 Flygt - a Xylem Brand ..... 21	 Sanitaire - a Xylem Brand ..... 19
FPZ, Inc. .... 47	 Tetra Tech, Inc. .... 37
 Gorman-Rupp Company ..... 5	 USABlueBook ..... 52
 Hach Company ..... 2	 Vaughan Company, Inc. .... 29
	 WEDECO - a Xylem Brand ..... 17
	Xylem ..... 23
	<b>CLASSIFIEDS</b> ..... 51

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## GOR GORMAN-RUPP PUMPS

## features

- 14 TOP PERFORMER – PLANT: NOT RUNNING SCARED**  
 Grass Valley plant operators make friends with technology and produce high-quality reclaim water for groundwater recharge and golf course irrigation.  
 By Jim Force
- 20 HEARTS AND MINDS: MULTIPLYING IMPACT**  
 Partnerships help an innovative water-quality education program reach diverse age groups and influence behaviors in Warsaw, Ind.  
 By Ted J. Rulseh
- 22 HOW WE DO IT: AN EASY TRANSITION**  
 A clean-water plant in the hometown of the Auburn Tigers completes a trouble-free conversion from gaseous chlorine to UV disinfection.  
 By Ted J. Rulseh
- 24 TOP PERFORMER – BIOSOLIDS: A SUNNY OUTLOOK**  
 A Utah city turns to renewable energy as part of an operation that brings the liquid and solids sides of treatment full circle.  
 By Ted J. Rulseh
- 30 TOP PERFORMER – OPERATOR: YOUNG AND GROWING**  
 Troy Bemisdarfer seized an opportunity in the clean-water industry and in just five years has built a satisfying and award-winning career.  
 By Jack Powell
- 34 GREENING THE PLANT: MORE THAN SUNSHINE**  
 Solar energy provides most of the energy for the Rifle water reclaim plant, while operators' innovations cut down electricity consumption.  
 By Doug Day
- 36 PLANTSCAPES: TROUT ON DISPLAY**  
 An aquarium inside an Idaho treatment plant demonstrates the life-giving quality of the facility's Class A reuse effluent.  
 By Jeff Smith
- 38 IN MY WORDS: TACOMA – PULLING IT ALL TOGETHER**  
 Tacoma Public Utilities and its water-related operations are part of an effort to promote sustainability and environmental quality as a catalyst for economic growth.  
 By Ted J. Rulseh

### COMING NEXT MONTH: MAY 2014

#### Special Issue: Annual Company Directory

- Let's Be Clear: The benefits of automation
- Top Performer – Plant: Plant of the Year award for Shannon, Ill.
- Top Performer – Operator: Mark Fogle, Lakehaven Utility Dist., Federal Way, Wash.
- Top Performer – Plant: EPA Excellence Award in Lee, Mass.
- How We Do It: One-stop grit washing in La Crosse, Wis.
- Greening the Plant: Energy-saving controls in Grand Rapids, Mich.
- Exam Tutor: Understanding alkalinity
- PlantScapes: Inside/outside makeover in Helena, Mont.

#### on the cover

The complexities of the Grass Valley Wastewater Treatment Plant don't faze Bob Bobik and his team. They relish the challenges and never stop learning. Bobik is shown beside the plant's Aria microfiltration system from Pall Corp. (Photography by Collin Chappelle)

14



30



38



22



24

## departments

- 8 LET'S BE CLEAR: WHAT KIND OF PLANTS ARE THEY — REALLY?**  
 What's the best way to brand the facilities that handle our communities' wastewater and keep our lakes and rivers safe, clean and healthy?  
 By Ted Rulseh, Editor
- 9 FIRE CHIEF PROJECT IDEA OF THE MONTH: CAN'T ARGUE WITH SUCCESS?**  
 San Francisco uses "potty humor" to draw attention and build support for a multibillion-dollar clean-water infrastructure upgrade program.  
 By Ted J. Rulseh
- 10 LETTERS**
- 12 @TPOMAG.COM**  
 Visit daily for news, features and blogs. Get the most from *TPO* magazine.
- 40 PRODUCT FOCUS: MONITORING AND INSTRUMENTATION**  
 By Craig Mandli
- 46 CASE STUDIES: MONITORING AND INSTRUMENTATION**  
 By Craig Mandli
- 47 INDUSTRY NEWS**
- 48 PRODUCT NEWS**  
 Product Spotlight: Rail-mounted fluid bed drier provides easy internal bag access  
 By Ed Wodalski
- 50 WORTH NOTING**  
 People/Awards; Education; Calendar of Events





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let's be clear

## What Kind of Plants Are They — Really?

WHAT'S THE BEST WAY TO BRAND THE FACILITIES THAT HANDLE OUR COMMUNITIES' WASTEWATER AND KEEP OUR LAKES AND RIVERS SAFE, CLEAN AND HEALTHY?

By Ted J. Rulseh, Editor



**Y**ears ago we called them sewage treatment plants. Today more often we call them wastewater treatment plants, water pollution control facilities or water reclamation plants. Now there are those (and I include myself) who would like to see at least some of these names revisited.

Some (and I am in this camp) say they should be called “clean-water plants.” The Water Environment Federation (WEF), in its official communications, calls them “water resource recovery facilities.” Both approaches have merit. I wonder what you think.

### WHY CHANGE

Before we look at the arguments, we must answer: Why change at all? Wastewater treatment is a proud profession — why run away from the name?

Well, because to the public the word “wastewater” (or “sewage”) has unpleasant connotations. In a small way it diminishes the profession because it focuses on the ugly raw material that comes in rather than the wonderful product that comes out.

Think for a minute. What if places out in the country that produce wholesome milk were called “manure processing facilities”? After all, manure is what sets everything in motion — nourishes the crops that feed the cows that make the milk. In reality, we call these places “dairy farms,” and when we hear the words we think milk, butter, cheese, ice cream — the end products.

So, isn't it more fitting — and more accurate — to call treatment plants something that evokes positive images? Of fishing, swimming, canoeing, pleasant beaches, sunsets on water? Of the end product?

### WHITHER THE BRAND

So if you buy that reasoning (and I know some would rather not), what should we call these facilities? Clean-water



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plants? Water resource recovery facilities? Or something else altogether?

“Clean-water plant” is simple and straight to the point. Clean water is something the public understands and treasures. It immediately evokes positive images — of the facility, its purpose and the people who work there.

There are two issues, though, with this name. First, as some operators have pointed out to me, “clean water” may create confusion with “drinking water.” It’s a point well taken, although I believe it’s a solvable problem. In the proper context, talking about the downstream side of the urban water cycle, there should be little or no confusion.

Why change at all? Wastewater treatment is a proud profession — why run away from the name? Well, because to the public the word “wastewater” (or “sewage”) has unpleasant connotations.

Second — and this is trickier — “clean water” does not recognize fully what these facilities do. And that’s the reasoning behind the WEF’s preferred term. The plants clean up water, yes, but they also extract energy from it (as digester methane) and separate out nutrients (as biosolids in various forms) for beneficial uses.

So, the term “water resource recovery facility” is more inclusive and technically more precise than “clean-water plant.” It also speaks more broadly to the knowledge, skills and sophistication operators bring to work every day.

What’s the downside to “water resource recovery facility”? It’s a mouthful, and it has a bureaucratic tone. Perhaps more important, what does it mean at first blush to people on the street? My bet is it would take some explaining — quite a bit, actually — before the average person would grasp it.

## NOW, YOUR TURN

So, which way to go? I prefer “clean-water plant.” Everyone can immediately understand it. Operators can easily take pride in it. The business is really about clean water (that’s why we had the Clean Water Act). While the energy and nutrients are great, they are byproducts.

But, my opinion isn’t the one that counts. Yours is. So, tell us what you prefer. Either of these names? Something different? Or stay with the status quo? Tell why you feel as you do. Send me a note to [editor@tpomag.com](mailto:editor@tpomag.com). I promise to respond, and we will publish as many comments as possible in an upcoming issue.

I look forward to a lively discussion. **tpo**



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## IDEA OF THE MONTH:

# Can't Argue With Success?

SAN FRANCISCO USES “POTTY HUMOR” TO DRAW ATTENTION AND BUILD SUPPORT FOR A MULTIBILLION-DOLLAR CLEAN-WATER INFRASTRUCTURE UPGRADE PROGRAM

By Ted J. Rulseh

Common wisdom has it that references to “poop” are counterproductive when it comes to building public awareness and support for clean-water initiatives.

The San Francisco Public Utilities Commission is perhaps providing “the exception that proves the rule.” The city is about to invest billions of dollars to upgrade its aging sewer pipes and harden its treatment facilities against earthquakes.

As part of an effort to get the public on board, the city posted ads on buses with a “talking sewer” saying:

- Your #2 is my #1.
- Nobody deals with more crap than I do.
- You can't live a day without me.

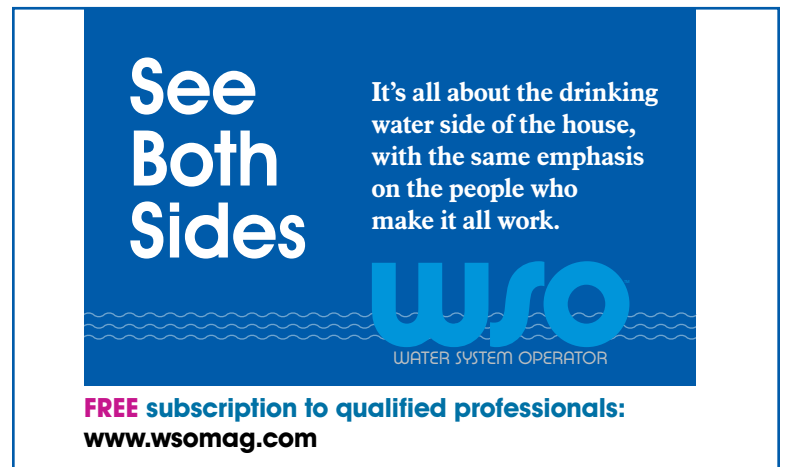
The idea is to draw people into the process of planning the infrastructure upgrades. Tyrone Jue, the commission's director of communications, told *Atlantic Cities* magazine, “Our belief is that when you have public support, you have a better outcome at the end of the road. “This campaign is about fostering interest and getting people talking about the sewer system in a way that they probably never talked about it before.”

One might argue that the commission would be better served by talking about the product of the sewer and treatment infrastructure (clean water), rather than the raw material (sewage). Instead, it appears the commission is using the “potty humor” to get people’s attention, after which they’ll be open to the clean-water messages.

The commission reports that when the ads began appearing, traffic on its Twitter account and Facebook page took off. As of late December, some 800 people had scheduled tours of the city’s clean-water plants. So, apparently the campaign is working. And anything that engages people in discussion of clean-water infrastructure as a priority furthers the aims of the Fire Chief Project:

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

What do you think of the San Francisco PUC’s approach to communication? Send your thoughts in an email to [editor@tpomag.com](mailto:editor@tpomag.com). **tpo**



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## Favors a name change

After reading your comments and those of Sam Wade, in the January 2014 issue of *TPO*, I feel obliged to respond. I started in the water and wastewater business 20 years ago after a downturn in the oil and gas industry. In many parts of Texas, particularly in the Greater Houston area, municipal utility districts are the owners of the systems and plants.

These are quasi-governmental entities set up by the state to provide water and wastewater services needed by customers. Many of these districts are operated and managed by operating companies that perform all the services involved. This includes meter reading, billing, plant operation, collection and distribution operation and maintenance, customer service, and repairs.

With most of these operating companies, one person may be responsible for the operation of four or five districts. That person will operate and monitor the wastewater plant, water wells and lift stations for each of those districts. Daily process control testing and periodic lead and copper sampling are other duties. They also respond to customer complaints and do initial evaluation of collection and distribution problems.

The point I am making is that the title of “operator” just doesn’t cut it in my mind. I like “clean water specialist” on the wastewater side and “water production specialist” on the potable side. As immediate past president of the Sam Houston chapter of the Texas Water Utilities Association, of which I am vice president, as well as chairman of the Texas Commission on Environmental Quality Water Utility Operator Licensing Advisory Committee, I have contact with a great many folks across the state.

Since I entered this industry, I have never seen a plant permit for a “sewer treatment plant” or a license that identifies the holder as a “sewer treatment plant operator.” These terms are at least 20 years old. Yet I still run into folks that say they work at a sewage treatment plant or that they are a sewage treatment plant operator. When asked, I tell people that I am a water utility manager, although that is not my job title with my employer. I support the effort to change the employee titles and plant identification, but I am afraid it will be a slow process.

**Allen P. Schreiber**  
Supervisor, Field Services  
Fort Bend County  
Stafford, Texas

## Profession needs positive recognition

I have been in the wastewater field for seven years as a pretreatment operator and now two years as an operator of five small rural activated sludge plants in Pennsylvania. This is a career path as far as the job goes, and we as operators are very much overlooked. We work behind the scenes, so to say, and not many people really think about how important our positions are. I believe we need to bring more light to the service we are providing, so that the public will recognize us more, and in a more positive way!

**Mark E. Rightmyer**  
Class B Wastewater Operations Specialist  
Miller Environmental, Pennsylvania

## It’s not a waste

Regardless of the name used in the industry, I always felt there was no such thing as “waste” water. It is too precious a commodity to be referred to as waste.

**Dale Baker**  
Environmental Coordinator/Laboratory Director  
Deep Creek Lake Laboratory  
Oakland, Md.

## Makes no difference

In reference to your article about what title to give to a person or a facility: It doesn’t matter. The operator is an operator, regardless what you call him or her. As for what pretty name you give a wastewater treatment facility, it is still a sewage treatment facility.

**Gary Boileau**  
T.H. Enterprises  
Arizona City, Ariz.

## Call them “specialists”

In reference to your article, “What’s in a Name? Or a Title?” I have been in the water industry for 38 years and prefer the term “water production facility” and the title of “water production specialist.”

**Kenny Henry**  
Water Treatment Plant Superintendent  
Manhattan, Kan.

## Names matter greatly

I’ve had issues in explaining to friends what my career and work have been all about. If you bring up wastewater or say that what goes down the sewer is what we clean up, the conversation is over and people slowly move away from you as if you smell.

A TV news director was the guest speaker at a Wisconsin Wastewater Operators Association Conference in Green Bay a few years ago, and he told the audience that the association needed an image change. Instead of being thought of as “Ed Nortons” who work in the sewers, we are environmentalists protecting resources for future generations. We work in a spirit of cooperation with the state Department of Natural Resources and the U.S. EPA to meet clean-water goals.

In Illinois, treatment facilities have been renamed “water reclamation facilities.” Their purpose is to reclaim clean water. The treatment facility in Grandville, Mich., (featured in November 2013 *TPO*) is named “Clean Water Plant.” We visited this facility, and I asked how they came upon that name. In essence, they said:

“We look at what we do as similar to an industry. We have product coming in and product going out. We have quality standards that must be met. We have operating budgets for which we are held accountable. We are very much in the public eye, and we need to produce 365 days a year.”

We support *TPO* 100 percent in efforts to bringing back pride and the reason we love this industry. It is time that others recognize the industry for protecting the most valuable resource for life: Clean water!

**Harlan Mueller**  
Energenecs

## Need to change perceptions

I have proudly worked in the wastewater field for almost 36 years. When I told people what I did for work, it wasn’t so much the title that they turned up their nose at, it was the perception of the job itself. I have always considered myself to be a professional, no matter what title I have held — although I do like the title of “water resource recovery specialist.”

**Lucien J. (Lou) Colburn**  
Chief Operator, Pretreatment Coordinator  
City of Brewer (Maine) Water Pollution Control Facility





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#### FEATURES

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- Internal Sequencing & Relay for Auto Sample Line Cleaning
- Low Maintenance & Low Reagent Usage

## Dissolved Ammonia Monitor

### Proven Measurement Approach



The Q46N uses reactive 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
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## 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 provides 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 comes standard.

#### FEATURES

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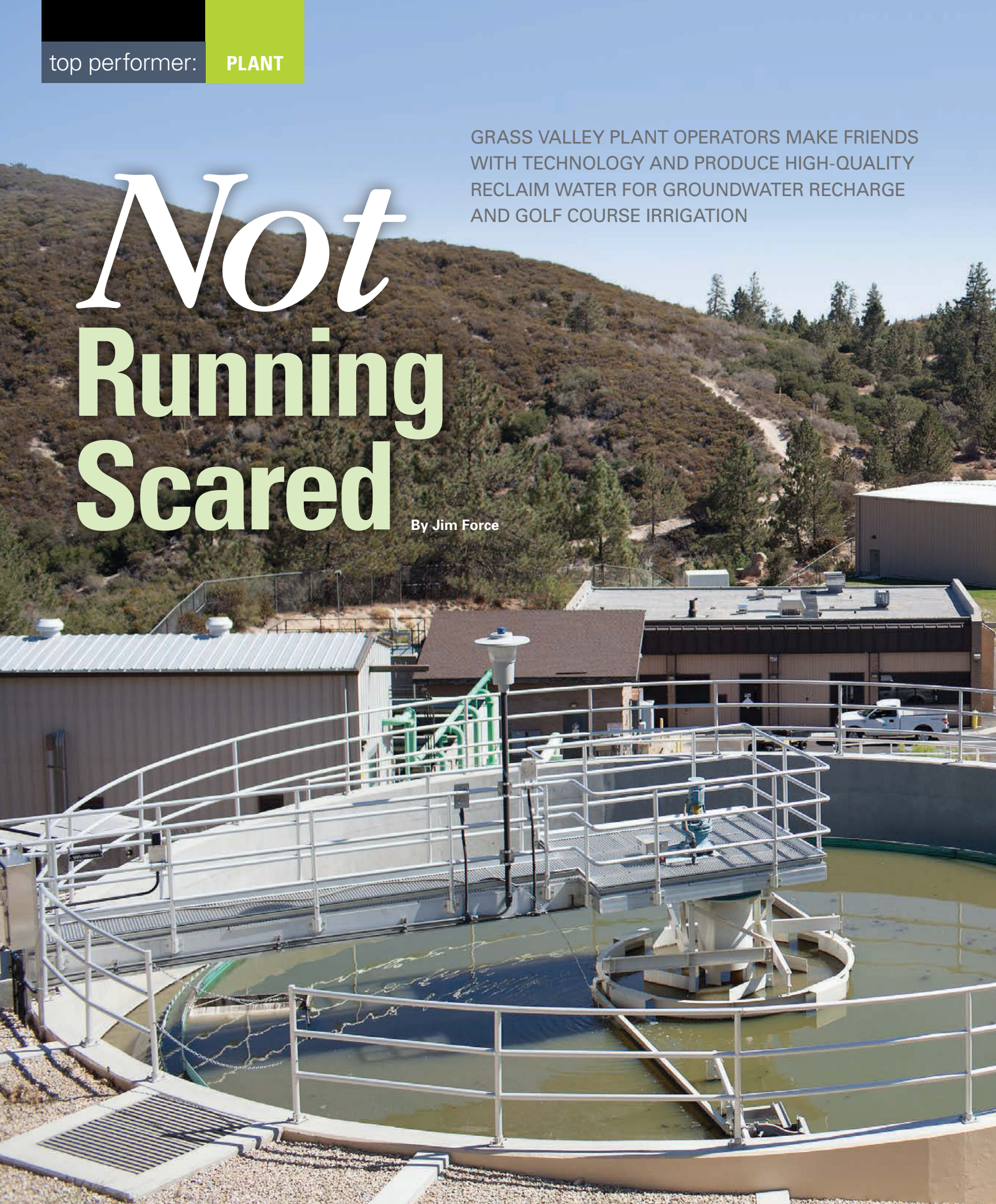
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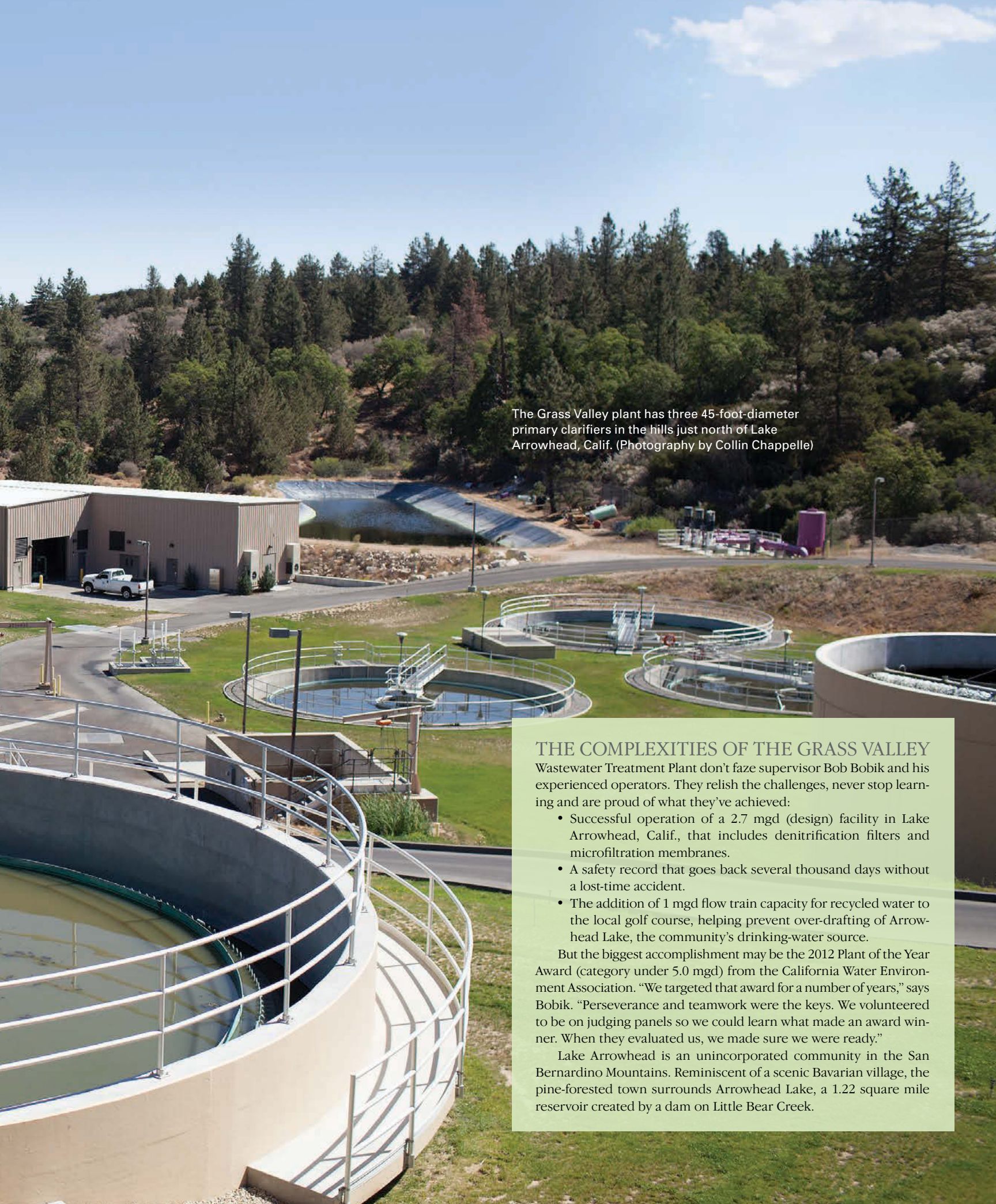
GRASS VALLEY PLANT OPERATORS MAKE FRIENDS WITH TECHNOLOGY AND PRODUCE HIGH-QUALITY RECLAIM WATER FOR GROUNDWATER RECHARGE AND GOLF COURSE IRRIGATION

# *Not* Running Scared

By Jim Force







The Grass Valley plant has three 45-foot-diameter primary clarifiers in the hills just north of Lake Arrowhead, Calif. (Photography by Collin Chappelle)

### THE COMPLEXITIES OF THE GRASS VALLEY

Wastewater Treatment Plant don't faze supervisor Bob Bobik and his experienced operators. They relish the challenges, never stop learning and are proud of what they've achieved:

- Successful operation of a 2.7 mgd (design) facility in Lake Arrowhead, Calif., that includes denitrification filters and microfiltration membranes.
- A safety record that goes back several thousand days without a lost-time accident.
- The addition of 1 mgd flow train capacity for recycled water to the local golf course, helping prevent over-drafting of Arrowhead Lake, the community's drinking-water source.

But the biggest accomplishment may be the 2012 Plant of the Year Award (category under 5.0 mgd) from the California Water Environment Association. "We targeted that award for a number of years," says Bobik. "Perseverance and teamwork were the keys. We volunteered to be on judging panels so we could learn what made an award winner. When they evaluated us, we made sure we were ready."

Lake Arrowhead is an unincorporated community in the San Bernardino Mountains. Reminiscent of a scenic Bavarian village, the pine-forested town surrounds Arrowhead Lake, a 1.22 square mile reservoir created by a dam on Little Bear Creek.





## AND THE AWARD GOES TO...

If you want to win a prestigious plant operations award, like California Plant of the Year, you'd best be ready to work hard at it, tidy up your plant and grounds, submit an exemplary application and, above all, be enthusiastic when the judges visit.

That's the formula that has earned the Grass Valley Wastewater Treatment Plant many section awards and, finally, the California Water Environment Association's top award for plants under 5.0 mgd last year.

"We persevered," says Bob Bobik, plant superintendent. "We volunteered to be on the judging panel for other plants, and we realized that if you had a cheesy looking application, or your place looked messy, or your staff wasn't enthusiastic when the panel came to review your operation, you were doomed."

Heeding its own advice, Grass Valley has won its share of honors:

- The California WEA Desert and Mountain Section Plant of the Year Award, eight times, including 2009, 2011 and 2012
- A California Section Research Achievement Award in 2007
- California WEA safety awards in 2003, 2004, 2007 and 2008

Operator experience also counts. "We put all of our certifications up on the wall in the front hall," Bobik says. "It's impressive, especially when we had a couple of Grade 5 operators on staff and this is a Class 4 plant. I know the judges were impressed."

At 5,000 feet elevation, the town is a popular summer getaway and sits at the edge of ski country. More than 4 million visitors and second-home owners contribute several million dollars a year to the economy, providing hundreds of full- and part-time jobs. Bobik says the influx of people on weekends creates a surge in flow for which his staff must be prepared.

### ADVANCED TREATMENT

Operated by the publicly owned Lake Arrowhead Community Services District, the Grass Valley facility dates to 1988, when it was built as a 1.7 mgd trickling filter plant, replacing an old activated sludge/incineration process.



## profile

**Grass Valley Wastewater Treatment Plant, Lake Arrowhead, Calif.**

<b>BUILT:</b>	<b>1988, expanded 2011</b>
<b>POPULATION SERVED:</b>	<b>12,000</b>
<b>SERVICE AREA:</b>	<b>Lake Arrowhead</b>
<b>FLOWS:</b>	<b>2.7 mgd design, 1.2 mgd average</b>
<b>TREATMENT PROCESS:</b>	<b>Trickling filters, membrane microfiltration</b>
<b>TREATMENT LEVEL:</b>	<b>Tertiary</b>
<b>RECYCLED EFFLUENT:</b>	<b>Groundwater recharge ponds, golf course irrigation</b>
<b>BIOSOLIDS:</b>	<b>Composted offsite</b>
<b>ANNUAL BUDGET:</b>	<b>\$2.1 million (operations)</b>
<b>WEBSITE:</b>	<b><a href="http://www.lakearrowheadcsd.com">www.lakearrowheadcsd.com</a></b>
<b>GPS COORDINATES:</b>	<b>Latitude: 34°17'17.12" N; Longitude: 117°13'05.42" W</b>

In 1995, denitrification filters were added for nitrogen removal. Then in 2009, the plant added microfiltration membranes and recycle systems that pump reclaimed water to the Lake Arrowhead Country Club for seasonal irrigation. In 2011, capacity was expanded to 2.7 mgd by adding more clarifiers, a trickling filter and two denitrification filters.

Wastewater enters the plant through a Parshall flume equipped with a sonic level sensor that calculates the flow. A single Hycor Grabber climber screen (Parkson Corporation) removes rags and debris, and an aerated chamber removes grit. The climber screen has operated reliably for more than 25 years, but the plant is budgeting for a new step screen to provide 100 percent redundancy in screening.



OPPOSITE PAGE: The Grass Valley team includes, from left, Justin Luck, senior plant operator; Mary Pedersen, lab technician; Trevor Cory, plant operator I; Al Edwards, plant operator II; and Bob Bobik, wastewater operation supervisor.

## SOLIDS TO COMPOSTING

All the solids generated at the Grass Valley treatment plant are composted at a facility 100 miles away in Helendale, Calif. Two-thirds of the cake is hauled by a contractor; the rest is hauled by the district's dump truck and three members of the operations staff who have Class B licenses. All the travel distance means it's important to remove as much water from the solids as possible.

Two new screw presses (Huber Technology) installed in 2011 accomplish that. Primary solids, trickling filter humus, secondary solids and filter backwash solids are gravity thickened to 2 to 3 percent solids. The screw presses then generate cake at about 25 percent solids. Previously, Grass Valley dewatered solids on a belt press, but Bobik and his staff like the screw presses because they are more energy efficient and are enclosed so that noise and spray don't escape.

"They're on the same floor as our office, but we're not even aware of them when they're in operation," says Bobik. They also enable the plant to save money by hauling a drier material.



Trevor Cory visually checks the plant's denitrification filter bed (Severn Trent).

The grit chamber performs double duty. With numerous septic systems in the area, Grass Valley also uses the grit chamber to hold septic loads, which are first aerated, then bled into the treatment plant. "It's nasty, high-oxygen-demand stuff," Bobik says. "The grit chamber allows us to freshen it up a bit before treatment."

Wastewater then moves through a trio of circular primary clarifiers and on to three high-rate plastic-media trickling filters for biological treatment. The denitrification filters, five beds in all, follow that. Supplied by Severn Trent Services, the filters use a down-flow design and consist of four feet of sand. Methanol is added to the filter influent as the carbon source. As the nitrate is metabolized to nitrogen gas, nitrogen bubbles build up in the filter media and are removed hourly through "nitrogen bumping" cycles.

The methanol is dosed automatically through Severn Trent's TetraPace closed-loop control system, which analyzes upstream and downstream methanol levels. Each filter bed is backwashed daily. After the denitrification

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Bob Bobik performs a quick systems check of the Aria microfiltration system (Pall Corp.) using the PanelView Plus 700 control panel (Allen-Bradley/Rockwell Automation). The system has a 1 mgd capacity.

“We targeted that award for a number of years. Perseverance and teamwork were the keys. We volunteered to be on judging panels so we could learn what made an award winner.”

**BOB BOBIK**

filters, the treated water heads either to the plant’s membrane process and UV disinfection system and then to the golf course, or directly to ponds that recharge the groundwater in the Mojave River Basin.

“Originally, we had secondary treatment and chlorination here,” Bobik says. But the state began cracking down on disinfection byproducts, particularly trihalomethanes, in the Mojave River Basin, so chlorination was eliminated in 2008. Bobik likes the move away from chlorine disinfection: “We trained and trained and focused on the hazards of chlorine gas and never had an incident. But now I think we’re a much safer operation.”

**RECYCLING SAVES**

Bobik likes the recycle system as well and is proud to describe its func-

tion. “During the summer season, June through mid-November, we supply about 100 million gallons of California Title 22-compliant recycled water to the golf course for irrigation,” he says. “That has helped preserve the water levels in Arrowhead Lake, which the golf course used to use for irrigation water, and has reduced the need for the community to import expensive state water.”

The microfiltration membranes (Pall) remove solids from the recycle stream, and the UV system (TrojanUV) disinfects it. The membranes consist of four racks of 30 modules each with a combined capacity of 1 mgd. “We do an air scrub every 15 minutes, an enhanced cleaning daily, and a complete clean-in-place once a month using caustic soda, chlorine and citric acid,” Bobik says. “Our membrane units do a really good job on turbidity.”

About 20 to 25 percent of the plant’s treated wastewater is pumped to the golf course two miles away, and there is just enough nitrogen in the water to keep the fairways green. “We averaged 4.7 mg/L of nitrogen in 2012,” says Bobik. “It comes in handy at the course, and they’ve been able to get by with less fertilizer.”

The rest of the effluent is returned to the Mojave River Groundwater Basin aquifer through a 10-mile-long outfall to four percolation ponds with a combined surface area of 7.2 acres. “This area used to be a 350-acre alfalfa farm, but the alfalfa wasn’t taking up enough nitrogen, and area wells started to reflect an increased nitrogen level,” Bobik reports.

The situation led to the addition of the denitrification filters at the treatment plant in 1995.

The water is rotated through the ponds, and after use, the surface crust on each pond is disced up to prepare for another use cycle. “We still monitor the wells beneath our effluent management site, but we’ve had no THM hits since chlorine was eliminated, and nitrate levels remain below the required limits,” Bobik says.

**TRAINING MATTERS**

The entire treatment process, and in fact major systems across the utility district, are monitored and controlled by SCADA-Pack (Schneider Electric) and Allen-Bradley/Rockwell Automation hardware, installed by Byrd Electronics and powered by ClearSCADA (Schneider Electric) software. Bobik’s team staffs the Grass Valley plant seven days a week, operating on a schedule of four 10-hour days, which the team members like.

“Everybody gets either Friday or Monday off,” Bobik says. “We’re a small crew, and we cooperate and work together.” The team includes Justin Luck, senior operator; Mary Pedersen, laboratory director; and Al Edwards, Trevor Cory, Matt O’Kelly and Phil Jag, operators.



## Grass Valley Wastewater Treatment Plant PERMIT AND PERFORMANCE

	INFLUENT	EFFLUENT	PERMIT
<b>BOD</b>	206 mg/L	12.16 mg/L	30 mg/L daily max. 20 mg/L 30-day mean
<b>TSS</b>	211 mg/L	4.78 mg/L	N/A
<b>Ammonia</b>	40 mg/L	1.63 mg/L	N/A
<b>Total N</b>	N/A	4.69 mg/L	10 mg/L daily max. 8 mg/L 30-day mean
<b>MBAS*</b>	N/A	0.23 mg/L	2.0 mg/L daily max. 1.0 mg/L 30-day mean

\*Methylene blue active substances

Because of the complex plant processes, Grass Valley emphasizes training. "We brought in each of the vendors and made sure they stuck around until everyone was up to speed on the new processes," Bobik says. "We were under construction for four years, so we picked our vendors' brains and made sure our operators were part of the process during equipment startup. It was a good training opportunity."

The plant has also implemented more formal training and records and maintains all operational and maintenance procedures in plant documents. "Only two of our current operators were here when the microfiltration units were installed," Bobik says. "The new people have been trained by the more experienced."

The training has paid off. "We have our challenges," Bobik says, pointing out the nitrogen removal filters with methanol feed, the recycled effluent and the microfiltration operation. "It can be a tightrope. The methanol dosing must be very precise, for example, and you need to know what's going on at all times."

Ditto for the automatic control system. "Automatic doesn't literally mean automatic," Bobik says. "We sometimes struggle to properly denitrify with our automatic controls. We used to run with manual samples and dosing; sometimes we still have to do that."

One of his goals is to tighten up controls, get smarter and keep a tighter rein on effluent process parameters. The staff will be changing the location of one of the methanol analyzers. "We didn't realize it was in a bad location until we kept seeing bad results," Bobik says.

But he's not complaining: "Neighboring agencies sometimes visit and ask how we learned all this. The complexity has actually been fun. We don't have to twist guys' arms to get them to learn new processes. They've actually gravitated toward them." **tpo**

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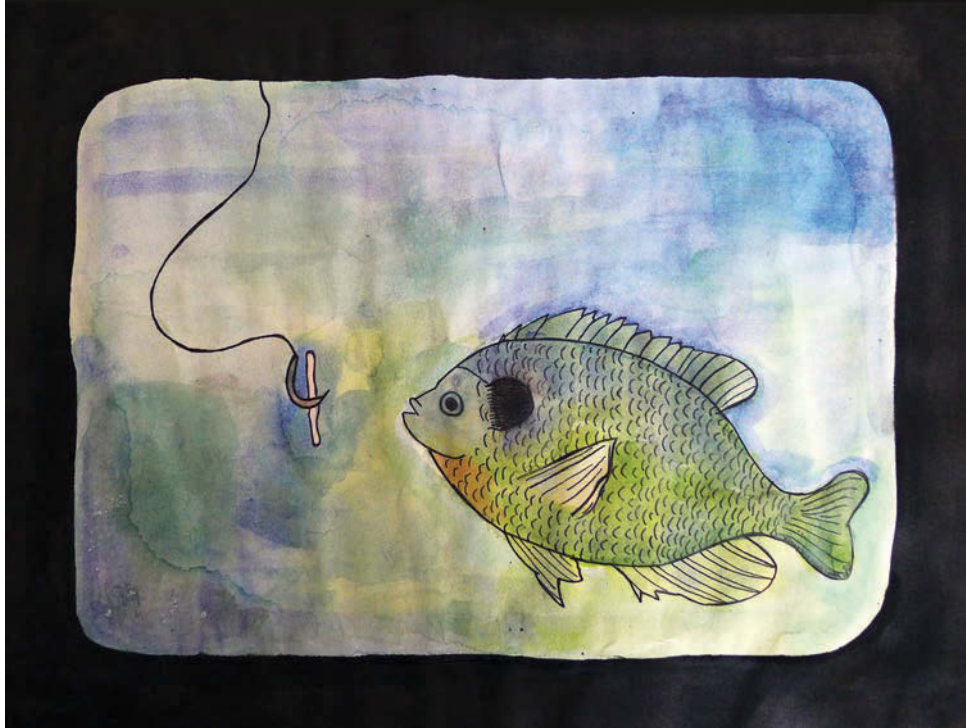
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# Multiplying Impact

PARTNERSHIPS HELP AN INNOVATIVE WATER-QUALITY EDUCATION PROGRAM REACH DIVERSE AGE GROUPS AND INFLUENCE BEHAVIORS IN WARSAW, IND.

By Ted J. Rulseh



Pictures like this second-place painting from middle school artist Colette Smith are featured in the 2014 Kosciusko Lakes and Streams Calendar. Students drew the pictures as part of a Wonderful Water Art Contest.

Working a booth at a local lakes festival, Theresa Sailor learned that about 80 percent of people didn't know where water flowing down storm drains ended up.

"Many don't realize that when they wash out their latex paintbrushes or put grass clippings in the street, all that water goes untreated, and most of it goes right into our waterways — Pike Lake, Center Lake, Winona Lake and the Tippecanoe River," says Sailor, stormwater coordinator for the City of Warsaw, Ind.

Her job is to change that, and generally to make people more aware of water-quality issues and the importance of pollution prevention. That's especially important in and around Warsaw, a northern Indiana city of 12,500 in an area rich with water resources.

## BROAD REACH

Sailor works out of the city wastewater treatment department and does her job with the help of that department's staff. "Wastewater personnel are our partners in everything we do, including water sampling," she says. "We monitor monthly samples from rivers and creeks coming into our corporate boundaries and exiting our boundaries to help determine our local impact on water quality due to stormwater runoff. We test for phosphorus, chlorides, pH, conductivity, DO, temperature and ammonium."

Partnerships with community organizations greatly extend the education program's reach. "We

work closely with the community resources we have," says Sailor. "Grace College does a lot of water-quality education in the local schools, and they also do water-quality monitoring in the community."

She also partners with the Kosciusko County Soil and Water Conservation District, and with the county Solid Waste Management District, supporting publicity for its recycling depot and for events like household hazardous waste collections and electronics recycling dropoffs. Those partnerships lend substantial leverage to reach community members with messages that have lasting impact.

## FISH AT SCHOOL

Warsaw is a sponsor of the Grace College Lake in the Classroom program, in which four- through six-grade classes from local schools receive a 30-gallon aquarium stocked with native fish, like bluegills, largemouth and smallmouth bass, and catfish. Once a week a Grace College student visits the class to talk about water quality and how pollution affects aquatic life.

"The kids take care of the fish," says Sailor. "They feed them every day. It connects them to something alive that they can see. The college drops off the tanks and sets them up and takes care of cleaning them every month. That way they're not a burden to the teachers."

## LEARNING ON WATER

Warsaw also partners with the Soil and Water Conservation District's Water Drop raft program for ninth graders. Students take a two-hour trip in rafts launched at the Grassy Creek inlet to Tippecanoe Lake. As they float and paddle the lake, they use simple chemical kits to test the water for phosphorus and dissolved oxygen. Later, on pontoon boats, they measure water clarity with Secchi disks.

"It's a beautiful lake and a great experience for the kids," says Sailor. "A lot of them have never been out on a raft and certainly have never thought about water quality and things like invasive species of plants and fish. It's a great opportunity for them to touch things and experience how neat it is to be outside and doing something different."



PHOTOS COURTESY OF THERESA SAILOR  
Greg Weber, operator/maintenance specialist, samples water to test for stormwater pollutants in the Tippecanoe River.



## FESTIVE EDUCATION

Sailor and the Warsaw team also take part in and sponsor the annual Northern Indiana Lake Festival, put on in early June by Grace College and its Kosciusko Lakes and Streams community-based research center.

The festival drew 4,000 visitors in 2013. Several water-quality organizations had exhibits. Visitors received a card containing one question about water quality from each of these groups. They were challenged to visit each booth, get the answers and turn in completed cards for a free water bottle.

## THE YEAR IN ART

Another Grace College/Kosciusko Lakes and Streams initiative is a student art contest around a water-quality theme. The contest is open to anyone in the county in grades four through 12. There are divisions for grades four through six, seven through eight, nine through 10, and 11 through 12.

"Kids can use any medium they want," says Sailor. "They use watercolor, colored pencils, charcoal and others." A selection committee chooses the winners, whose works are compiled in a calendar.

Businesses and organizations (including the City of Warsaw) sponsor calendar pages, each of which includes a pollution prevention tip. The artworks

"It's not that people intentionally pollute. The problem is that they don't realize where their stormwater goes. In the next two years, we would like to reach the point where every single resident knows where their particular street storm drain goes."

### Theresa Sailor

are also displayed at Grace College and at the Warsaw City Hall. "It's an opportunity for the kids to draw something that's meaningful," says Sailor. "Kids really just want to be acknowledged and have their art submitted. They really enjoy that."

Sailor uses some of the artworks on educational door hangers, distributed in areas of town where street workers or others have reported evidence of illicit discharges, such as paint stains at storm sewer grates. The door hangers are customized to let the residents know exactly where their streets' stormwater goes.

"It's not that people intentionally pollute," Sailor says. "The problem is that they don't realize where their stormwater goes. In the next two years, we would like to reach the point where every single resident knows where their particular street storm drain goes. Then they'll be engaged on a personal level."

## AT THE FAIR

Brian Davison, Warsaw utility manager, notes that the city does its own exhibit at the county fair. Wastewater plant operators sign up to staff the booth at hours of their choosing. They hand out information on stormwater and wastewater treatment and other environmental concerns.

"We've never had an issue getting enough people to staff the booth," says Davison. "We usually pass out popcorn to draw people's attention, so they'll stop and talk to us. The wastewater information is pretty basic — about not dumping grease down the drain, how to dispose of medications properly. In the past we've shown videos from inspections of our sewer lines. We had video of a line that was plugged with grease, and a video of clean line so people could see it flowing."

Sailor is grateful for the help, seeing education as a team effort. "We all participate in the stormwater program," she says. "It wouldn't happen without everybody here. One person alone cannot do this job." **tpo**



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A UV system replaced gaseous chlorine disinfection at the H.C. Morgan Water Pollution Control Facility in Auburn, Ala.

PHOTOS COURTESY OF CST COVERS

# An Easy Transition

A CLEAN-WATER PLANT IN THE HOMETOWN OF THE AUBURN TIGERS COMPLETES A TROUBLE-FREE CONVERSION FROM GASEOUS CHLORINE TO UV DISINFECTION

By Ted J. Rulseh

**T**he Alabama city of Auburn in 2012 converted the disinfection system at its H.C. Morgan Water Pollution Control Facility from chlorine to UV.

Since the UV system went online in October of that year, it has consistently outperformed the plant's regulatory requirements for *E. coli* of 126 cfu/100 mL monthly average May to November and 548 cfu/100 mL monthly average December to April. The conversion made use of the existing chlorine contact tanks and fixed weir to reduce construction cost, while also enabling surplus space in those tanks to be repurposed.

## VARIABLE LOADS

Auburn, home to Auburn University, faces treatment challenges common to college and university towns. The population of 56,900 swells significantly on fall weekends when crowds descend for Auburn Tigers football games.

"The bottom line is making sure we consistently meet our permit limits for *E. coli*, and we've had no issues with that."

**MATT DUNN, P.E.**

Located between Montgomery, Ala., and Atlanta, Ga., along Interstate 85, Auburn has seen rapid growth in recent years. Separate wastewater treatment plants were built to serve the city's two sewer service basins: the 2 mgd (permitted capacity) Northside Water Pollution Control Facility, and the 11.25 mgd H.C. Morgan plant.

Both were built in 1985 and were the first privatized plants in the state. The city owns the facilities and has a contract with Veolia Water North America to operate and maintain them. In 2008, the U.S. EPA and Alabama Department of Environmental Management imposed a total maximum daily load limit on total phosphorus for the Saughatchee Creek Watershed, which received the Northside plant's effluent.

After reviewing compliance options with consultants from CH2M HILL, the city decided to cease treatment and discharge at the Northside plant and use a recently built transfer sewer to pump that plant's

influent to the H.C. Morgan plant, which would be upgraded to handle the additional flow. The Northside plant now in effect serves as a lift station.

## DUE DILIGENCE

The H.C. Morgan activated sludge/extended aeration plant on 40 urban acres discharges to Parkerson Mill Creek. As part of the upgrade in 2012, the city decided to convert to UV for its safety advantages and for long-term operation and maintenance cost savings.

The city had been disinfecting with gaseous chlorine and dechlorinating with sulfur dioxide. "Like a lot of plants, this one was built in the middle of nowhere, but now we have a subdivision, apartment complexes and a golf course around us," says Matt Dunn, P.E., assistant director of the city's Water Resource Management Department.

"We've never had a problem with chlorine, but it only takes one leak to lead to a potentially dangerous situation. With those developments close to our plant, continuing disinfection with chlorine became a bigger safety concern."

The safety of plant personnel was also a concern, notes Scott Milner, project manager with Veolia Water: "Chlorine gas is a great disinfectant, but we think it's better to get away from using a chemical if you can."

With CH2M HILL, the city evaluated UV technologies, in the process making site visits to see systems in action. They selected the TrojanUVSigna system from TrojanUV for its suitability for seasonal operation, low number of UV lamps, ease of operation and maintenance, low installed cost and low long-term operating cost.

"We looked at UV in the past," says Dunn. "It's a case where as more vendors offer a technology and refine it, costs start to go down. So adopting UV became more financially attractive than it was several years ago."

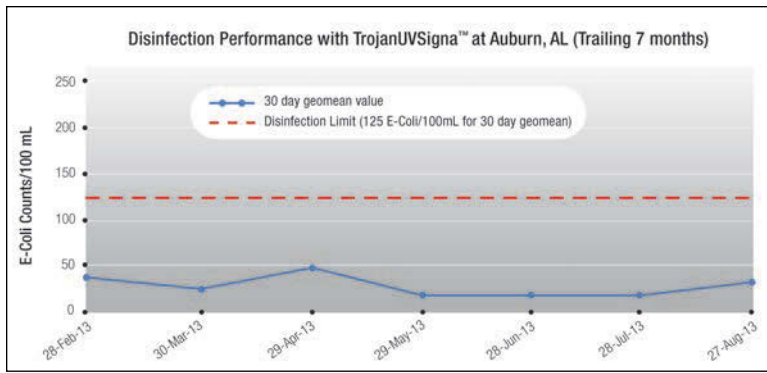
## ONLINE PERFORMANCE

The retrofit installation into the existing chlorine contact basin proceeded quickly and without incident. Free space in the old tanks



**Matt Dunn, P.E.**





The TrojanUVSigna system has consistently outperformed the plant's regulatory limit for disinfection.

#### SYSTEM DESIGN PARAMETERS

- **PEAK DESIGN FLOW:** 34.2 MGD (129,460 m<sup>3</sup>/d)
- **UV TRANSMITTANCE:** > 65%
- **DISINFECTION LIMIT:** 126 E.coli/100mL (30 day average)
- **NUMBER OF UV UNITS:** Two channels, two banks of 22 lamps (expandable to 29) in each channel
- **AVERAGE SOLIDS CONCENTRATION:** 30 mg/L TSS
- **UPSTREAM TREATMENT:** Biologically Treated Secondary Effluent, Unfiltered

is used for water storage, bypass and other purposes. The installation came online just in time for the 2012 college football season. It includes two 22-lamp banks (expandable to 29) to treat a peak hourly capacity of 34.2 mgd. The plant has excellent effluent quality with UV transmittance that consistently exceeds 65 percent.

The TrojanUVSigna system is designed for large-scale wastewater disinfection, for ease of conversion and for low ownership cost compared to chlorine. It uses TrojanUV Solo Lamp technology, designed to combine the advantages of medium-pressure lamps (low lamp count,

small footprint, dimmable from 100 percent to 30 percent power) and low-pressure high-output lamps (one-third the energy usage of medium-pressure lamps, more than 15,000 hours lamp life, and low carbon footprint and environmental impact).

Dunn and Milner appreciate the angled lamp arrangement, which allows lamps to be replaced without disrupting disinfection by removing the lamp banks from the channel. Individual lamps can be turned off at the local control panel.

"You can basically walk out on the system, give an interlock mechanism a quarter-turn and slide the lamp right out of the sleeve," says Milner. "There is also a hydraulic system that pivots the banks out of the channel. Banks of UV lamps do not need to be removed for routine maintenance such as lamp replacement or sleeve cleaning. The push-button pivot feature can be used when operators want to inspect the banks and for cleaning the bank or channel as required."

The system incorporates advanced control and the company's maintenance-saving ActiClean automatic chemical/mechanical cleaning system, which eliminates fouling on lamp sleeves and is third-party validated to maintain at least 95 percent of sleeve UV transmittance. The same hydraulic system drives both the lamp sleeve cleaning and the pivot function.

#### POSITIVE RESULTS

"Through our first year of operation, we found the system really simple to operate and maintain," Milner says. "TrojanUV has been a pleasure to work with. The support and service have been excellent, and we look forward to working with them in the future."

Dunn concludes, "The bottom line is making sure we consistently meet our permit limits for *E. coli*, and we've had no issues with that. We are consistently below our limits even during high-flow situations. It's a nice system, and we're pleased to have it at our plant." **tpo**

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The Tooele facility produces Class A biosolids used as fertilizer on city parks and a golf course. (Photography by Sallie Shatz)

# A Sunny Outlook

## A UTAH CITY TURNS TO RENEWABLE ENERGY AS PART OF AN OPERATION THAT BRINGS THE LIQUID AND SOLIDS SIDES OF TREATMENT FULL CIRCLE

By Ted J. Rulseh

**IN NORTH CENTRAL UTAH'S DESERT CLIMATE, WATER** is scarce and sunlight abundant. The Tooele City Water Reclamation Facility helps ease the first condition and takes full advantage of the second.

The plant, serving a community of 32,000 about 30 miles west of Salt Lake City, delivers reclaimed water to a private golf course and uses the sun to help make a Class A biosolids product that fertilizes city parks and a city-owned golf course.

The public receives both products enthusiastically, most notably the biosolids, produced in a solar-heated drying system. "People are really glad to see us doing something that is fiscally responsible and makes use of an alternative source of energy," says Dan Olson, wastewater reclamation superintendent since 2001.

The drying process yields a gray-colored, granular product that is essentially odor-free. The investment in solar technology is being paid back by well over \$100,000 in savings from the former process of lime stabilization and land application of Class B material. For its efforts, the city earned the 2012 Outstanding Biosolids Program Award from the Water Environment Association of Utah.

### **BIG STEP FORWARD**

Tooele City (pronounced Too-WILL-a) is a largely residential community; many who live there commute to Salt Lake City. The clean-water plant has come a long way since 2000. "The original trickling filter plant was built in

the 1950s," says Olson. "It was way overloaded and very antiquated. It had old pumps that came out of battleships. It was pieced together and barely getting by. There was no SCADA. It was very low-tech."

The city built a new tertiary water reclamation plant in 2000 in a unique arrangement with the Overlake Golf Course, with which the plant shares a fence line. The plant and golf course projects came together synergistically: The developer needed water and the city needed to make use of its treated wastewater. The city developed the treatment process and worked with the developer to send some of the water to the golf course.

The city saw fast growth through the early 2000s, and the plant soon met its capacity. An upgrade completed in 2007 expanded the headworks and

"People are really glad to see us doing something that is fiscally responsible and makes use of an alternative source of energy."

**DAN OLSON**

oxidation ditch process, added a secondary clarifier and upgraded the tertiary filters, raising design capacity from 2.0 mgd to 3.4 mgd. An upgrade finished in 2012 added UV disinfection and the biosolids dryer.

The water reclamation process starts with a headworks that includes two Step Screens (Huber Technology) and a grit removal system (John Meunier). The water then flows directly to the oxidation ditch (Kruger), where air is supplied by three 75 hp turbo blowers (APG-Neuros) and fine-bubble diffus-





The team at the Tooele City Water Reclamation Facility, shown inside the Solar-Regenerative Sludge Dryer (Huber Technology), includes, from left, Matt McArthur, operator; Craig Savage, collection expert; John Chacon, operator; Scott Von Hatten, operator; Dan Olson, plant superintendent; Jim Morrison, collection system lead; Mike Outzen, collection operator.

# profile



## Tooele City (Utah) Water Reclamation Facility

<b>POPULATION SERVED:</b>	<b>32,000</b>
<b>PLANT FLOWS:</b>	<b>3.4 mgd design, 2.1 mgd average</b>
<b>PLANT PROCESS:</b>	<b>Activated sludge/gravity sand filtration</b>
<b>BIOSOLIDS PROCESS:</b>	<b>Screw press dewatering, solar drying</b>
<b>BIOSOLIDS VOLUME:</b>	<b>1,050 dry tons/year</b>
<b>BIOSOLIDS USE:</b>	<b>Land application to parks, golf course</b>
<b>WEBSITE:</b>	<b><a href="http://www.tooelecity.org">www.tooelecity.org</a></b>
<b>GPS COORDINATES:</b>	<b>Latitude: 40°35'19.08" N; Longitude: 112°19'53.77" W</b>

ers (Environmental Dynamics International [EDI]). After the secondary clarifiers (two by WesTech Engineering, one by EDI), the water receives tertiary treatment in three traveling bridge gravity sand filters (Infilco Degremont) and UV disinfection (Ozonix) before being pumped to the golf course.

### THE SOLIDS SIDE

Activated sludge wasted from the process is fed to a gravity thickener (WesTech) and from there to a 60-foot-diameter, four-compartment holding tank, aerated by turbo blowers (Aerzen) and fine-bubble diffusers (EDI). The tank is not a digester, although it provides some stabilization. "It's really designed to give us storage so that on weekends and holidays we can still waste sludge but don't have to run our screw presses."

Those two screw presses (Huber) are preceded by a Muffin Monster grinder (JWC Environmental). The waste activated sludge is fed to the screw presses



Dan Olson, wastewater reclamation superintendent



## LOVES TO LEARN

Dan Olson brings substantial education to his role as water reclamation superintendent. His 20 years' experience includes eight years as wastewater superintendent with a feed company, during which he received a 1997 Outstanding Wastewater Operator award from the Water Environment Association of Utah (WEAU). He owns an associate of science degree from Snow College in Ephraim, Utah, and a bachelor's degree in chemistry from the University of Utah.

His certifications include Utah Wastewater Treatment Grade IV (highest), Collections Grade IV, Water Treatment IV, Water Distribution IV, Land Applier II and National Rural Water Association Utility Management Certification. He has been a Water Environment Federation member since 1998, was WEAU president in 2011 and 2012, and has served on several WEAU committees.

He leads a team of seven operators responsible for the water reclamation plant and the collection system. Team members are:

- John Chacon, Matt McArthur, Preston Burr and Scott Von Hatten, operators
- Jim Morrison, collections system lead
- Craig Savage, collections expert
- Mike Outzen, collections operator

at about 2 percent solids, and the presses deliver cake at 17 percent solids. A screw conveyor then sends the cake to the solar drying system (Huber).

In replacing its lime stabilization solids process, Olson and his team looked only at alternatives that would yield a Class A product. Composting wasn't feasible because the city had no ready source of green waste; thermal drying appeared costly to operate, especially since energy costs for the next



A splitter box at the effluent end of the oxidation ditch divides the flow of mixed liquor to the three clarifiers. The splitter box valves are 24-inch telescoping valves from Online Engineering. The plant's new UV disinfection building (center top) and the filter building (right top) are in the background.

10 to 20 years were unpredictable. That left solar drying.

Facility representatives looked at various manufacturers' solar dryers at operating sites in the United States. They also visited Germany to see the Huber system at work. "It looked like the best fit for our needs," Olson says.

## AUTOMATED PROCESS

The Huber Solar-Regenerative Sludge Dryer consists of a 310- by 150-foot greenhouse with three parallel bays. The screw conveyor delivers dewatered material to nine zones, three in each bay. Turning and transporting units, one in each bay, mix the biosolids. One unit spans each bay, slowing traveling from one end to the other, in the process pushing the material along, a few inches at a time. The total retention time is about two weeks.

"We add material at one and take out at the other," says Olson. "There is no handling of material other than the turner. It's an automated process. The turner has the ability to scoop up dry material at the end of the process, bring it back to the beginning, and mix it with wetter material. That helps speed up the drying.

"It's a continuous process. We run the screw presses 24 hours a day for about three days, then turn them off. For the next couple of days, the solar unit will dry and turn and mix. We usually don't run it on the weekends, but we could run it 24 hours a day forever if we needed to."

At the end of each bay is a drop wall where operators use a Bobcat loader to transfer material, generally at 95 percent solids, into 10-wheel dump trucks





for delivery to a storage facility, a 100-square-foot concrete pad that has a roof but is open on three sides. Material is held there until it passes testing for Salmonella, enteric viruses and helminth ova (eggs of tapeworms and similar flatworm intestinal parasites).

The finished material is applied to city parks, and to the Tooele City Golf Course in fall after the golf season. It's applied using a broadcast spreader mounted behind a tractor.

As of last fall, the drying system had been running for a little over a year. "We've yet to determine how much material the city will need in a given year," says Olson. "If we end up with excess, we'll offer it to the public, either for sale or as a give-away. We've had lots of requests for the material. I'm sure once we offer it, it will go pretty quickly." The granules are small enough to apply to lawns with a typical rotary spreader.

The system produces Class A biosolids 10 months of the year; in January and February the material dries to 75 to 80 percent solids. "During those months, we have options for the material," says Olson. "One is to go back to land application. We have several farmers who would take it at the drop of a hat and would even pay for it. Another option is that when the weather warms up again, we can bring that material back to the head end of the greenhouse and rework it."

### MANY ADVANTAGES

The system has reduced operating costs significantly over the previous Class B process. The elimination of lime saves \$40,000 a year. Moving material at 95 percent instead of 15 percent solids, and hauling it shorter distances, saves \$25,000. Spreading costs are reduced by \$15,000 and application field rental costs by \$30,000.

In addition, applying the material to city land saves on chemical fertiliz-

Secondary clarifiers (two by WesTech Engineering; one by Environmental Dynamics International) precede tertiary treatment by three traveling bridge gravity sand filters (Infilco Degremont).

ers. Labor costs are down, too: The process requires a part-time operator versus a full-time person previously. "We didn't lay anybody off," Olson says. "We just allocated the hours we saved to other tasks in the plant."

Odor issues have been nonexistent: "We're right next to the golf course and we've had zero odor complaints from golfers. We have farms and farm-

"We add material at one and take out at the other. There is no handling of material other than the turner. It's an automated process."

**DAN OLSON**

houses around us and we've had zero complaints from them. If you get 30 to 40 yards away from the greenhouse, you can't smell anything. In fact you'd have to be standing right at the fans to smell anything. Our plan called for installing an odor-control system if odors become an issue, but it just hasn't been necessary."

One reason odor is minimal, even though the material is not first processed in digesters, is that the fans and the turning-transporting system keep the material aerobic, says Olson. "If we were to put our material out on regular drying beds, within a few days the odor would be strong. But the greenhouse process dries it quickly. Even in winter when the material stays wet longer, the system still keeps it fresh."

The system provides substantial flexibility to deal with seasonal changes in weather. Operators can program how fast the turner-transporter moves material down the bays. A weather station outside the greenhouse monitors temperature, rainfall and humidity, and six sensors monitor indoor conditions.



## AMPLE DEMAND

As Tooele City grows and its water reclamation facility produces more volume, there will be no shortage of outlets for it.

Today, most of the plant's 2.1 mgd average output goes to irrigate the neighboring Overlake Golf Course. Seventeen small lakes dot the 18-hole course; reclaimed water from the plant is stored in them over the winter and pumped out through the sprinkler systems during the growing season.

"The farthest lake is about a mile from our plant," says Dan Olson, wastewater reclamation superintendent. "The lakes are all connected. We normally pump to the highest lake, and it feeds by gravity feed down to the lower lakes. We have valving that lets us pump to any of three lakes, depending on where the golf course needs the water." Some reclaimed water is sold in bulk for purposes like construction site dust control.

"As we grow, water will be available for other uses, but we haven't yet determined what those will be," says Olson. "We're surrounded by agricultural fields, so that's a possibility. Some places in town have secondary irrigation systems already installed. It's possible that we could use those systems and deliver water to residential users, the hospital and some of the schools."

Whatever happens, reuse water from Tooele City will have no trouble finding a market.

"The program uses that data to decide how fast to run the turners and when to run the fans," says Olson. "It minimizes the amount of energy consumed. The fans only come on when environmental sensors say there's moisture that needs to be pulled out. There are different operating programs for winter, spring, summer and fall. There are literally thousands of ways we could run the system."

"We have famously poor soils here. We'd been using the biosolids on the plant property, and the grass looked beautiful. After the tour, one lady asked me if the grass was real. She said 'I've never seen grass so green.' "

**DAN OLSON**

### WELL ACCEPTED

Tooele City residents have welcomed the technology, with help from a little public outreach. An open house and ribbon cutting in July 2012 drew city officials, county commissioners, a state representative and local media — about 200 people in all, many of them Chamber of Commerce members. Olson and his team gave away samples of biosolids in small jars.

Olson especially remembers one comment: "We have famously poor soils here. We'd been using the biosolids on the plant property, and the grass looked beautiful. After the tour, one lady asked me if the grass was real. She said 'I've never seen grass so green.'"

As Tooele City keeps growing, the biosolids process can grow with it. There's room to add a fourth bay and so add significant volume. That means a future of beautiful grass on city properties — and perhaps eventually on homeowners' lawns, as well. **tpo**



Scott Von Hatten checks one of the three 75 hp turbo blowers (APG-Neuros) that supply air to the plant's oxidation ditch (Kruger).

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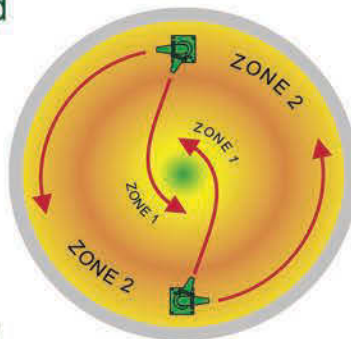


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# YOUNG AND GROWING

TROY BEMISDARFER SEIZED AN OPPORTUNITY IN THE CLEAN-WATER INDUSTRY AND IN JUST FIVE YEARS HAS BUILT A SATISFYING AND AWARD-WINNING CAREER

By Jack Powell

WITH A LITTLE MORE THAN FIVE YEARS' EXPERIENCE, TROY BEMISDARFER HAS already made a name for himself at the Big Bear (Calif.) Area Regional Wastewater Agency. A quiet, good-natured 25-year-old, he earned the California Water Environment Association (CWEA) 2012 Operator of the Year Award while still learning the wastewater business.

Bemisdarfer's determination and drive have gained the attention of his boss and attaboys from co-workers. Francis Hobbs, a 20-year veteran operator, says, "The kid does real good work; he's our hope for the future." Nick Josenhans, who joined in 2011, agrees: "Troy has taught me a lot about what it takes to keep the plant running. He's made me feel like part of the team."

CWEA based the award on criteria including knowledge of the job, overall performance, operational responsibilities and contributions to the facility.

## COMMITMENT TO GROWTH

Of CWEA's 9,000 members, more than 5,500 hold certificates. That includes Bemisdarfer, who has California Grade 2 Collection Systems Maintenance and Grade 2 Mechanical Technologist certifications, as well as a Grade 2 Plant Operator license.

"Since Big Bear was my first job in the wastewater industry, I had a lot to learn," says Bemisdarfer. "So the plant executives sent me to classes and training programs, even to a course at the Waukesha Engine manufacturing plant in Waukesha, Wis., to learn how to be a good generator mechanic. That's one of the best things about working here — the chance to grow, build your skills and make a difference to the community."

Bemisdarfer hadn't thought much about wastewater growing up in Big



Troy Bemisdarfer, Grade 2 treatment plant operator, received the 2012 California Water Environment Association Operator of the Year Award. (Photography by Collin Chappelle)

Bear, about 100 miles northeast of Los Angeles. In his sophomore year in high school, his family moved to North Carolina, and he graduated in 2007 from Davie High School in Mocksville. He returned to Big Bear two years later and started as a temporary employee at the 4.89 mgd extended aeration treatment plant, which has 15 employees.

## DIVERSE DUTIES

There, Bemisdarfer and six other operators do just about everything: plant operation, equipment maintenance, general upkeep and biosolids delivery. They share responsibility for operating the plant, and Bemisdarfer takes that on one week out of every month. That entails taking water samples, making sure the pumping system works, checking all the equipment, and generally making sure the plant meets its discharge permit. And, as part of the maintenance crew, he's responsible for changing oil in the pumps, checking four lift stations, keeping screens clean and other tasks. He relishes them all, seeing learning opportunities everywhere.

"I typically work 8 a.m. to 4:30 p.m., but there's always something else to do," Bemisdarfer says. "For example, we have a belt filter press that dewater our solids, so when we're running that, depending on our solids level, it can operate 24 hours straight. We send the solids to a compost facility in Redlands. We have a truck we use to do some of the hauling, so everybody here has a Class B commercial driver's license. It takes about an hour and 20 minutes to get there."

## IN-HOUSE FOCUS

Working at the Big Bear plant presents its share of challenges. Built in 1974, the plant uses three oxidation ditches and three secondary clarifiers





“This is a great place to work; we all get along real well. I’ve had a chance to get my certifications, learn how to work on the generators and understand plant operations from the ground up. The time has gone by very quickly.”

**TROY BEMISDARFER**



## profile

**Troy Bemisdarfer,**  
**Big Bear (Calif.)**  
**Area Regional**  
**Wastewater Agency**

The crew of the Big Bear Area Regional Wastewater Agency treatment plant, atop the San Bernardino mountains east of Los Angeles, includes, from left, Nicholas Josenhans, Bob Sellards, Clayton Hanson, Troy Bemisdarfer, Jeremy Sweeney, Nikki Flores, Robert Schindler, Francis Hobbs and Justin Ploense.



**POSITION:**  
**Operator**

**EXPERIENCE:**  
**Five years**

**DUTIES:**  
**Plant operations, equipment upkeep, maintenance**

**EDUCATION:**  
**Graduate of Davie High School, Mocksville, N.C.**

**CERTIFICATIONS:**  
**Grade 2 Plant Operator license; Grade 2 Collection Systems Maintenance and Mechanical Technologist certifications**

**GOALS:**  
**Expand skills and enjoy a successful industry career**

**GPS COORDINATES:**  
**Latitude: 34°16'05.54" N;**  
**Longitude: 116°48'53.92" W**





**WATCH THEM  
IN ACTION**

To learn more about Troy Bemisdarfer and the Big Bear Area Regional Wastewater Agency, view the video at [www.tpomag.com](http://www.tpomag.com).

(all Lakeside Equipment) that the team must maintain. Raw wastewater enters the headworks and passes through a Link-Belt bar screen (FMC Corporation) and an aerated grit chamber. The water then goes to the oxidation ditches, where nitrification/denitrification occurs, and then is sent to the secondary clarifiers. The final effluent is pumped to a 1-square-mile piece of property the Big Bear agency owns in the Lucerne Valley, 15 miles away in western San Bernardino County. There, a farmer uses it to water alfalfa.

The Big Bear service area includes the entire Big Bear Valley (79,000 acres) and is served by three separate collection systems: the City of Big Bear Lake (47 percent of connections), the Big Bear City Community Services District (48 percent) and the County of San Bernardino Service Area 53B (5 percent). Each delivers wastewater to the agency's interceptor system for transport to the treatment plant.

**VARIABLE FLOWS**

Flows to the Big Bear Area Regional Wastewater Agency can vary dramatically from summer to winter. The area's year-round population is about 25,000, but in winter, skiers at Snow Summit and Bear Mountain resorts can push the number to 100,000 or more. The plant sees an average dry-weather flow of 2.2 mgd; summer flows average 1.4 mgd and winter 3.0 mgd.

"Every year gets a little more difficult for us because of the changing weather," says Troy Bemisdarfer, operator. "If we have heavy snowfall, then it rains, the snow turns to slush and adds to the flow. It doesn't happen every year, but it's something we deal with. Fortunately, we keep up to date with maintenance and the upkeep on our equipment, so if we get a lot of water, we can deal with it."

"Troy has taught me a lot about what it takes to keep the plant running. He's made me feel like part of the team."

**NICK JOSENHANS**

Troy Bemisdarfer hoses out one of the plant's three 75-foot-diameter secondary clarifiers (Lakeside Equipment). At 12-feet deep, each clarifier can receive a flow of 500 gpd per square foot. The clarifiers are meticulously cleaned of any pin floc or trash that may pass through the primary treatment system.

The plant team is committed to self-sufficiency and cost savings, for which Bemisdarfer credits Fred Uhler, chief plant operator, and Steve Schindler, general manager, both water industry veterans who are big on training, education and cost control.

**ENERGY PRODUCTION**

As an example, Bemisdarfer points out that the plant has been "off the electric power grid" for the past decade. In 2002, it installed a 600 kW Waukesha Engine natural gas generator (GE Energy) and in 2008 two 250 kW generators (Cummins), all fueled by Southwest Gas. The generators save \$15,000 to \$18,000 per month in energy costs and give operators like Bemisdarfer the chance to develop new skills.

"We do regular maintenance on them, such as oil changes and adjusting valves, and I'm the one who does it," says Bemisdarfer, who clearly relishes the challenge. "We also do rebuilds and complete overhauls on the engines as needed, whether it's changing the heads or putting in new pistons. We tear them down to bare bones and rebuild them."

The Big Bear team in 2012 built its own lift station from the ground up over a six-month period. Except for pouring the concrete for the wet well, plant crews — including Bemisdarfer — did everything from the wiring to the pipelines to the pumps. Although they hired a mason to do the concrete block work, the operators mixed the cement and handed him the bricks. The result: \$600,000 in savings. In 2010, they built and installed a SCADA system, and a few years earlier they built an alarm system for the lift stations.

"Typically these projects are bid out to contractors, but we have a group of very talented people like Troy who can do the job," says Uhler, who has spent 14 years with Big Bear. "Troy is the kind of kid every plant is looking for. He's sharp, he learns quickly, he's a hard worker and he's very dependable. Other agencies throughout the state come and look at what we've done,



“Troy is the kind of kid every plant is looking for. He’s sharp, he learns quickly, he’s a hard worker and he’s very dependable.”

**FRED UHLER**

because we’ve been able to save several hundred thousand dollars by building our own systems rather than buying them.”

**NEW SOLIDS PROCESS**

Right now, plant personnel are working on a cutting-edge solids reduction process that is expected to reduce biosolids volume by 80 percent. The process uses heat from the gas-fired generators’ exhaust to heat the slab where solids are dried. Pilot tests achieved 80 percent solids in the material, which is land-applied.

With the current process, the plant would generate on average 2,100 tons of biosolids per year over the next 20 years, or 175 truckloads per year. The new process will cut that to 420 tons per year, equal to 35 truckloads per year over the next 20 years. That sharply reduces truck traffic on the mountain roads, not to mention fuel costs and air pollution.

While Bemisdarfer is grateful for the recognition he has received, he’s quick to credit Schindler as “the person instrumental to our success” and sees him as “the kind of person you want to work for. He started in the trenches 27 years ago down in Oceanside in the wastewater field as an operator in training, and then worked his way up the ladder to become general manager for the last 20 years. It’s great to work for a person who knows the industry, who has done everything there is to do.”

**GOOD CAREER CHOICE**

In his short time at the Big Bear treatment plant, Bemisdarfer has come to think of water as “a great career.” He tells co-worker Josenhans that this is the right move to make, since water is a finite resource and that people need it now and always will.

Bemisdarfer is particularly high on wastewater, calling it, “one of the biggest growth industries with a ton of room for growth.” He cites Orange County as a community that is taking treated wastewater and putting it back into the water table so that residents can drink it.

Demonstrating his confidence in his job and the industry, Bemisdarfer bought a house last year in Big

Bear, about a mile from the plant. As for the operator of the year award, which he learned about at a CWEA dinner around the Christmas holidays, he was surprised, given his relatively few years in the field and the fact that “California is a big state and a lot of people get nominated each year.”

Still, he’s excited about his role in producing clean water — neither he nor Uhler can remember the last time the plant had a discharge violation. “This is a great place to work; we all get along real well,” he says. “I’ve had a chance to get my certifications, learn how to work on the generators and understand plant operations from the ground up. The time has gone by very quickly; it doesn’t seem like I’ve been here for five years. I’m looking forward to being here a long, long time.” **tpo**



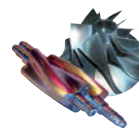
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# More Than Sunshine

SOLAR ENERGY PROVIDES MOST OF THE ENERGY FOR THE RIFLE WATER RECLAIM PLANT, WHILE OPERATORS' INNOVATIONS CUT DOWN ELECTRICITY CONSUMPTION

By Doug Day

Since the sun provides much of its energy, the Rifle Regional Wastewater Reclamation Plant finds it doesn't need much electricity from the utility grid. But that hasn't kept the staff from looking for ways to save energy: By tweaking plant operations, they have cut energy use by 20 percent.

Put online in November 2009 to meet new ammonia nitrogen discharge requirements for the Colorado River, the \$23.3 million facility in West Rifle, Colo., uses three oxidation ditches to clean the wastewater from 10,000 residents about three hours west of Denver. With a design flow of 2 mgd, the plant averages 1 mgd.

## PLENTY OF POWER

The construction project included a contract with SunEdison to build a solar photovoltaic system. In exchange for land and a 20-year

purchased power agreement, SunEdison designed and built single axis, ground-mounted solar arrays totaling 2.3 MW on two tracts of land on the plant grounds. A 1.7 MW array powers the wastewater treatment plant, and a nearby 0.6 MW system runs a pumping station. The equipment can produce about 4,300 MWh of electricity per year; any excess is sold to the local municipally owned Glenwood Springs Electric System.

"On a clear, sunny day in summer, we get about 300 percent of our plant's electrical demand generated by solar," says Devin Jameson, lead operator. Even in winter solar fulfills nearly all the plant's needs. That is better than the projections of 50 to 70 percent of the plant's demand.

## KEEPING TRACK

But solar energy was only the beginning. Garfield Clean Energy, a countywide clean-energy partnership of 10 local governments, offered to help the Rifle team better understand the plant's energy use. "Garfield Clean Energy offered to put in data loggers across the plant," says Jameson. "They provide a website, Garfield Energy Navigator, that gives us daily, weekly, monthly and annual data on our solar and grid power use."

The data loggers record energy use around the plant every 15 minutes, showing energy use off the grid, solar generation, the amount of solar-generated power being sold back to the utility, natural gas usage and more. The website is being used to track energy use in 70 buildings across the county.

"We also have trending software in our SCADA system," adds Jameson. "If we see a spike in our solar or grid usage, we can go back

The crew of the Rifle Regional Wastewater Reclamation Plant includes, from left, Trish Manuppella, operator; Roger Schouten, maintenance mechanic; David Gallegos, wastewater supervisor; Pat Lake, operator; and Devin Jameson, lead operator. Not pictured is Marsha McCormick, lab technician.



PHOTOS COURTESY OF THE RIFLE REGIONAL WASTEWATER RECLAMATION PLANT

## What's Your Story?

**TPO welcomes news about environmental improvements at your facility for future articles in the Greening the Plant column. Send your ideas to editor@tpomag.com or call 715/277-4094.**



to our SCADA to see what equipment ramped up and figure out what happened.”

David Gallegos, plant supervisor, says the team has used the information to help detect equipment problems: “It can help find malfunctions by just tracking the energy use. Maybe a blower doesn’t turn off or a VFD has failed. We keep a real close eye on it.”

The data helps, but it still takes legwork to find ways to save energy. “After tracking energy use and talking with Garfield energy coaches, we cut back a little bit here and there,” adds Jameson. “We’re using 50 to 70 kWh less every day.” The annual 20 percent energy reduction saves about \$20,000 a year and earned the plant an Active Energy Management Innovation Award from Garfield Clean Energy.

“We found we could operate without using some equipment,” says Gallegos. “We have three huge clarifiers. We tried taking two of them offline. It has worked out fine, and we’re not running two

“We were running a lot of our blowers and other equipment during peak times, and that was really costing us. Just changing the times that equipment came online resulted in a big savings.”

#### DAVID GALLEGOS

motors 24/7.” It has also reduced workload on the staff because the clarifiers don’t have to be cleaned as often.

About 30 Cutler-Hammer variable-frequency drives (Eaton) have been added throughout the plant and have been tied into the SCADA system. “They’re able to ramp down during the cold hours and months and work a little harder when it’s warmer and the oxygen dissipates,” according to Jameson. “There are 12 motors on the oxidation ditches alone. There are now VFDs on blowers, nonpotable water pumps for reuse inside the plant, and the scum and sludge pumps.”

#### LEARNING THE RATES

The staff also learned that the local utility, like many others, offered lower rates outside times of peak demand. “We were running a lot of our blowers and other equipment during peak times, and that was really costing us,” says Gallegos. “Just changing the times that equipment came online resulted in a big savings.”

The peak demand charges also gave Jameson an idea to adjust use of the centrifugal blowers for dissolved oxygen control in the digesters. “We used to run them for hours at a time, then shut them off,” he says. “We had problems keeping oxygen in the digesters. After doing some math, I realized that we could do on/off aeration. We turn them on for 12 minutes, then turn them off for 12 minutes.”

That’s important because the peak demand use is measured every 15 minutes. “Keeping it from running for 15 minutes reduces the peak demand, and we found we’re able to hold more oxygen in the digesters.” This measure has also reduced overall use of the blowers: They now run six to eight hours less every day.

#### LIGHTS ON

The staff even began questioning the plant’s lighting, even though the facility was relatively new. “We had metal halide lights that took five minutes to warm up and sucked up a lot of energy,” says Jameson. “We replaced those with instant-on fluorescent lighting and placed them in better locations. It’s more efficient, we’re using less energy, and we’re getting better lighting.”

The outdoor lighting was put on timers with local on/off switches. “We were lighting up the entire place like a prison,” Jameson says.



The oxidation ditches at the Rifle Regional Wastewater Reclamation Plant.

## TRUSTED ADVISOR

Garfield Clean Energy is a partnership of 10 local governments in Garfield County and is Colorado’s first intergovernmental clean-energy authority. Its programs and services are managed by CLEER: Clean Energy Economy for the Region.

One of the partnership’s initiatives was the installation of solar arrays across the county in 2010 and 2011, including several in Rifle. Local officials say the community could be one of the most solar-powered small cities in the nation: with a population of 9,172, Rifle’s per capita solar capacity is now 467 watts per person.

Solar installations include:

- Rifle wastewater facilities, 2.3 MW
- Three City of Rifle buildings (police department, parks maintenance building, city operations and maintenance building), 10 kW each, 30 kW total
- Garfield County Fairgrounds Riding Arena, 101 kW
- Rifle Branch Library, 53 kW
- Clean Energy Collective solar garden, 700 kW
- Eagle Springs Organic farm, 1.1 MW

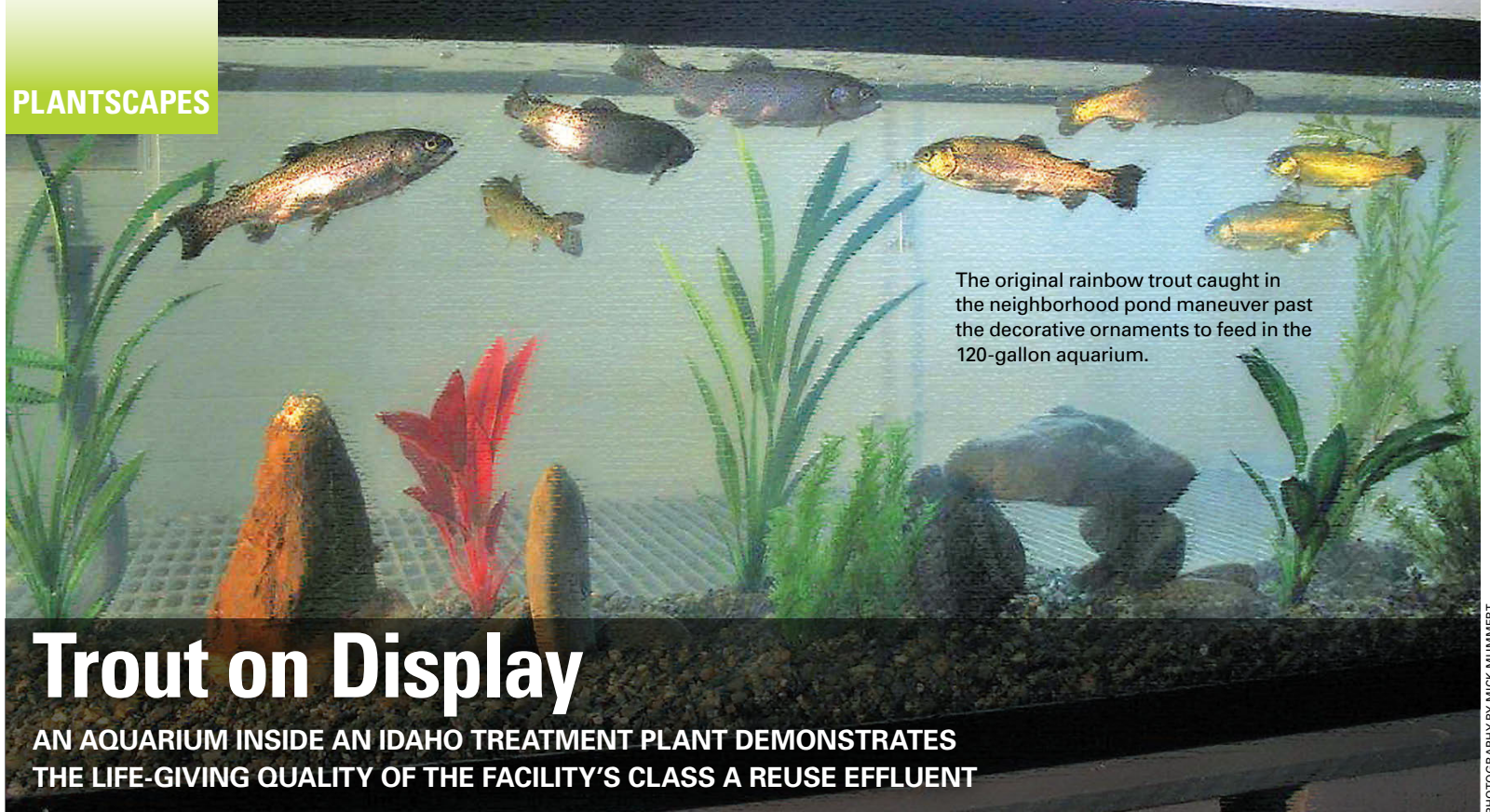
Garfield Clean Energy has helped more than 90 businesses and almost 300 homes cut energy costs. It has helped save more than \$1 million in public building energy expenses and has installed 23 renewable energy systems on public buildings.

“Now they turn off at night when we’re not there, but we can turn on the lights we need if we have a call-in.”

Rifle’s accomplishments have drawn interest from others in the area, such as when other members of Garfield Clean Energy meet at the plant. “People from the other towns picked our brains for ideas,” says Gallegos. They also come to see the solar installation, which is one of the most extensive among state clean-water facilities.

Good data, questioning attitudes and the willingness to experiment have paid off for the Rifle plant, according to Gallegos: “I think we even surprised ourselves a little bit.” **tpo**





The original rainbow trout caught in the neighborhood pond maneuver past the decorative ornaments to feed in the 120-gallon aquarium.

PHOTOGRAPHY BY MICK MUMMERT

# Trout on Display

AN AQUARIUM INSIDE AN IDAHO TREATMENT PLANT DEMONSTRATES THE LIFE-GIVING QUALITY OF THE FACILITY'S CLASS A REUSE EFFLUENT

By Jeff Smith

The wastewater treatment plant in Ketchum, Idaho, treats 1.25 mgd, largely for reuse in irrigation. One of the plant's most popular features, though, holds just 120 gallons of water. It's an aquarium, fed by plant effluent, that nurtures rainbow trout.

The plant team installed the aquarium as a test to demonstrate that the trout could live in a subdivision pond supplied by flow-through effluent. It has become a focal point for visitors of all ages during plant tours

## AESTHETIC FEATURES

The Ketchum/Sun Valley Wastewater Treatment Plant sits at the foot of Bald Mountain, a popular destination for skiers and visitors to the Sun Valley Ski and Golf Resort. It is surrounded by subdivisions and neighborhoods with large, expensive homes.

One such neighborhood, Weyyakin Ranch, features a half-acre pond stocked with rainbow trout. The pond is part of more than two miles of streams and smaller ponds that the subdivision developer promotes as an aesthetic feature.

The ponds and streams are used for irrigation. Until summer 2012 they were fed with water from Trail Creek, a tributary to the Big Wood River, site of the treatment plant's outfall. To meet the city's goals to reduce plant discharges and to acquire water rights associated with Trail Creek, and to satisfy the subdivision's desire to reduce its water costs, the two parties struck an agreement by which the plant pumps 0.5 mgd of reuse water to the half-acre storage pond.

"Their main purpose was to have enough water to support a decorative pond filled with rainbow trout for aesthetic purposes and irrigation," says Mick Mummert, lead operator of the 7.0 mgd (design) activated sludge, extended aeration plant, jointly owned by the City of Ketchum and Sun Valley Water and Sewer District.

## NEEDING PROOF

But subdivision residents were concerned whether the trout could survive in the effluent, says Jeff Leamon, plant operator. So, to demonstrate the

effluent's suitability, Leamon led the installation of a 120-gallon flow-through aquarium in the plant's UV disinfection building. The team put in half a dozen trout caught in the Weyyakin Ranch pond by Teri Pierce, plant lab technician. "I just took my fly rod over there one day and stocked the aquarium with some nice-sized trout," says Pierce.

The fish survived with no problem, and today trout thrive in the neighborhood pond, says Leamon. Since the test trout were returned to the pond,

"Once a month I clean the tank gravel and wipe down the glass. It takes about an hour, and that's it for maintenance."

JEFF LEAMON

the aquarium has been restocked with fingerlings provided by the aquaculture department of the College of Southern Idaho (CSI). Flow is maintained at 120 gallons a day to simulate the water turnover in the subdivision's 0.5 mgd holding pond. As demand for reuse water increases, flow through the aquarium will increase proportionately. "Once a month I clean the tank gravel and wipe down the glass," Leamon says. "It takes about an hour, and that's it for maintenance."

## TROUT CARE

Pierce monitors the aquarium water temperature and feeds the trout daily with commercial fish pellets recommended by CSI. "Because they metabolize protein more slowly in cold temperatures, I feed them smaller amounts during the cold months," says Pierce. "They are a lot like the goldfish I have in my pond at home."

The aquarium is a highlight of tours conducted for grade school and middle school kids, college students and other visitors. Mummert says the aquarium shows off the quality of the reuse water because the supply to the aquarium is drawn

## 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.





The Ketchum plant staff includes, from left, Dave Taylor, plant supervisor; Jeff Vert, operator; Teri Pierce, lab technician; Dan Daigh and Jeff Leamon, operators; and Mick Mummert, lead operator.

just downstream from the disinfection step and is the same effluent that goes to the outfall.

The plant is permitted by the state to distribute more than 3 mgd of recycled water for irrigation and snowmaking. Other neighborhoods are interested in connecting to the reuse water infrastructure. Treatment plant co-owner Sun Valley Water and Sewer District has already installed a 1-million-gallon storage tank and pumping facility to use effluent for water features and golf course irrigation at the Sun Valley Resort in 2014.

Says Leamon, "Sometime in the future they might use 'snowfluent' for snowmaking on the slopes." **tpo**

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# Pulling It All Together

TACOMA ENVIRONMENTAL SERVICES AND ITS WATER-RELATED OPERATIONS AIM TO PROMOTE SUSTAINABILITY AND ENVIRONMENTAL QUALITY AS A CATALYST FOR ECONOMIC GROWTH

By Ted J. Rulseh

Clean-water plants and clean-water professionals contribute strongly to environmental quality. But it's not often they are front and center in a community's effort to market itself, promote sustainability and encourage economic growth.

The Tacoma (Wash.) Environmental Services Department, which encompasses wastewater, surface water and solid waste management, is part of just such an effort. A partnership involving the city's utilities, the Port of Tacoma, the University of Washington Tacoma and its Center for Urban Waters, Washington State University, and the Economic Development Board for Tacoma-Pierce County are working together to establish Tacoma as a laboratory for sustainability and environmental research, and as a hub for businesses involved in clean-water technology.

The utilities are involved in a range of initiatives to save energy, recover resources and improve water quality in the Puget Sound. The city is also part of Water Partners of Tacoma, which presents an annual Wellspring Conference focused on water quality, sustainability and clean-water technology (see sidebar).

Representatives of the various entities shared their thoughts on Tacoma's ventures in an interview with *Treatment Plant Operator*. Participants were:

- Michael P. Slevin III, P.E., director of the city's Environmental Services Department
- Jody Bratton, P.E., assistant manager of operations and maintenance with the Environmental Services Department
- Geoffrey M. Smyth, P.E., manager of Environmental Services Department's Science and Engineering Division
- Dan Thompson, manager of the Environmental Services Department's Business Operations Division
- Joel Baker, professor and Port of Tacoma Chair in Environmental Science at UW Tacoma, and science director of the Center for Urban Waters
- Bruce Kendall, president and CEO of the Economic Development Board

**tpo:** What's the reasoning behind this focus on sustainability and clean water technology?

**Kendall:** From the Economic Development Board's perspective, we see clean-water technology as an emerging field that has a huge economic upside. We believe Tacoma has world-class assets that we can leverage to recruit investments and research, and the jobs that go with them, and then market the science and technology that's developed here to the rest of the world, while doing good things for ourselves and the environment.

**Slevin:** My focus as environmental services director, and one of our city council's focuses, is to provide a sustainable, healthy environment for our citizens, and protecting the water quality in the Pacific Northwest is really critical to that. Toward that end, our wastewater treatment plants are outstanding in meeting their NPDES requirements. They have more than 15 years of perfect compliance. Just three years ago we completed a plant facility upgrade costing more than \$85 million. We've been involved in Superfund clean ups in and around the Puget Sound. We also have a strong focus on marine water quality on our Surface Water [stormwater] side.



Dan Thompson



Michael P. Slevin III, P.E.

**tpo:** How does Tacoma promote its clean-water attributes?

**Kendall:** We do this in three ways. First, we use the assets we have in our regular recruitment efforts. A staff member is focused on two of our cluster areas — clean water and aerospace — and works to recruit companies into this market. Second, we market our area to the world through media placements. Even for those not in the clean-water space, it's worthwhile to know of the innovations occurring in our marketplace.

Third, we do internal and external marketing to individuals. We've done that so far through the Wellspring Conference. It's an opportunity to shine a light on the assets we have and invite visitors to share, network and accelerate innovation. The goal is to have this become a place where people from around the world want to be, need to be, if they are working on solutions related to water contamination.

**tpo:** What is the role of the university, research and education in Tacoma's quest?

**Baker:** About 20 years ago, the city and its utilities, along with the Port of Tacoma, were involved in cleaning up and restoring the Thea Foss Waterway, which essentially is the front yard of the city. Around the same time, the University of Washington created its branch campus in Tacoma. Part of the strategy was to say we're not only cleaning up this area, we're going to revitalize it. So the Center for Urban Waters was created as partnership between the city, the university and the Puget Sound Partnership, which is the state agency responsible for restoring Puget Sound. Those three organizations sit in the same building on the waterfront and are designed to be catalysts for innovation.

**tpo:** On the wastewater treatment side, what is being done to advance sustainability?

**Slevin:** We have three major initiatives. The first is energy efficiency. We're working with government and local industries to identify projects identified in a high-performance efficiency audit, and we've seen significant electrical energy savings in the treatment plants — around 9 percent in the past year, and that is increasing. Second, we're looking at using biogas. One of our goals is to increase gas production by possibly taking commercial food waste from our solid waste utility directly into our plant. The greater volume of gas would then be scrubbed and used to fuel our garbage trucks. The third initiative is TAGRO, which is Tacoma's biosolids product. We are constantly trying to grow that brand. It's a great brand, and Tacomans love it.



## The Wellspring Conference

Tacoma has hosted the Wellspring Conference in 2012 and 2013. The two-day conference aimed to stimulate informed dialogue about the issues facing clean-water technology and the impact of regulations on business, create relationships between stakeholders, and develop solutions to propel growth in the water industry.

Held at the University of Washington Tacoma, the conference included education and discussion sessions guided by industry leaders, a technology exhibition, networking opportunities, and a guided tour of Tacoma destinations already successfully managing clean-water technology. **For more information, visit [www.wellspringtacoma.com](http://www.wellspringtacoma.com).**

**tpo:** What specific progress has been made on energy savings?

**Smyth:** About five years ago, consultants identified a laundry list of projects we could undertake to reduce energy consumption at our treatment plants. One thing we did was upgrade the oxygen generation system for our high-purity oxygen secondary treatment process. Our operations and maintenance personnel came up with a plan to alter that process so that less energy would be used in the generation of oxygen. In addition, in 2013 we used less energy during our wet-weather events, lowering our peak usage, and reduced demand charges from our utility.

**Bratton:** We tried going to one compressor instead of two to provide air for the generators that produce the high-purity oxygen. We tried it, and it worked — we reduced our power usage while still maintaining a happy bug supply to treat the wastewater. So now we produce enough high-purity oxygen using one compressor instead of two. That reduces our peak demand, resulting in monthly savings from our power supply company.

**tpo:** What else has been accomplished on the energy front?

**Bratton:** We have an energy team consisting of engineering, operations and maintenance personnel that meets twice a month. We have a register of energy-saving projects at the plant that we're looking to implement. We've looked at putting variable-frequency drives on our pumps and on our aeration blowers. We're looking at turning off lights and the heat in areas of our buildings that are mostly unoccupied.

**Smyth:** This past year we shaved \$88,000 off our electric bill. On top of that, at the end of the year, we received from Bonneville Power Administration and the city's power company a second-year energy savings incentive check for about \$48,500. That's compounded savings, and we're pretty proud of that.

**tpo:** Where do you stand on the biogas initiative?

**Slevin:** Last summer the wastewater and solid waste utilities partnered on this project. The solid waste utility had been doing a pilot project with 60 restaurants and other food-related businesses to collect their pre-consumer food waste. They put a pulping machine and a storage tank at the landfill, and we hooked up a system at the wastewater plant to pump that food waste directly into our digester.

The trials were successful. The next step is to analyze the data and look at the next phase — whether we want to expand the commercial food waste program and how we would go about doing that. The aim would be to capture the increased amount of gas and feed that to compressed natural gas vehicles for the fleet of trucks used by our utilities.

At present we use biogas instead of natural gas for heating the treatment

plant buildings and for providing heat for the treatment process. It would actually be more economical to purchase natural gas and either sell our biogas on the open market or offset the purchase of diesel fuel for our vehicle fleet. We are starting to look at using heat exchangers and heat pump technology to capture energy from our effluent to heat the plant. If we take in more food waste and increase gas production, ultimately we're going to have more solids and more TAGRO on the back end. We've been working across multiple divisions in our organization — science and engineering, plant operations, solid waste — to figure out the best way to do these things.

**tpo:** What innovations are in store for the TAGRO program?

**Slevin:** Here again we're combining efforts with our solid waste group. They collect yard waste that is composted and sold by a private party. We may want to recapture some of that stream and sell it as a Tacoma compost. TAGRO would manage it.

**Thompson:** We're also trying to put together a commercial topsoil mix to add to the product line.

**tpo:** So far, what innovations have come from the partnership with the university?

**Baker:** We're trying to create new rain garden designs for stormwater control that would use the TAGRO product. That research is being done at the University of Washington in cooperation with the city.

We're also working with the drinking water utility, which is building a \$200 million water filtration plant that will generate residuals as part of the flocculation process. We think that material, which at present is a waste that has a fairly high disposal cost, can be engineered into a material that can be used in rain gardens to help remove nutrients from stormwater. That work is underway in my lab right now.

**tpo:** What is the city doing on the stormwater front to limit contamination of Puget Sound from runoff?

**Slevin:** There are three pieces of the puzzle. One is illicit discharge reduction. We have inspectors, and we offer classes to help people be better stewards of the environment and not pollute the stormwater to start with.

The second piece is maintenance, which includes cleaning stormwater pipes and sweeping streets to keep fines and contaminants from entering the system. We've found that extensive maintenance of stormwater systems to remove legacy pollutants gives by far the biggest bang for the buck in surface water quality. We had cleaned catch basins, but we had never actually gone through and scrubbed the pipes. We went up the drainages, steam-cleaned the pipes and tested before and after, and we saw an

increase in water quality, reductions in PAHs and reductions in metals that were astronomical.

The third phase is treatment, which is the most expensive but for some areas is the only solution. We work our way up the cost chain from training, education and inspection, to additional maintenance, and finally civil engineering solutions.

**tpo:** What kinds of treatment have been deployed for stormwater?

**Smyth:** Our NPDES permit requires us to enforce treatment for development and redevelopment projects. We have more than 25 rain gardens in various locations. We have the largest canister system in the state, with more than 250 canister filters in an area of 51 acres. We're looking at putting in more canister systems in the downtown area. We also have a lot of silviculture.

In addition, we're working on partnerships with private developers on low-impact development, including complete streets that have water-quality elements built in and reduce runoff output. We are also a leader in the world for green roads, which include pervious pavement instead of concrete. We have four certified Greenroads, the most of any city in the world. **tpo**



# Monitoring and Instrumentation

By Craig Mandli

As stricter permit limits and tight budgets demand high efficiency, accurate monitoring and instrumentation is paramount in plant operations. Here is a look at the latest analyzers, controllers, meters, SCADA systems and sensors designed to keep operators on top of effluent quality and plant performance.

## Analytical Instrumentation

### ONLINE MONITOR

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**FX-300 Series monitors from Foxcroft Equipment & Service Co.**

### MULTI-INPUT PROCESS ANALYZER

The flexible AquaSelect multi-input process analyzer from HF scientific suits a wide range of process applications. With a user-friendly interface and easy-to-use menus and using up to four inputs or parameters, it meets the needs of complex process operations.

It is compatible with a wide range of analog and digital sensors, including the company's AdvantEDGE series of measurement probes.



**AquaSelect process analyzer from HF scientific**

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**TL-2800 analyzer from Timberline Instruments**

## Controllers

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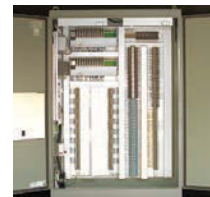


**MultiCELL Type 8619 controller from Burkert Fluid Control Systems**

Control Systems can be used in reverse osmosis systems for monitoring functions as a flow indicator, to measure the ORP value or to determine the percentage retention value. It can also be used for control tasks, such as pH regulation, chemical dosing and ratio control. It is adapted at the factory to customer specifications. The large, configurable graphic display with back-lighting can display up to four readings simultaneously. Further parameters and user-specific pages can be displayed by scrolling. **800/325-1405; www.burkert-usa.com.**

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**Process monitoring and control systems from Five Star Electric**

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**MyConnect integrated control unit from Flygt – a Xylem Brand**

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**DLT 2.0 transmitter from Greyline Instruments**

### THICKENING/DEWATERING CONTROL SYSTEM



**Real-Time Control Systems from Hach Company**

Real-Time Control Systems for biosolids thickening and dewatering from Hach Company continuously monitor sludge load and automatically maintain a specific polymer-dosing rate based on the influent TSS concentration and feed biosolids flow rate. Optimized

polymer dosing reduces maintenance and hauling costs, increases biosolids thickness and can increase biogas yield. In less than 24 hours the system is fully prepared to monitor and thicken or dewater biosolids. **800/227-4224; [www.hach.com](http://www.hach.com).**



## GAS DETECTION DIGITAL MODBUS RTU CONTROLLER

The TA-2016MB-WM gas detection wall-mount controller from Mil-Ram Technology has a 16-channel system (eight-channel available) using an RS-485 Modbus RTU Multi-drop sensor network. It has low/mid/high/fault relays (SPDT rated 10 amp), LED alarm indicators, local buzzer and backlit LCD auto-scrolls for channel data/fault conditions. An auto-configuration wizard makes channel configuration simple and automatic. It can be installed at any point on the RS-485 network, eliminating long wiring runs. **510/656-2001; [www.mil-ram.com](http://www.mil-ram.com).**

**TA-2016MB-WM controller from Mil-Ram Technology**

## SCADA-ENABLED CONTROL PANEL

TCOM modular telemetry controllers from Orenco Systems combine the functions of relays, timers and meters into one low-cost device used to control booster stations, reservoirs and community wells. They can also be used as a SCADA patch, connecting peripheral equipment to an existing SCADA system. Panels include built-in communication protocols supported by most existing SCADA systems. Units offer real-time data acquisition and control over an Internet, cellphone or land line connection. Free TCOM Viewer software works on Windows PC computers. **800/348-9843; [www.orencocontrols.com](http://www.orencocontrols.com).**



**TCOM modular telemetry controllers from Orenco Systems**



**QUICKSMART controllers from Smith & Loveless**

## SYSTEM CONTROL

QUICKSMART PLC-based pump system controllers from Smith & Loveless have screen function buttons and a status bar accessible from each screen. A digital maintenance log displays periodic recommended operation and maintenance instructions and makes lubrication suggestions based on actual pump run times. The unit also offers alarm management, wet well level simulation,

pump on/off levels, prime-mode selection, environmental system set points and optional STATIONCOMM integration. The 7-inch 65K-Color TFT LCD touch-screen HMI controller has surge protection. **800/898-9122; [www.smithandloveless.com](http://www.smithandloveless.com).**

## MULTI-INPUT CONTROLLER

The AquaMetrix 2300 from Water Analytics can monitor and control up to seven probes. Four inputs accept signals from 4-20 mA analog sensors such as pH, ORP, conductivity, oxygen, chlorine, turbidity or level. Three other inputs take pulse signals from paddle wheel or magnetic flowmeters. Four relay outputs complete the standard configuration. An expansion card slot allows for additional inputs or outputs. It is network enabled and can be set up, calibrated and monitored from a local area network. Control is via a browser window on a computer, tablet or mobile phone. Multiple configuration wizards guide the user through all controller functions. Email and text notifications alert the user to alarmed conditions. **855/747-7623; [www.aquametrix.com](http://www.aquametrix.com).**



**AquaMetrix 2300 monitor from Water Analytics**



## Data Loggers

### UNIVERSAL MONITORING SYSTEM

**dataTaker DT80 data logger from CAS Dataloggers**

The dataTaker DT80 data logger from CAS Dataloggers includes universal inputs that connect to nearly any

sensor for flexible measurement of temperature, voltage, current and other parameters. It offers USB memory stick support, 18-bit resolution, extensive communications capabilities and a built-in display. Its dual-channel concept allows up to 10 isolated or 15 common referenced analog inputs to be used in many combinations. The internal memory stores up to 10 million data points. Users can archive data on alarm event, copy to USB memory or transfer via FTP. The built-in Web interface allows users to configure the unit, access logged data and see current measurements as mimics or in a list using a web browser. **800/956-4437; [www.dataloggerinc.com](http://www.dataloggerinc.com).**

## Gauges

### PRESSURE GAUGE

Ashcroft diaphragm seals, isolation rings and isolation spools allow media to interface with a compatible elastic element, which displaces a fluid fill into the sensing element of the instrument. To prevent clogging, the media side of the isolation device can be easily cleaned through disassembly or a dedicated flush port. Pressure gauges, switches and transmitters are configured with the appropriate wetted materials, instrument features and fill fluid. Multiple instruments can be combined on a single seal to provide any combination of switching and local and remote indication. **800/328-8258; [www.ashcroft.com](http://www.ashcroft.com).**



**Pressure gauge from Ashcroft**



**DIGI-FLO F-2000 Series flowmeter from Blue-White Industries**

## Meters

### FLOW MONITORING SYSTEM

The DIGI-FLO F-2000 Series electronic insertion-style flowmeter from Blue-White Industries monitors flow in municipal water and wastewater applications. Pipe fittings are available in inline and clamp-on saddle type for pipes from 3/8 to 12 inches. The electronic display and communication enclosure can be mounted directly to the sensor or remotely mounted to a pipe or panel. Standard models display flow rate and accumulated total flow and include an NPN open collector output for communication with data loggers, SCADA systems and other external devices. Optional 4-20 mA/0-10 VDC plug-in circuitry can be added for additional communication requirements. The device can be battery-operated using four standard AA batteries, or AC powered using a 15- to 24-volt DC plug-in transformer. **714/893-8529; [www.blue-white.com](http://www.blue-white.com).**

### VERSATILE WATER METER SYSTEM

The IntelliH2O water meter from Capstone Metering is designed as an integrated system approved within the 7.5-inch specification. It has a rechargeable battery system, ball valve for on/off control and complete remote operation from the office, and cellular communication via Verizon Wireless directly from the meter to the cloud.

(continued)



Integrated pressure and temperature sensing alarms isolate potential leaks and service degradation even in poor service areas and provide data for research of potential water-quality problems, even in extreme conditions. It is accurate at flows from 0.25 to 15 gpm. **972/446-1700; www.intelli-h2o.com.**



**IntelliH2O water meter from Capstone Metering**



### MICROWAVE MOISTURE/SOLIDS ANALYZER

**SMART Turbo analyzer from CEM Corporation**

The SMART Turbo microwave moisture/solids analyzer from CEM Corporation provides total solids determination in less than three minutes and can measure TSS and total solids in wastewater and sludge. Rapid, precise analysis helps control the treatment process and reduce costs through effective dewatering and efficient polymer usage, optimizing solids content.

Its IntelliTemp temperature feedback system constantly monitors weight loss and sample temperature, adjusting power so that the sample is thoroughly dry without being overheated. The system is simple to operate, and methods are easily transferable from unit to unit. **800/726-3331; www.cem.com.**

### PORTABLE SLUDGE BLANKET AND DO METER

The portable MultiTracker from Cerlic Environmental Controls measures DO, suspended solids and sludge blanket levels in water and wastewater treatment processes. It uses plug-and-play sensors. Operators can choose between the Oxyduo sensor that measures DO with an Optical DO electrode, SolidO sensor for suspended solids, or BlankO sensor to measure fluff and blanket levels in clarifiers, thickeners and lagoons. The hand-held unit has a large LCD graphic display, straightforward keypad push buttons for simple programming, real-time sensing with alarms and 250 data-point logging. **404/256-3097; www.cerlic.com.**



**MultiTracker from Cerlic Environmental Controls**



**ODM-100 monitor from Challenge Technology**

### OXYGEN DEMAND MONITOR

The ODM-100 oxygen demand monitor from Challenge Technology records real-time data on oxygen uptake rate (OUR) at any point in a process. The rail-mounted unit can be quickly installed or moved from location to location for a full analysis of the biomass in a treatment plant. It feeds OUR data directly to a SCADA system or to storage on a USB drive.

Continuous mode can be used for toxicity detection, trend monitoring and aeration control. The sequential batch mode can be used for OUR analysis. It operates in harsh environments with minimal scheduled maintenance and runs on one standard 110-volt plug. **479/419-0708; www.challenge-sys.com.**

### CHLORINE MONITORING SYSTEM

The RA-1000 from Eagle Microsystems monitors residual concentrations of free or total chlorine. It has eight field-selectable ranges, all-digital controls, self-cleaning electrodes and fully automatic control capability. A sample containing the target chemical is pumped to a reservoir, where it is fed by gravity along with a pH-buffering agent to the



**RA-1000 monitor from Eagle Microsystems**

amperometric-measuring cell, where a small current is developed. A microprocessor-based digital controller processes the output of the cell, and the residual value is displayed on the LCD readout. The digital controller transmits a 4-20 mA DC signal for recording or remote display and can output a signal for residual process control via modes including flow pacing and compound loop control. **610/323-2250; www.eaglemicrosystems.com.**

### AIR/GAS MASS FLOWMETER

The Model ST51 mass flowmeter from FCI – Fluid Components International provides precise air/gas flow measurement in demanding environments. The explosion-proof instrument is easy to install and needs minimal maintenance. It has no moving parts, is nonclogging and operates over a wide flow range with low-flow sensitivity. It is packaged in an explosion-proof transmitter, and the calibration is matched to the user's actual gas composition and installation conditions. It measures with accuracy to plus-or-minus 1 percent, with repeatability of plus-or-minus 0.5 percent. **800/854-1993; www.fluidcomponents.com.**



**Model ST51 flowmeter from FCI – Fluid Components International**



**Sultan Sonar transmitter from Hawk Measurement**

### SLUDGE LEVEL TRANSMITTER

The Sultan Sonar sludge level transmitter from Hawk Measurement provides reliable and accurate sludge level measurement on various clarifier processes. Using high-end acoustic signal processing and sophisticated configuration software, it is suited for sludge bed control measurement and provides data that can be used for control. **978/304-3000; www.hawkmeasure.com.**

### ONLINE WATER-QUALITY MONITOR

The Testomat 2000 online field-measuring instrument from Heyl USA analyzes feed water hardness and other parameters such as chlorine, p-value, chromate and iron on a quantity- or time-controlled basis. Lime scale buildup inside pipes and other metal boiler components processing hard water reduces heat transfer, causing a decrease in heating capacity and high flow resistance. Online water-quality monitoring helps prevent lime scale. **312/377-6123; www.heyl.de.**



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



**LevelRat transmitter from Keller America**

### NON-FOULING LEVEL TRANSMITTER

The LevelRat non-fouling level transmitter from Keller America has a Kynar diaphragm that combines the non-stick properties of Teflon with high resistance to puncture and abrasion. The result is a small, non-fouling level transmitter fit for use in even the worst environments without protective cages. Lightning protection is standard on all 4-20 mA units. **877/253-5537; www.keller-america.com.**

### ODOR MONITOR

The Odotech OdoWatch 4.0 real-time odor monitoring system from Kruger USA uses U.S. EPA-approved AERMOD and CALPUFF modeling to follow the odor plume over complex terrain, allowing plants to track

odors and provide alerts when odors approach areas outside a preset boundary. Information from the system helps plants focus on processes that need the most attention and plan upgrades for greatest impact. It can be used to optimize chemical dosing and biofilter media, saving money while controlling odors. It uses real-time, continuous views of H<sub>2</sub>S emissions. **919/677-8310; www.krugerusa.com.**



**Odotech OdoWatch 4.0 odor monitoring system from Kruger USA**

## SUSPENDED SOLIDS DENSITY METER



**Suspended Solids Density Meter from Markland Specialty Engineering**

The Suspended Solids Density Meter from Markland Specialty Engineering monitors biosolids concentrations in pipes, clarifiers and tanks, and helps automate control of biosolids removal. Using nonradioactive ultrasound, it measures primary, secondary and return-activated biosolids (including concentrations too thick for optical methods). It allows users to

program underflow pumps to automatically shut off before biosolids become too thin, optimizing feed density before subsequent processing. It helps operators determine appropriate polymer dosages to improve filter press/centrifuge/digester performance. It also provides a continuous linear reading of percentage suspended solids, enabling calculation of mass flow rate. The inline pipe spool-piece sensor is nonintrusive, and simple to install, calibrate and clean. A throw-in-style probe is also available. **855/873-7791; www.sludgecontrols.com.**

## NONINVASIVE FLOW MEASUREMENT

The Flow Pulse pipe flow monitor from Pulsar Process Measurement ensures repeatability and simple installation with no downtime for monitoring flow rates and pump efficiency in process plant or sewage pumping stations. Just clamp a small sensor to the outside of a pipe and immediately get a reliable, repeatable flow measurement. Ultrasound is fired through the pipe wall, reflected from bubbles, particles and vortices in all directions and at a wide range of frequencies, the reflections received back into the device. Its Refracted Spread Spectrum Analysis (RSSA) digital signal processing analyzes and integrates received signals over a wide frequency range, then slices them for real-time analysis and flow rate calculation. It operates in a flow range from 1 foot per second through to 13 feet per second, with minimum particle size of 100 microns and concentration of 200 ppm or above. Pipe material can be rigid plastic, stainless steel, mild steel or cast iron. **850/279-4882; www.pulsar-pm.com.**



**Flow Pulse monitor from Pulsar Process Measurement**



**RKI GX-2009 monitor from Scantek**

## FOUR-GAS MONITOR

The RKI GX-2009 four-gas monitor from Scantek weighs 4.6 ounces and fits in the palm of a hand. It simultaneously monitors and displays combustibles, oxygen, carbon monoxide and hydrogen sulfide. Dual audible alarm ports and alarm LEDs on three sides of the instrument make alarm conditions obvious from multiple perspectives. The device has a large LCD display, STEL and TWA readouts, a water-resistant and dustproof design with IP 67 rating and a large-capacity data logging system. It operates for 20 hours with batteries. **800/224-3813; www.scantekinc.com.**

## FLOW TOTALIZER SOFTWARE

The free flow totalizer software module for the QuadraTherm 640i/780i mass flowmeter from Sierra Instruments helps management totalize and monetize all gases. The device is accurate to plus-or-minus 0.5 percent of full scale. It gives a view of the totalized value of multiple gases and totalizes up to four gases. Four totalizers are visible on the user interface screen; the user selects one to be active. Each totalizer is independent of the others; users can totalize one gas, then switch and totalize another. **800/866-0200; www.sierrainstruments.com.**



**Software module for the QuadraTherm 640i/780i flowmeter from Sierra Instruments**

## QUAD-PATH ULTRASONIC WATER METER



**280W-CI water meter from Spire Metering Technology**

The 280W-CI commercial and industrial grade ultrasonic water meter from Spire Metering Technology has a wide dynamic range and leakage detection capabilities. With no moving parts, quad-path ultrasonic technology and IP68-rated heavy-duty enclosure, it exceeds ISO4064 Class D/AWWA C750. Its quad-path technology improves accuracy and reduces straight-pipe run requirements. It is unaffected by magnetic interference and is AMR/AMI-ready with pulse, M-Bus, Modbus, 4-20 mA or wireless interface. **888/738-0188; www.spiremt.com.**

## MULTIPARAMETER WATER-QUALITY COLORIMETER

The Lovibond MD 600 colorimeter from The Tintometer Group (formerly Orbeco-Hellige Inc.) tests for a wide range of water-quality parameters and is suited for field or laboratory use. It has a six-LED photo detector array that supports over 120 pre-programmed methods, including DPD chlorine, COD, phosphate, and molybdate. It allows for testing using a Powder Pack, tablet or liquid reagent platforms. It has 1,000 data point storage, an infrared interface for data transfer and a user calibration mode. It allows new-method uploads via the Internet. **800/922-5242; www.tintometer.us.**



**Lovibond MD 600 colorimeter from The Tintometer Group**



**P 700 analyzer from YSI, a xylem brand**

## ORTHOPHOSPHATE ANALYZER

The P 700 for orthophosphate measurement from YSI, a xylem brand, can be used as a stand-alone analyzer or with the IQ SensorNet 2020 XT continuous monitoring and control system. It measures orthophosphate throughout the wastewater treatment process, from primary settling to the biological tanks and the effluent, providing continuous data to help improve operational efficiency as well as verification of phosphate removal to meet permit requirements. Indoor and outdoor versions with climate control are available. It offers the use of the proven Vanadomolybdate (yellow) method of detection and has low reagent consumption. The compact housing design allows rail mounting. Two measuring ranges in each model allow it to be used in a wide range of locations. **937/767-7241; www.ysi.com.**

*(continued)*



## Process Control Equipment

### BIOSOLIDS DATA MANAGEMENT SOFTWARE

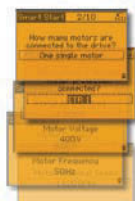
The BioSolids Module for Operator10 Wastewater from AllMax Software monitors loading rates for land application of biosolids.

It also tracks application locations, methods, amounts and who applies the material.

A reporting section allows users to generate limit, application and nutrient reports for proper recordkeeping and compliance. Its use enhances communication between the preparer, applier and landowner. **800/670-1867; www.allmaxsoftware.com.**



**BioSolids Module for Operator10 Wastewater from AllMax Software**



**SmartStart wizard in VLT AQUA drives from Danfoss Water and Wastewater**

### DRIVE SETUP PROGRAM

The SmartStart wizard in VLT AQUA drives from Danfoss Water and Wastewater makes drive commissioning easy and fast, improving process efficiency and optimizing energy savings. It guides users through 10 steps to ensure accurate and efficient motor control.

Setup parameters include single pump/motor, motor alternation, basic cascade control, master-follower, flow compensation, deragging, pipe fill, dry run/end of

curve detection, sleep mode and special ramps. Settings are selected on the drive's 28-language graphical control panel. **800/432-6367; www.danfossdrives.com.**

## SCADA Systems

### INVENTORY MONITORING SOFTWARE

eBob software from BinMaster Level Controls helps users gather real-time inventory data from storage bins for affordable inventory tracking. Users can manage bin levels without manually inspecting and measuring each bin, saving time while optimizing bin levels and storage capacity. Version 5.2 lets users with a LAN, WAN or VPN access the bin level measurement from one or multiple server (remote) locations on the network. Workstations can be located at any number of sites so that personnel at any site can monitor inventory. **800/278-4241; www.binmaster.com.**



**eBob software from BinMaster Level Controls**

### WIRELESS SCADA SYSTEM

The wireless ScalableSCADA from Revere Control Systems provides flexibility for growth. Nonproprietary hardware and communications protocols eliminate restrictions on growth, application and supplier. Protocol choices include cellular, radio, modem and land line. The system includes built-in serial and ethernet ports, Web pages and data logging with FTP transfer to the server. Options include I/O, modems, cellular modems and keypad. NEMA 4X fiberglass, NEMA 12, and NEMA 4X stainless steel enclosures are available, as is radio path testing. **800/536-2525; www.reverecontrol.com.**

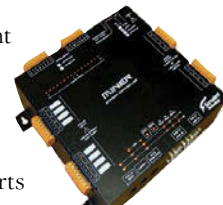


**ScalableSCADA from Revere Control Systems**

## STATION CONTROLLER

The MINER station controller from Survalent Technology combines the functions of a traditional remote terminal unit with those of a data concentrator and includes a terminal and Web server. It provides a balanced combination of input and output points and communication ports in a compact package, operating with 6 watts in an industrial temperature range.

It can connect to multiple IEDs on multiple ports with multi-drop configurations or over one or two Ethernet ports. It has two dedicated serial ports for configuration, point monitoring and diagnostics. It allows operation, maintenance and configuration of the remote terminal unit without proprietary software. **905/826-5000; www.survalent.com.**



**MINER station controller from Survalent Technology**

## Sensors

### POINT LEVEL SWITCH

The Z-tron IV Point Level Switch from AMETEK Drexelbrook has an all-electronic design with no-wear parts. It is unaffected by sticky coatings and impervious to corrosive liquids. It needs no replacement parts

and no routine maintenance or cleaning. Cote-Shield circuitry allows it to ignore coatings and buildup on the sensing element. Dust or tunneling will not produce a false signal; it reacts only to actual high- or low-level conditions. The compact unit is inserted into a vessel so that the sensing element is positioned at the desired high or low level. When the material level reaches a predetermined point on the sensing element, it causes a change in status in the electronic unit, resulting in the actuation of a relay. That relay can be used to operate alarms, annunciators, valves, or other controls or indicators. **215/674-1234; www.drexelbrook.com.**



**Z-tron IV Point Level Switch from AMETEK Drexelbrook**

### ELECTROCHEMICAL OZONE SENSOR

The SM-EC electrochemical ozone sensor module from Eco Sensors provides accurate ppb-level detection and resolution over a concentration range from 0.2 to 50 ppm. It is compensated for temperature and humidity effects and has minimal cross sensitivity to VOCs. The sensor makes digital instruments more accurate at both ppb and high ppm levels of ozone, enabling improved monitoring and control. With a Wi-Fi adapter, it can be used as part of a wireless monitoring solution. **800/472-6626; www.kwjengineering.com.**



**SM-EC ozone sensor module from Eco Sensors**

### WIRELESS MONITORING SYSTEM



**Guardian 2000 monitor from FLO-CORP**

The Guardian 2000 wireless monitor from FLO-CORP transmits data using cell towers or satellites. The battery-powered system can be used to report combined sewer overflows measured by the Ranger 1000 ultrasonic level transmitter, providing constant access to data. The wireless monitor also can report exact tank truck locations, flow into the tank during pickups, flow out during deliveries, tank level and product temperature. It also can monitor frac fluid to ensure against overflow. **877/356-5463; www.flowlineoptions.com.**

## MULTI-SENSOR ATMOSPHERIC MONITOR

The G460 multi-sensor atmospheric monitor from GfG Instrumentation has a concussion-proof boot that along with a dust- and water-resistant housing protects the instrument in harsh environments. It offers completely automatic calibration, one-button operation, and data and event logging, and includes a top-mounted display, interchangeable battery packs and a highly configurable smart sensor design. Options include a dual-range infrared combustible gas sensor, motorized pump operable in diffusion or sample draw mode, and up to seven channels of detection. **800/959-0329; [www.goodforgas.com](http://www.goodforgas.com).**



**G460 monitor from GfG Instrumentation**

## LEVEL SENSOR



**FLO-DAR sensor from Hach Flow Meter Products & Services**

The FLO-DAR sensor from Hach Flow Meter Products & Services uses advanced digital Doppler radar technology to measure velocity and ultrasonic pulse echo to determine level. It eliminates sensor fouling and the missed flow data, ensuring accurate data under challenging flow conditions, including high solids content, high temperature, and shallow, greasy or caustic flows. It can be combined with the FLO-STATION flowmeter to create a convenient monitoring solution. **800/368-2723; [www.hachflow.com](http://www.hachflow.com).**

## DIGITAL PH SENSOR

SMARTSENS pH 1590 analytical sensors from KROHNE use integrated transmitter technology where circuitry is miniaturized and fits into the sensor head. They offer an open standard without transmitter and a direct connection via standardized fieldbus from the sensor to the process control system. The devices store all data and send it as bidirectional digital signals with 4-20 mA/HART 7 protocol to the control and asset management systems, handhelds, PC and other peripherals. They offer low maintenance, long service cycle and high cost-saving potential. A large ceramic diaphragm ensures reliable pH measurement. **800/356-9464; [www.us.krohne.com](http://www.us.krohne.com).**



**SMARTSENS pH 1590 sensors from KROHNE**



**TX2000 pH/ORP transmitter from Sensorex Corporation**

## PH MEASUREMENT TRANSMITTER

The TX2000 pH/ORP transmitter with quality sensors from Sensorex Corporation monitors pH in raw sewage to detect excess acid or caustic conditions that may result from a municipal spill or large industrial user discharge. Full featured with alarm/control relays and current (4-20 mA)

or optional RS-485 (Modbus RTU or ASCII) outputs, it can interface to plant SCADA or DCS control systems. It uses a large graphical backlit display with easy-to-navigate text and graphic illustrations. Supplied in a compact NEMA 4X enclosure, it can be wall mounted, installed in a panel or pipe/handrail mounted. **714/895-4344; [www.sensorex.com](http://www.sensorex.com).**

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## RADAR LEVEL TRANSMITTER

The Bindicator MP Series radar level transmitter from Venture Measurement uses microwave and pulse radar technology to measure the level of bulk solids in tanks or silos. With a sensing range up to 230 feet, it is well suited for tall silos. Operating at 26 GHz with a narrow beam angle of approximately eight degrees, it avoids disturbances such as cement dust, fly ash dust and tank wall protrusions. It uses a noncontact, time-of-flight method to determine the level of bulk material in a vessel. **864/574-8960; [www.bindicator.com](http://www.bindicator.com).** tpo



**Bindicator MP Series transmitter from Venture Measurement**



By Craig Mandli

## Nutrient analysis system keeps wastewater plant in control

### Problem

The Denver, Colo., Metro Wastewater Reclamation District wanted near-real-time nutrient analysis for a challenging headworks wastewater aeration process, consisting of a combination of centrate and RAS. The centrate and RAS reaeration basin (CaRRB) effluent is added to primary effluent prior to mainstream aeration.

### Solution

ASA Analytics supplied a centralized nutrient analysis system for CaRRB improvements in 2009, following a two-year period of development, testing, project design and procurement. The system uses a single **ChemScan UV-6101 Analyzer** and four in-line cyclic filters to monitor nitrate and ammonia from four sample locations within the plant. One of the major benefits of this process is to verify the reduction of very high ammonia generated in the anaerobically digested biosolids prior to mainstream aeration. The project required ASA to develop new calibration methods for ammonia and nitrate, allowing much improved upper detection limits, new types of sample filters that could survive without frequent cleaning in the CaRRB and primary effluent samples, better automatic cleaning methods for the in-line cyclic filters, and addition of ortho-phosphate analysis at two sample locations in 2010.



### RESULT

The system is now approaching five years of reliable operation at the plant and generating real-time nutrient data for process operation and control. **800/665-7133; www.asaanalytics.com.**

## SCADA solves pressure problems and saves energy

### Problem

The City of Winter Park, Fla., was seeing excessive pump run times and unacceptable force main pressures due to multiple lift stations pumping into a single under-sized force main. The cost to design and construct a larger force main was prohibitive. That, along with likely public outcries over construction disrupting a major commercial street, led the utility to look for a solution that didn't require a larger pipe.



### Solution

The utility implemented **Data Flow Systems' TAC II SCADA System** with Symphony, Harmoni-

ous Pump and Flow Management to coordinate all lift station pumping. Symphony incorporates algorithms that synchronize all pumping minute by minute. This levels out peak flows by managing the force main's diurnal curve over a 24-hour period without surcharging any gravity sewer mains.

### RESULT

All lift station pumping was precisely coordinated so that pumps were not fighting each other. Pressure spikes were significantly reduced, cutting energy costs by 42 percent, average pump run time by 34 percent and maintenance costs by nearly 50 percent. **321/259-5009; www.dataflowsys.com.**

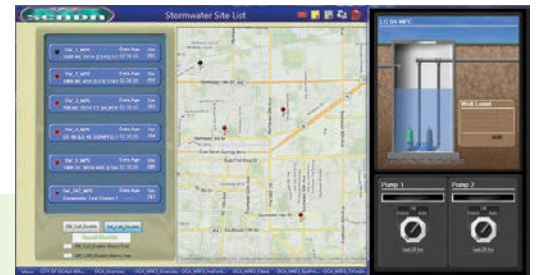
## Community moves toward a single SCADA system

### Problem

The monitoring and control system for the water and wastewater systems in Ocala, Fla., was built over time by various integrators. The original system included only remote telemetry units (RTUs) with proprietary HMI software at the treatment plants. Programmable logic controllers (PLCs) were then installed in the lift station network, and a third hardware and software system was added to the irrigation sites. It was expensive to train staff on three applications, each system only monitored part of the process, there was no central historian for reporting and analysis, many servers were required to ensure redundancy, and multiple software renewal fees and support contracts were involved.

### Solution

In 1995, Ocala began a 15-year transformation to a unified SCADA application by adopting **VTScada monitoring and control software from Trihedral Engineering Limited**. Because VTScada could communicate with the legacy RTUs and PLCs, there was no need to replace them, and conversion could proceed one system at a time.



### RESULT

Though the process took 15 years, the city never exceeded the yearly budget. The final system included a new approach to distributed historical data management that helped to lower costs by reducing labor at some remote sites. **800/463-2783; www.trihedral.com. tpo**

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## industry news

### Xylem extends TotalCare service to Sanitaire

Xylem extended its TotalCare service to the Sanitaire portfolio of wastewater treatment products and systems. Services include inspection and auditing, maintenance contracts, asset refurbishment, parts and logistics, monitoring and supervision, training and technical support.

### WesTech facility receives ISO certification

WesTech Engineering's Iowa branch received ISO 9001:2008 certification. The facility oversees the company's general filter and microfloc product lines.

### ADS polypropylene pipe receives Ontario approval

The Ontario Ministry of Transportation approved ADS polypropylene pipe for gravity flow sewer and water applications. The new standards and specifications denote dual and triple wall polypropylene (PP) pipe, in addition to previously approved high-density polyethylene (HDPE) pipe in diameters of 100 to 1,500 mm.

### Singer Valve receives NSF 372 certification

Singer Valve received NSF 372 certification for low lead content in its control valves, which use stainless steel for wetted areas.

### UV Pure revises wholesale channel

UV Pure Technologies, developer and manufacturer of UV water purification system, provides wholesalers with direct pricing, next-day shipping of parts, technical support and training. The revised North American wholesale channel structure follows the company's termination of its nonexclusive master distribution agreement with 3M Purification in North America.

### Apollo Safety forms wastewater division

Apollo Safety, based in Fall River, Mass., formed a new division to serve the wastewater treatment industry. The division will offer gas detection equipment, maintenance and monitoring.

### Meter pumps from seepex receive NSF 61 certification

Metering pumps from seepex received NSF 61 certification for use in treating water and wastewater. The pumps are certified safe for sodium, hypochlorite, ferric chloride, sodium bisulfate, potassium permanganate, sodium silicofluoride, calcium fluoride, polymers and most other chemicals commonly used in water and wastewater flocculation, clarification, sterilization and buffering.

### Hayward expands Canadian operations

Hayward Flow Control expanded operations to a facility in Oakville, Canada. The 200,000-square-foot warehouse and office will headquarter customer service, technical service, valve automation service, product warehousing, sales and marketing support.

### Kohler donates generator to Seaside Park

Kohler Generators donated a commercial-grade, standby generator to Seaside Park, N.J., scene of two disasters. In October 2012, Superstorm Sandy swept away the borough's boardwalk and nearby amusement park, destroying homes and businesses. In September 2013, the community's rebuilding efforts were set back by a boardwalk fire. The generator will be used to provide power for the administration building at 1701 North Ocean Ave. The building serves as a command center and shelter during crisis situations. **tpo**

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**1. GRISWOLD HIGH-HEAD, SELF-PRIMING CENTRIFUGAL PUMPS**

H Series high-head, self-priming pumps from Griswold Pump Co. are available in 3, 5, 7 1/2, 10, 15 and 20 hp models with heads to 260 feet and flow rates to 325 gpm. Features include a closed impeller, mechanical shaft seal, stationary seal face and rotating seal face. **800/843-9222; www.griswoldpump.com.**

**2. AUTOMATION PRODUCTS GROUP PRESSURE TRANSDUCERS**

PT-500 submersible pressure transducers from Automation Products Group are available with additional output, cabling, cage, vent cap and installation options. The transducers are available with 4-20 mA and Modbus output, as well as 0-5 VDC and mV/V. **888/525-7300; www.apgsensors.com.**

**3. CONVEYOR COMPONENTS BELT ALIGNMENT**

The Model TA belt alignment control from Conveyor Components Co. is a deviation switch for belt conveyors when they become misaligned due to an unbalanced load, high speed or belt damage. The control is

made of cast aluminum with a steel, red epoxy-coated, spring-loaded roller arm and stainless steel shaft. The standard roller arm is 10 inches (5-inch arm available). The arm is adjustable up to 90 degrees in both directions. **800/233-3233; www.conveyorcomponents.com.**

**4. MAGNATROL MANUAL OVERRIDE SOLENOID VALVE**

A manual override option is available on two-way bronze and stainless steel solenoid valves from Magnatrol Valve Corp. The override is available on normally closed Type L and M (bronze) and Type J and K (stainless steel) valves to handle liquid oxygen (-270 degrees), argon (-303 degrees) and nitrogen (-320 degrees). The valve fits pipes from 3/8 to 3 inches in diameter. **973/427-4341; www.magnatrol.com.**

**5. DIALIGHT LED HAZARDOUS LIGHTING FIXTURE**

The ATEX/IECx certified 21,000 lumen SafeSite LED high bay from Dialight is designed for hazardous rated applications. The light includes an integrated power supply with 10 kV surge protection and is rated for 100,000 hours. It also is available in general purpose CE and UL versions. **732/919-3119; www.dialight.com.**

## 6. WALCHEM PRE-ENGINEERED PUMP SYSTEMS

Pre-engineered chemical feed systems from Walchem Pump Systems have a chemical-resistant pump stand made from molded, UV-stabilized, linear low-density polyethylene. Components include calibration columns, back pressure/anti-siphon valves, pressure relief valves, pulsation dampeners, gauges, ball valves and Y-strainers. Single, dual and redundant pump systems are factory assembled and hydrostatically tested. The auto-fill option enables the metering pump to fill the calibration column for applications when flooded suction is not available. Floor mount is standard with wall mount available. **508/429-1110; www.walchem.com.**

## 7. NK TECHNOLOGIES THREE-WIRE CURRENT TRANSDUCER

The DT Series three-wire current transducer from NK Technologies uses a common point for both power supply and output signal. Factory calibrated for a single current range, the transducer features industry standard outputs of 0-5 or 0-10 VDC proportional to the DC current. Applications include photovoltaic panel monitoring, hoists, DC motor protection and wind-driven generators. **800/959-4014; www.nktechnologies.com.**

## 8. LWT MUD CAT MULTIFUNCTION DREDGE

The Mud Cat MFD-1000 multifunction amphibious dredge from Liquid Waste Technology has a 6-inch cutter suction pump for hydraulic dredging and a 1-yard bucket for mechanical backhoe dredging. Other features include a clamshell bucket for mechanical dredging, weed raking and collection, pole setter and pile driver. The dredge can load and unload itself from a truck without the need for a crane. The self-propelled dredge has a large stainless steel prop, joystick, work lights, and heated and air-conditioned cabin. **800/243-1406; www.lwtpithog.com.**

## 9. BJM SUBMERSIBLE SHREDDER PUMPS

The model SK submersible shredder pump from BJM Pumps is designed to shred soft solids and debris. Features include non-clog cutting impeller, cast-iron construction and 304 stainless steel motor housing for corrosion and abrasion resistance. Models range from 2 to 6 inches, 1 to 20 hp, pumping to 911 gpm and heads to 101 feet. **877/256-7867; www.bjmpumps.com. tpo**

## product spotlight

### Rail-mounted fluid bed dryer provides easy internal bag access

By Ed Wodalski

**Vibrating fluid bed dryers and coolers** from **The Witte Co.** are available mounted on rails, providing unobstructed access for cleaning, maintenance and visual inspection. During washdowns or product changeovers, the entire drying and cooling sections spanning the length of the thermal processing system can be rolled out by one person and rolled back into place without tools. The steel rails include cushioned bumpers and are mounted into the floor during installation.

“The primary reason for the rail-mounted dryer is to have a dryer with an integral bag collector directly over the fluid bed,” says Larry Stoma, design engineer for Witte. “The dryer rolls out from under the bag collector and exposes the inside of the dryer and bag collector for maintenance and cleaning.”

Because fines remain inside the bag collector and nothing goes out of the exhaust, it's possible to exhaust the air directly into the plant, eliminating the need for an outside or separate exhaust.

The self-contained system also eliminates the need for a remote dust collector with explosion protection for carbon-based materials, Stoma says. “You don't have to protect duct work. You don't have to protect a separate collector. Typically we would provide a single suppression system for the dryer and collector.

“As we are not concerned about dust being entrained in the exhaust, we can use higher air velocities, which result in a smaller dryer footprint,” he says. “This means lower initial cost and improved drying efficiency.”



Vibrating fluid bed dryers and coolers from The Witte Co.

Dryers range in size from 12 inches wide by 6 feet long to 48 inches wide by 24 feet long. Drying capacity depends on moisture content of the product. “If you're talking about a high, 30 percent content, like you might see in a filter tank from sludge, you're looking at about 10,000 pounds an hour,” Stoma says. “Of course, the lower amount of moisture in the product, the smaller the dryer needs to be.”

Moisture content can be reduced to one-tenth of a percent, depending on dryer size, heat used and amount of moisture in the original material.

Because of its smaller footprint, the fluid bed dryer can be used as a replacement for a conventional dryer. “[But] it's not something that you add to an existing dryer because the design is different,” he says.

“The unique feature of the dryer is mobility. It provides quick and easy access to the interior. You simply undo a Velcro section and roll it out.”

Other than changing the bag filters each year, the dryer requires little maintenance, Stoma says. “Basically, the only other maintenance would be replacing the oil in the vibrators and checking the condition of the drive belts.” **908/689-6500; www.witte.com.**



## people/awards

**Bob Conner**, assistant director of the water and wastewater utility for the City of Lakeland (Fla.), was promoted to interim director.

**Peter A. Bozick Jr., P.E.**, of George Miles & Buhr in Delaware, Derek J. Wold, Baxter & Woodman Wastewater Group Leader and board of directors vice president, earned the Board Certified Environmental Engineer Credential in water supply and wastewater engineering from the American Academy of Environmental Engineers and Scientists.

American Water Works Company announced that **Jeff Sterba** will retire from his role as president and CEO of American Water in May. American Water's current senior vice president and chief financial officer, **Susan N. Story**, will succeed him.

A laboratory in the **City of Fort Smith (Ark.) Utility Department** was recertified, allowing it to continue analysis of surface water and wastewater and serve as a backup to state labs in Little Rock.

The city council of Princeton, Mo., hired **David Akins** as wastewater supervisor. He replaces **Jeff Peace**, who retired after 33 years of service.

**Brad Eitel**, wastewater superintendent in Edina, Mo., for 15 years, resigned that position to become the utility supervisor for the City of Kirksville, Mo.

**JWC Environmental** received the 2013 James C. Morriss Member Achievement Award from the Water and Wastewater Equipment Manufacturers Association.

**Jairo Luque Villanueva**, a Humboldt State University student, received a Greater Research Opportunity Fellowship from the U.S. EPA. Villanueva is an environmental resources engineering major studying wastewater treatment methods.

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

## education

### Arkansas

The Arkansas Environmental Training Academy is offering these courses:

- April 8-9 – Basic Industrial Wastewater, Fayetteville
- April 21-24 – Class II Wastewater, Burdette
- April 28-30 – Class I Wastewater, Hot Springs
- May 12-20 – Basic Industrial Wastewater, Fort Smith
- May 19-20 – Basic Industrial Wastewater, Camden
- May 27-June 5 – Class I Wastewater, Camden

Call 870/574-4550 or visit [www.sautech.edu/aeta/schedule.aspx](http://www.sautech.edu/aeta/schedule.aspx).

### Indiana

The Alliance of Indiana Rural Water is offering the following courses:

- April 24 – Lift Station Troubleshooting and Pump Service, Jasper
- April 30 – Financial Impact of Phosphorus Removal, Connersville
- June 24 – Meeting Ammonia Limits in Lagoon Systems, Mulberry
- July 10 – Lift Station Troubleshooting and Pump Service, Warsaw
- July 17 – Financial Impact of Phosphorus Removal, Knox

Visit [www.inh2o.org](http://www.inh2o.org).

### Kansas

The Kansas Water Environment Association is offering these courses:

- April 2 – An Examination for Your Safety, Garden City
- April 2-3 – Safety, Manhattan
- April 4 – Wastewater Treatment, Pratt
- April 8 – An Examination of Your Ethics, Garden City
- April 8-9 – Lift Stations, Sedgwick
- April 16-17 – Wastewater Stabilization Ponds, Lagoons and Lift Stations, Great Bend
- April 17 – Wastewater Stabilization Lagoons, Hays
- April 22 – Wastewater Stabilization Lagoons, Scott City
- April 22-23 – Wastewater Stabilization Ponds, Pomona
- April 23-24 – Utility Management Skills, Fort Scott
- May 13 – Introduction to Water and Wastewater Chemistry, Dodge City
- May 15 – An Examination of Your Safety, Scott City
- May 20 – Special Topics-US and UV, Hays
- May 23 – An Examination of Your Ethics, Scott City
- May 28 – Wastewater Reclamation and Reuse, Hays
- May 30 – Natural Systems for Wastewater Treatment, Pratt

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

### Ohio

The Ohio Water Environment Association is offering these courses in Lewis Center:

- May 1 – Collection Systems Workshop
- May 21-22 – Operations/Lab Analysis Workshop

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

### Virginia

The Virginia Water Environment Association is offering the following:

- April 30 - May 1 – Annual Education Conference, Richmond
- June 12-13 – Operations Conference & Ops Challenge, Wintergreen
- July 28-29 – Good Laboratory Practices Workshop & Seminar, Charlottesville

Call 804/332-5286 or visit [www.vwea.org](http://www.vwea.org).

### Wisconsin

The University of Wisconsin Department of Engineering-Professional Development is offering a course in Nutrient Removal Engineering: Phosphorus and Nitrogen in Wastewater Treatment in Madison April 15-17. Visit <http://epdweb.engr.wisc.edu>.

The Wisconsin Department of Natural Resources is offering these courses:

- April 9-10 – Activated Sludge, Introduction and Advanced, Oconomowoc
- April 15-17 – Nutrient Removal Engineering: Phosphorus and Nitrogen in Wastewater Treatment, Madison
- April 15-17 – Lab Intro, Wausau
- April 22-23 – Disinfection, Intro and Advanced, Green Bay
- April 28-29 – Primary Treatment, Intro and Advanced, Chippewa Falls
- April 30-May 1 – Lab, Advanced, Chippewa Falls
- May 6-8 – Pumps and Motors, Madison
- May 13-14 – Advanced Asset Management Practices for Water and Wastewater, Madison

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

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

## CALENDAR OF EVENTS

### March 30-April 2

Missouri Water Environment Association/American Water Works Association Joint Annual Conference, Osage Beach. Visit [www.mwea.org](http://www.mwea.org).

### April 6-9

Alabama Water Environment Association Annual Conference, Orange Beach. Call 205/349-0067 or visit [www.awea-al.com](http://www.awea-al.com).

### April 6-9

Florida Water Resources Conference, Coronado Springs Resort, Lake Buena Vista. Event is a joint conference of the Florida Section of the American Water Works Association, the Florida Water Environment Association and the Florida Water and Pollution Control Operators Association. Visit [www.fwea.org](http://www.fwea.org).

### April 14-16

Illinois Association of Water Pollution Control Operators Annual Conference, Crowne Plaza, Springfield. Visit [www.iawpco.org](http://www.iawpco.org).

### April 16-17

Nebraska Water Environment Association Great Plains Conference, Embassy Suites, LaViasta. Visit [www.ne-wea.org](http://www.ne-wea.org).

### April 22-24

Nevada Water Environment Association Annual Conference, location to be announced. Visit [www.nvwea.org](http://www.nvwea.org).

### April 22-24

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

### April 27-30

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

### May 3-6

British Columbia Water & Waste Association Annual Conference & Trade Show, Whistler. Visit [www.bcwwa.org](http://www.bcwwa.org).

### May 12-16

New Jersey Water Environment Association Annual Conference, Bally's Atlantic City. Visit [www.njwea.org](http://www.njwea.org).

### May 18-21

Water Environment Federation Residuals and Biosolids 2014: Sustainability Made Simple, Austin Convention Center, Austin, Texas. Call 703/684-2441 or visit [www.wef.org](http://www.wef.org).

### June 5-6

Canadian Biosolids and Residuals Conference, Sheraton Wall Centre, Vancouver, British Columbia. Visit [www.acwwa.ca](http://www.acwwa.ca).

### June 22-25

Michigan Water Environment Association Annual Conference, Boyne Mountain Resort, Boyne Falls. Visit [www.mi-wea.org](http://www.mi-wea.org).

### Aug. 26-29

Ohio Water Environment Association and American Water Works Association Joint Conference, Hilton Columbus Downtown. Visit [www.ohiwea.org](http://www.ohiwea.org).

### Sept. 8-11

WaterJAM, joint conference with the Virginia Water Environment Association and the Virginia Section of the American Water Works Association, Hampton. Call 804/332-5286 or visit [www.vwea.org](http://www.vwea.org).

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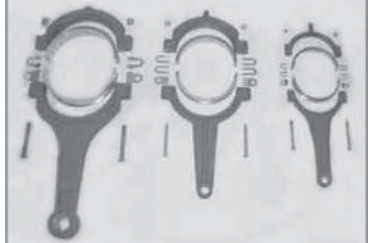


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## MISCELLANEOUS

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.thefecalfighter.com](http://www.thefecalfighter.com). (oBM)

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The team at Antioch's Wastewater Treatment Facility is proud to show off their new high-efficiency system. In 2008, Antioch broke ground on their new wastewater treatment facility, which was officially completed in 2011. "The old plant had just run its course," explained Jason Treat, Lead Supervisor.

Thanks to the new facility, Antioch sees itself in a great place going forward. Their use of the Biological Nutrient Removal treatment process has proved highly effective in many ways, including increased control of phosphorus levels. Jason shared that "chemical usage has been greatly reduced from the old facility. This provides huge savings for the citizens of Antioch!"

USABlueBook is dedicated to helping Jason and his team, whether it's through our extensive product selection or our unbiased technical support. "We got a new temperature gauge from you guys, and it's been great. Now we're only out here measuring the temperature about once a month," said Jason.

**"We got a new temperature gauge from you guys... now we're only measuring temperature once a month."**

USABlueBook is proud to support the entire crew out in Antioch. Their commitment to increased facility efficiency shows a great deal of dedication to the folks in their community.

Jason Treat  
Supervisor  
Antioch WWTP  
Antioch, IL



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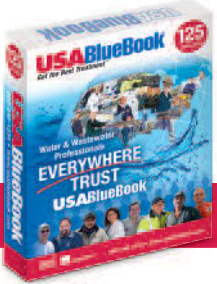
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