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Industrial waste engineer/
HHW coordinator
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on the cover

Tom Sinclair worked in wastewater operations and industrial pretreatment before taking on his current role as an industrial waste engineer and household hazardous waste coordinator for Monroe County, N.Y. He's shown on the bridge of final clarifiers at Frank E. VanLare Wastewater Treatment Plant, the county's largest with permitted capacity of 135 mgd. (Photography by Trent Wellott)

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let's be clear

Time to Look Again?

A SERIES OF SEVERE ACCIDENTS AT WASTEWATER TREATMENT PLANTS SHOULD BE A CLARION CALL FOR MANAGERS AND OPERATORS TO REVISIT SAFETY PRACTICES

By Ted J. Rulseh, Editor

A few months ago, the news brought reports of three serious incidents in one week at wastewater treatment plants nearly spanning the country.



A construction worker died in a trenching accident in Gatlinburg, Tenn. Five construction workers were injured in a propane explosion in Edmonds, Wash. And two treatment plant maintenance workers were critically burned in a methane gas explosion in Struthers, Ohio.

I know that wastewater treatment plants pay close attention to safety and in general have excellent records for low frequency of lost-time accidents. But statistics aren't necessarily something to hang one's hat on.

WHAT COULD HAVE BEEN DONE?

I once was acquainted with a mining company president who, during a previous tenure was a coal mine manager in South America. Over a very long stretch of years, the mine had experienced two worker fatalities — a safety record far better than industry — in a huge operation that employed more than 1,000 people.

One might have expected this man to be proud of his record, and all things considered perhaps he was. But on one occasion when asked about the mine's safety, he responded, "I am ashamed to say that two men died on my watch." He went on to say that when one looks carefully at any occupational fatality, there is almost always something that could or should have been done to prevent it.

At the risk of seeming like a Monday morning quarterback, it seems that a trenching accident, for example, should be eminently preventable. A trench beyond a certain depth must be shored; if the soil is unstable, then people and equipment must be kept away from the edge of the excavation. A Competent Person is supposed to evaluate site conditions and recommend the proper precautions.

Were good procedures and policies in place that the workers in question, including the victim, simply failed to follow? Quite possibly — that does happen. If so, all the more reason to give safety practices another look and a bit more emphasis.

ATTENTION TO DETAIL

So much of safety performance depends on attention to little things — not just the quality of the safety program, the effectiveness of safety training, or the condition of equipment. What often separates the best safety programs from the rest is an almost obsessive fussiness about the details of safe working.

These days no responsible company operates equipment with dangerous mechanisms unguarded. Every top firm requires personal protective equipment appropriate to the site and the task. Everyone does the big things like locking out electrical devices during repair, and using proper confined-space entry procedures.

How, then, do accidents happen? Often it's the little things — that detail overlooked, the minor rule exception made. If you think about it, it can be incredibly easy to get hurt on a work site if you're being the least bit careless.

Keep an eye peeled for the little things. Don't feel bad about being obsessive and fussy in watching for hazards and enforcing your rules. On the contrary, feel proud of it.

Years ago, while working my way through college, I had a summer job with a temporary help service. On one assignment, I ran a grinding wheel, cleaning paint off the heads of bolts. I simply had to hold the bolt head against the wheel for a few seconds until the shiny metal was exposed.

It was a clean, pleasant workplace. I was given safety glasses. I went about the job mechanically, one bolt after another. Then, about six hours into the workday, I felt a sudden pain in my left hand, alongside the knuckle at the base of my index finger. I had brushed up against the abrasive wheel, probably spinning at a couple thousand rpm, and it had cut a ditch in my skin almost down to the bone. I still have the scar.

ASKING QUESTIONS

When I stepped back to analyze what had happened, I realized that the pattern of motion I had developed during the day was causing me to pass that left hand within a tiny fraction of an inch of that wheel each time I tossed a finished bolt into the box and brought the hand back to work on the next piece.

Why didn't I notice that? Why didn't the person supervising me notice it? For that matter, why didn't someone in the shop say, "Hey, that temp should be wearing gloves." The reason? Details. This job wasn't something people did every day — otherwise the firm wouldn't have hired a temp for a day to do it.

The people surely knew the risks of working on a grinding wheel, but maybe not the risks of this particular menial, now-and-then job. For my part, I was just a college kid and didn't know a thing about workplace safety. Someone could have told me at the start of the workday (while issuing gloves) that this grinding wheel could take a chunk of flesh off my bones in a fraction of a second. Another detail.

And so one has to ask: How many work accidents happen because someone didn't take a critical look at a particular task? Or more to the point, how many accidents and injuries could be saved if people did?

TARGETING ZERO

So consider carrying that idea into your treatment workplaces. Be alert for the hard-to-spot hazard on a particular odd job. Be rigorous about forbidding exceptions to safety rules. For example, it's not OK for someone to enter a confined space unprotected because he or she will "only be there for a second."

Keep an eye peeled for the little things. Don't feel bad about being obsessive and fussy in watching for hazards and enforcing your rules. On the contrary, feel proud of it.

If you do these things, you have a better chance of being able to post on your bulletin board at year's end a sign that says: "We have worked 365 consecutive days without a lost-time accident."

It's worth noting that impressive safety statistics don't matter to the one person who ends up getting hurt. The only acceptable workplace injury rate is zero, and that must always be the goal. **tpo**

letters

Beating the Bugs

In regard to your article, "Where Have All the Solids Gone?" (Lab Detective, TPO, June 2012), we have had pretty good control of midges using just good old blue-light bug zappers. We hang them in the buildings, over the clarifiers, and even inside our EQ reservoir from the ceiling. The humidity eventually gets to the electronics, but at around \$70 apiece they work really well for three to four years. Just replace the lamps and clean out the basket. We had to rig up a 5-gallon bucket under some of the indoor units to hold the remains of the insects.

**Shannon Wirtjes, Lead Operator
Pinery Wastewater Facility
Parker, Colo.**



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Plant manager Chris Rowe checks final effluent after the UV disinfection system (Infilco Degremont). (Photography by Bob Kahn)



A Seasonal *Challenge*

OPERATOR MOTIVATION AND TEAMWORK HELP THE AWARD-WINNING PROVINCETOWN TREATMENT PLANT DELIVER QUALITY EFFLUENT DESPITE EXTREME SEASONAL FLOW VARIATIONS

By Trude Witham

LOCATED ON THE TIP OF MASSACHUSETTS' CAPE Cod, Provincetown was the Pilgrims' first landing place. It is also the country's oldest continuous arts colony and is home to numerous beaches. Between Memorial Day and Labor Day, tourists swell the population from 3,000 year-round residents to 70,000.

None of this fazes the three operators at the town's wastewater treatment plant. "We have a commendable compliance record," says plant manager Chris Rowe of Woodward & Curran, which operates the plant. "Our plant actually runs better during the summer when the flow is higher."

Built in 2003, the 0.5 mgd plant requires careful monitoring and adjustment during seasonal changes. The highly trained and motivated operators do that so well that they won the 2011 New England Water Environment Association (NEWEA) Utility Management Award for operational and performance excellence.

CHECKERBOARD SYSTEM

Unlike other plants in the Northeast, Provincetown uses a vacuum sewer collection system (AIRVAC) — the first on Cape Cod. "It uses traditional vacuum lines in tandem with

Chris Rowe, plant manager,
Provincetown, Mass.



Plant manager Chris Rowe checks the water pump system (SyncroFlo).



HOW VACUUM SEWERS WORK

The AIRVAC vacuum sewer system at the Provincetown Wastewater Treatment Plant starts out working like any other sewer system: traditional gravity lines carry wastewater from the customer's property to a vacuum structure, also called a valve pit, nearby. One or two customers are typically connected to a single pit.

Each valve pit contains a vacuum interface valve that activates when wastewater in the lower sump reaches a predetermined level, typically 10 gallons. The valve also allows the correct amount of air into the vacuum main, providing the energy to move the wastewater through the sewer main collector line to the vacuum pump station in a building downtown.

Once the wastewater reaches the vacuum station, it is collected in a 6,000-gallon tank, then pumped under pressure through a force main to the wastewater treatment plant. The four vacuum pumps cycle on and off as required to maintain a constant pressure within the sewer main collection lines.

The vacuum sewer system control panel houses motor starters, overloads, control circuitry and the hours-run meter for each vacuum and sewage pump. The collection tank level control and fault monitoring equipment are also housed in the control panel.



mechanical pump stations that convey sewage to the plant," says Rowe.

Vacuum systems are suited for areas with high water tables that prevent excavating to the depths required by a gravity system. While vacuum systems are designed for flows normally found in residential areas, Provincetown's flow varies from as low as 60,000 gpd in winter to greater than 475,000 gpd on peak summer days. A post-equalization basin helps manage peak hourly flows during high-demand seasons.

Before the plant went online in 2003, numerous residential and commercial septic systems in Provincetown failed. That led to a regulatory consent order mandating installation of a collection system and treatment facility.

Says Rowe, "Provincetown received special state permission that

exempted properties in the vacuum service area from mandatory connection; only certain 'spot' properties had to connect. That's why they call it a checkerboard system."

Residences that have septic systems do not have to connect to the sewers but can join a townwide septic system inspection program. It requires a property owner either to correct septic tank deficiencies or tie into the sewer system once issues are known. The same conditions apply for real estate transactions, where a state law requires a septic system inspection with every property deed transfer.

GROWING POPULATION

Many residents and businesses have chosen to connect to the sewers: Today, 722 properties are connected, including homes, inns, restaurants, art galleries, theaters, condominium complexes, campgrounds, comfort stations, the airport, and general businesses. The number of connections is expected to grow to around 950.

"An issue arises when people who didn't want to be connected 10 years ago want to connect now," says Rich Hunt, maintenance reliability manager with Woodard & Curran. "The difference between then and now is that three houses in a row may want to be connected, but not the next two, and then the next one wants to be connected, but not the next three." The collection system was expanded in 2008, and a second expansion will be completed in 2013.

AECOM designed the treatment plant and collection system and subcontracted operation to Woodard & Curran. The activated sludge plant consists of:

- In-channel microstrainer with Sigma flowmeter (Hach Flow Meter Products & Services)
- Two sequencing batch reactors (Sanitaire – a xylem brand)
- Aeration system (Sanitaire – a xylem brand) with blowers (Aerzen) controlled by variable-frequency drives

profile Provincetown (Mass.) Wastewater Treatment Plant



BUILT:	2003
POPULATION SERVED:	3,000-70,000 (depending on the season)
EMPLOYEES:	3
FLOWS:	0.5 mgd design, 0.12 mgd average
TREATMENT LEVEL:	Advanced secondary
TREATMENT PROCESS:	Activated sludge
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BELOW: The control panel (Allen-Bradley/Rockwell Automation) for the vacuum sewer system. RIGHT: Operator Chris McKernan tests samples in the lab using a Hach DR 2800 portable spectrophotometer.



- Recycle/post-equalization tank
- Two disc filters with cloth membranes (Aqua-Aerobic Systems)
- UV disinfection system (Infilco Degremont)

There are two 70-foot-diameter SBR tanks and both are split into two chambers. Both tanks are used between Memorial Day and mid-October. One is then taken offline for the non-peak months. “The nicer the weather, the more people are in town, and the higher the flow,” says Hunt. “When one tank is offline and there is a high flow, the second tank will be used as an equalization tank to get through a couple of days of high flows. It’s not uncommon for the flow to triple or even quadruple over a weekend.”

Sludge is processed through a rotary drum thickener (Huber Technology) and sent to a holding tank. When the tank reaches capacity, a contractor removes 9,000 gallons at a time and trucks it to a facility in Cranston, R.I., for further treatment. Effluent is discharged into the ground through five rapid infiltration basins.

TWEAKING THE SYSTEM

The nature of the vacuum system, combined with seasonal flow variations, keeps operators on their toes. “Both the vacuum system and SBR process settings need to be monitored and adjusted often,” says Hunt. “There isn’t any system that you can set and forget. With each season and flow change, you can tweak the settings to get close to where it should be, but it still requires operators’ attention to evaluate and adjust.”

Rowe and operators Reid Snow and Chris McKernan make sure they stay on top of their lab testing, gravity system monitoring and spot checking, and equipment maintenance. “We do lab work and maintenance in-house,” says Rowe. “We spend about half our time on maintenance and the rest on operations, lab testing and plant aesthetics.”

They send the regulatory samples to a private lab but take daily process-related samples for pH, turbidity and TSS, plus ammonia and nitrate samples three times a week.

“Provincetown received special state permission that exempted properties in the vacuum service area from mandatory connection; only certain ‘spot’ properties had to connect. That’s why they call it a checkerboard system.”

CHRIS ROWE

The operators’ greatest challenges occur in spring and fall, during the tourist season changeover. “The guys time the valve controllers to make sure they are working right when the flow starts to increase and again when it starts to decrease,” says Rowe.

System flow typically increases from 60,000 gpd in winter to 120,000 gpd in the spring, and that requires some process tweaking. Says Rowe: “Typically, these flow changes require control changes to the SBR aeration and decant cycles. They also require changes to rotary drum thickener operation, the recycle of decant from the post-equalization basin, and return activated sludge changes, including sludge hauling and chemical feed adjustments.”

TRAINING HELPS

When the new system came online, the operators received classroom and hands-on training on the vacuum system. “Someone from

AIRVAC came to the plant and answered our questions about the system, since every system is a little different,” says Rowe. “Reid and I went to the five-day operators’ school at the AIRVAC factory where they ran us through mock drills on a full-scale system. But I also learned a lot on the job.”

AECOM asked the major equipment vendors to perform startup training, including troubleshooting techniques. Operators took in-house training on the sophisticated SCADA system, designed by Woodard & Curran.

“We learned how to operate the system on site, and the technical representatives who designed it could log onto the computer and walk us through the steps,” says Rowe. “They also visited our site if we needed hands-on help.”

(continued)

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BELOW: Plant manager Chris Rowe uses an iPad to check the plant's SCADA system wirelessly. RIGHT: The Provincetown team includes, from left, operator Adam Curtis, plant manager Chris Rowe, operator Chris McKernan, and operator Reid Snow.



PROVINCETOWN WASTEWATER TREATMENT PLANT PERMIT AND PERFORMANCE (daily maximums)

	PERMIT	EFFLUENT*
BOD5	30 mg/L	2-6 mg/L
TSS	30 mg/L	2-10 mg/L
Nitrate nitrogen	10 mg/L	0.51-4.1 mg/L
Total nitrogen	10 mg/L	1.5-6.6 mg/L
Oil and grease	15 mg/L	5-7 mg/L
Fecal coliform	200 cfu/100 mL	None detected
pH	6.5-8.5	Compliant

*Varies with month

Operators recently began using portable devices such as smartphones and tablets to monitor and access the SCADA system, which has more features than typically found with a vacuum system. The system allows for more precise troubleshooting so that collection system and treatment plant issues can be corrected quickly. Says Hunt, "Being able to access the SCADA remotely is huge when you're in the street chasing a problem and you need to control a valve or pump back at the vacuum station."

Rowe adds, "I can't imagine if we didn't have this system. It makes our lives ten times better. When there's an alarm, the system calls the house, and I use my tablet to pull up the information. The system gives me the alarm number and description. For example, 'Alarm 112, decanter failed to cycle properly, press 2 to acknowledge.' I can then decide if the problem must be fixed right away or if it can wait."

The SCADA system also allows process trending. "We trend everything from incoming to outgoing flow and everything in between," says Rowe. "It's a good maintenance tool. If there is a vacuum leak, I can go to the plant, turn on the PC, go to the vacuum line, and diagnose the problem online."

SYSTEM IMPROVEMENTS

The plant has completed a few upgrades, including moving the recycle line from upstream of the flowmeter to downstream. "We recy-

cle water from the rotating drum thickener and plant waste discharge," explains Hunt. "So, we've improved the accuracy of the influent flow, since we don't have to use the SCADA to subtract the recycle flow."

Other improvements:

- Dissolved oxygen, pH and ORP sensors for the SBRs in 2008. These were connected to the SCADA and allowed control of the blowers and mixers for the biological process.
- Increased aeration in each SBR in 2010 by addition of 35 percent more diffusers, upgrading of the blower motors 30 hp to 50 hp and addition of variable-frequency drives to each blower. The VFDs are controlled by the SCADA to run at a set time and air-flow, or to run at a dissolved oxygen set point.
- Seven additional vacuum monitoring points along the three main vacuum lines.
- Controller towers on the vacuum valve pits, making them more service friendly.
- Valve alarm boxes with an illuminated alarm if the vacuum valve stays open for more than 30 seconds. This keeps vacuum pumps from running more often than they should and causing a low vacuum condition.
- Installation of gravity lines and grinder pumps, and four new pump stations.

AECOM is designing a plant expansion to 0.75 mgd. A pre-equalization basin will be built to buffer the peak hourly hydraulic flows and loadings, complete with an air scrubber or blower system.

Using the same footprint as the existing facility, a Bio-Mag treatment and recovery system (Cambridge Water Technology, now part of Siemens Water Technologies) will be installed for advanced sludge settling. "We anticipate using this system during peak summer months or possibly only during extreme peak flows July 4, Memorial Day and Labor Day weekends," says Hunt.

MOTIVATED TEAM

Operator morale is high. "We're a small group, and we all get along and don't step on each other's toes," says Rowe. "We help each

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other out. Whatever I know, they know, and whatever I don't know, we all learn together."

Rowe was an operator at the plant before becoming plant manager. "I'm just one of the group," he says. "Reid and Chris do a great job maintaining the collection system — running the vacuum pumps, changing the oil. They know what's going on with every piece of gear, and they can just walk by a pump and tell if something sounds funny."

Team members are also motivated to continue their education. Rowe has earned his Grade 5 wastewater license. Snow is Grade 2 certified in wastewater and collections and plans to advance his licensure. McKernan, the newest employee, is working toward his certification.

FUTURE CHALLENGES

As more residents connect to the sewer system, the challenges will increase for the plant's operators. Keeping energy costs down is a goal. "We check energy use with the SCADA system, and we check our energy bill religiously," says Rowe.

Maintaining a strict maintenance schedule will be key as equipment ages, as will ensuring an adequate spare parts inventory. "Woodard & Curran uses a computerized maintenance software program (SEMS Technologies) for tracking routine and corrective maintenance on all our equipment," says Hunt. "We maintain inventory of critical spare parts, and perform a thorough cost analysis for each piece of equipment so that staff can decide whether it's more cost effective to replace or repair equipment."

Other challenges include monitoring and tweaking the SBR and vacuum system processes during the peak season. "Peak hourly flows and loadings will continue to be challenging, and so will public outreach and education for tourists and property owners," says Rowe. "There are many do's and don'ts that they should know about to maintain the integrity of the system."

At the opposite extreme, things can slow down in the off-season. "In the dead of winter, our flow might drop as low as 86 to 115 gpm, and there are days where you can watch the paint dry," says Rowe. "But, as I tell my guys, you can always go and study, and learn something new." **tpo**



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BEYOND THE TREATMENT PLANT

FORMER CLEAN-WATER OPERATOR TOM SINCLAIR USED HIS EXPERIENCE TO PURSUE A NEW CAREER PATH LEADING TO A SERIES OF CHALLENGING, REWARDING ROLES

By Trude Witham

TOM SINCLAIR LOVES HIS JOB AND ALWAYS HAS: “I THINK ABOUT WORK constantly — how I can make it more efficient and help others make their job easier.” That philosophy drives him, and it has reaped rewards for himself and his employers.

Trained as a dental laboratory technician, Sinclair moved into the municipal wastewater field when his dental position was eliminated. Working up from maintenance to operations to industrial pretreatment, he enjoyed the wastewater field. Then, he found his calling: household hazardous waste collection.

Since 1996, Sinclair has worked as an industrial waste engineer and household hazardous waste (HHW) coordinator for Monroe County, N.Y. He oversees hazardous waste identification, disposal and transportation of 250 to 300 tons of HHW per year.

His experience in wastewater has helped him in his new career: He understands the impact industrial waste has on treatment plants, waterways, landfills and the ecosystem. His background has also been valuable in his dealings with all levels of wastewater treatment staff, industry, and residents.

Having worked in the field, he's not afraid to get into the trenches. “I can be out in a suit and tie giving a presentation at a conference or business organization, and an hour later I am wrapped up in Tyvek handling hazardous waste,” he says.

As HHW coordinator, Sinclair also oversees the dental pollution prevention program, started the first pharmaceutical waste collection program in the State of New York, and helped launch a one-stop recycling center for a vast variety of materials.

The pharmaceutical program's success won him the 2010 Charles Walter Nichols Award from the American Public Works Association (APWA) for out-



Tom Sinclair at Monroe County's Frank E. VanLare Wastewater Treatment Plant. (Photography by Trent Wellott)

standing achievement in the environmental field.

Sinclair is an example of what is possible for clean-water professionals who want to explore sides of an environmental service career outside the treatment plant. His experience illustrates just one of various other pathways professionals can follow after mastering the plant operations and management roles.

STEADY ADVANCEMENT

Sinclair began his municipal career in 1980 at the Town of Tonawanda (N.Y.) Wastewater Treatment Plant as a maintenance person. In 1985 he became treatment plant assistant, operating equipment, collecting and analyzing lab samples, and performing maintenance. He became a certified treatment plant operator in 1990, a role in which he supervised facility operations including lab work, employee training, and resolution of consumer complaints.

Along the way, he took advantage of the plant's in-house training program. He also took the Great Lakes Grade II wastewater operator course from State University College of New York (SUNY) at Buffalo, and the wastewater treatment operator correspondence course from California State University.

The plant's small size allowed him to do everything from working in the lab, to biosolids processing and incineration. He married, moved to Rochester,

and interviewed for an operator position at Monroe County in 1993.

“As it turned out, I was interested in learning about industrial pretreatment, and they offered me a job as industrial waste technician,” Sinclair says. In his new role, he interacted with the laboratory technicians at the Frank E. VanLare Wastewater Treatment Plant and county pretreatment employees with 15 to 20 years on the job. “We did about 85 industrial inspections a year

Sinclair and dentist Ann Calamel of Rochester Family Dental discuss the Monroe County Dental Pollution Prevention Program.

"Dental offices are the number one source of mercury pollution from industry to wastewater facilities. By installing amalgam separators, dentists are protecting the environment and Lake Ontario from these dangerous pollutants."

TOM SINCLAIR

profile



Tom Sinclair, Monroe County (N.Y.) Department of Environmental Services

- POSITION:** Industrial waste engineer/household hazardous waste coordinator
- EXPERIENCE:** 31 years
- EDUCATION:** Associate degree in dental laboratory technology, Erie Community College; business management studies, State University of New York
- CERTIFICATION:** New York Grade II wastewater operator
- MEMBERSHIPS:** New York Water Environment Association (NYWEA)
- GOALS:** Continue thinking outside the box and helping others to be more efficient in their jobs

WELCOME OPPORTUNITY

As industrial waste engineer/hazardous household waste (HHW) coordinator for the Monroe County (N.Y.) Department of Environmental Services, Tom Sinclair has always believed in new possibilities.

“Sometimes people will get a job and will be unhappy with the choices they made and think, ‘Is this what I am going to do forever?’” he says. “I’m a huge proponent of thinking outside the box. I believe that everything can be made better and more efficient, no matter what the task at hand is.

“It’s really not about me, but getting people to think about doing the right thing for our environment, and making it easy to do, from industry to the residents we serve. No one can do it alone. You need the assistance and support from your employer and fellow workers to make things happen.”

For those thinking about making a career change, Sinclair’s advice is to welcome the opportunity to grow. “When I first moved to Rochester, I really didn’t know what to expect,” he says. “I was leaving my wastewater operator position, a job I enjoyed, and moving into a new environment and a new career. I was nervous, but I welcomed the opportunity to expand my knowledge. It took me some time to find my niche.”

Sinclair believes there are always avenues for growth in the wastewater field. “Observe what others are doing and ask questions,” he says. “Stop and look at tasks from a different perspective. How can it be done better?”

and processed about 1,600 lab samples a year,” he recalls.

His experience with sample collection and analyses at the treatment plant helped him learn the industrial monitoring requirements. It took him another three years to find his passion in life: HHW collection. After being promoted to his current position as industrial waste engineer, he began assisting with the HHW program. Two years later, when the for-

“We give local law enforcement agencies assistance and provide all the paperwork. They collect the pharmaceutical waste, and we dispose of it by sending it to Covanta Energy in Niagara Falls, where they incinerate it as a community service free of charge.”

TOM SINCLAIR

mer HHW coordinator was promoted to another job, the county offered the position to Sinclair.

ENVIRONMENTAL STEWARDSHIP

About 300 employees for the Monroe County Department of Environmental Services operate two wastewater treatment plants, also overseeing 1,500 miles of sewers, 110 miles of interceptors, 35 miles of combined sewer overflow tunnels, 52 pump stations, four sewer districts, a landfill, stormwater systems, hazardous waste and recycling facilities, and a certified laboratory.

The department excels at being progressive and proactive. “We pride ourselves on attacking issues as they surface, instead of waiting for regulations,” says Sinclair. The organization provides freedom to develop programs that make a difference.

When he started as coordinator of the HHW program in 1996, Sinclair enlisted the help of the county’s town officers and media outlets to get the word out with newsletters, Web pages and special events. He educated him-



Tom Sinclair places collected cans of household waste for proper disposal at a recent collection event.

self about hazardous wastes by “seeing how it’s done” and working with environmental contractors.

At that time, the HHW program was run by an outside contractor. “I changed that and brought in plant operators, maintenance people and sewer collection people to work alongside a contractor employee,” Sinclair says. “I learned from my experience with operators that they are hands-on people and willing to learn and try new things.” Using in-house resources saved the county money and allowed the program to expand.

GROWING PARTICIPATION

Another educational experience was editing the department newsletter, “From Down Under,” from 1993 to 2000. “That took a big chunk of my time, but it was a great experience because it opened my eyes to what others in our department were doing,” says Sinclair. “That helped me in coordinating and expanding the HHW and other programs we would develop.”

In 1998, the county built a new HHW facility that allowed greater control

Sinclair fields questions during a presentation to a Tiger Cub Scout troop and guests, describing the Mill Seat Landfill end of the waste stream cycle and benefits of recycling.



of collection and processing. The facility used existing staff, including industrial waste control personnel and collections, plant operations and laboratory staff.

Sinclair spent countless hours calling and visiting towns in the county and talking to people he thought could help make the program work. He asked people to donate advertising and other services. "If you approach the right people and don't ask for the world, they will usually accommodate your request," he says.

One of the largest in the state, the Monroe County HHW program has been a great success. With 12 collections a year to start, the program grew to 85 collections a year, involving about 5,500 households. The collected waste is packaged and removed by a contractor, Clean Harbors.

SEPARATING THE AMALGAM

Sinclair took on another challenge in 1998 with the dental pollution prevention program. The program started before the New York State Department of Environmental Conservation (NYSDEC) passed a law in 2008 requiring amalgam separators in dental offices. In this role, Sinclair oversees a program that helps dental offices handle and dispose of wastes including mercury dental amalgam, fixer and lead.

"Dental offices are the number one source of mercury pollution from industry to wastewater facilities," says Sinclair. "By installing amalgam separators, dentists are protecting the environment and Lake Ontario from these dangerous pollutants."

Very small pieces of amalgam are released when a dentist places or removes a restoration. The fragments usually collect in the office's wastewater, which goes into the public sewer system. Amalgam separators, installed in dental office plumbing, capture and remove at least 95 percent of the waste particles before they enter the sewers.

To get the word out, Sinclair worked with contacts he had gained over the years, and visited dental societies, associations and individual offices to tell them about the coming regulations. He knew his way around a dental office from his experience as a dental laboratory technician.

"I think this cooperative program is pretty unique to our organization," he says. By getting buy-in from the dentists, we ended up being way ahead of the curve and very proactive." The amalgam separator requirement quickly achieved 99 percent compliance, resulting in 67 percent less mercury load to the wastewater treatment plant.

COLLECTING PHARMACEUTICALS

In 2008, Sinclair helped start a pharmaceutical waste collection program that won the 2009 U.S. EPA Environmental Quality Award for the county, and the 2009 Environmental Excellence Award from the NYSDEC.

"In 2006, we started looking at the issue of pharmaceutical waste and its effect on the environment," says Sinclair. "We requested permission from the NYSDEC to collect pharmaceuticals through our HHW collection program. NYS drug enforcement laws pro-

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Tom Sinclair, far right, briefs the collection crew before the start of a household hazardous waste special collection.



Sinclair and Monroe County sheriff Patrick O'Flynn discuss the Monroe County Pharmaceutical Waste Collection Program.

hibited collection of pharmaceuticals, so there were no procedures in place to allow for the proper collection and disposal of this waste.”

Since the U.S. Drug Enforcement Agency (DEA), the NYSDEC and the state Department of Health could not agree on a procedure, Sinclair assembled a team to establish one. The team partners included:

- The Monroe County sheriff's office to supply on-site law enforcement.
- The Center of Environmental Information (CEI) to help apply for an EPA grant for advertising the pharmaceutical waste collection.
- The Ruth A. Lawrence Poison and Drug Information Center, a clearinghouse for information.
- Clean Harbors for hazardous waste disposal.
- Wegmans Food Markets for pharmacists as expert resources.
- Action for a Better Community (a Rochester community services organization) for advertising assistance.

SHOWING HOW IT'S DONE

The team wrote a work plan to satisfy the legal and environmental agencies in the state, and it won approval from the DEC and Department of Health. “We give local law enforcement agencies assistance and provide all

the paperwork,” says Sinclair. “They collect the waste, and we dispose of it by sending it to Covanta Energy in Niagara Falls, where they incinerate it as a community service free of charge.”

All medications and containers are incinerated under law enforcement supervision, as required by law. The program is free to all Monroe County residents for household medications only. Pharmaceuticals collected at drop-off sites, police departments and Wegmans Food Markets include prescription and over-the-counter medications, veterinary medications, and nutritional supplements. The county operates 80 to 100 collections per year, including those by law enforcement agencies and pharmacies.

Sinclair didn't stop with Monroe County. He helped expand the program throughout the state, bringing together pretreatment coordinators, local and state regulators and municipal representatives to facilitate collections. Sinclair's eagerness to share his experiences and help other municipalities led to more pharmaceutical collection sites throughout upstate and western New York.

BRINGING IT ALL TOGETHER

Sinclair's newest project is the Monroe County ecopark, an all-inclusive recycling facility opened last September in a public-private partnership between Monroe County and Waste Management of New York. It collects HHW, pharmaceuticals, electronics, freon-containing appliances, tires, clothing, sharps and needles, cooking oil, metals, plastic wrap and bags, bulky plastics, and items that are part of the county's curbside recycling program: paper, plastic, and metal containers.

“As a one-stop drop for our residents, this program is unique, and as far as I know, it's the only one like it in the country,” Sinclair says. “It's important to me, because I want people to think about what happens when they throw stuff away — how does it affect the environment?”

The project's website (www.monroecounty.gov/ecopark) includes a Web-based tool that takes the guesswork out of determining which items are recyclable and where to deliver them.

WINNING PHILOSOPHY

All this work takes energy. “Being an innovator and a leader is what excites me,” Sinclair says. “One thing I strongly believe in is helping others. I meet a lot of different people in my job, within our department and outside agencies, and I get enjoyment out of being able to offer my skills to them.”

Sinclair shares his knowledge and his love of meeting new people by presenting at national and local conferences, such as the New York Water Environment Association (NYWEA), its Industrial Issues Committee, and the Solid Waste Association of North America (SWANA).

He coordinates a hazardous waste training program for county and municipal employees that trains about 185 employees a year. He also works with the county Office of Emergency Management for a local nuclear power plant's congregate care center.

Outside work, Sinclair coaches for Odyssey of the Mind, an international program that provides creative problem-solving opportunities for children in kindergarten through college. He coached a team of sixth graders to the world finals in 2005. He also serves as assistant soccer coach and manager for girls' soccer teams.

As for the future, Sinclair will continue to perfect the processes he has helped put in place, including the new ecopark. And, he will continue to share his knowledge: “I'm always open to new things, but right now I have no idea what the next big thing will be!” **tpo**

“I'm always open to new things, but right now I have no idea what the next big thing will be!”

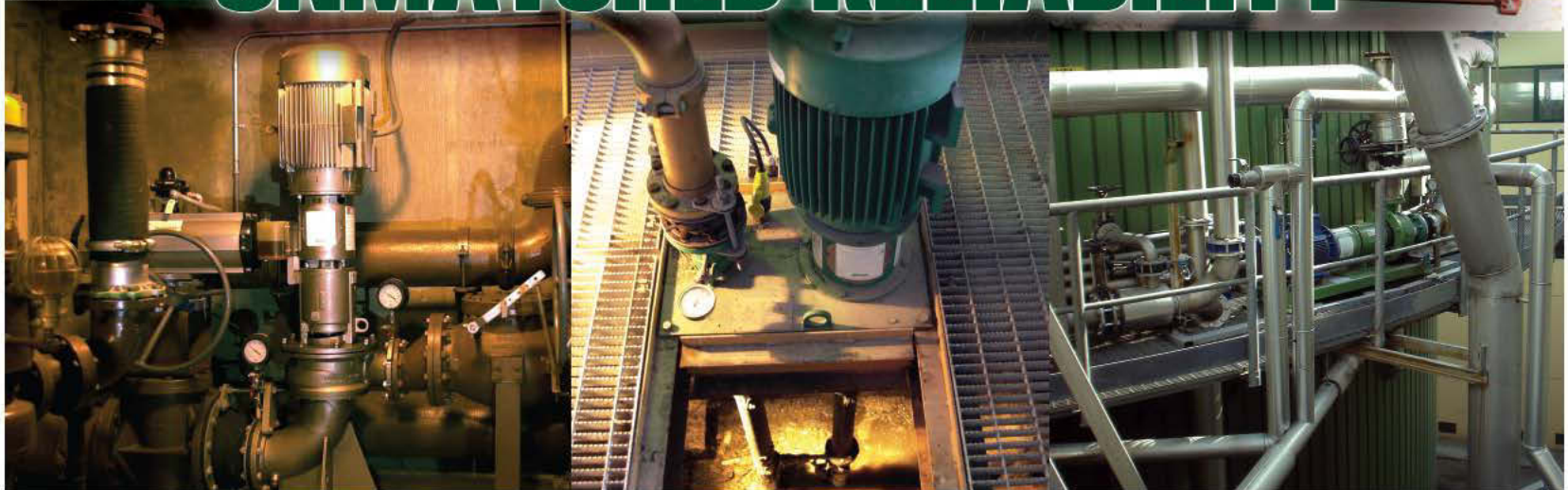
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The earth goddess Gaia wraps her arms around a scene that includes a variety of sea creatures. Students at the Savannah College of Art & Design (SCAD) created the design and prepared the mural using a technique similar to a paint-by-numbers process.

PHOTOGRAPH BY TED J. RULSEH

Poetry in Paint

MURALS ON A SAVANNAH TREATMENT PLANT'S CLARIFIERS ARE A SOURCE OF PRIDE FOR THE OPERATING TEAM AND A POSITIVE VISUAL STATEMENT TO THE COMMUNITY

By Jeff Smith

Curb appeal is a big deal for operators at the President Street Wastewater Reclamation Facility in downtown Savannah, Ga. It shows in a multi-colored mural that covers 5,700 square feet of three secondary treatment tanks fronting the street that bears the plant's name.

Measuring 10 feet tall and covering the street-facing concrete surfaces of the 120-foot-diameter clarifiers, a colorful mural depicts the earth goddess Gaia wrapping her arms around a scene that includes a variety of sea creatures, as well as people boating and swimming in the ocean.

INSPIRED BY TRAVEL

Inspiration for the project grew from plant employees' desire to make the plant more visually compatible with the fast-growing city. Lots of ideas were considered. Then Lester Hendrix, water reclamation treatment administrator took a trip out of town and saw a news photo of a mural that had been painted on a fuel tank. "I showed it to my boss, water reclamation director Charlie Birkenkamper, and a community-wide effort took off from there," he says.

Plant leaders consulted with the water reclamation staff for ideas about the subject of the mural. The consensus was that it should be something related to water. Students at the Savannah College of Art & Design (SCAD) created the design and prepared the mural using a technique similar to a paint-by-numbers process.

COMMUNITY EFFORT

Hendrix chuckles when he says, "The design outline work was done after midnight under bright lights, and the police showed up and corralled the students in the control room, because someone reported them for painting graffiti on the tanks."

Once the outline was in place, more than 300 city employees volunteered to paint the mural with paint supplied by the Water Reclamation Depart-

ment. "A lot of plant operators and mechanics with their families took part in the painting project," Hendrix says. Most of the work was done on Saturdays, and it took about a month to complete.

The facility's landscaping and aesthetics have become more important over the years, says Hendrix. Before a major plant expansion in 1994, the 27 mgd (design) activated sludge plant was on the fringe of the city. Since then, population growth has transformed the plant into a prominent fixture on President Street.

The colorful mural includes a variety of sea creatures, as well as people boating and swimming in the ocean.



The mural is clearly visible to passers-by along President Street.



“The design outline work was done after midnight under bright lights, and the police showed up and corralled the students in the control room, because someone reported them for painting graffiti on the tanks.”

LESTER HENDRIX

COMPLEMENTARY PLANTINGS

The maintenance staff planted 11 palm trees left over from a convention center project. Three additional palms were sourced from a sister-plant expansion project, and nine pear trees, four weeping willows and some cedar trees were purchased. Facility staff members planted them with complementary flowers and bushes. They also installed an automated sprinkler that uses reclaimed water for grounds irrigation.

The plant receives many compliments on its landscaping and overall appearance. “In fact, on several occasions, tourists have stopped at the facility, thinking it was a public aquarium,” Hendrix says. He is equally proud of

the artwork on the inside of the plant. Plant operations and maintenance staff painted images of bacteria and microbes, math formulas, operating permit parameters, and many other wastewater-related items in hallways throughout the plant.

Hendrix says, “Today, the mural has become a staple landmark in the City of Savannah.” **tpo**

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The Siemens odor control system helps the expanded Tri-City Water Pollution Control Plant fit in with the neighborhood, including a \$100 million condominium development next door.

Sustainability First

A TREATMENT PLANT EXPANSION FOR TWO WASTEWATER DISTRICTS IN OREGON IS DESIGNED TO DELIVER ENVIRONMENTAL, ECONOMIC AND SOCIAL BENEFITS

By Doug Day

Rapid growth, tighter regulations and aging infrastructure were challenging the wastewater systems in Clackamas County, Ore. In response, two wastewater districts teamed up to expand the Tri-City Water Pollution Control Plant in Oregon City.

Designed with extensive public input, the \$90 million expansion includes everything from advanced membrane bioreactor (MBR) technology to bike trails and wheelchair-accessible plant tour routes.

The 2-year construction project started with six years of public discussion that sent a clear message: The community wanted sustainable features built into the new facility, operated by Clackamas County Water Environment Services.

“There are three pieces of sustainability: environmental, economic and social,” says technical support consultant Dale Richwine, president of Richwine Environmental of Beaverton. The plant, serving about 66,000 customers, went online in February 2011. It serves the Tri-City Service District and the neighboring Clackamas County Service District #1. The Clackamas district’s Kellogg Creek treatment plant had exceeded its design capacity and was leasing capacity from the Tri-City plant, which was also nearing its operational limits.

Both districts, in suburban Portland, now have adequate treatment capacity for at least 10 years and have avoided a building moratorium that could have been enforced by the state Department of Environmental Quality.

EFFICIENT TREATMENT

Clackamas County chose the GE-Zenon membrane bioreactor (MBR) with hollow-fiber membranes from GE Water & Process Technologies.

“It’s producing effluent that is almost drinking water quality,” says Doug Harbaugh, county water quality manager. “It’s unbelievable how clean it is. The operators are happy to work on the cutting-edge of membrane technology. We’re one of the biggest MBRs on the west coast.”

The process is supported by high-efficiency equipment, such as WEMCO-Hidrostral pumps from Weir Specialty Pumps/WEMCO Pump. The UV disinfection system from Ozonia (Infilco Degremont) uses vertical tubes to minimize power use. “It can be turned down to 7 percent of total output rather than the normal 30 percent, and it automatically matches the UV dose to what is needed,” says Richwine. “We put out virtually zero coliform.”

The new buildings were laid out to allow for modular expansion without increasing the plant’s footprint. Expansions, planned about every three to five years for the foreseeable future, should keep the plant adequate through 2050. Incremental revenue from fees paid by new users will pay for the expansions.

Tri-City Water Pollution Control Plant

	DESIGN CAPACITY	PEAK CAPACITY
1986 plant (activated sludge)	8.4 mgd	50 mgd
2011 expansion (MBR)	11.9 mgd	68.6 mgd
Future additions	30 mgd	138.6 mgd

As part of the expansion, five 300 hp aeration blowers were replaced with 250 hp high-speed turbo blowers from HSI to serve both the old and new facilities. The blowers use 17 percent less energy while increasing air-flow by 50 percent, boosting performance and making it unnecessary to add a blower building for the new 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 877/953-3301.

Some 20,000 square feet of green roofs help curtail rainwater runoff.



PHOTOS COURTESY OF CLACKAMAS COUNTY WATER ENVIRONMENT SERVICES

That saved \$7 million and brought in a \$183,000 efficiency rebate from the Energy Trust of Oregon.

A three-level lighting design allows the plant staff to use only the amount of lighting necessary. The first level uses skylights for day-lighting, adequate for most tasks on sunny days. High-efficiency fluorescent lamps provide two more levels of lighting, operated by separate switches. At night, all exterior lights are controlled by motion sensors to minimize energy use and reduce light pollution.

A Caterpillar 2.5 MW backup generator is connected to the Portland General Electric (PGE) utility grid under the utility's dispatchable power program. "They can turn it on anytime for peak shaving," says Richwine. The utility controls the generator and can use it for up to 400 hours a year. In exchange, PGE pays all maintenance and fuel costs and provided \$575,000 toward the \$1.3 million cost of the generator.

The plant's HVAC system was designed for conversion to hot-water heating. It will use reclaimed heat from an engine-

"The plant operators really enjoy being able to share their work with people. This is a chance to showcase what we do for a living, how we protect the environment and public health, and how we provide a great service for ratepayers."

DOUG HARBAUGH

generator as part of a future expansion of the solids-handling system. The buildings are automatically ventilated to maintain a slight negative pressure, stopping the escape of odors while optimizing power use.

VOICE OF THE PEOPLE

The plant expansion had to fit in a small footprint because the property is confined by the Willamette and Clackamas rivers to the north and west, an old landfill to the south, and a major freeway to the east.

"On the west is Clackamette Cove where a developer is planning to build a \$100 million condominium project within 100 feet of the plant," says Richwine. "It came down to how we could enhance the neighborhood. We're very proud of the end product."

Citizens in both districts and in the three communities served by the plant were consulted from the start. One advisory committee included various city professionals, while another included citizens and elected officials from each community. All meetings were open to the public, and several community surveys helped identify priorities and keep the committees on task.

"They wanted this plant to be as sustainable as possible while remaining cost-effective," says Richwine. Rate impact was fourth among priorities, and water quality came in third. The most important elements were open space for public access and links to bike trails in the area.

"An MBR was selected because it can be built indoors with a small footprint," says Richwine. "The new buildings have a commercial look and screen the old plant from the condo development next door. In

addition, the modular design means the districts can add additional capacity in a just-in-time fashion, mitigating the need to invest in large capacity construction that would likely sit idle waiting for future customers to show up".

PUBLIC EDUCATION COMPONENT

In line with residents' wishes, the plant was laid out to accommodate educational and public tours and to be wheelchair accessible. The Oregon Museum of Science and Industry in Portland designed displays and interactive exhibits in and around the facility. "People can see how the screening system operates, touch membranes and learn about stormwater management," says Richwine.

Tours end by going through a 72-inch pipe removed from the plant's outfall during construction. A local artist created a mural inside with signage to illustrate flow levels. "They can get a feel for how much flow



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CURTAILING RUNOFF

The expansion of the Clackamas County's Tri-City Water Pollution Control Plant includes several innovative stormwater management features. According to technical support consultant Dale Richwine, president of Richwine Environmental, "It is an opportunity to demonstrate progressive stormwater management."

Storm drains that used to empty into the nearby river were rerouted to a 2-acre retention basin. The street in front of the plant was rebuilt as a green collector street. "All the water flows to a bioswale that removes silt and pollution," says Richwine.

Another road on the property drains to a collection swale where the runoff is routed under the roadway and absorbed into the soil. Pervious pavement on another road allows water to infiltrate through the street into storage rock and then into the soil.

The plant's five new buildings have 20,000 square feet of green roofs that absorb rainwater and prevent runoff. Hardy plants and low-growth vegetation grow in soil above a membrane system. Besides absorbing rain, the green roofs provide insulation.

"We can take a 10-year, 24-hour storm and have no runoff from the site," says Richwine. "It is all collected and infiltrates into the groundwater."

really comes through the treatment plant," says Richwine.

Equipment manufacturers such as JWC Environmental, maker of the Muffin Monster grinder, and GE Water & Process Technologies provided funding and materials and helped with the design and con-



Public education was a key design element desired by the public. Plant tours end by walking through a 72-inch pipe painted to show different flow levels.



MBR technology was selected for its small footprint and its ability to be contained in a building.

tent of the displays. General contractor Slayden Construction donated display installation, including concrete.

Harbaugh says operators enjoy the tours: "They really enjoy being able to share their work with people. This is a chance to showcase what we do for a living, how we protect the environment and public health, and how we provide a great service for ratepayers." **tpo**

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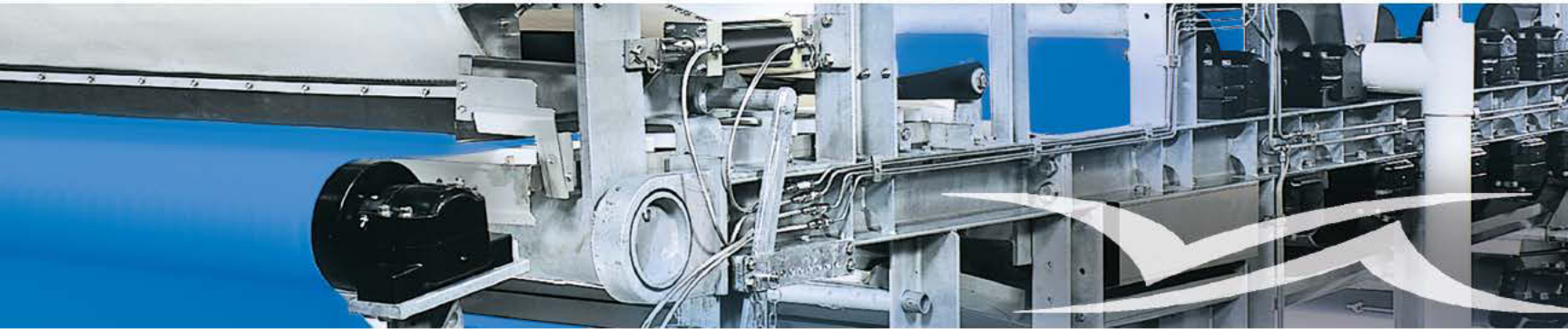


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WATER AND WASTEWATER TREATMENT SOLUTIONS



Brilliant engineering is the result of a collaboration between operators and engineers at Rock Falls, Ill. Skylights and windows brighten the buildings. Everything from the headworks to the outfall is set up for operators' convenience, efficiency, comfort and safety. (Photography by Thomas Guschl)

Tailor Made

OPERATORS AND ENGINEERS IN ROCK FALLS WORKED TOGETHER TO CREATE A NEW TERTIARY TREATMENT PLANT THAT'S EFFICIENT, EFFECTIVE, SAFE, AND READY TO GROW

By Ted J. Rulseh

WALK AROUND THE NEW ROCK FALLS (ILL.) WATER Reclamation Facility and you can see and feel that it's different.

Skylights and windows brighten the buildings. Ample stairways connect levels instead of ladders or narrow metal steps. Pumps are mounted away from the walls to allow easy servicing. There are no confined spaces anywhere. The laboratory is spacious; influent and final effluent samples are piped right in.

There's a lunch and break room with space outside for a picnic table. There's a shower, and a washer and dryer for team members' uniforms. Each building has a restroom. Everything from the headworks to the outfall is set up for operators' convenience, efficiency, comfort and safety.

Brilliant engineering? Yes — the kind you get when consultants and operators collaborate from even before the first lines are drawn on a plan. Plant superintendent Edward Cox and his team worked with project engineer Bob Gasper of the Willett Hofmann & Associates engineering firm of Dixon, Ill., from 2003 until the plant was commissioned in July 2011.

The result is a \$20 million, 3 mgd (design) tertiary facility that consistently meets its discharge permit, operates efficiently, makes operators feel at home and — perhaps best of all — came in on budget.

"Willett Hofmann had been the city engineers for years," says Cox. "They went into the project with the same attitude we did — that we were going to work together. Other firms that approached us basically gave us the cookie cutter. We didn't want to get stuck in that mode. Almost every piece of equipment in this plant was hand-picked."

TOUGHER STANDARDS

The plant project began in 2003, the same year Cox joined the city. The old treatment plant was built in 1935 and expanded three times, most recently in the 1980s. Ultimately, its packed biological reactors (PBRs), essentially trickling filters with plastic media, could not meet new ammonia and phosphorus permit limits.

"The new ammonia limit was 1.5 mg/L, and we could only reach that in the hot summer months," recalls Cox. "The PBRs couldn't retain heat, and we couldn't get the nitrifiers to work correctly in colder weather. We would violate right up to the heat of summer in late June or early July, and then in September, when the nights got cooler, we'd fall out of compliance again."

The plant site would not accommodate expansion: It was across the

Operator Dan Reinhardt takes readings with a YSI 550A dissolved oxygen meter.



profile



Rock Falls (Ill.) Water Reclamation Facility

BUILT: 2011

FLOW: 3 mgd design, 1.5 mgd average

POPULATION SERVED: 9,500

TREATMENT LEVEL: Tertiary

TREATMENT PROCESS: Oxidation ditch (extended aeration activated sludge); cloth disc filtration

RECEIVING WATER: Rock River

BIOSOLIDS: Aerobic digestion, landfill

STAFF: Plant superintendent Edward Cox, assistant superintendent Steve Mulvaney, operators Allan Briggs, Dan Reinhardt, Scott Breed

ANNUAL BUDGET: \$1.3 million (operations)

WEBSITE: www.rockfalls61071.com

GPS COORDINATES: Latitude: 41°46'20.54"N; longitude: 89°44'6.44"W



The oxidation ditch provides secondary treatment with biological nutrient removal.

ers it to a dump container. A Eutek (Hydro International) system collects, classifies and dewateres grit, and a Eutek Grit Snail unit conveys it to a container.

NUTRIENT REMOVAL

The wastewater passes through a Parshall flume for flow measurement and is lifted to the three-channel Envirex oxidation ditch (Siemens Water Technologies) by a second set of Spaans Babcock screw pumps.

The oxidation ditch provides secondary treatment with biological nutrient removal. Exiting that process, the water passes through a

street from the high school and hemmed in by the Rock River and residential neighborhoods.

In 2003, the city and engineers chose a 19-acre site for a new plant on farmland about 1.5 miles west of the old one.

Formal design began in 2007, and transfer of flow to the new plant began in July 2011. A pump station at the old plant, with a Muffin Monster grinder (JWC Environmental) and four Smith & Loveless dry-pit pumps rated at 1,500 gpm, delivers wastewater (average daily flow about 1.5 mgd) to the new site through a 20-inch ductile iron force main.

The wet well at the new plant is set deep enough to allow gravity flow from future residential and industrial development in the area. Spaans Babcock screw pumps lift the flow to the influent building. At the headworks, a Parkson step screen captures material, compacts and dewateres it and deliv-

er splitter vault and enters the two 90-foot-diameter Envirex clarifiers. The splitter vault provides capability to add ferric chloride for phosphorus removal if necessary.

From there the flow proceeds to tertiary treatment in three basins with AquaDisk cloth disc filters (Aqua-Aerobic Systems), through UV disinfection (TrojanUV), and through final flow metering before discharge to the Rock River.

On the solids side, telescoping valves in the clarifier sumps draw off activated sludge. Flygt pumps (Xylem) send return activated sludge (RAS) back to the oxidation ditch, and waste activated sludge (WAS) to the aerobic digesters feed air with Kaeser blowers and Sanitaire fine-bubble diffusers (Xylem). The plant SCADA system adjusts airflow to the digesters based on sludge levels in four basins. Digested biosolids are dewatered on a belt filter press (BDP Industries) and hauled to landfill.

The Rock Falls team includes, from left, plant superintendent Ed Cox, assistant plant superintendent Steve Mulvaney, and operators/maintenance workers Allan Briggs and Dan Reinhardt.



Bob Gasper, project engineer for Willett Hofmann & Associates, designer of the Rock Falls treatment plant.



MAKING CHOICES

Credit for the plant's successful first year and bright future belongs to careful planning and design. The first key objective was to pick a location that allowed room for expansion over 50 years or longer.

"We're not landlocked now," says Cox. "Everything is already in place in case we have to expand in the future. We could mirror this plant in a heartbeat — we'd just flip the design and build another right beside it. Everything is all ready to be connected."

The second key objective was ease of operation and maintenance, and here Cox and assistant plant superintendent Steve Mulvaney worked closely with Gasper.

"Willett Hofmann went into the project with the same attitude we did — that we were going to work together ... Almost every piece of equipment in this plant was hand-picked."

ED COX

Before joining Rock Falls, Cox had worked 10 years with a private water operations and management company. "I had worked at different sites all over and had seen what worked and what didn't," he says. "I had certain things I wanted as an operator. I wanted an Envirex ditch, and I wanted Envirex clarifiers. They're widely used, there's a lot of experience with them, and it's easy to get parts."

Cox and Gasper traveled extensively to look at equipment such as bar screens, grit systems and biosolids dewatering presses. They looked at SCADA systems at several plants in Illinois before choosing to work with SCADAware of Bloomington, which had provided the system for the Rock Falls water department.

Operator Dan Reinhardt greases screw pumps (Spaans Babcock).



"The water side was very happy with their services," says Gasper. "We laid out what we wanted, and we came to the conclusion that there were advantages to using the same provider for both sides of the city system." Among the system's features, manuals for all plant equipment are built in and accessible on-screen.

LITTLE THINGS MATTER

Cox and Mulvaney also collaborated with Gasper on multiple details of the plant structures and workspaces. At times they sought input from operations and maintenance team members Allan Briggs, Dan Reinhardt and Scott Breed.

"My philosophy is that I'm not designing it for myself," says Gasper. "If a

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A QUESTION OF ATTITUDE

Many operators and engineers will attest to tension between the professions.

"An operator may say, 'He thinks he knows everything because he's an engineer,'" says Ed Cox, superintendent of the Rock Falls Water Reclamation Facility. "An engineer may say, 'What do operators know?' That's common in the industry."

The Rock Falls team and engineers from Willett Hofmann & Associates got around that problem by respecting each other's perspectives and knowledge. "They're the ones who have to operate the plant every day, and I'm there to make sure it works," says Bob Gasper, project engineer with Willett Hofmann.

"When they came to me with an idea, I didn't just say, 'No, that's not going to work, this is the way we're going to do it.' I explained the reasons why, so that they understood where I was coming from. There was give and take on both sides. We all took the time to really look at the different options and think outside the box."

Assistant plant superintendent Steve Mulvaney adds, "Flexibility and willingness to listen will get you far in this field — and without that you have nothing. Willett Hofmann was more than willing to listen to our ideas, no matter how crazy some may have been.

"It's nothing but beneficial to work with the engineers. We weren't trying to tell them how to do their job. We just needed to tell them what we would like to see out of the project. It was nice to know that if we wanted to have a door here or a spigot there, they were willing to help us out."

Cox offers a strong word of advice to communities planning to expand, upgrade or build treatment plants: "When you go into the planning process, if you don't speak up, you're going to get what's handed to you. You have to speak up and express from the beginning where you'd like to be involved."

That certainly happened in Rock Falls. Gasper jokes, "After nine years of working on this project, the engineer and the city staff are still talking to each other. That by itself means something."

piece of equipment gets installed that the team didn't like from the very beginning, it's just human nature that they're going to complain about it and they're not going to want to use it. But if they really like what is put in place, they're going to work with it and they're going to take care of it better. So let's deal with the concerns up front in the design, so that everybody is on board and we deliver a great product."

Cox adds, "We tried to make this an operator's plant — make it simple to operate and easy to maintain while getting rid of all the headaches like confined spaces, low ceilings, and really hot environments in the summer.

"There are no confined spaces. In every basement you could fit multiple people. We have positive ventilation. The ceilings are 10 feet high. Every staircase is four feet wide with large landings. Another key item was access for maintenance and service. There are no pumps against the walls. We can actually put a person on each side of the pump and they can move their elbows without cutting them up."

At one point during design, city staff pointed out that there was no easy way to remove the RAS and WAS pumps from their basement location for replacement or service. In response, the engineers provided a removable grating in the floor above through which the pumps can be lifted out using a portable hoist.

Rock Falls Water Reclamation Facility

PERMIT AND PERFORMANCE (monthly averages except where noted)

	INFLUENT	PERMIT	EFFLUENT
CBOD	185 mg/L	10 mg/L	3 mg/L
TSS	210 mg/L	12 mg/L	1 mg/L
Ammonia nitrogen	30 mg/L	1.5 mg/L March-Oct. 4.0 mg/L Nov.-Feb.	0.1 mg/L
Phosphorus	7 mg/L	1 mg/L	0.25 mg/L
Fecal coliform (daily maximum)	N/A	400 cfu/100 mL May-Oct.	0
pH	7.6	6.0-9.0	7.8

"If the operators really like what is put in place, they're going to work with it and they're going to take care of it better. So let's deal with the concerns up front in the design, so that everybody is on board and we deliver a great product."

BOB GASPER

Mulvaney observes, "Maintenance is easy to do here. Things are placed where you can get to them. You don't have to climb over pipes or crawl through a tunnel to grease something. Everything is right there in front of you. It's a matter of just walking up to any piece of equipment to check or change the oil or adjust belt tension."

AMPLE AMENITIES

Mulvaney had great flexibility to design the laboratory. "I sat down with the architect and was told, 'This is how big your space is — what do you want to do in here?'" he recalls. "It was nice to be able to set it up with a certain workflow in mind.

"We have two U-shaped work areas, each with a center island. There are separate areas to keep operations testing away from DMR [discharge monitoring report] testing. Sinks are located where they're functional for us. There are separate writing areas for doing reports. Three or four people can work without bumping into each other."

Refrigerated samplers for influent and final effluent are inside the lab. A wall-mounted still saves countertop space. There are plenty of storage cabinets, closets and sinks. Windows and skylights make the atmosphere pleasant.

FLEXIBLE AT EVERY STEP

The Rock Falls team even had input on architectural details. "Bob and I went to Rockford (Ill.) and actually picked out the brick," Cox says. "Steve and I picked out the color of the metal roof. Every place that's painted, we chose the colors — even for the piping, which is all color-coded.

"We picked out the floor tile color and pattern. Our painted floors have a Tnemec coating that's used in auto repair shops. We can walk in with our boots icy and wet, but once you step on that floor, you don't slip." (The coating includes 3 mils of Series N69 Hi-Build Epoxoline II and 6-12 mils of Series 281 Tnemec-Glaze.)



Mixed liquor suspended solids and return activated sludge samples are weighed on a balance (Denver Instrument).

Collaboration continued during two years of construction. "Steve and I were out there often, and changes were made as we went," says Cox. "We had many meetings. We even discussed exactly where the road should go. Now we have a big circle drive so any delivery vehicle can pull in and pull right out."

In the solids building, the belt filter press discharges from a conveyor directly into a dump truck or roll-off container. The vehicle maintenance building includes a truck wash bay and a large shop area with four bays.

A variety of small changes were made on the fly. Gasper observes, "If we were running piping in a building or placing hose bibs for washdown areas, they might ask, 'Can we just move that over here?' Doing so might not even change the cost, but yet it might help them in the long run. They took ownership of the construction process to see that everything was going to be in the best location."

THE WAY FORWARD

Looking back, Cox is grateful to have worked with engineers who listen: "As operators, we work with these systems every day. We know the good and we know the bad. We may not be able to tell you how to build a structure, but

Operator Allan Briggs checks the biosolids belt filter press (BDP Industries).



we can tell you how the plant is going to run once you build it.

"I think you'll see more of this working together in the future. Operators now are much more educated than they were 20 or 30 years ago. We're starting to see younger people coming in who have gone to school, have worked with engineers, and may have some engineering background of their own.

"At the end of the day, when operators can talk back and forth with the engineers, and both sides can be flexible, it makes a world of difference." **tpo**

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From Old to New

THE CITY OF JACKSONVILLE (N.C.)
REUSES FORMER TREATMENT PLANT
INFRASTRUCTURE TO CREATE A CIVIC
ENVIRONMENTAL EDUCATION CENTER

By Briana Jones

PHOTOS COURTESY OF STURGEON CITY



Sturgeon City Institute participants seine for aquatic life along the newly constructed wetlands area, at the site of the former wastewater treatment plant.

When the former Greater Jacksonville (N.C.) Wastewater Treatment Facility became unusable, the city took “make-over” to the extreme and turned its infrastructure into a civic environmental education center for local students and community members.

The result is Sturgeon City. Situated on 26 acres, the center grew out of a vision to use the old plant’s tanks to raise sturgeon. That concept expanded into using the grounds for education programs year-round.

“Sturgeon City started off as a unique concept because it was a conversion of the former treatment plant into a civic environmental education program,” says J.P. McCann, the center’s executive director.

The old river discharge plant was designed for 4.46 mgd but surpassed that in the 1990s. The new 9 mgd (design) Jacksonville Land Treatment Facility was commissioned in 1998.

Students learn how to conduct water-quality tests and relate the titration method to concepts taught in the classroom.



MOVE TO REMEDIATE

When the new plant went online, city officials debated what to do with the old one. They decided to adaptively reuse it.

Funding for Sturgeon City and its education programs comes from local donors, public groups and agency partners. “There was an initial grant from the Clean Water Management Trust Fund in North Carolina for \$572,000 to assist in the remediation of the habitat around the plant,” says McCann.

“Called the Wilson Bay Initiative, that project brought in a lot of student volunteers and community members. Sturgeon City grew out of the experience of students and volunteers working alongside scientists and technicians. It was that dynamic that really seeded the program here on site.”

Plant staff and Jacksonville employees were involved in the Wilson Bay project.

“Water-quality technician Tami Dubois Odum and I worked for North Carolina State University College of Veterinary Medicine and the City of Jacksonville on the restoration of Wilson Bay,” says Pat Donovan-Potts, stormwater manager for the city.

STEAM EDUCATION

The Sturgeon City center itself opened in 1999, operating out of the administration building on the old treatment plant site. It serves about 6,500 participants annually. “Sturgeon City stands for our accomplishment,” says Donovan-Potts. “It’s important to tell the story of how science and technology are always changing.”

Series of summer institutes are the foundation of programming. All programs include water-quality improvement projects. Institutes focus on enhancing knowledge of science, math, aquaculture, forensics, videography, photography and more. The institutes include:

- Student Leadership Development Institute
- Science Institute
- Advanced Marine Science Institute
- Young Leaders Institute
- Education Institute
- Media Studies Institute
- Engineering & Physics Institute

What’s Your Story?

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



Students return to Wilson Bay Park after a water-based activity that would not have been possible when the wastewater treatment plant was in operation.

“Civic environmental education takes whatever we’re doing on the ground and translates that into STEAM (science, technology, engineering, art, math) enrichment to the elementary, middle and high school students,” says McCann.

For example, the Student Leadership Development Institute and Young Leaders Institute teach students basic leadership and team building. In one exercise, horse trainers brought horses to the site and divided the students into two groups: one blindfolded and allowed to speak, the other able to see, but not allowed to speak.

Each group had to set up panels into a pen for the horses. The students learned that listening and providing good directions are essential skills for leading a team.

“We need to look at the education program as civic and environmental,” McCann says. “It’s important that students get involved and stay involved in the community.”

In the Science Institute, students get their hands dirty in the marsh, capturing and studying specimens, testing for water-quality parameters and building oyster bags to construct future reefs. “We put adult oysters out in chubs to filter the feed to improve water quality,” says Donovan-Potts. “For the last three years, Tami and I have been putting oyster spat, baby oysters, into drying beds, growing them to adults to be added to the oyster reefs we are building this year. We hope to promote new recruitment and settlement with them.”

Participants also meet with plant staff to get another view of wastewater treatment. “Chief operator Tony Rooks and the operators at the land application site address groups in the education room,” McCann says.

“They go out in the natural lily ponds and do water-quality testing to see the impacts of wastewater on an on-site body of water. Mostly they don’t see any impacts and that’s the whole thrust of it. Through land application, the wastewater goes back into the land, and through absorption it eventually goes back into the aquifer.”

FUTURE PLANS

The existing wastewater treatment plant infrastructure at Sturgeon City will be reused to better suit future needs. Says McCann: “The old biodigester and methane tank will be used as aquariums. The chlorine contact chamber will become a maze for students. The old headworks will be retained as an instructional tool.”

Clean water awareness is passed on to other generations as students come through the Sturgeon City program. “Educating school-age children about the need for clean water and showing them how a polluted river can be turned around will help spread this knowledge to their friends and parents,” says plant superintendent Ray Holder.

“This knowledge and experience may also act as recruitment for future wastewater professionals.”

Creating an educational environment out of something that easily could have been bulldozed allows a community to prosper. “If it wasn’t for the community support, we wouldn’t be here today,” McCann says. “They’ve been wonderful and they fully support the program. They’ve enabled us to grow.” **tpo**

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Energy from Water

A WASHINGTON TREATMENT PLANT CONDUCTS TESTING ON A HYDROTURBINE THAT CREATES ELECTRICITY FROM A CHLORINE CONTACT BASIN OUTFALL

By Scottie Dayton

The South Kitsap Water Reclamation Facility in Port Orchard, Wash., doubles as an energy test site for a company pioneering a new kind of hydropower technology.

Facility manager John Poppe wondered whether it would ever be feasible to generate a little hydropower from the water that falls over a weir before discharge to Puget Sound.

When Burt Hamner of Hydrovolts told him about his new barrel-rotor low-head hydroturbine generator, Poppe obtained permission from his supervisors to evaluate it. A Hydrovolts crew installed the prototype in the plant chlorine contact basin's 10-foot-deep outfall well.

The unit ran for four months, powering a 300-watt floor space heater inside the plant, along with Christmas tree lights. The treatment facility uses hot water from a boiler fired with mesophilic digester gas to heat the buildings. "Recovering the energy from the outfall warms the building and reduces the demand on the boiler," says Poppe.



PHOTOS COURTESY OF JOHN POPPE

Hydrovolts technicians install Version 2 of the low-head hydroturbine generator in the chlorine contact basin's 10-foot-deep outfall. The stainless steel chute funnels water directly onto the blades.



The installation ensures that water hits the turbine blades with maximum force.

"The pilot study determined the best pitch on the paddles for maximum efficiency during variable flows, how much power could be captured, how often the unit would break down, and its maintenance requirements."

MAKING REFINEMENTS

The plant's 4.2 mgd (design) activated sludge process running parallel with a membrane bioreactor averages 1.7 mgd. Before discharge, effluent goes over a chlorine contact basin weir at 300 gpm during low flow and 1,400 gpm at high flow, dropping 10 feet.

The plant completed field testing of Version 1 in January and in April began testing Version 2, designed by Hydrovolts engineers after analyzing data from the prototype. They enlarged the unit to 4 feet long by 24 inches in diameter and built a stainless steel chute to funnel water directly onto it. Engineers also designed a new weir for mounting the chute and field-fabricated removable stainless steel brackets with a 6-inch-high backsplash.

Hydrovolts staff used a portable crane to install the components, then adjusted the chute so that the water hit the turbine blades with

The Hydrovolts team used a lightweight portable crane to install Version 2 of the low-head hydroturbine.



The new weir has field-fabricated removable stainless steel brackets with a 6-inch-high backslash that directs water to the chute.

Share Your Idea

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

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

5 mgd and the waterfall drop is at least 6 feet. Poppe is realistic about the hydroturbine and its energy-saving potential in his plant, where flow averages 1.7 mgd: "Helping to demonstrate new clean energy technology from a local company is a matter of principle and doing the right thing, making choices that best serve the customer." **tpo**

maximum force. The backslash directed water that would have gone over the weir into the chute. "The upgrades enabled us to capture 10 percent of the overflow's energy potential," says Poppe.

Initially scheduled to operate for one month, Version 2 ran for three months, providing data and power for the space heater.

ELECTRONIC CONTROL

A programmable logic controller (PLC) mounted inside the plant adjusts the hydroturbine's energy output to variable flows. During the day, the electronics increase resistance on the blades, enabling the generation of more energy. At night, the opposite occurs, allowing low flows to turn the blades. Hydrovolts staff updated the software and some hardware several times during the trial.

The chain on the sprocket driving the shaft connected to the turbine blades was rated for 30 rpm but ran continually at 700 rpm. When it failed in four months, Hydrovolts staff replaced it in two hours after hoisting the unit from the outfall. Plant operators have done no maintenance.

"The upgrades enabled us to capture 10 percent of the overflow's energy potential."

JOHN POPPE


Third-party monitoring of the turbine is done by Prof. David Stensil, P.E., from the University of Washington, and his senior and graduate students who analyze the treatment plant's energy usage and production.

FURTHER IMPROVEMENTS

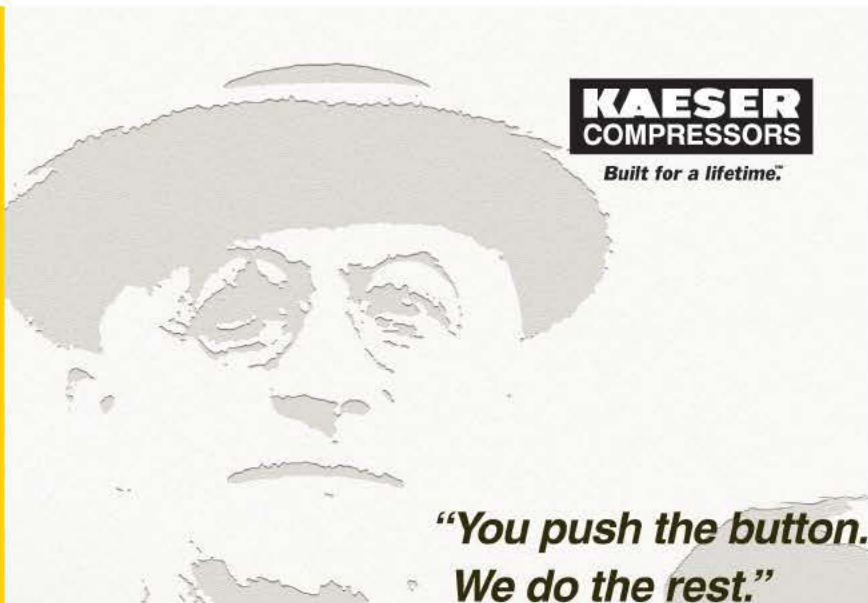
The Version 3 waterfall turbine will be twice the size of its predecessors and will use a significantly more efficient rotor. The new design also allows for adaptability to more facilities. An outdoor control panel houses the upgraded PLC, and Web access allows operators to view live data. If the unit works well, Hydrovolts will install a second one next to the first to capture all the flow.

Hydrovolts says its turbines have a good value proposition in facilities where the average flow is over





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Pumps, Drives, Valves & Blowers

By Briana Jones

SELF-PRIMING PUMP

The Contractor Pump range from AllightPrimax is designed for cost-efficient fluid handling. Fuel usage is minimized through the hydraulic pump-end, impeller and wear plates. The self-priming pumps do not require manual priming of the suction line or filling of a priming tank to begin normal operation. The pumps can run dry for extended periods due to the oil bath mechanical seal assembly, which allows priming with long suction hoses and suction lifts up to 28 feet. As fluid levels fluctuate, the pumps will snore until the liquid is available to fully re-prime automatically. **803/328-2035; www.allightprimax.com.**



Contractor Pump range from AllightPrimax



Blowers from Atlantic Blowers

SINGLE- OR DOUBLE-STAGE BLOWERS

Blowers from Atlantic Blowers are available in single-stage (one impeller) or double-stage (two impellers) configurations. The impeller is directly connected to the motor shaft, eliminating pulleys and belts. This reduces maintenance and moving parts, maximizing longevity. The blowers provide clean, dry, oil-free air, slightly above ambient temperatures, making them well suited for highly regulated environments.

Air volume ranges from 18 to 791 cfm, and air pressure ranges from 22 to 313 inches H₂O. Motors range from 0.16 to 50 hp. Accessories include relief valves, check valves, pressure/vacuum filters and silencers. **214/233-0280; www.atlanticblowers.com.**

GRINDER PUMP

The Multicrusher pump from Boerger offers a pull-in function that macerates and reduces rags and stringy materials to unproblematic sizes. Two central screws hold the rotating blade configuration in place. The relative rotation speed of the two shafts ensures an optimized macerating effect and prevents stringy materials from wrapping around the blades.

In standard allocations a fluid/solids mixture flows through the unit. A downstream pump ensures a reliable fluid transfer. The unit is equipped with lobe pump seals so that it can be installed on the discharge side of various pump devices. Maintenance In Place (MIP) construction provides long operating life. A quick-release cover offers quick access to internal parts. All wetted parts can be quickly maintained or replaced without the removal of the pipe or drive system. **612/435-7300; www.boerger.com.**



Multicrusher pump from Boerger



Adjustable-speed drives from DSI Dynamic

ADJUSTABLE-SPEED DRIVES

DSI Dynamic adjustable-speed drives are built for long life in pumps, blowers and centrifuges. The drives deliver 50 to 60 percent lower capital cost than medium-voltage VFDs. The drives feature digital controls for new installations and are compatible with all brands of eddy-current drives and eddy-current drive upgrades. The controls are 70 percent smaller than comparable medium-voltage VFDs, saving space and reducing installation costs. The drives have an electromagnetic clutch design that is unaffected by fluctuations in power quality and use less than 1 percent of the power to the motor to achieve greater efficiency. **800/548-2169; www.drivesourceusa.com.**

VOLTAGE TEST KIT

The AEGIS shaft voltage test kit from Electro Static Technology (EST) and Fluke Corporation measures motor shaft voltage to determine the vulnerability of VFD-controlled motors. The kit includes a replaceable probe tip for highly accurate voltage readings on rotating equipment. The tip contains high-density conductive microfibers that ensure continuous contact with a rotating motor shaft. The tip and extension rod can be used with an optional magnetic base, while the 10:1 probe and Fluke 190 Series ScopeMeter portable oscilloscope display the voltage waveform and save the image for reporting. **866/738-1857; www.est-aegis.com.**



AEGIS shaft voltage test kit from Electro Static Technology



ReliaPrime emergency bypass station from Gorman-Rupp Co.

BACKUP SYSTEM

The ReliaPrime emergency bypass station from Gorman-Rupp Co. operates on natural gas, making it quiet and environmentally friendly. The unit features a 6-inch Super T Series pump capable of passing 3-inch spherical solids and offers a soundproof, lightweight aluminum enclosure. The enclosure has padlocked door panels and can be removed for maintenance. The unit is a complete backup package, ready for hookup. **419/755-1011; www.grpumps.com.**

BLOWER PACKAGES

Com-paK Plus integrated blower packages from Kaeser include Omega Control Basic, variable-frequency drives, and reduced current (wye-delta) starting. The ready-to-operate, self-protecting units are available with a variety of sensor and instrument choices. They are available in ratings from 7.5 to 100 hp with flows from 335 to 1,419 icfm at 4.4 psig.

All starters, sensors and instruments are pre-mounted, piped and wired at the factory. Dry contacts are included for output to SCADA, and the packages can be remotely started and stopped. The units feature the company's Omega blowers and include motor, automatic belt tensioner, starters, silencers and a high-quality cabinet design with enhanced air-flow for improved efficiency and heat removal. Side-by-side installation reduces space requirements. **877/596-7138; www.kaeser.com/omega.**



Com-paK Plus blower packages from Kaeser



DRY-PIT MOTORS

High-efficiency dry-pit submersible motors from KSB range from 6.5 to 10 hp and meet IE2 requirements. Made for dry-pit installations, the motors can also be used in wet wells when the pumps need to run at low liquid levels for extended periods. Heat loss in the stator windings and squirrel cage of the rotors is reduced.

Dry-pit submersible motors from KSB

Loss of friction and magnetic reversal losses are also reduced. The motors reduce losses from recirculation of coolant liquid. Available with 4 and 6 poles, the motors comply with NEMA MG1 part 31 requirements. 804/222-1818; www.ksbusa.com.

CUTTER SYSTEM

Heavy-duty chopper pumps from Landia offer a cutter system consisting of knives separated from the pump casing and impeller. No adjustments are required. Replacement of worn chopping systems is quick and inexpensive.

The cutter system protects the pump casing and impeller from being worn by the chopping process and prevents the pump inlet from clogging. The pump casing and impeller form a unit, ensuring that no particles are caught in the pump. Impeller shapes and sizes are customized to the pumping situation and effluent. Guide traces in back and front plate of the pump protect the sealing system from stringy materials. Applications include raw sewage and effluents heavily contaminated with debris such as rags, strings and other coarse material. The pumps include wet well pumps, dry installed pumps and submersibles in cast iron and stainless steel. 919/466-0603; www.landiaworld.com.



Heavy-duty chopper pumps from Landia



Omnivore grinder pump from Liberty Pumps

GRINDER PUMP

The Omnivore grinder pump from Liberty Pumps features V-Slice cutter technology, which provides more cuts per revolution. The hardened stainless steel cutting system shreds solids into fine slurry with less jamming. An open volute eliminates cutwater, improving solids flow. Other features include a one-piece cast iron body, quick-disconnect power cord, stainless steel impeller, and dual shaft seals. Models are available in single-stage or two-stage designs. Complete pre-designed grinder systems are available in a variety of basin sizes. 800/543-2550; www.libertypumps.com.

DIGITAL METERING PUMP

The Centrac series digital metering pump from Milton Roy is offered with an advanced diaphragm integrity alarm that indicates a diaphragm issue before the process or the pump is compromised. The pump features a 30-year drive design life, 45,000-hour diaphragm life, and capacities between 0.06 and 1,100 gph. The unit offers advanced turn-down flexibility with ± 0.5 percent steady-state accuracy over the full range. Pump control options are tailored to the specific needs of the treatment facility and its process control requirements. 215/441-0800; www.miltonroy.com.



Centrac series digital metering pump from Milton Roy



M-Ovas Grinding System from NETZSCH Pumps

GRINDER SYSTEM

The M-Ovas Grinding System from NETZSCH Pumps protects downstream pumps, pipelines, belt presses, centrifuges and digesters from blockages. The single-shaft design cuts and conditions debris-laden fluids into a homogenous sludge. Other debris like stones and metal parts fall out of suspension and accumulate in an integrated stone trap, making it easy to access and dispose of settled matter.

The compact design allows high flow rates with low energy consumption. The grinder allows for maintenance in place without disconnecting any piping. The quick-release hinged lid gives access to the cutting blades and plates. The cutting blades are simple to change, and the cutter plate is reversible. A variety of cutter plates and control panels are available. 610/363-8010; www.netzschusa.com.

MAGNET MOTORS

Gen2.0 PremiumPlus+ brushless permanent magnet motors from NovaTorque are driven by variable-frequency drives and have motor-only-rated point efficiencies of 93 and 92 percent for 3 and 5 hp versions. The motors are packaged in standard NEMA frame sizes and mounting dimensions. Due to high power density, they are available in a mounting frame size typical for induction motors and a frame size smaller. The motors are compatible with available VFDs from most manufacturers. A flux-focusing stator and roto hub geometry allow the motor to produce with an all-ferrite (versus rare earth) magnet design. 510/933-2700; www.novatorque.com.



Gen2.0 PremiumPlus+ motors from NovaTorque



Enviroprime System pump series from Thompson Pump

AUTOMATIC PRIMING

The Enviroprime System pump series from Thompson Pump provides reliable, automatic priming without spilling pump fluid. It is well suited for sewer bypasses and wastewater treatment. Pumps are available in sizes from 2 to 18 inches with capacities up to 11,000 gpm, heads to 430 feet, and the ability to handle solids up to 4 inches. 800/767-7310; www.thompsonpump.com.

ACTUATOR PACKAGE

The actuator package from Rotork Fluid Systems is designed for dependable, effective actuator control of pump control valves. The system protects discharge pumps and piping systems from reverse flow and water hammer.

The system has a specially designed hydraulic manifold, which eliminates control circuit piping and potential leak points. The manifold block includes speed controls for open, close and emergency shutdown (ESD), as well as a hydraulic solenoid control valve with manual override. It also incorporates a manual hand pump with a local/remote operation selector and a hydraulic oil reservoir. For



Actuator package from Rotork Fluid Systems

(continued)

normal operation, the system provides an adjustable one-to-four-minute stroke time. It also provides a fast, and independently adjustable, five-to-30-second stroke time upon the loss of the ESD signal. **585/247-2304; www.rotork.com.**



CAKE PUMP

The seepex BTH cake pump design allows flow rates up to 220 gpm at differential pressures of 540 psi. An auger pushes the cake into the pumping element. The pitch, diameter and speed of the auger can be adjusted to match the application. A customizable open hopper along with system controls results in a non-intrusive cake pump solution.

BTH cake pump from seepex

A control panel controls dry running protection sensors, load cell sensors, pressure gauge and boundary layer injection. The unit offers simple integration with dewatering and drying equipment and low operating and maintenance costs. **937/864-7150; www.seepex.com.**

RELIEF VALVE

The Pneumatic Dynamic Lifter from Singer Valve is a responsive, compact sewage relief valve that can handle high pressures and uses a compressed air cylinder to hold the valve closed. The chamber is fitted with a relief pilot that is closed when line pressure is lower than the set point. If the pressure rises above the set point, the relief point opens, causing the air in the cylinder to vent, opening the valve. The valve closes drip-tight when pressure falls below the set point.



Pneumatic Dynamic Lifter from Singer Valve

The surge anticipator has two three-way solenoid valves to put air into the cylinder under the piston, driving the valve open on power failure. When the surge returns back to the pump, it comes back to an open valve where it can be discharged back to the sump in the vicinity of the pump. The main valve needs to be open long enough to handle the initial surge, but not longer, or it will continue to drain the line. The solenoid is on a timer, which is set at startup. Once the set time has elapsed, another solenoid allows air to recharge the cylinder, closing the main valve. **604/594-5404; www.singervalve.com.**

IMMERSIBLE PUMPS



I-Series immersible non-clog pumps from Smith & Loveless

I-Series immersible non-clog pumps from Smith & Loveless are available for new and retrofit applications in lift stations and wastewater treatment plants. The heavy-duty pumps can be immersed for up to three weeks in flooding conditions. They are designed to withstand 21 days at 30 feet submergence. Features include oversized bearings and stainless steel pump shafts, bronze mechanical seals for high heat dissipation, close tolerances that prevent recirculation

and a keyed and tapered shaft for positive lock and easy impeller removal. **800/898-9122; www.smithandloveless.com.**

USER-FRIENDLY DRIVE



VARIOspeed variable-frequency drive from SJE-Rhombus

The VARIOspeed variable-frequency drive from SJE-Rhombus features a user-friendly HMI interface and is designed for constant pressure applications up to 250 hp, including booster pumps, deep well submersible pumps and irrigation pumps. As flow and head conditions change in the pumping system, the

drive can automatically control the pump speed and maintain a constant discharge pressure. The desired set

pressure is set on the VFD keypad. The pressure transducer measures the pump discharge pressure.

The drive is available from 5 to 150 hp at 208-240V and 5 to 250 hp at 380-480V, single-phase or three-phase supply voltage. Built-in features include P.I.D. control, energy optimization control, adjustable electronic overload, automatic system restart, high- and low-pressure alarms, and multiple pump control. Pre-programmed parameters make installation quick and startup simple. The standard unit is supplied in a NEMA 3R enclosure with a 0-200 psi pressure transducer. **888/342-5753; www.sjrhombus.com.**

DRY-RUN PUMP

The Dri-Prime NC150M pump from Godwin, a Xylem brand, is a compact pump with flow capabilities up to 1,767 gpm and discharge heads up to 195 feet.



Dri-Prime NC150M pump from Godwin, a Xylem brand

The pump features Flygt N-technology with a self-cleaning impeller. NC Series pumps deliver high efficiency, resulting in low energy and fuel costs while reducing downtime.

Features include an automatic self-priming system that primes and re-primers from dry up to 28 feet without operator assistance or foot valve control; non-clog performance; Hard-Iron (60 HRC) impeller and insert ring; dry-running high-pressure oil bath mechanical seal with highly abrasion-resistant silicon carbide faces; and close-coupled centrifugal pump mounted to a diesel engine or electric motor for easy pump-end or engine/motor changeover in the field. The unit is also available as a Godwin DBS for pump station backup. **865/467-3636; www.godwinpumps.com.**

CUSTOMIZABLE DRIVE



Altivar 61 drive from Schneider Electric

The Altivar 61 drive from Schneider Electric reduces installation, startup and maintenance time while providing a user-friendly interface, high connectivity and reliable operation in a wide range of applications. It provides connectivity to the major building automation networks including Lonworks, BACnet, Metasys N2 and Apogee P1, as well as other industrial networks.

The drive can be internally fitted with the water solutions multi-pump option card to expand connectivity or fitted with the controller inside option board, which allows custom programming via the IEC 1131 programming methods.

A customizable graphic keypad makes setup and configuration quick and easy. The large-screen, customizable display and easy-to-use navigation wheel simplify programming, as do plain text menus available in six languages. Simple start menus and function keys put common parameters in one place at the user's fingertips. The ability to save programs to the portable keypad allows for quick transfer from one drive to another. **888/778-2733; www.schneider-electric.us.**



THERMOPLASTIC PUMPS

T-Series Webster thermoplastic pumps from Hayward Flow Control are vertical seal-less immersible pumps that feature a single, non-coupled motor/impeller with a shaft seal. The pumps are available in ratings from 1/3 to 1 1/2 hp with standard and washdown motors and in voltages of 115/230 and 208-230/460.

Other features include CPVC pump head and impeller, 303 stainless steel shaft, and an extended shaft sleeve. The pumps provide a solid, stable one-piece shaft for long-lasting performance; a seal point away from weep hole; less vibration for long motor life; and true run. Additional options

T-Series Webster pumps from Hayward Flow Control

include GFPP or PVDF pump head and impeller assembly, inlet screen, in-tank filtration, impeller trim variations, explosion-proof motors, 575V motors and S-J type electrical cord. **888/429-4635; www.haywardflowcontrol.com. tpo**

case studies

PUMPS, DRIVES, VALVES AND BLOWERS

By Scottie Dayton

Pumps lower operating expenses

Problem

Three 300 hp long-shaft pumps at the Baltic Avenue Pump Station in Atlantic City, N.J., were sized to handle expected growth from casinos. When the growth did not materialize, the pumps operated inefficiently and cavitated, damaging the impellers.

Solution

A consultant for Atlantic City Sewerage Co. recommended replacing the units with **submersible pumps from Flygt (Xylem)**. The utility bought a 135 hp pump delivering 9,600 gpm at 36 feet total dynamic head (TDH) and two 200 hp pumps delivering 13,500 gpm at 40 feet TDH. The pumps had variable-frequency drives and were mounted in a dry-pit configuration to handle 8 to 15 mgd.



RESULT

The utility has saved 10 to 30 percent in energy costs and maintenance. Operators appreciate their quieter work environment. **704/409-9750; www.xylem.com.**

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Blower reduces energy usage

Problem

City officials wanted to reduce operating expenses at the 6 mgd (design) Charleston (Ill.) Sewage Treatment Plant by upgrading the Hoffman multi-stage aeration blowers.

Solution

They selected a **Hoffman Revolution Model R07 high-speed centrifugal blower from Gardner Denver**. The unit, with active magnetic smart bearing technology, replaced two 250 hp and one 150 hp multistage blowers.



RESULT

The city expected a 25 percent reduction in electricity usage, but realized a 47 percent reduction in the first month. **800/682-9868; www.hoffmanandlamson.com. tpo**

Caring for Concrete

DETERIORATION IN LARGE WASTEWATER TREATMENT STRUCTURES IS A COSTLY PROBLEM. AN EXPERT OFFERS SOME PRACTICAL ADVICE ON FIXING, REPURPOSING AND RECONFIGURING.

By Ted J. Rulseh

The most expensive part of a wastewater treatment plant is not the mechanical equipment — it's the massive concrete tanks and other structures in which the treatment processes function. So says Kent Nichols, wastewater treatment practice manager with the Weston & Sampson environmental and infrastructure consulting firm based in Peabody, Mass.

Nichols observes that concrete structures in the nations' treatment plants are aging — and meanwhile new and tighter permit requirements are forcing plants to revisit their treatment processes. For plant operations teams, that brings a variety of challenges, not the least of which is deciding whether existing buildings and tankage can accommodate the processes needed to meet current and future nutrient limits.

Nichols talked about the preservation, repair and repurposing of concrete structures in an interview with *Treatment Plant Operator*.

tpo: How would you describe the basic challenge of dealing with concrete structures in treatment plants?

“Now a lot of plants are in desperate need of repair or modernization, and at the same time there are very significant changes in the discharge permits the plants are facing, so the treatment plant has to do a different job than was originally envisioned.”

KENT NICHOLS

Nichols: Most plants get pretty good funding to do repairs and upgrades of their mechanical equipment, but many plants lack the budget, time and sometimes the capacity to do maintenance on the physical structures. So what happens is that they live with the tankage and buildings while they go through three or four cycles of changing out the pumps, motors and other devices. All the while the structures are aging.

tpo: What happens to concrete structures as they age?

Nichols: We're talking about aggressive environments. Conditions vary some depending on the region, but a constant in the business is degradation of organic material, causing formation of hydrogen sulfide that causes surface corrosion. You also get some pH conditions that can be challenging.

And everybody is exposed to weather conditions. Where I am in the northeast, the freeze-thaw cycle is a big thing. Concrete structures need to be designed for proper expansion. These are large structures — big tanks with thick walls and deep foundations. It can be a challenge to create expansion joints to control cracking.

One common thing we see in tankage is cracks on the surface of the concrete. In some cases, those cracks are just a result of natural aging, but often they result from the fact that the original expansion joints weren't constructed properly. It's a real challenge, and it tends to be greater in regions with a lot of freezing and thawing cycles.

tpo: In general, how would you rate the condition of concrete structures in treatment plants today?

Nichols: It's highly variable. Many treatment plants have structures that go back to the 1960s when the original rules were put in place, and there were a lot of primary treatment systems that wouldn't meet the standards set by the Clean Water Act of 1972.

From the 1970s to the 1980s, we built a lot of new plants and new structures to address the need for secondary treatment and introduce biological processes. So a lot of plants that existed in the 1960s were amended in the 1970s and 1980s, and now they have a mix of concrete that is 50 years old, and other concrete that is 25 to 30 years old.

Curiously enough, in plants we've worked in, some of the concrete that is 50 years old is in just as good or better condition than concrete that's 25 to 30 years old. It tends to be mainly about how the concrete was prepared and set, and the type of environment it has been subjected to.

In the later upgrades, we find the designers were good at putting coatings on the concrete to prevent those aggressive conditions from attacking the surface. We find that a lot of original concrete, if it was constructed well, if it had good oversight, and if it was a good mix design, is still pretty sound.



Kent Nichols

(continued)

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tpo: What are the consequences of concrete deterioration?

Nichols: The big thing is it starts to affect structural stability. The places where you see it the most are in closed tanks, where we see a loss of mass on the surface. When that happens, the surface starts to erode and you'll actually get damage to the shallow rebar. When you lose enough mass to affect the rebar, the rebar starts to fall apart. Once you've exposed one face of the rebar, your stability is really in question.

tpo: How do you help treatment plants deal with aging concrete structures?

Nichols: It's a challenge for a variety of reasons. Probably the biggest one is that most plants were built or upgraded in the 1970s and 1980s and, mainly for financial reasons, a lot of communities didn't get around to rehabbing or repairing those plants every 20 years, which was the original intended life.

Now a lot of plants are in desperate need of repair or modernization, and at the same time there are very significant changes in the discharge permits the plants are facing, so the treatment plant has to do a different job than was originally envisioned. That means you have to go back and re-evaluate. What structures do you have? What do you need for structures? What types of processes will allow you to stay within the footprint and tank sizes you have?

You have aging infrastructure and constantly tightening discharge permits, aggravated by the fact we're in some difficult financial times. So since structures are the most expensive things to build in a plant, you're left with a need to try to adapt them to the new permit conditions, but not spend extra money on them.

tpo: Why are these structures so costly?

Nichols: First, large structures that contain a lot of concrete are inherently expensive to build. Second, most such structures are built in excavations, and that creates all sorts of additional challenges. Wastewater treatment plants frequently are not on pristine sites, so you can run into poor soil conditions or things previously buried on the site. Old sludge burial areas are pretty common on treatment plant sites. So are landfill areas. Poor-quality urban fill is also a common problem.

tpo: How should a clean-water agency proceed when dealing with aging concrete structures and new permit requirements?

Nichols: The first step is good planning. When you're extremely limited in the money you can spend, the last thing you want to do is change things without a lot of forethought. The new treatment processes may be basically similar, but when you add the need to deal with nitrogen and phosphorus, those processes are very different. They're more space intensive, they're more biologically intensive, they require more chemical addition, and they require a lot of systems you didn't envision originally. In selecting process changes, you need to look not just at what your permit is now, but what your discharge limits are likely to be in the next couple of permit cycles.

tpo: What is the role of operators in this kind of planning process?

Nichols: You need to rely on the operators. We find a lot of communities miss the opportunity to involve operators in the design. Operators know which systems they can live with and which ones they can't. They have a good feeling for what the life of the structures and systems are like — they look at the structures from day to day. They can be very helpful in evaluating not just where you are today, but where you think you'll end up in the future, based on permit changes.

tpo: What's involved in assessing the condition of the structures themselves?

Nichols: The first step is surface testing. Frequently, with modern systems, we can do some non-invasive testing where we take scans of the walls and check the density of the concrete. There are technologies that provide new ways of seeing the strength of concrete and the rebar.

We generally find there's no real substitute for doing some core samples, where you actually take a section out and look at the structural stability. There are a variety of tests we can run on core samples. We can look at the condition of the concrete at various depths. Often we can grab pieces of the rebar and check out its condition. We can get a good sense of how the original concrete structure was built.

“Operators know which systems they can live with and which ones they can't. They have a good feeling for what the life of the structures and systems are like — they look at the structures from day to day. They can be very helpful in evaluating not just where you are today, but where you think you'll end up in the future, based on permit changes.”

KENT NICHOLS

That helps us understand where the structure is in its life and how sound the structure was to begin with.

tpo: What can be done to remediate a structure that has undergone some damage?

Nichols: If you find that the structure's physical configuration will work with what you need for new permit conditions and any process changes you're going to make, then you have a few options. If the structure is in generally good shape, you can just do surface protection. There have been some great advances in surface coatings.

You do a pretty intensive surface cleaning to take off any loose material. You identify the cracks and use a specialized process to inject the thicker cracks, and maybe finger-seal the smaller cracks. Then you go back and do a protective corrosion inhibition coating on the concrete. In very intense situations, you can apply a built-up coating.

There are a lot of specialized liners available. They include epoxies, bitumen-based materials, and flexible lining systems that will bridge gaps if you've got movement in a tank. We find that on a solid tank surface, something with a hard finish performs well. The epoxies in particular are pretty tenacious. They also allow you, once you get a coating on a tank, to do a better job of cleaning the surface later.

tpo: What about tanks that have more severe surface damage?

Nichols: One option if you have a loss of surface mass is to use a spray-applied amendment, like shotcrete. Then you still finish that off with a surface coating to protect it. Tankage has to be treated carefully. You don't want to put on any type of mass if it won't hold, and you don't want to put it in a place where over time the environment is just going to destroy it again.

tpo: What if the structural damage is severe enough so that these coating actions aren't workable?

Nichols: If in situ repair techniques won't work, then you need to do more significant reconstruction, in a lot of cases demolishing the tanks. If you're smart about it, you can actually use the better pieces of the structures and change the configuration to be suitable for more modern treatment process technologies.

(continued)

tpo: What about repurposing of concrete tanks?

Nichols: We see a lot of repurposing. A lot of old anaerobic digesters years ago were taken out of service and changed over to different modes of operation. Many were changed to aerobic digesters or gravity thickeners. I've seen places where they changed a circular digester tank out to be a room for pumping equipment. In one case they built a chemical feed room inside an old digester.

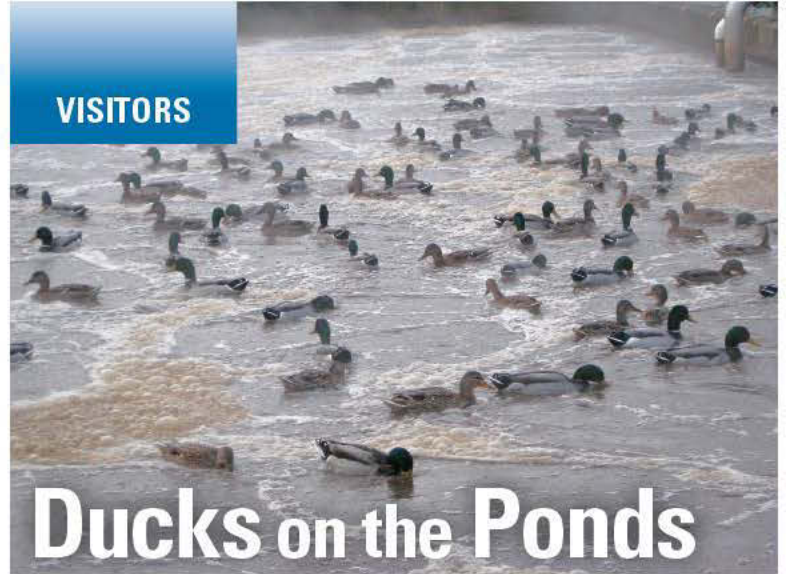
The curious thing is that this is starting to come full circle, because now more than anything, energy use drives a lot of the business of upgrading plants. The need to pay attention to energy efficiency and use opportunities for renewable energy drives a lot of communities back to anaerobic digestion with the ability to capture methane gas as an energy source for combined heat and power systems.

tpo: How would you summarize your advice for treatment plants in dealing with structures?

Nichols: The biggest challenge going forward is finding a way to fund projects. When you're at the end of the life expectancy of a wastewater treatment facility, that results in some kind of large capital project, and the challenge with large capital projects is mostly funding-related. The good news is that most wastewater systems have enterprise funding, where the budget is independent of the local tax rate. But even then the need to be very fiscally conservative is pressing.

The big thing we push is to really understand the inventory of what you have for physical structures and process equipment and to follow a sound planning process. Really understand what spaces you have and will need, what the condition of your structures is, what your permit needs will be in the future, and what capacity you will need. Wrap that together and come up with an effective plan that tells you what to do. **tpo**

VISITORS



Ducks on the Ponds

By Briana Jones

Ducks have found a stopping point at the City of North Royalton (Ohio) Wastewater Treatment Plant B. They land in the aeration tanks, and cold early-spring weather doesn't seem to bother them.

"It started with small numbers 23 years ago after an expansion, and the numbers have grown every year," says operator III Dennis Few. "First it was just one aeration tank, but as the years passed the population grew and spilled into two tanks and then finally all three tanks as well as the three final clarifiers.

"I've worked for three municipalities and seven plants, but I've never seen ducks on aeration tanks until I came here. I've always been curious if other operators have seen something like this." **tpo**

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Red Valve offers selection guide

Red Valve Company Inc. offers a valve selection guide for wastewater treatment plants. A detailed treatment plant layout illustrates applications for Red Valve products at every stage, from influent flow through effluent discharge.



Purafil hires product manager

Purafil hired Tom Miles as product manager for its Biological Air Treater odor control technology. Miles has 26 years experience in the water and wastewater industry.

MAR Systems names VP of sales

MAR Systems named Darrell Zielinski vice president of sales. He has 20 years of experience in the water treatment industry.

Oldham's WX64 controller receives CSA approval

Oldham's WX64 gas detection control panel has been certified by the Canadian Standards Association (CSA) and carries the CSA mark of approval. The 64-channel controller is certified as a signal appliance for use in Class I, Division 2, Group A, B, C and D hazardous locations, according to CSA standards C22.2 No. 1010.1-92, 142-M1987, 152-M1984, 213-M1987 and UL 1604.

Grundfos opens water utility center

Grundfos North America held a ribbon cutting in April for its Aurora, Ill., water utility center. The facility will function as a competence center for municipal water, where research and development operations will bring to market sustainable and innovative solutions for water supply and wastewater challenges.

WILO names CEO, adds distributor

WILO USA LLC names Mark D'Agostino president and chief executive officer. He joined the company in 2007 and has been vice president of sales and marketing and national sales manager. The company also added Metropolitan Industries Inc. of Romeoville, Ill., as a product representative in Illinois, Northwest Indiana and St. Louis County, Mo.



Mark D'Agostino

VerderGPM becomes Verder Inc.

VerderGPM changed its name to Verder Inc. The company sells Verderflex brand hose and tubing, Verderair air operated diaphragm pumps and SSP Alfa Laval rotary lobe and dual disc pumps.

GSE Lining Technology rebrands as GSE Environmental, adds assets

GSE Lining Technology LLC of Houston rebranded as GSE Environmental after its listing on the New York Stock Exchange, and to reflect its transition as a global organization. The company's brand identity includes name change, logo and tagline, "Durability runs deep." The company's subsidiaries also acquired certain manufacturing equipment from Poly-America LP and Poly-Flex Inc. for \$75 million.

Carboline's Reactamine 760 receives FDA approval

Reactamine 760, an elastomeric polyurethane hybrid lining from Carboline Co., received FDA approval for direct dry food contact in addition to its UL certification for potable water service.

Agri-Inject names CEO, director of global sales

Agri-Inject Inc., provider of fluid injection technology for industrial and municipal use, named Erik Tribelhorn chief executive officer and Neal Saxton director of global sales.



Erik Tribelhorn



Neal Saxton

2G CENERGY adds Florida manufacturing plant

2G CENERGY Power Systems Technologies Inc. purchased a 60,000-square-foot manufacturing facility in St. Augustine, Fla., where it will produce advanced biogas CHP (combined heat and power) clean energy conversion systems for its North and South American markets. The plant is part of a 10-acre site and is expected to bring 125 new jobs to the area.

Bauer Gear Motor opens China assembly plant

Bauer Gear Motor, part of Altra Industrial Motion, opened its first assembly plant in China to more effectively serve industrial growth in that region. Located in Esslingen, Germany, Bauer is not moving its core design and manufacturing facilities.

Xylem offers product app, launches marketing campaign

Xylem Inc. launched a mobile app for its online Xylect product selection tool. The app provides access to detailed product information and is available for download at the iTunes App Store, <http://itunes.apple.com/us/app/xylect/id490601467?mt=8>. The company also launched a new marketing campaign, Great Pumping Moments, to promote its Flygt Ready dewatering pumps.

Severn Trent's Spanish office changes name

Severn Trent Services/Apliclor, the company formed when Severn Trent Services acquired Barcelona-based P.S. Apliclor S.A. in 2009, will be simply known as Severn Trent Services. The Apliclor name will continue to be used as a product brand within the Spanish office's chemicals business. The company also introduced a new Spanish website, www.severntrentservices.es. **tpo**

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9

1. WAGO IO-LINK MASTER MODULE

The 750-675 4-Channel IO-Link Master module from WAGO Corp. simplifies integration, configuration and management of intelligent sensors and actuators. The network-based system eliminates configuration of field devices via handheld units and reduces device wiring to three conductors, minimizing automation footprint, engineering, commissioning and maintenance costs. **800/346-7245; www.wago.us.**

2. WITTE VIBRATION ISOLATORS

Vibration isolators from The Witte Company Inc. are available on vibrating fluid bed dryers, coolers, screeners, pellet classifiers and other machinery. The isolators permit installation on mezzanines, platforms, upper floors, in cleanrooms, and other sensitive locations by absorbing vibrations at the source and inhibiting their transmission through the building, enabling processing lines to be expanded or reconfigured and available space to be maximized. **908/689-6500; www.witte.com.**

3. KROHNE LIQUIDS, SOLIDS LEVEL METER

The OPTIFLEX 1100C level meter from KROHNE Inc. measures liquids and solids in non-explosive environments. The meter is two-wire, loop-powered and available with a standard 20-meter cable or segmented

coaxial probe for liquids and a 10-meter cable probe for solids. All probes can be shortened on site. The meter is available with an integrated display and keyboard in the cover, eliminating the need to open the housing cover for configuration. A blind version also is available. Multiple blind versions can be configured on site using a single Human-Machine Interface service tool. **800/356-9464; www.us.krohne.com.**

4. RDP SIGNAL CONDITIONER

The E725 signal conditioner and display unit from RDP Electrosense can be used in either a stand-alone or panel-mounted mode. Local display of transducer values from a variety of sources, including displacement, pressure, load and torque, can be incorporated into control panels using the conditioner. The unit has an analog output (voltage or current) that can be connected to a suitable input on a PLC and provides serial communication via RS232 or RS485. Settings can be password protected and, if required, the panel can be disabled to prevent upsetting operation. **800/334-5838; www.rdpc.com.**

5. AIRMASTER TURBO X-TREME AERATOR

The 50 hp Turbo X-Treme Magnum floating/surface high-efficiency aerator from Airmaster Aerator pumps up to 12.5 mgd. The unit has a

turbo blower and double-sided impeller for high-capacity water movement and maximum aeration and mixing. Made of stainless steel, the aerator is built for long-term operation. A chemical injection port for adding enzymes and de-foamers is available. **888/813-3680; www.airmasteraerator.com.**

6. FCI ST100 AIR/GAS FLOWMETER

The ST100 Series thermal mass air/gas flowmeter from Fluid Components International has a remote-mount transmitter with optional digital display and can be mounted up to 1,000 feet from the flow sensor using interconnecting cable. The meter is available with 4-20 mA analog, frequency/pulse, alarm relays or digital bus communications. **800/854-1993; www.fluidcomponents.com.**

7. THERMO FISHER WATER SAMPLE COLLECTION CONTAINERS

Thermo Scientific Sterilin water sampling bottles from Thermo Fisher Scientific protect samples against contamination and other damage after collection. Designed for either chlorinated or non-chlorinated water sampling, bottles are available in square and rectangular designs. The over-cap shape reduces the risk of contamination as well as bottle

neck damage that can occur during transit. Tamper-evident seals reduce the need for retesting. Square bottles are available in 500 mL and 1,000 mL sizes. Rectangular bottles are available in 350 mL and 500 mL capacities. **800/637-3739; www.thermo.com.**

8. PARKSON AQUA GUARD ULTRACLEAN SCREEN

The Aqua Guard UltraClean water and wastewater treatment plant screen from Parkson Corp. improves capture rate and provides easier maintenance over previous designs. The screen can be used with new systems and retrofitted to existing systems. **888/727-5766; www.parkson.com.**

9. CARBOLINE POLYCLAD 975 EPOXY COATING

Polyclad 975 100-percent solids epoxy pipeline coating from Carboline is made to protect buried steel and ductile iron pipeline exteriors, girth welds or tie-ins. The coating can be applied by spray (plural airless or dual cartridge), while companion product Polyclad 975 H can be hand applied by brush or roller. The coating is compatible with FBE, coal tar, tape systems and cathodic protection. **800/848-4645; www.carboline.com.**

(continued)

product spotlight

Vertical Screening System Mounts in Small Spaces

By Ed Wodalski

The AGV Vertical Auger Monster wastewater screening system from JWC Environmental combines a grinder, fine screen and compactor. The system mounts to the inside wall of a pump station next to the inlet pipe and catches rags, wipes, plastics and trash before they get inside. The vertical design lets it fit in manholes and other limited-space areas.

The system can be installed as a headworks screen for package treatment plants or lagoon systems. Available in four models, it is designed for treatment plants with flow rates of 1 mgd or less.

"The purpose of the entire system is to protect downstream systems, and ensure we remove things like wipes that are hitting the industry quite hard right now," says Rob Sabol, director of research and development. "We pull those things out of the waste stream, grind them into some sort of uniform size and discharge them into a bin, bucket or trash container, making sure they're clean and reasonably dry."

The customizable system has a 55-inch-diameter base and stands from 34 1/2 to 56 inches tall, depending on model. The top of the unit extends up to 30 feet, depending on the application. Most discharge chutes extend 4 to 5 feet above the walking surface for debris disposal into a roll-off container. "The overall height is determined by where the influent pipe is relative to where you want the discharge," Sabol says.

Powered by a 5 hp motor (immersible and other electric types available), the dual-shafted grinder shreds long, stringy material to prevent wrapping and breaks up clumps for efficient washing. Soft organics are washed back into the channel through a perforated screen (5/64, 1/8 or 1/4 inches). The integrated spray wash launders screenings and removes fecal material for cleaner discharge and reduced odor.

"The grinder acts as a pre-conditioner," Sabol says. "If you didn't have it, you would get large chunks of solids. It gives you a better washing effect and keeps fecal content in the waste treatment process."

A screening basket with 1/4-inch circular openings stops debris and small trash, such as cigarette butts. The rotating auger, powered by a 2 hp motor, lifts debris to ground level, where it is compressed and dewatered, reducing volume by up to 90 percent and leaving about 30 percent dry solids content that would pass the paint filter test. Debris is discharged through an 8- by 12-inch chute into a plastic bag or bin. "Our intent is to ensure that there is no free water in the discharge," says Todd Nydam, senior mechanical engineer.

Automated PLC monitoring, auto load sensing and reversing controls protect the system from damage, while an auger failsafe mode ensures that the system continues running even if electronics are disabled. Adjustable differential run times provide optimal solids removal and extend operating life. Weather protection enables the system to operate in temperatures to minus 13 degrees F. **800/331-2277; www.jwce.com.**



AGV Vertical Auger Monster from JWC Environmental



10. ANUE ODOR ELIMINATOR

The FORSe 5 series from Anue Water Technologies is a range of systems that target and eliminate odor and corrosion at the source in collection systems. Using microprocessor control, the systems produce oxygen and ozone on demand and infuse the treatment into a sidestream that is then returned to the main, untreated flow. The process is used to treat force mains, lift stations or combinations of the two. It offers low cost of ownership, reduced sulfide concentrations and increased dissolved oxygen, according to the manufacturer. 760/476-9090; www.anuewater.com.

11. ROXTEC CABLE, PIPE SEALING MODULES

BG (bonding and grounding) rubber sealing modules for cables and pipes from Roxtec feature a center core and removable black and blue layers for adaptability to different sizes of cable and pipes that simplify installation and logistics. Designed to seal large quantities of metal clad or armored cables in minimal space, a single module can seal a cable or pipe of different diameters by removing layers from the module halves. The modules, used with a frame and compression unit, provide a seal that protects against water, fire, gas, pressure, sand, pests, dust and dirt, while ensuring a certified bonded or grounded termination. The seals also protect against damage from pull-out, blast load, vibrations, noise and electromagnetic interference. 800/520-4769; www.roxtec.com.

12. HACH BIOGAS TITRATION MANAGER

The Biogas Titration Manager from Hach Co., designed for monitoring biogas production, features three pre-programmed methods and has seven free spots for user-defined methods, such as acidity, chloride and hardness. The system provides real-time on-site analysis, dedicated FOS/TAC application package and a library of biogas methods. 800/227-4224; www.hach.com. tpo



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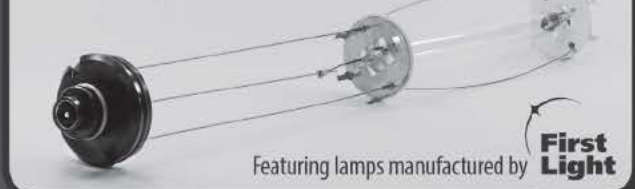
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Pepco to build biogas-fueled CHP plant

Pepco Energy Services, a subsidiary of Pepco Holdings, signed an agreement with DC Water to design, build and operate a combined heat and power (CHP) plant at the 370 mgd Blue Plains Advanced Wastewater Treatment Plant (AWTP). The company will design and build the project for \$81 million. It will produce at least 14 MW to supply nearly 30 percent of the plant's average power demand.

The company will also provide on-site operations and maintenance valued at \$89 million over 15 years. The new CHP plant will be part of DC Water's thermal hydrolysis and anaerobic digestion project, which will be the largest in the world. Thermal hydrolysis uses high-pressure steam to increase the rate of biogas production and neutralize contaminants in waste streams. The CHP plant will include three Solar Mercury 50 low-NOx gas turbines.

Ameresco and Philadelphia announce biogas project

Ameresco and the Philadelphia Water Department agreed to design, build and maintain an innovative wastewater biogas-to-energy facility. The Northeast Water Pollution Control Plant Biogas Project will generate electricity and thermal energy for use on site, fueled mainly by digester gas. The \$475 million construction project, designed to generate 5.6 MW of power, is expected to reduce energy costs by more than \$12 million over 16 years. Ameresco will manage engineering, procurement, construction and maintenance. The project will reduce carbon emissions by nearly 22,000 tons per year.

St. Helens treatment plant gets energy efficiency award

SolarBee solar-powered mixers at the St. Helens (Ore.) Wastewater Treatment Plant have helped reduce aeration horsepower by more than 60 percent and save the city \$100,000 compared to the previous year. The city received the Oregon Leaders Award for Industrial Energy Efficiency at the 4th Annual NW Industrial Energy Efficiency Summit in Portland in January.

St. Helens (population 13,000) and the town's major industry, Boise Paper, share the wastewater treatment plant and its NPDES permit along with it. The two work together to operate the plant as effectively and efficiently as possible. A recent project to reduce the cost of aeration in the 42-acre secondary lagoon led to the installation of solar-powered, long-distance circulation mixers from SolarBee. The project qualified for a \$70,000 rebate from the local electric utility with support from the Bonneville Power Administration's Energy Smart Industrial (ESI) program.

Woodard & Curran acquires Cumming/Riter

Consulting and operations firm Woodard & Curran has acquired Cummings/Riter Consultants of Pittsburgh, a 32-person firm concentrating in corrective action work with associated services in environmental compliance and site development. The two firms have teamed on corrective action projects for the past 12 years. Besides its remediation practice, Cummings/Riter has a practice in the natural gas market, specifically the Pennsylvania shale gas market. The firm will operate as Cummings/Riter, a Woodard & Curran Company.

American Water and Elizabeth, N.J., earn mayors' award

American Water and the City of Elizabeth (N.J.) water and wastewater systems earned the 2012 Outstanding Public/Private Partnership Award from the U.S. Conference of Mayors. The award honors achievements made possible through the combined effort of cities and the members of the Mayors Business Council. American Water and the city were honored for the positive results of a public-private partnership and significant improvements to the city's water and wastewater systems.

Needing to upgrade its 100-year-old water infrastructure and 150-year-old wastewater system, the city entered two long-term contracts with American Water. In 1998, the city entered a 40-year concession contract with American Water's market-based subsidiary to operate and maintain the water system. Later, the city entered a 20-year operation and maintenance contract with the company for the sewer system.

During the partnership, American Water has made more than \$4 million in water-related infrastructure investments, including systemwide meter replacements, and 700 new fire hydrants. On the wastewater side, E'town Services operates the city's combined sewer system and has invested \$1.4 million to rehabilitate brick sewers.

Kruger wins AnoxKaldnes MBBR Contract

Kruger, a Veolia Water Solutions & Technologies company, won a contract from Fischer Construction to furnish a 0.82 mgd AnoxKaldnes moving bed biofilm reactor (MBBR) nitrification system for a Marbleton (Wyo.) Wastewater Treatment Plant upgrade. The MBBR LagoonGuard process will allow the existing lagoon system to meet strict ammonia limits year-round, even at winter temperatures.

Atlas Copco wins bid for energy-efficient screw blowers

The Town of Huntington on Long Island, N.Y., contracted with Atlas Copco for ZS75-K-900 low-pressure screw blowers for its wastewater treatment facility. The ZS series low-pressure blowers are designed for energy-efficient operation.

Headworks ships large screens to India

Headworks has shipped two huge Mahr bar screens to Maharashtra, India. Each screen is as tall as a five-story building, measuring 50 feet high and 11 feet wide. Raw materials used included 48,947 pounds of stainless steel sheet and plate metal, 15,248 pounds of screenfield bar, and 400 feet of chain.

The units will be installed at the intake of the Shahad River, 60 km north-east of Mumbai. The installation is being handled by Crystal Industrial Syndicate. Headworks was awarded the contract last fall by STEM Water Distribution and Infrastructure Company. Heavy debris from the Shahad River has been blocking and clogging the intake structure and transfer pumps at the local water treatment plant. The conditions demanded a bar screen with 10 mm spacings that could withstand flows up to 435 mgd. **tpo**

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Installer Workshops

October 15, 2012 - Dover, DE

DOWRA Conference Contact Hollis Warren at (302) 284-9070 or Htwarren43@aol.com

October 25-26, 2012 - Lakewood, CO

CHURCH Onsite Wastewater Consultants
Contact: Kim Seipp (303) 622-4126 or highplains@tds.net

Operation & Maintenance Training Certification:

September 12-13, 2012 - Mill Valley, California

Operation & Maintenance, Level 1
Instructors: Mike Treinen or Kit Rosefield
Go to www.COWA.org

November, 2012 - (TBA) California

Operation & Maintenance, Level 2
Instructors: Nick Weigel or Kit Rosefield
Go to www.COWA.org

January 2013 - Lakewood, CO

CHURCH Onsite Wastewater Consultants
Contact: Kim Seipp (303) 622-4126 or highplains@tdsnet

CEU's for NAWT Recertification

July 26, 2012 - Sacramento, CA

COWA - NAWT - Low Pressure Pipe Drainfield & Drip Design - Go to www.COWA.org

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INDUSTRY MAGAZINES FOR UPDATES

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The **City of Mayer** was awarded a Wastewater Treatment Facility Operational Award-Certificate of Commendation by the Minnesota Pollution Control Agency.

Arthur Franks with U.S. Water at FGUA Seven Springs Wastewater Treatment Plant in Holiday, Fla., achieved his Operator C Level license and was promoted to plant operator.

Reid Snow and **Chris Rowe** received the Wastewater Utility Award from the New England Water Environment Association. Snow is wastewater treatment plant operator and Rowe is plant manager for Woodard & Curran, which operates the plant in the City of Provincetown, Mass.

Qk4 and the **City of Shepherdsville, Ky.**, received the American Council of Engineering Companies Grand Award for the city's wastewater treatment plant expansion and integrated fixed film/activated sludge process implementation. Qk4 led the design for the expansion.

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

Kentucky

The Kentucky Water & Wastewater Operators Association is offering the following courses:

- Aug. 9 – Confined Space, Bowling Green
 - Aug. 16 – Confined Space, London
- Visit www.kwwoa.org.

Michigan

The Michigan Water Environment Association has a Collection Systems Seminar Sept. 6 in East Lansing. Visit www.mi-wea.org.

Massachusetts

The New England Water Environment Association has a Collection Systems Seminar and Exhibit Sept. 11 in Westford. Visit www.newea.org.

North Carolina

The North Carolina-AWWA-WEA is offering these courses:

- July 16-20 – Biological Wastewater School, Morganton
 - Aug. 6-10 – Collection and Distribution School, Morganton
 - Sept. 11 – Advanced Topics in Wastewater Seminar, Lexington
 - Sept. 27 – Collection and Distribution Seminar, Greensboro
- Visit www.ncsafewater.org.

New York

The New York Water Environment Association has a Fundamentals of Wastewater Asset Management Seminar Aug. 29 in Potsdam. Visit www.nywea.org.

Wisconsin

The Wisconsin Wastewater Operators Association is offering these courses:

- July 26 – Northwood's Collection System Seminar, Marshfield
 - Aug. 13 – Microscopic Examination of Activated Sludge, Birnamwood
- Visit www.wwoa.org.

The University of Wisconsin Department of Engineering-Professional Development has a Processes, Design and Operation Seminar Sept. 25-27 in Madison. Visit www.epdweb.engr.wisc.edu. **tpo**

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



CALENDAR OF EVENTS

July 15-18

Georgia Association of Water Professionals Annual Conference & Expo, Savannah International Trade & Convention Center, Savannah. Visit www.gawponline.org.

July 19-20

Nebraska Water Environment Association Heartland Operators Conference, Holiday Inn, Kearney. Visit www.ne-wea.org.

July 24-27

Minnesota Wastewater Operators Association Annual Conference, Grand Rapids. Visit www.mwoa.net.

Aug. 26-29

American Public Works Association Expo, Anaheim Convention Center, Calif. Visit www.apwa.net/congress.

Sept. 9-12

Rocky Mountain Water Environment Association Annual Conference, Copper Mountain, Colo. Visit www.rmwea.org.

Sept. 12-14

South Dakota Water and Wastewater Association Annual Conference,

Ramkota Convention Center, Rapid City. Visit www.sdwwa.org.

Sept. 13-14

New York Water Environment Association Science and Technical Conference, Hotel Thayer, West Point. Visit www.nywea.org.

Sept. 29-Oct. 3

Water Environment Federation Technical Exhibition and Conference, New Orleans Morial Convention Center. Visit www.weftec.org.

Oct. 9-12

Wisconsin Wastewater Operators Association Annual Conference, Kalahari Resort, Wisconsin Dells. Visit www.wwoa.org.

Oct. 14-16

Atlantic Canada Water & Wastewater Association Annual Conference, Charlottetown, Prince Edward Island. Visit www.acwwa.ca.

Oct. 21-24

Pacific Northwest Clean Water Association Annual Conference and Exhibition, Boise Centre, Boise, Idaho. Visit www.pncwa.org.

See Both Sides

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BUSINESSES

FOR SALE: Septic pumping and portable toilet business in north central MN. Includes 2 vacuum trucks, 3,000-gallon tandem and 2,000 gallon, single axle, portable toilet service truck, 1 ton service van, 6 place portable toilet trailer, and 59 portable toilets. Asking \$215,000. Home: 320-676-8638. Cell: 320-630-3640. (P07)

WASH DC & TRI STATE AREA SEWER & DRAIN BUSINESS FOR SALE: Here's a chance to expand your business instantly! Steady, reliable healthy corporation grossing 1 -1.5 mil. with good reliable net for sale. sewer, drain, septic, grease trap, stormwater and vacuum truck services, commercial, residential, industrial, service trucks, jet trucks, pump trucks, jet-vac trucks, garage pumper, excavator, lateral TV/locators, etc. Company has been in business for well over a half century and still growing with plenty of potential. Owner wants to retire but will provide consulting and training for a reasonable transition period. Warehouse with large lot, sale or flexible lease available. Interested parties should contact: drainbizforsale@aol.com. (P08)

DRAINFIELD RESTORATION

Soil Shaker 2000. Universal skid steer attachment for drainfield restoration. Buy factory direct: \$6,250. www.soilshaker.com or call 320-293-6644. (P1-12)

EDUCATION

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

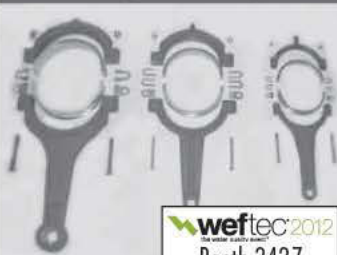
MISCELLANEOUS

UV DISINFECTION EQUIPMENT: Attention: Small wastewater treatment plant owners and operators. Very easy installation. Brand new product. US patent pending. callagher@sbcglobal.net, www.thefecalfighter.com. (oBM)

WATERBLASTING

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Moorhead (Minn.) Public Service

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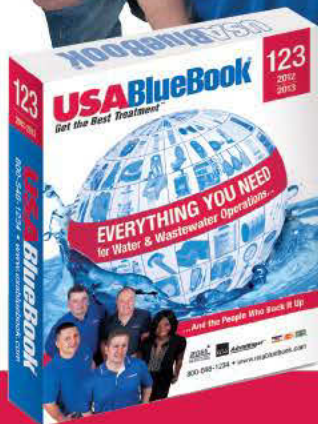


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