

March 2020

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Like the old Johnny Cash tune, Brian Wakefield added new parts to his business over time and soon enough had a full-service onsite wastewater operation p. 12

Brian



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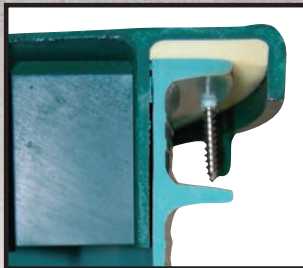
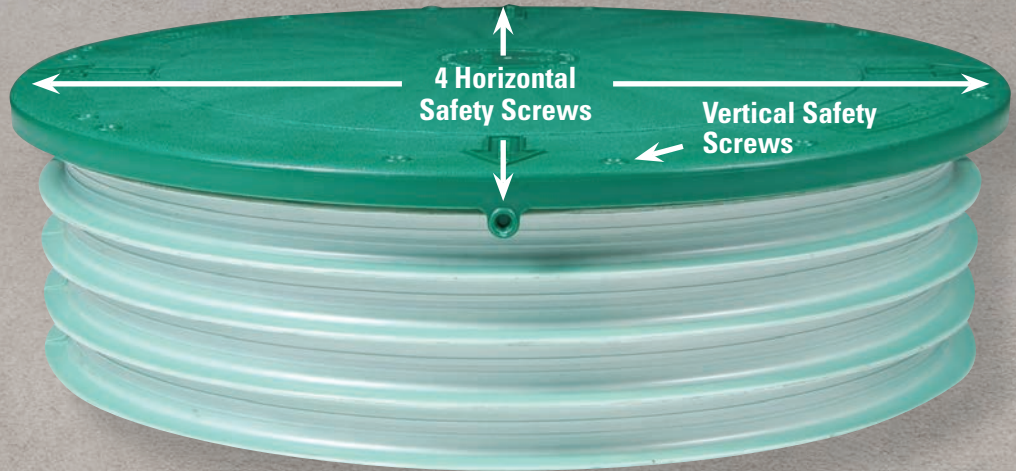


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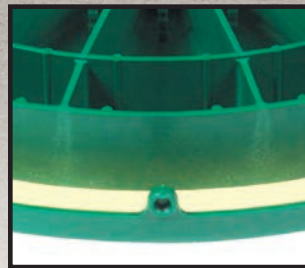
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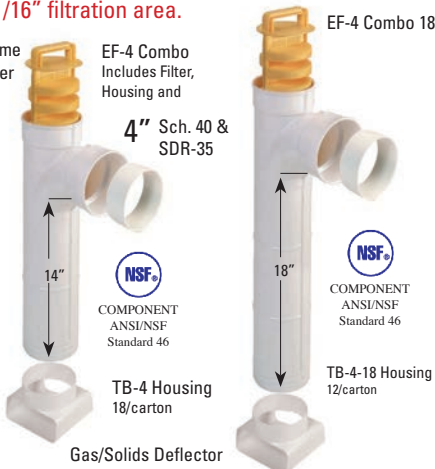


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## INSTALLER PROFILE:

### One Piece at a Time

By Betty Dageforde

## ON THE COVER:

B&J Wakefield Services started out providing real estate inspections, but then grew to become a full-service onsite wastewater company in Waxahachie, Texas. Owner Brian Wakefield is shown with a Kubota mini-excavator during a septic system installation. (Photo by Olivia Ogren-Hrejsa)

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Basic Training: Pay attention to drainage patterns

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## Enjoy this issue!

Established in 2004, *Onsite Installer*™ fosters higher professionalism and profitability for those who design and install septic systems and other onsite wastewater treatment systems.





Send your comments, questions or opinions to Jim Kneiszel at [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com).

# North Carolina Waterfront Community Honors Septic Program Leader

Environmental planner Todd Krafft is recognized posthumously for nearly 20 years of onsite education provided to the residents of Nags Head

In 2000, the thriving North Carolina beach town of Nags Head faced the same challenges with maintaining its decentralized wastewater systems as many other sensitive regions of the U.S. Local officials wanted to ensure a clean environment and safe groundwater, but the county and state had no laws requiring mandatory septic inspections.

The Nags Head Board of Commissioners felt it was their responsibility to monitor onsite wastewater systems, so it started what was then an innovative voluntary program called the Septic Health Initiative and put a young environmental planner in charge of educating the community. The program thrived and became a model for public septic education and assistance programs, even being profiled in the National Environmental Services Center's *Small Flows Quarterly* magazine in 2003.

For nearly 20 years, the program in the small coastal town of about 3,000 permanent residents (which balloons to 40,000 to 50,000 during the tourist season) successfully raised environmental awareness about septic system care. Funded by \$250,000 annually from the town water fund, the program coordinates free septic inspections, subsidizes septic pumpouts and offers low-interest loans to homeowners who need system upgrades.

As the program grew and gained notoriety, Todd Krafft was on the front lines, tirelessly promoting system maintenance by meeting with community groups, Realtors and residents one-on-one, spreading the word and getting positive results. In 2016, Krafft was honored by Nags Head officials as the Earl Murray Jr. Employee of the Year.

However for many years, Krafft suffered the debilitating effects of Lyme disease, caused by the bite of an infected tick. In fall 2019, Krafft died suddenly at age 46. A few months later, the town renamed the septic program the Todd D. Krafft Septic Health Initiative in honor of the former U.S. Air Force veteran who had served in the Somali conflict, the Bosnian war and Desert Shield/Storm before dedicating his life to Nags Head and onsite wastewater.

"A lot of people don't know anything about septs. It's overwhelming for a lot of people, but Todd would sit down with them and go over questions. He was great with people, and they loved him."

**Jimmy McNeill**

◀◀ Todd Krafft speaks about the Septic Health Initiative at the North Carolina Coastal Resilience Summit last June. (Photos courtesy of Town of Nags Head)





» Todd Krafft's daughter, Kayleen Krafft (second from left), receives a plaque honoring him. Town of Nags Head (North Carolina) officials are, from left, Mike Siers, Ben Cahoon, Renee Cahoon, Susie Walker and Webb Fuller.



## DIGGING DEEPER

When I read a brief news story about the town honoring Krafft, my reaction was to seek out more information about an unsung hero in our industry. What I learned was that Krafft had a passion for a topic most folks don't want to know anything about and he derived great satisfaction playing a role in improving the environment around him.

Working with the mayor at the time, Bob Muller, Krafft spearheaded the septic education program aimed at maintaining water quality in a community that wanted to promote use of onsite systems. While some towns, like Kill Devil Hills, just to the north, moved toward sewer treatment plants, Nags Head officials felt that keeping properties 80% to 90% on septic systems would be a hedge against overdevelopment and help maintain the character of the town, according to Michael Zehner, Nags Head planning and development director.

But without required system inspections or mandatory pumping in place, the town turned to property owner education and voluntary inspection and maintenance to ensure groundwater quality. Since its inception, the program has loaned \$500,000 in low-interest loans to homeowners for system upgrades. The town offers property owners free onsite system inspections every two years, and about 200 per year take the town up on its offer. And if pumping is found to be necessary, property owners receive a \$30 credit on their water bills as a way of community cost sharing.

And all along, Krafft was the face of the program for the town. Zehner says Krafft did the educational outreach with community groups and met with each homeowner asking for an inspection. He saw clean water as his mission.

"It was something Todd was focused on, the relationship between septic health and water quality, and the importance of maintaining septic systems and the impact they might have on the natural resources that make this place what it is," Zehner says. "The appreciation they had for his experience and his patience working with them really impressed me. I knew immediately how passionate he was for this program."

## SERIOUS ILLNESS

And while Krafft was successful in his mission and recognized for his contributions, he was also tormented by a disease that caused him great pain. Lyme disease was a daily companion, but not one that kept Krafft from his important work.

Jimmy McNeill of McNeill's Septic maintains about 200 systems in Nags Head, varying from 300- to 30,000-gpd advanced systems that need to be serviced weekly, monthly or every six months. Over 20 years,

McNeill and Krafft became great friends, and McNeill witnessed how Lyme disease affected Krafft.

"Every day he fought to get out of bed and go to work because he loved what he did. Todd was loved by the community, and he loved his job," McNeill says. "He was in more pain than we all knew. Every now and then he would say how bad it hurt and so forth. Customers didn't have any idea. He would put on a smiling face and go to work."

And work he did. McNeill often went out with Krafft when he visited homeowners to explain how their septic systems worked and why it was important to maintain, pump and sometimes repair them at great cost. The job took patience, understanding and a desire to help others.

"Todd went out of his way, working early in the morning, later in the evening, on weekends. If he had to work two hours off the clock at night, he did it," McNeill recalls. "He was a very caring person. A lot of people don't know anything about septic. It's overwhelming for a lot of people, but Todd would sit down with them and go over questions. He was great with people, and they loved him."

Krafft's role was very important in a community with a sensitive waterfront ecosystem and continuing pressure to increase development along a popular strip of sand. He developed a close working relationship with town officials and onsite professionals and both sides had great respect for him, according to McNeill. That can be a difficult tightrope to walk, as many installers, designers and regulators can attest to.

When a resident needed repair or replacement work for an onsite system, Krafft would suggest contractors who could do the job to the homeowner's satisfaction. Sharing bad news with homeowners about expensive repairs and recommending a variety of contractors for the work could lead to hard feelings.

"But the way Todd was with people, they felt very comfortable with it. They didn't think someone was trying to get something over on them," McNeill says. "Todd took this program to the next level. He was a great guy, and I miss him every day."

## TAKING ACTION

Renaming the septic program after Krafft was an obvious choice, according to Zehner. He was a driving force of the success of the program to date, and his memory will help move it forward. As climate change



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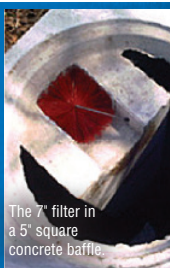
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## **EDITOR'S NOTEBOOK**

causes rising water along the coastline, caring for onsite systems will only become more important. Before he died, Krafft was lobbying to raise the pumping credit to \$45 and continuing to look for ways to evolve the program, Zehner says.

"Through Todd's influence and involvement in the community, there is a sense of proactiveness that is inherent in the program. We want to continue to improve the program because that's what Todd always wanted to do. He didn't want to maintain the status quo," Zehner says.

The town is also working with Krafft's family to raise awareness of Lyme disease, which until recently was not thought to be prevalent to that part of North Carolina. Krafft's illness went undiagnosed for a period of time, and his family and friends in town government don't want that to happen to another person. The town is organizing a fun run in Krafft's name in May, which is National Lyme Disease Awareness Month.

### **PAYING TRIBUTE**

It's important to honor the contributions of Krafft and other hardworking people in our industry. The story of Krafft's struggle with Lyme disease is also instructive to installers who are working in the field and could be exposed to infected ticks at any time.

If you have a story you'd like us to follow up on in *Onsite Installer*, please contact me at [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com).



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## INSTALLER PROFILE

» Brian Wakefield prepares to level a sand layer at the bottom of an excavation during an install project. (Photos by Olivia Ogren-Hrejsa)

# ONE PIECE AT A TIME

Like the old Johnny Cash tune, Brian Wakefield added new parts to his business over time and soon enough had a full-service onsite wastewater operation

By Betty Dageforde



axahachie, Texas, on the edge of the Dallas-Fort Worth metroplex, is in a geologic area of clay soils, fractured rock and limestone. As a result, conventional septic systems have not been an ideal product, and today aerobic treatment units are being installed in almost all new construction and many old conventional units are being replaced.

The requirement for regular maintenance of ATUs turned out to be a game changer for Brian Wakefield and his father, Jerry Wakefield, who started a real estate inspection business in the late 1990s. Initially they

knew next to nothing about septic systems but eventually realized it would be helpful to learn something about them. They took classes, got a Class D license and started inspecting ATUs as a sideline to fill in between real estate work. To their surprise, that service turned out to be very successful for them.

“Next thing you know, it took over and we were actually becoming a large company just doing maintenance contracts,” Brian Wakefield says. In the early 2000s, they discontinued their real estate work.

Having stepped into the wastewater industry, they soon added





installations, pumping and repairs; and today B&J Wakefield Services is a full-service septic company. Jerry retired a few years ago, but Brian, 48, operates the business out of an 80-by-40-foot shop and a 16-by-30-foot crew office on his 20-acre property. His wife, Holly, manages office work with assistance from part-timer Holly Coulter. The crew is cross-trained to some extent, but installations are done primarily by Willard Cavitt, Ric Seley and Larry Watson; Hermillo Aguilar handles repairs; Aaron Williams does pumping; Chuck Vineyard manages ATU inspections; and Kurt Harrison fills in where needed.

"I switch guys around so they don't get too bored doing the same thing," Wakefield says, "and so they don't get too comfortable in the same spot and riding with the same person all the time." Their service territory covers a 30- to 40-mile radius, the sweet-spot distance that Wakefield says allows them to deliver quality service while providing enough work to keep busy.

### ADDING INSTALLATIONS

After establishing a reputation as ATU inspectors, Wakefield says people started asking them to install systems. So around 2005, he obtained a license, purchased a used New Holland backhoe and began putting in systems, mostly residential. Today installing accounts for about half their business. Their go-to unit these days is Enviro-Flo's NuWater ATU system. "It's a 600-gpd unit," Wakefield says. "It's been working really well for us, and

it's been enjoyable working with Enviro-Flo." Maybe once every year or two, B&J Wakefield Services will install a conventional system.

The company's original backhoe is long gone. They now use a Kubota KX040 mini-excavator with an auger attachment and a Kubota SVL75 skid-steer with a trencher attachment and vibratory plow.

"We use that to plow drip irrigation lines and spray lines," Wakefield explains. "We don't usually trench anymore, we vibratory-plow most of our lines in because we can basically be almost trenchless."

When larger excavators are needed, the company subcontracts the work out. An enclosed 20-foot trailer carries parts and supplies. "We converted it with a pipe rack up top and put all our bins and tool racks inside to carry to a job site," Wakefield says. "It's all there, loaded and ready to go."

In the spring of 2019, they began work on a 70-lot subdivision, which helped carry them through a particularly wet winter and spring.

"We were still able to go into that new subdivision with a 50,000-pound excavator and dig because it was solid rock," Wakefield says. "It would dry out fast enough that we were able to drop tanks in between the rains and even dig while it was wet. Whereas, for some of the replacements on other properties, it was too wet to get on the properties. The good thing about rock is it doesn't get saturated."



**B&J Wakefield Services**  
**Waxahachie, Texas**

---

**Owner:** Brian Wakefield  
**Founded:** 2000  
**Employees:** 9  
**Service area:** 30- to 40-mile radius  
**Services:** Septic installations, repairs, aerobic treatment unit inspections and maintenance, pumping  
**Website:** [www.texasseptic.com](http://www.texasseptic.com)



▲ Willard Cavitt runs PVC tube to a tank during installation. Risers and lids are from TUF-TITE.



## TRASH TO TREASURE

As owner of B&J Wakefield Services, Brian Wakefield relies heavily on his employees and says he works hard at treating them fairly and paying a decent wage.

"Everybody says I'm a good boss," he says. "And then some people say I'm too lenient. I'm stern when I need to be stern, I talk to them when I need to talk to them, and I've fired the ones I needed to fire. If they do a good job and treat me fairly, I will reward them correctly as well. And I will praise them when praise is due."

Offering insurance benefits is hard to do, he says, and not feasible, but some team members have other sources to draw on and others have found discounted rates with Wakefield's help. "In a lot of cases, it's cheaper for them to go out and get it themselves," he says.

His one big annual splurge for the staff is taking everyone out to a restaurant for a Christmas lunch. And he has one handy resource that helps him fund the Christmas bonuses — scrap metal.

"When we replace water pumps or air compressors with these aerobic units or wiring that goes bad, all that is scrap metal," he says. "We probably have thousands and thousands of pounds of it per year. Instead of throwing that away, we keep it in bins, and then two or three times a year, we'll run everything up to the scrap yard and get money for it. I keep it in the safe, and that's what I use for Christmas bonuses. Instead of me pocketing it, I give it back to them."



▲ The crew at B&J Wakefield Services includes (from left) Hermillo Aguilar, Willard Cavitt, Ric Seley, Brian Wakefield, Kurt Harrison, Aaron Williams and Larry Watson.

▼ Ric Seley runs electrical wire for components of a new onsite system.



"I'm stern when I need to be stern, I talk to them when I need to talk to them, and I've fired the ones I needed to fire. If they do a good job and treat me fairly, I will reward them correctly as well."

**Brian Wakefield**

Although working in muddy conditions was not exactly pleasant, Wakefield says they had no choice. "I told my guys that if we didn't, we'd never see the light at the end of the tunnel. It would have been a disaster." Nevertheless, the weather took its toll, and by fall they were still playing catch-up on a small backlog.

Wakefield knows many of the builders in the area, and working on large subdivisions is not new for the company. The guys are accustomed to working with and around other contractors and just take the inevitable delays and schedule changes in stride. "I've been doing it a long time and don't think anything about it," Wakefield says. "I've got enough business where I can switch jobs if I have to and then go back and do the job."

### DOING IT ALL

The company has maintenance contracts on 1,300 ATUs. They offer seven levels of service. The least expensive plan provides a three-times-a-year basic inspection with a report sent to the regulating



authority. Other plans include extra services such as cleaning water pumps and compressor filters, discounted service calls or free products such as chlorine.

At the higher end, the company offers a warranty plan to cover the cost of certain parts such as compressors or water pumps. Its premium warranty plan also includes free sludge removal. Customers can pay yearly or monthly using any form of payment including autopay through their bank or online bill pay through the company website.

In 2014 the company added septic pumping, which now accounts for about 15% of its work. "We were getting five to 10 calls a day requesting pumping," Wakefield says. "And we were tired of companies who came in and would either try to refer somebody else or flat-out not do the job right and we'd have to go out and fix stuff." The vacuum truck is a 2013 Freightliner M2 with a 2,500-gallon steel tank and Jurop/Chandler LC420 pump. Equipment includes a camera, locator and Milwaukee Tool battery-powered drain cleaning machine. Septage is taken to the Dallas wastewater treatment plant.



▲ Left to right, Larry Watson, Rich Day from SI Precast Concrete, and Willard Cavitt monitor the placement of a tank by Cody Roland, boom truck operator from SI Precast Concrete.

Wakefield sends all his drivers to school to learn septic system maintenance so they can offer full service anytime they're at a site — "So, if we need to pull a water pump while we're there or fix something, we can do it at the time of service." Wakefield says more companies today are one-stop

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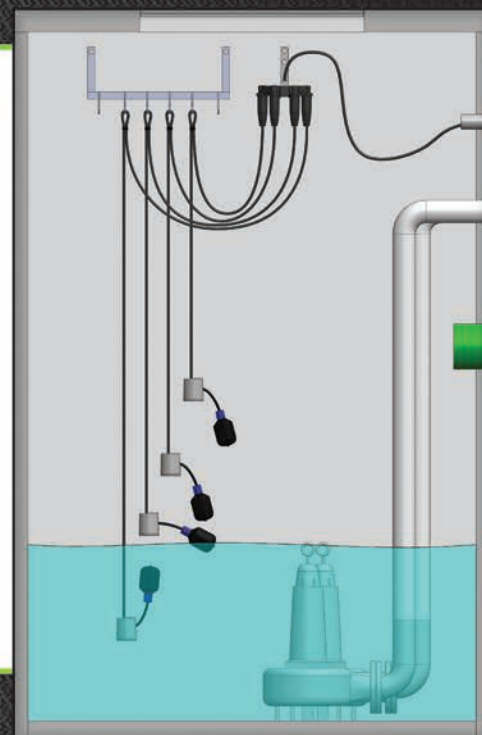
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▲ Ric Seley measures the depth of an excavation using a Topcon laser level.

▼ Willard Cavitt operates a Kubota skid-steer, adding sand to the bottom of a trench.



shops, but when he started, he was one of the few in the area. “Customers like it because they know we’re going to take care of it for them. We do it all.”

## KEEPING TRACK

Service routes are planned with Route4Me software. Technicians pull up information on their laptops.

“I upload their inspections and it’ll give the driver a list for the day,” Wakefield says. “He clicks on when he’s been there and when he’s left. It will actually track a breadcrumb trail and leave a time stamp.” Wakefield says it also protects them in situations when a homeowner claims the technician didn’t show up.

“When you have that many customers, sad to say, you get people who want stuff for free and they’ll say the guy didn’t do his job. We use that technology to prove my guy was there. The customer backs off when they see how much detail you have.”

Vehicles are outfitted with TomTom Telematics GPS units for navigation and tracking. Wakefield says tracking has many benefits. “We know where the driver has been, how fast they’re going, how long they’ve taken for lunch and where they went. If somebody wants to know how much longer before the driver will get there, I can pull that up.”



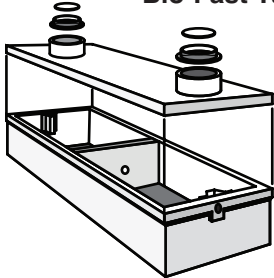
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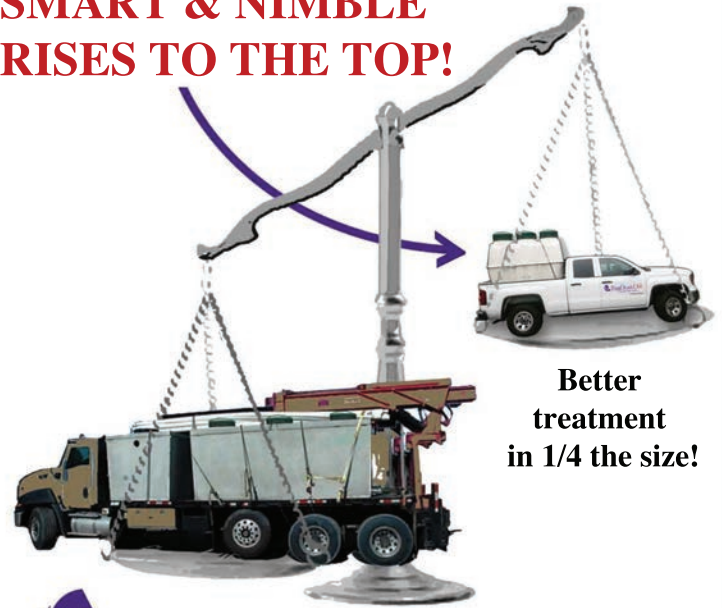


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"When you have that many customers, sad to say, you get people who want stuff for free and they'll say the guy didn't do his job. We use that technology to prove my guy was there. The customer backs off when they see how much detail you have."

**Brian Wakefield**

ATU inspections are done using SAFE Software, which contains the customer database. The technician transmits the data back to the office at the end of the day. Bookkeeping and account management are handled with QuickBooks.

Wakefield maintains the company's website himself. "I'm not a web-site expert by any means," he says, "but I just played with it long enough and figured it out." He also helped build a website for the Texas Onsite Wastewater Association, an organization he has been a member of for 16 years and for which he has served as president and currently sits on the board.

### MANAGING GROWTH

Wakefield says he doesn't do much marketing other than the website.

"I used to market a lot. But the problem is you spend a lot of money and, yes, I grew but at a rate that was hard to control. So, we quit

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advertising, quit spending all that money, and now I grow at a good, steady rate. We stay at a level I can control, and it's all by word-of-mouth." Another factor he has to take into consideration is the difficulty of finding employees because of the extremely low unemployment rate.

The septic business has given Wakefield the opportunity to exert control over many facets of his work life. "I like being able to manage the chaos and control the outcome," he says. "And I like the freedom of doing whatever I want to do. I take pride in the quality, craftsmanship and service we offer, and I'm able to make sure that happens as the owner of the company." □



# Jennifer Morris Believes in the Value of Networking

A wastewater trade group helps you connect with fellow contractors and decipher ever-changing industry rules and regulations

Compiled by Betty Dageforde

*In States Snapshot, we talk to a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we visit a member of the Yankee Onsite Wastewater Association.*



## Jennifer Morris

chief executive officer and owner  
along with husband Gregory Morris

**Business:** GFM Enterprises, South Dennis, Massachusetts

**Age:** 43

**Services we offer:** Septic installations and upgrades, demolition, engineering, road grading, site development, water services

**Years in the industry:** 33, starting when my family owned Cape Cod Ready Mix

## Association involvement:

Yankee Onsite Wastewater Association

## Benefits of belonging to the association:

It helps us learn about new products in the industry. Plus, there are the connections you make. It's just a great way to connect with people and meet new people. And you may form friendships that may lead to jobs. Or, for example, I was talking to somebody the other day and they asked if we

knew someone who did asbestos removal and I was able to recommend someone because of somebody I had met at one of the events I attended.

## Biggest issue facing your association right now:

Keeping up with state laws and regulations. They're constantly changing.

## Our crew includes:

GFM Enterprises has two administrative staff, three project managers, five project foremen and 15 laborers/drivers.

## Typical day on the job:

I do a little bit of everything including scheduling, working upcoming bids, invoicing and job site visits.

## The job I'll never forget:

For the most part, we've been pretty fortunate with the jobs we've done. We come across all kinds of clients. They could be a super joy to work with or they could be extremely difficult. Sometimes you get people who think they know how to install a septic system and then sit there and watch your guys do it and tell them what they're doing wrong.

## My favorite piece of equipment:

"The Boss Lady." She's an excavator — a John Deere 245. She's just a big, beautiful piece of equipment that they named after me. A lot of times the guys in this industry name their trucks and machines. Kids' names end up on them. My son's name is painted on one of our mini-excavators. His name is Quinn, and we call it the Mini-Quinnie (another John Deere).

## Most challenging site I've worked on:

We had a job in Provincetown on Cape Cod where we excavated 35 feet alongside the house and two feet away from the foundation. It was a really tight job site for the machines and the guys getting materials in there. Everything's tight like that in Provincetown. And sometimes on Cape Cod you run into what's called sugar sand. It doesn't cooperate and just keeps on piling down. We ended up shoring it up with some steel so we could continue with the project.

## Oops, I wish I could take this one back:

We did a ballfield that was poorly engineered, creating lots of issues. For example, certain areas weren't pitched properly and water was pooling. There were probably 50 different issues, and we just dealt with each one as it arose. It's still an ongoing project and should have been completely done

continued >>



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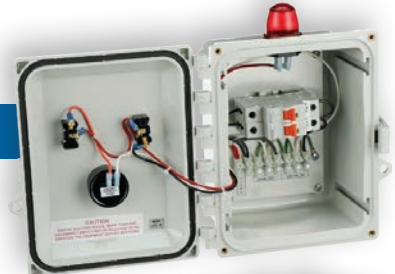


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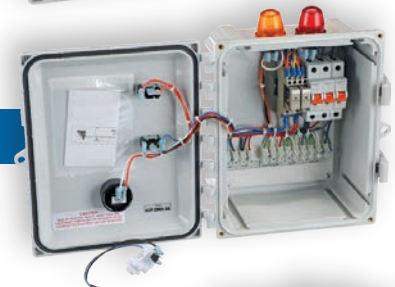
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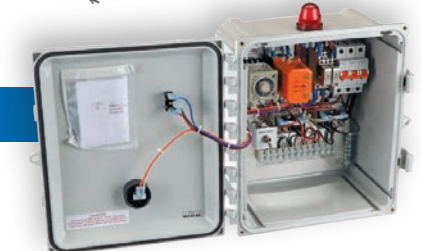
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## STATES SNAPSHOT

by now. The plans came in maybe only 50% complete. Meanwhile, the company we were doing the project for was often trying to put the cart before the horse. You've got to go in a logical pattern so the project pans out the right way. They were just trying so hard to move the project along. They would say things like, "If you have nothing to do right now, do this" — but you can't really do that until you've done some other thing. We had to push back.

### The craziest question I've been asked by a customer:

"Do you know what you're doing?" It's the funniest thing because they hired you to do the job, but people do ask us that. Sometimes my guys are like, "No, I just YouTube'd it."

### If I could change one industry regulation, it would be:

It would be nice to have a uniform code that carried completely into each town. All the towns here do things differently. The permitting process is the biggest one. You show up and you think you have all your paperwork ready to pull a permit, but then this town requires things no other town requires.

### Best piece of small-business advice I've heard:

My grandfather, who founded Cape Cod Ready Mix, always said be honest and treat your employees with respect.

### Planning for the future:

We're trying to streamline how we do things, both inside the office and outside, so that things run smoother. As far as software, we're always looking to see what's out there.

### If I wasn't working in the wastewater industry, I would:

I'd love to own a fun boutique geared toward women. Years ago I owned a home decor store.

### Crystal ball time - This is my outlook for the wastewater industry:

Right now there's a lack of qualified employees, and I think that's going to continue. Finding people with a good work ethic, who will show up and put an effort into what they're doing, seems to be hard. ☐

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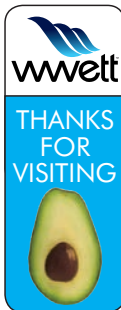
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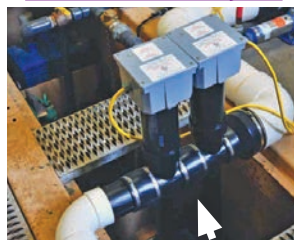
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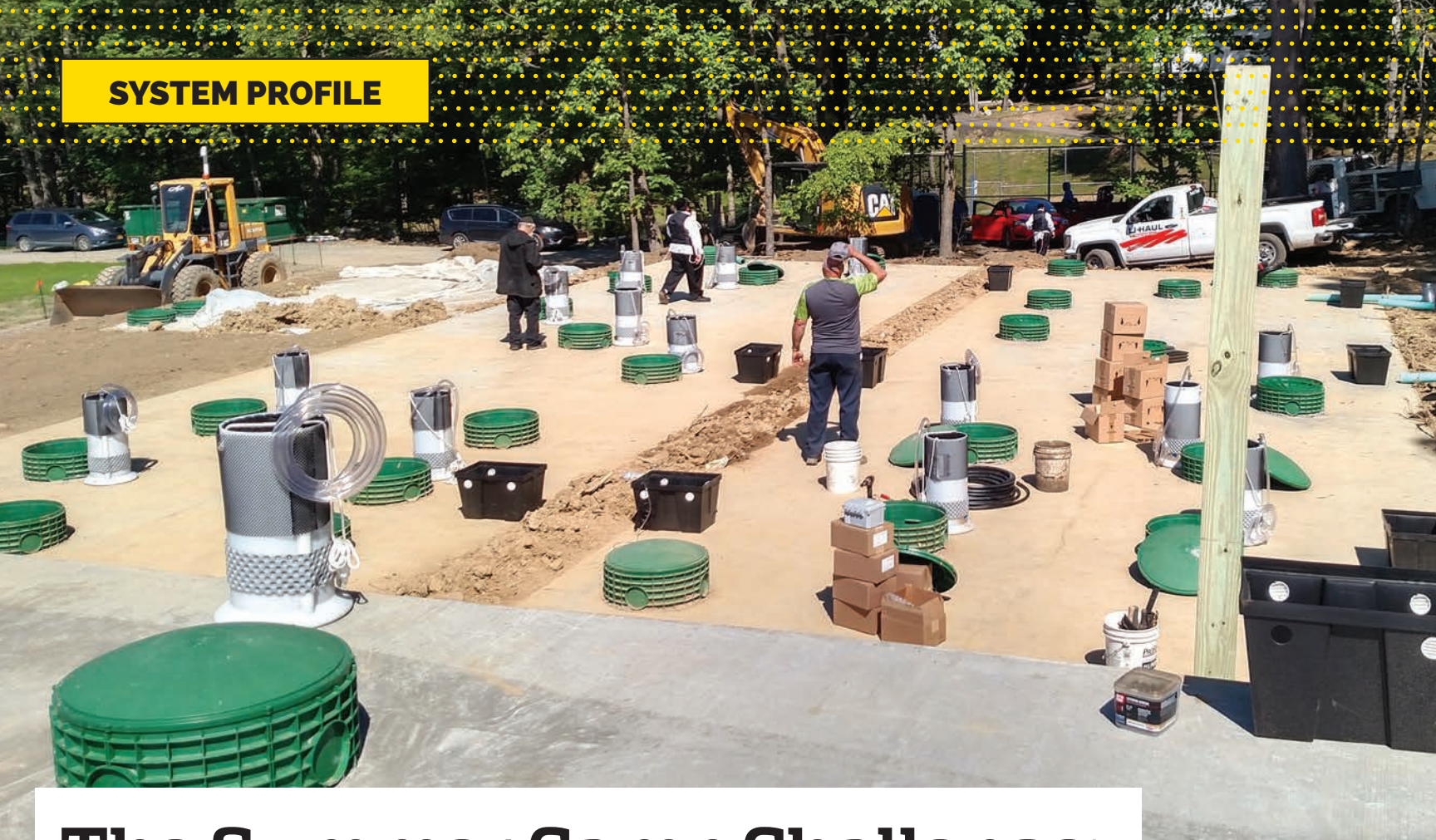
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# The Summer Camp Challenge: Dealing With Spikes in Flow

New York's Onsite Engineering is tasked with building a system that moves 50,000 gallons per day for two months, then sits idled the rest of the year

By Scottie Dayton

**D**uring the 2018 summer season, wastewater ponding at the toe of a drainfield alerted the owner of a nonprofit girls camp in Kerhonkson, New York, to a serious problem. The Ulster County Health Department closed the 49,400-gpd system and mandated the wastewater be pumped. The expense was a hardship for a camp funded mainly by donations.

The camp owner hired Eric Murdock, P.E., proprietor of Onsite Engineering in Syracuse, to upgrade the legacy system. The company specializes in designing systems with small footprints.

"In one day, the camp goes from empty to full occupancy for two months — July and August," Murdock says. "It's a huge campus with dozens of cabins and buildings accommodating some 1,500 weekly campers plus staff."

In January 2019, Murdock determined the breakout was caused by groundwater infiltrating the septic tanks and overloading the system. Poor site conditions limited his design options to using the existing 180-by-180-square-foot drainfield for the replacement.

"There was no room for error, so I overengineered the design to ensure

a lifetime of trouble-free operation and compliance with the New York's State Pollutant Discharge Elimination System permit," Murdock says. His safety net included:

- A loading rate of 1.5 gpd per square foot instead of the manufacturer's recommended loading rate of 2.25 gpd per square foot
- 108,000 gallons of additional tankage supplementing the existing 41,000 gallons of tankage
- Pretreatment
- 2,996-gallon doses instead of the recommended 8,325 gallons
- Gravity dosing to circumvent power outages

The trick was to complete the permitting and installation in time for the camp's summer season in six months.

### Site conditions

Soils are clay loam with shallow depth to bedrock. The percolation rate at the bottom of the existing trenches (48 inches) is 30 minutes per inch.



◀ Workers install White Knight WK-200 Microbial Inoculator Generator towers through the septic tank risers. Black boxes house the turbine fans, while the biofilter is to the right. (Photos courtesy of Onsite Engineering)



## System Profile

**Location:** Kerhonkson, New York  
**Facility served:** Girls summer camp  
**Designer:** Eric Murdock, Onsite Engineering, Syracuse  
**Installer:** Gary Royce Jr., A+ Excavating, Fulton  
**Type of system:** Passive combination treatment and dispersal system  
**Site conditions:** Clay loam; percolation rate of 30 minutes per inch  
**Hydraulic capacity:** 49,400 gpd

### System components

Murdock designed the system to treat 49,400 gpd. Major components are:

- 36,000-gallon cast-in-place flow equalization tank
- Two 36,000-gallon cast-in-place septic tanks
- 28 White Knight WK-200 Microbial Inoculator Generator towers (Knight Treatment Systems)
- Seven HP-200 linear air pumps (Hiblow USA)
- 11,220-gallon cast-in-place dose tank
- Multiple-outlet Flout chamber with Alternator system (Rissy Plastics)
- Model DC3 data logger (Rissy Plastics)
- 16,650 feet of 12-inch Presby Advanced Enviro-Septic treatment-dispersal pipe (Infiltrator Water Technologies)
- 10 RP145c turbine fans (RadonAway)
- 48 Quick4 Equalizer 36 chambers (Infiltrator Water Technologies)

### System operation

After wastewater passes through the camp's original tankage, on-demand pumps in the existing 6,000-gallon dose tank send effluent to the equalization tank in the new central treatment area. Liquid then gravity-

▲ Gary Royce Jr., owner of A+ Excavating, directs the operator of a Caterpillar 312E excavator on where to place the septic sand on a section of treatment-dispersal pipes.

▼ Close-up of an in-line turbine fan (RadonAway).



flows through the process tanks to the dose tank. The dose tank and process tanks have 8, 10 and 10 towers, respectively, each with four microbial breeding columns and a 0.75-inch feeder line delivering air to the fine-bubble diffuser at the base.

In the dose tank, a Flout with 10 3-inch outlet tubes and flow control discs delivers water to dedicated distribution boxes, five per side of the mirror-image drainfield. Eight times per day, the two zones are alternately dosed with 2,996 gallons at 120 gpm.



## SYSTEM PROFILE



▲ Workers from A+ Excavating and Hudson Valley Concrete Pumping pour a 12-inch-thick wall for the second 36,000-gallon septic tank.

▼ A worker smooths system sand, guided by a leveling gauge on the rake handle.



Ball valves evenly distribute the liquid to 37 modules per zone. Each module has three 75-foot-long treatment pipes. The first two dispersal areas closest to the dose tank have eight modules; the three other sections have seven modules. The data logger counts the cycles and potable water usage.

In-line turbine fans connected to 4-inch PVC piping convey vapors from the tank risers to a 111-by-13-foot-wide biofilter. The venting bed has four

sections of paired chambers, six per side. Each section has a dedicated fan that draws vapors into a 4-inch perforated pipe at the bottom of the chambers. As the vapors diffuse up through 36 inches of wood chips, they trap odor-laden moisture and purify the air.

An 8-by-10-foot shed shelters the fans, air pumps and electric service.

### Installation

In early April, installing the drainfield and tanks began simultaneously. Gary Royce Jr., owner of A+ Excavating in Fulton, was the installer and construction manager. Hudson Valley Concrete Pumping did the pours.

In the camp, Bill French from Onsite Engineering supervised testing the septic tanks for watertightness and replacing the 20 tanks that failed with 1,500-gallon tanks. Workers also replaced leaking building sewers and portions of the force main, and they built curtain drains to divert major runoff from tanks in low areas.

Meanwhile, Royce's heavy-equipment operators excavated the L-shaped hole for the three 36,000-gallon tanks (64 by 18 by 8 feet high) and dose tank (27 by 14 by 7 feet high), then bedded the area with 12 inches of washed broken stone. "We lucked out," Murdock says. "We didn't hit bedrock and the soil was stable."

As additional workers finished a form for the 12-inch-thick tank floors, Hudson Valley Concrete Pumping arrived with a Putzmeister boom pump to fill it. Multiple trucks from Sullivan Structures, a ready mix supplier, fed the pump. They repeated the procedure for the 12-inch-thick tank walls, completing four walls in a single pour. Each pour took 28 days to cure. The lids with penetrations for the 24-inch risers (Polylok) were poured in place.

Simultaneously, Royce's operators removed the top 48 inches of the existing drainfield and filled in the toe of the downgradient slope with the spoils. Then workers leveled off 36 inches of regular sand on the field, followed by 6 inches of system sand (ASTM C33 concrete sand).

"Organization enabled the installation to go smoothly," Murdock says. "We moved material once to minimize traffic. End dump trailers delivered





◀ Gary Royce Jr., owner of A+ Excavating, checks the level of a distribution box.

**“We moved material once to minimize traffic.** End dump trailers delivered sand and gravel to the drop zone, then wheel loaders loaded the crawler carriers for delivery to the appropriate work site.”

**Eric Murdock**

sand and gravel to the drop zone, then wheel loaders loaded the crawler carriers for delivery to the appropriate work site.”

Methodical planning prevented workers and machines from obstructing one another. Some equipment included Komatsu 39EX bulldozers, Caterpillar 304E excavators and mini-excavators, John Deere crawler dozers, Bobcat S130 skid-steers and Toolcat 5600 utility work machines, Komatsu WA180 wheel loaders and Terramac RT9 crawler carriers.

### Expert help

Because Royce’s team had never installed a Presby system covering 32,000 square feet, company representative Mike Carbonneau worked with them for three days to ensure success.

“They set grade stakes, which helped hold the piping 18 inches on center, then built up 6 inches of system sand around and over the pipes,” French says. “Excavators placed the material, but we leveled it.” System sand also extended 5 feet from both ends of the pipes. As each dispersal area was completed, it was covered with 12 inches of topsoil. Installation took a month.

“Meticulous organization also enabled us to take advantage of good weather early in the project and get ahead of schedule,” Murdock says.

“This helped immensely because we weren’t forced to work in the rain.”

Additional help came from Jim Richard, inventor of the Flout. “Because we needed 10 outlet tubes and only six had been used so far, Jim helped design and install the device,” Murdock says. “It’s simple, it works, and it provides dosing solutions that weren’t possible before.”

Flouts are open plastic boxes with an attached weight and outlet pipes. As effluent accumulates in the tank, the box floats. At maximum depth, effluent spills into the box, sinking it and opening the outlets to the distribution boxes. Once the tank is empty, the cycle resets.

### Pretreatment

To install the microbial inoculator generators, workers lowered the columns via tethers through the risers to the floor of the tanks. At the base of the risers, they connected each column’s flexible hose to the air supply line delivering 2.25 cfm at 2 psi. After filling the tanks to operating level, workers inoculated the breeding columns with the IOS-500 bacterial matrix.

“The greater the depth, the more efficient fine-bubble diffusion becomes because of increased oxygen uptake,” Murdock says. “A high volume of air isn’t necessary.” It took less than 15 minutes to install each tower, and building the bark bed biofilter was straightforward. The project concluded at the end of June.

### Maintenance

The New York’s State Pollutant Discharge Elimination System permit requires monthly visits during the operating season to collect samples from the tanks. Onsite Engineering does this and system startup, which includes running the fans and air pumps, adjusting the airflow for bubble size and hosing off the microbial inoculators.

“We also collect samples from a groundwater monitoring well down-grade of the system to demonstrate compliance,” Murdock says. “At the end of the season, the owner shuts off the power and goes home.” ◻

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# Remember Maintenance to Control Biomat in the Drainfield

Keeping a clean effluent filter and inspecting the drainfield soils will preserve your customer's onsite system and save money over time

By Jim Anderson and David Gustafson

**W**e always spend time at workshops discussing what happens in the soil when septic tank effluent is applied by gravity. We've had recent questions about the role suspended solids may play in the formation of the biomat and, ultimately, the plugging of soil pores that reduces the infiltration rate into the soil, causing hydraulic failure. So this is a good time to review how the biomat forms and why it can be a good thing but also can be a problem.

When septic effluent is introduced to the soil surface, a layer begins to form along the bottom of a drainfield trench consisting of organic material contained in effluent and the living and dead colonies of soil microorganisms. These microorganisms — in the presence of oxygen in the soil — consume and break down the organic material in effluent. The layer of organic matter and microorganisms makes up the biomat.

As the layer forms at the interface with the soil surface, it creates unsaturated flow through the soil with two results: It slows down the flow of effluent through the soil, and it puts the sewage in contact with oxygen in the soil pores and aerobic organisms to break down and consume the organic material, providing treatment.

## BIOMAT BASICS

The thickness and resistance of the biomat to flow depends on the initial effluent strength and the original soil conditions. As we have indicated numerous times in this column, most current sizing numbers used for determining drainfield size are based on formation of this biomat. The numbers assume a well-maintained and operating septic tank with BOD values less than 170 mg/L and TSS values less than 60 mg/L. If these values are consistently exceeded, the biomat will be thicker and more resistive. If water use is more than the soil will accept through this thicker biomat, hydraulic failure will result.

So system longevity is directly related to the size of the system and the amount (flow) and organic loading of the wastewater applied. How development of the biomat is managed and controlled will, to a large extent, determine how long the system will last. Properly managed and maintained systems can last 40 years or longer.

We received this comment recently: "My experience with surface ponding or backing up of septic systems often has led to discovery of a biomat as the suspected culprit, a result of accumulated suspended solids over time. This has caused me to consider better ways to reduce TSS."

We would agree that strategies to reduce TSS delivery to systems will

It is key to work with the homeowner to impress upon them the importance to have the system periodically evaluated. **They need to understand the necessity of checking effluent screens for plugging.**

have a positive impact on system longevity. A comment about suspended solids: Most solids are organic in nature and will break down in the soil, but some may consist of materials that have difficulty breaking down in the soil (coffee grounds) or are inorganic in nature and will not break down (plastics in cleaning products). These will permanently block soil pores, reducing infiltration rates and potentially causing hydraulic failure.

## REDUCING SOLIDS

So, what are some of the strategies that can be employed to reduce suspended solids? It starts in the house. System performance and longevity will improve if users limit the addition of materials that are difficult to break down, such as coffee grounds and grease, and reduce water usage. Limit the use of cleaning products that contain small plastic beads or are antimicrobial and could affect bacterial action in the septic tank.

Increasing septic tank capacity, which increases effluent retention time in the tank, can lead to additional settling of suspended particles, reducing reliance on effluent screens to catch the particles or break down in soil. While typical effluent screens will not catch the microscopic plastic particles, they will catch other larger solids, preventing them from making their way to the drainfield.

The importance of having a regular maintenance schedule cannot be overstated. Effluent exceeding BOD or TSS limits will contribute to lower system life. Regularly pumping and cleaning tanks and making sure effluent screens are in place and operating are key to preventing problems.

Many localities have instituted mandatory inspection and pumping requirements. In areas that do not have these requirements, it is key to work with the homeowner to impress upon them the importance to have the system periodically evaluated. They need to understand the necessity



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of checking effluent screens for plugging, and doing so more often than the septic tanks are pumped, to prevent sewage backing up into the house. Hopefully they see the value and are willing to enter into a maintenance agreement.

Finally, additional pretreatment — more than adding septic tank capacity — is a good idea. Better a media filter be plugged than the final dispersal and treatment area. Media can periodically be replaced if it becomes plugged at less expense than replacing the drainfield. We would welcome comments from service providers about their observations and problems encountered due to suspended solids. ▣

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# Effort to Create a Michigan Sanitary Code Is Moving Slowly

By David Steinkraus

It's been more than a year since the attempt to create a statewide sanitary code failed in the Michigan Legislature, but the idea is not dead. It can happen under the right circumstances, says one observer of the state's wastewater struggles. Michigan is the only state without a statewide code.

Late last year, a symposium in Traverse City — in the northwestern part of the state's Lower Peninsula — assembled people to talk about the issue. Also at that time, a member of the Michigan Environmental Council, a coalition of groups interested in public policy, called for better rules for onsite systems and system inspections. In addition, commissioners for Oakland County, near Detroit, endorsed a resolution urging the Legislature to pass a statewide code.

People in Michigan can have a statewide code, and Ohio has already shown the way, says Dendra Best, executive director of the nonprofit WasteWater Education based in Traverse City. There were several attempts in its Legislature before Ohio achieved success, she says.

The Michigan bill that failed earlier would have required the state Department of Environmental Quality to develop rules for the siting and design of onsite systems, for effluent, for inspections and maintenance, and for the qualification of people managing and installing onsite systems. Every system would have had to be assessed at least every 10 years, but advanced treatment units would have had to be inspected at least every five years.

Opponents of the bill were loud and numerous. They objected to some provisions in the legislation, but opposition was focused on how the bill was created. That happened behind closed doors, say opponents, including some local health departments who say their concerns were ignored. The bill stalled in committee and died when the legislative session ended.

"How Ohio actually got to the point of passing (its law) was that everybody had something to complain about, but everybody felt their opinions had been taken into consideration. And everything was fair and affordable," Best says.

Contrast that with the Michigan bill. There was no provision for low-interest loans or grants to help people afford the cost of upgrading or repairing onsite systems, she says. Upgrades must be affordable if we are to protect human health, Best says, and the law should not penalize people just because they can't come up with the money for a better system. "You can't have a piece of legislation that's all stick and no carrot."

Ohio took several years to slowly work through what should be in its code — sections about soils, local geology, installation and training for installers and designers, she says. Ohio's code, the first major revision since the 1970s, took effect in 2015.

Best says she applied for a grant that would pay for WasteWater Education to facilitate the process of writing a statewide code. Facilitation would happen through an online conferencing platform, which means people wouldn't have to drive to the state capitol in Lansing to be part of the process. That's especially important for people who live in the Upper Peninsula, far from Lansing, she says.

At the Traverse City symposium, two lines of thought remained. One says a statewide code is necessary to make sure the environment and public health are protected, and the other says no statewide code would allow enough adjustments to fit local soils and other conditions.

"But there is a way out of it if people will sit back, take a deep breath and do it right," Best says.

\* \* \*

Two counties each blocked the other's attempt to change its time-of-sale onsite inspection program. Commissioners in Manistee County denied permission for nearby Kalkaska County to end its inspection program. Manistee's approval was required under the rules of the district health department, which is composed of several area counties.

Kalkaska officials were unhappy. The Kalkaska County Board had approved Manistee County's proposal to end some exemptions and change other rules in its own inspection program, reports the *Record-Eagle* of Traverse City. Kalkaska County commissioners were so unhappy that they held a second vote on the Manistee County changes, and this time denied them.

Questions arose about the legality of the second vote, but an attorney who researched the issue says it was legal.

\* \* \*

The time-of-sale onsite inspection program in Isabella County may be paying off. During 2018, inspectors looked at 475 properties and found 66 in need of some kind of repair or overhaul. Of the 66, 19 were discharging untreated wastewater into streams, tiles or onto the ground, writes *The Morning Sun* based in Alma.

"I'm surprised by the number of illegal systems people are trying to put in," Central Michigan District Health Department Environmental Health Supervisor Scott Jones told a committee assigned to track the inspection program. He says the number of failures, and the causes of failure, were not surprising.



He told the committee that testing on the North Branch Chippewa River found lower *E. coli* numbers than in prior years. While it is too early to rule out other causes, Jones says, the reduced bacteria count may indicate that the inspection program is having an effect.

## Rhode Island

Portsmouth residents will have another chance at financing to close cesspools or upgrade onsite systems. Last December, the Rhode Island Infrastructure Bank announced a third round of funding for zero-interest loans for such work.

Residents may borrow up to \$25,000 for their projects, and money may be used to cover both engineering and construction costs, reports the news website Patch. During the past three years, 850 people in the state have taken advantage of the program.

## Florida

As part of its work to combat local water pollution, Alachua County recently turned its attention to nitrogen-reducing onsite systems. County commissioners said they wanted more information and asked staff of the county's Environmental Protection Department to develop cost estimates for installing nitrogen-reducing systems in new residential developments, reports *The Gainesville Sun*.

"I just don't know if this is going to have the impact that we're wanting," says Commissioner Ken Cornell. The real cause of pollution seems not to be onsite systems but agriculture, he says. County staff agree.

## Montana

A meeting to talk about the problem of septic leachate in the Flathead Valley resulted in the formation of a committee to try to do something about it.

The committee will consist of biologists, tribal representatives and others, reports the *Daily Inter Lake* based in Kalispell. Through research and outreach, the committee will try to make the issue of septic leachate an important one for homeowners and governments.

"No one really knows how to deal with nonpoint source because it's not coming out of a pipe directly in front of your eyes," says Tom Bansak, assistant director for the Flathead Lake Biological Station.

Another task of the committee is to explore regulations such as the onsite inspection programs used in other parts of the country.

## Missouri

Grants are available to replace failing septic systems in the watersheds of Crane Creek and Lower James River. The size of each grant will depend on household income. Grants will cover 50% to 90% of costs, reports the *Christian County Headliner News* of Ozark, Missouri.

## Texas

People living in the Attoyac Bayou watershed may be eligible for grants that pay for new septic systems. The watershed is polluted with *E. coli* coming in part from failing wastewater systems. Homes within 2,000 feet

of an affected body of water will have priority. Only households with incomes at or less than 150% of the median household income will be eligible for grants, according to the Angelina & Neches River Authority.


## Massachusetts

A U.S. Environmental Protection Agency decision that it cannot use the Clean Water Act to regulate pollution flowing through groundwater needs to be respected, a federal judge said recently as he dismissed a lawsuit seeking to regulate such pollution in the state.

Last fall, the U.S. Supreme Court heard oral arguments in a similar case from Hawaii where a group of organizations said the act should be used to stop pollution flowing through groundwater from deep injection wells operated by Maui County's wastewater treatment plant.

The EPA had said that it cannot regulate pollution that starts at a point source and moves through groundwater. This is a change from its previous policy, writes *Bloomberg Environment*.

The Massachusetts case that Judge William G. Young ruled on involves a wastewater treatment system at the Wychmere Beach Club on Cape Cod. The state Department of Environmental Protection found that wastewater seeping through groundwater from the system was partly responsible for excess nitrogen in Wychmere Harbor, and the nonprofit Conservation Law Foundation filed two lawsuits seeking to curb the pollution. One was based on the Clean Water Act, and the other on the Resource Conservation and Recovery Act.

After Young's ruling, the Clean Water Act lawsuit is dead, but the other will continue. 

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"Rules and Regs" is a monthly feature in *Onsite Installer*™. We welcome information about state or local regulations of potential broad interest to onsite contractors. Send ideas to [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com).

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# Distribution Equipment and Systems

By Craig Mandli

## CONTROLS

### Alderon Industries Oil Alert 7410-4X

The Oil Alert 7410-4X from Alderon Industries is a single-phase simplex panel that controls a single pump to remove water from an elevator sump pit while monitoring oil level. The sensor module is designed to only pump down the water level and alarm in the event of excess oil or water. The sensor module probes are preset for off, start and high level. A 2-Zone Oil Alert alarm panel equipped with audible and visual indication is included for remote monitoring in addition to the local indicators on the main control panel. There are LED indicators for power on, pump run, high water and high oil on the control panel, while the remote alarm panel includes LED indicators for power, high water and high oil. Auxiliary contacts are included to connect to a building automation system or SCADA. 218-483-3034; [www.alderonind.com](http://www.alderonind.com).



### Delta Treatment Systems CP20/40/50 Series

CP20/40/50 Series control panels from Delta Treatment Systems provide intelligent monitoring and alarm functions for residential, commercial and industrial wastewater treatment systems. They are easy to install and operate and are available in several models engineered for use with advanced wastewater treatment systems and custom packaged plants. Customized control panels are also available, and all panels can be supplied with UL and/or Canadian UL 508A listings upon request. They monitor air pumps and effluent pumps on the Delta Whitewater treatment system. Additional options include the Series CP22, which monitors the air blower on Delta ECOPOD systems with options for controlling and monitoring UV lights for disinfection after treatment. Series CP8000/9000 control the Delta ECODRIP Pre-Engineered Disposal Systems' headworks filter system and effluent dosing pump using a PLC for time-dosing drip disposal fields. 800-219-9183; [www.deltatreatment.com](http://www.deltatreatment.com).



### Septic Products 50B019-120-240DD



The 50B019-120-240DD control panel from Septic Products is a duplex time-dosing panel for use in residential or commercial applications. It can be used with 120- or 240-volt power, and it accommodates two dosing pumps controlled by a repeat cycle timer. It has a durable, weather-resistant, NEMA 4X polycarbonate enclosure with SST latches; large, easy-to-access terminal block; circuit breakers for the pumps and control circuits; a rugged, externally mounted, UV-resistant alarm light; audible alarm and run-mute-test switch with UV-resistant sealing boot; definite purpose motor contactors; alternating relay; and pump hand-off-auto switches. Compressor hookups are available. Wiring schematic and detailed connection diagrams are provided, as well as mounting feet for the enclosure. It is UL listed. 419-282-5933; [www.septicproducts.com](http://www.septicproducts.com).

### SJE Rhombus Model 122

The Model 122 control panel from SJE Rhombus controls two 120/208/240-volt, single-phase pumps in water and sewage installations. This panel includes a duplex controller for pump control, alternation and alarm. It includes float status LEDs, a control/alarm power on/off switch with LED indicator, pump run LEDs, HOA switches, a pump lead lag selector switch and auxiliary contacts. It includes built-in lag pump delay time, pump failure detection and float out of sequence. In addition, there are four user-selectable field-programmable operations: alarm steady state or flashing; alarm auto reset or manual reset; pump failure notification; and optional seal failure alarm beacon notification or beacon plus horn activation. It is available in the new NEMA 4X enclosure, which is designed for easy installation and additional protection from the elements. It is UL/cUL listed. 888-342-5753; [www.sjerrhombus.com](http://www.sjerrhombus.com).





## DISTRIBUTION BOX

### TUF-TITE Distribution Box with Speed Leveler

The noncorrosive TUF-TITE Distribution Box with Speed Leveler in each outlet provides a simple, stable, reliable and permanent means for dividing septic tank effluent flow, according to the maker. Distribution boxes come in four sizes: four-, six-, seven- and nine-hole. Risers are available on the four-, seven- and nine-hole boxes. All boxes come with a one-piece watertight seal that accepts 1.5-, 2-, 3- and 4-inch SDR 35 or Schedule 40 pipe, including corrugated, for easy installation. 800-382-7009; [www.tuf-tite.com](http://www.tuf-tite.com).



## DRAINFIELD COMPONENTS

### Geomatrix Systems GeoMat

The GeoMat leaching system from Geomatrix Systems consists of a core of fused, entangled plastic filaments surrounded by a high-capillary geotextile fabric. When sized accordingly, it is compatible with pretreated wastewater or septic tank effluent. Uses also include subsurface irrigation and evapotranspiration systems. It is 1 inch high and available in 6-, 12- and 39-inch widths. A pressurized distribution pipe typically runs the length of the lateral for uniform application of wastewater. Additionally, it can be configured with a time-dose pump station for flow equalization. The combination of pressure dosing and flow equalization reduces peak hydraulic loading. The thin, narrow profile, shallow burial depth and uniform hydraulic loading maximize efficiency of oxygen transfer. It has complete surface contact with the soil and is not reliant on complex valving and filtration systems. Distal head pressure is fully adjustable through manual zone valves. 888-764-5247; [www.geomatrixsystems.com](http://www.geomatrixsystems.com).



### Infiltrator Water Technologies EZflow

The Infiltrator Water Technologies EZflow septic system replaces stone-and-pipe drainfields using geosynthetic aggregate in a modular, lightweight and easy-to-install design. It eliminates fines and reduces compaction and embedment associated with stone. The engineered system provides optimal storage and absorption efficiencies. The modular construction allows

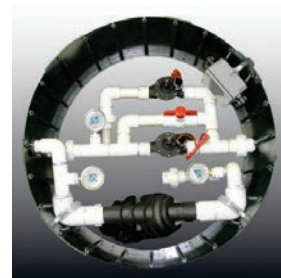


configurations to match most system trench dimensions and enables contouring along sloped sites and around trees or landscaping. Preassembled units include a 3- or 4-inch perforated pipe surrounded by aggregate and held in place with durable, high-strength netting. Manufactured from recycled materials, the system is available in 5- or 10-foot lengths with simple snap internal couplers and a variety of bundle system configurations. The system is suitable for repairs and tight job sites and is easily hand-carried into position, reducing time, labor and machine expense. It is approved in many areas with an increased efficiency rating that reduces drainfield size requirements. 800-221-4436; [www.infiltratorwater.com](http://www.infiltratorwater.com).

## DRIP SYSTEMS

### Jet Inc. Drip Irrigation Headworks

The Drip Irrigation Headworks package from Jet Inc. is designed as a direct-mount device on an effluent pump tank to filter effluent while controlling pressure to the dripfield. It is available for auto or manual flush. The package contains a 1.5-inch vortex screen filter and pre-installed pressure gauges to monitor pressure drop across the filter component and regulate pressure to the dripfield. It mounts onto an existing 24-inch riser for easy access to the pump, float tree, integrated vortex filter and controls. The package is available as part of the Drip Disposal Field Package that complements the J-1500 Series BAT Media treatment system. An optional flowmeter package and pressure relief valve is available to meet site-specific and regulatory criteria. 800-321-6960; [www.jetincorp.com](http://www.jetincorp.com).



### Norweco subsurface drip disposal system

The subsurface drip disposal system from Norweco is engineered to uniformly apply treated effluent below the ground's surface. This method of pressure distribution is suited for all conditions, as effluent is delivered directly to the infiltrative surface of the soil using specially manufactured polyethylene tubing with built-in turbulent flow emitters. Properties with marginal soils can be economically developed using wastewater treatment systems and drip disposal technology. The system can increase the options available for onsite treatment system design. U.S. Environmental Protection Agency and environmental protection agencies worldwide have determined subsurface drip disposal is a reliable and efficient method of effluent distribution. Even the most difficult sites can be utilized through gradual soil absorption, nutrient uptake by vegetation and evapotranspiration. 800-667-9326; [www.norweco.com](http://www.norweco.com).





## FILTERS/FILTER MEDIA

### Sim/Tech Filter No-Vault

The No-Vault pump filter from Sim/Tech Filter is designed to help protect turbine pump intake screens. Filtration is achieved through a choice of a 6-inch diameter PVC or 316L stainless steel screen with 1/16-inch diameter perforations. The shorter model has 139 square inches of open area, while the tallest model has 325 square inches of open area. With 35 to 80 times the open area of the intake screen, it helps reduce the frequency of screen and pump cleaning. The interior sealing sleeve allows it to adjust to different pipe heights. The smallest unit handles pumps up to 26 inches tall, while the largest unit handles pumps up to 50 inches tall. The simple unit is easily installed in new systems or retrofitted onto existing systems. 888-999-3290; [www.simtechfilter.com](http://www.simtechfilter.com).



## PUMPS

### Ashland Pump effluent pumps

Heavy-duty effluent pumps from Ashland Pump are available in multiple horsepower sizes for various performance requirements, with efficient permanent split-capacitor motors. The oil-filled pumps have an upper and lower ball bearing design and handle up to 3/4-inch solids. They are made of cast iron, with cast iron impellers and equipped with a piggyback switch (20-foot standard cord) or in manual configurations. They are offered in 3/10, 2/5, 1/2, 3/4, 1 and 1 1/2 hp models. 855-281-6830; [www.ashlandpump.com](http://www.ashlandpump.com).



### Gorman-Rupp SF Series

SF Series submersible solids-handling pumps from Gorman-Rupp use single-vane impeller designs requiring lower horsepower with increased flow and head. The line of pumps is available on more than 24 models in 3-, 4-, 6- and 8-inch flanged discharge sizes and power ranging from 3 to 75 hp. These combinations will provide flows up to 3,400 gpm and heads to 170 feet. 419-755-1011; [www.grpumps.com](http://www.grpumps.com).



### Grundfos Pumps SL



SL wastewater pumps from Grundfos Pumps are designed for raw water intake, commercial wastewater, municipal wastewater, industrial wastewater, process water and stormwater runoff applications. The solids-handling pump series ranges from 1.5 to 15 hp and is available with two types of impellers: either an SLV/ SuperVortex impeller that provides the free passage of solids up to 4 inches in diameter with a 6-inch discharge for liquids with a higher content of solids, fibers or gassy sludge; or the SL1/S-tube impeller that accommodates solids up to 4 inches in diameter with a 6-inch discharge and is designed for large flows of raw sewage and reduced horsepower usage. 630-236-5500; [us.grundfos.com](http://us.grundfos.com).

### Orenco Systems Biotube ProPak

Biotube ProPak pump packages from Orenco Systems are complete, ready-to-install pump packages. They are used for filtering and pumping effluent from single- or dual-compartment septic tanks to gravity or pressurized discharge points. Pump vault technology eliminates the need for a separate dosing tank. Packages include a Biotube filter cartridge, which filters up to two-thirds of solids, so only liquid from the tank's clear zone is pumped. Filters are easy to remove and clean without pulling the pump vault. All components are designed to be quickly installed and easily maintained. The PF Series high-head effluent pump is field serviceable and field repairable, and pump controls are designed for specific packages. Multiple models are available. ProPak Select software is designed to provide fast, error-free hydraulic calculations and generate system curves, according to the maker. 800-348-9843; [www.orenco.com](http://www.orenco.com).



### Polylok PL-CPE4A



The Polylok PL-CPE4A is a submersible, 4/10 hp, 115-volt, single-phase effluent pump with a 2-inch NPT vertical discharge. It has a maximum head of 38 feet and a maximum flow of 56 gpm. The pump is designed with a 3,450 rpm oil-filled permanent split-capacitor motor and has an amp rating of 6.6 for 115 volts, a rugged cast iron housing and volute equipped with a cast iron vortex impeller capable of passing a 3/4-inch-diameter solid. The stainless steel shaft is supported by two single-row, oil-lubricated ball bearings. The shaft seal is an inboard design with a secondary Exclusion V seal. It has a 20-foot UL/ CSA-listed power cable suitable for submersible service and fitted with a three-prong plug. The unit is supplied with an integrated clip for the included piggyback mechanical float switch and used for automatic operation. 888-765-9565; [www.polylok.com](http://www.polylok.com). □





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# Distribution Equipment and Systems

By Craig Mandli

## Sequencing batch reactor a fit for island resort



**Problem:** An island resort in the Florida Keys was having trouble meeting discharge limits with its 18,000-gpd extended air package treatment plant. The owner engaged Morris Smith Engineering to evaluate options for rehabilitating or replacing the plant. To make matters worse, after the engineer's initial inspection the resort was hit directly by Hurricane Irma, causing great damage to the resort and plant.

**Solution:** The decision was made to rebuild the resort and replace the plant. The Sabre sequencing batch reactor from Earthtek Environmental was selected due to its treatment specifications, minimal operations and maintenance requirements, and reduced waste sludge. The system is installed in fiberglass tanks, which would not corrode in the island's saltwater environment. The tanks are also lightweight and were easily delivered to the island by barge. The tanks were placed on the ground and surrounded by retaining walls and sand backfill to raise them above flood level. The system is a fill-and-draw process, which treats wastewater in batches. It includes a primary tank where solids are settled out and scum floats. Duplex pumps transfer the effluent to the SBR in batches where it is aerobically treated and BOD, TSS and ammonia are reduced. Chemical treatment also reduces phosphorus in the final effluent. Treated effluent is filtered by pressure filters with Zeolite media and disinfected by UV units prior to discharge to soil disposal and deep well injection.


**Result:** The system has performed as advertised. 812-528-8784; [www.packageplants.com](http://www.packageplants.com).

## Sand filtration system a fit for property with shallow water table



**Problem:** A real estate flipper in North Smithfield, Rhode Island, needed to replace a cesspool for a two-bedroom home so the property would pass a time-of-sale inspection. The property had a shallow water table, and all setbacks had to be met for a code-compliant system. The builder wanted to make sure a system would be able to be installed below grade, as to not detract from the curb appeal.

**Solution:** D.H. Keene Septic designed the system and chose Eljen GSF (Geotextile Sand Filter) B43 modules for the drainfield because of the reduction in footprint size and shallow profile compared to a traditional system. The 80-foot-long by 4-foot-wide trench was placed within the setbacks of the property line and well by Matt Osborne and Dan Marcotte from Ken's Excavating. A tipping distribution box delivers effluent to the 18 GSF modules from new 1,000-gallon septic tank.

**Result:** The home has a code-compliant system that was installed quickly so the property could be sold. The GSF system was installed in a smaller footprint than a stone-and-pipe system but requires the same maintenance. 800-444-1359; [www.eljen.com](http://www.eljen.com). 



## PRODUCT NEWS

### PRODUCT SPOTLIGHT

#### The BioBarrier HSMBR offers a wastewater-recycling alternative for large systems

By Craig Mandli

There's no denying the rise in demand for sustainable technologies to answer the world's water needs. The BioBarrier HSMBR (High Strength Membrane Bioreactor) system from BioMicrobics offers onsite installers an alternative way to treat and reuse all wastewater on a property.

BioBarrier systems don't require external pumps, valves, clarifiers and the associated control system, nor costly chemicals, additives or add-on disinfection. While conventional treatment processes focus on the degradation of the waste and nutrients (i.e., nitrogen and phosphorus), the membranes physically separate much smaller microorganisms and contaminants that create turbidity.

"The HSMBR provides new opportunities for wastewater recycling to have dramatic, positive effects on water resources around the globe," says Jennifer Cisneros, vice president of marketing for BioMicrobics. "Its use can help meet the increasingly stringent needs of water-quality standards, site issues and water reuse applications."

Utilizing biological processes and membrane separation to treat wastewater and engineered to fit most residential (small to large) and commercial applications, the BioBarrier is designed to treat water to 99.9% clean of contaminants. The membranes and processes used in this advanced system act as an impenetrable physical barrier for nearly all common pollutants found in wastewater today, according to Cisneros.

"The complete, optimized design of the BioBarrier dramatically simplifies the settling, screening, direct aeration and ultrafiltration of the wastewater treatment process," Cisneros says. "This treatment system establishes the material, design, construction and performance requirements for onsite residential and commercial applications. Installed in watertight tanks, the systems also meet water-quality requirements for the reduction of chemical and microbiological contaminants for nonpotable water reuse."

The HSMBR is designed for larger commercial applications, such as restaurants, hotels/resorts, wineries, breweries and other specialty applications, providing a system to achieve higher water-quality standards in situations that can exceed 150,000 gpd.

"It basically combines the advantages of activated sludge treatment with ultrafiltration flat-sheet membranes with a pore size of 0.03  $\mu\text{m}$ , eliminating the need for secondary clarification tanks," Cisneros says. "The result is a system with a smaller footprint. With the solids-liquid separation process inside the tank, the system produces a clear, highly purified effluent that is suitable for water reuse, direct discharge into the receiving environment." 800-753-3278; [www.biomicrobics.com](http://www.biomicrobics.com).



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