September 2017

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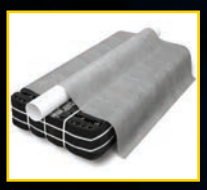

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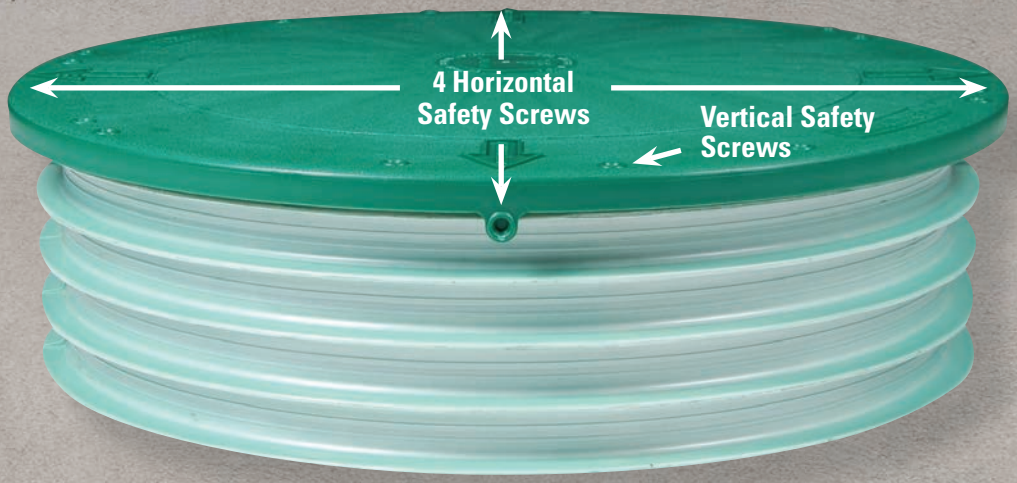

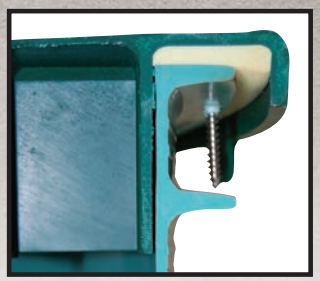

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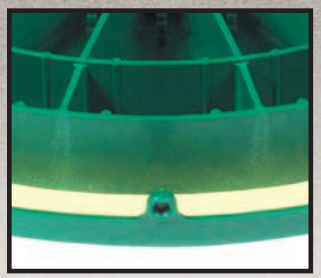

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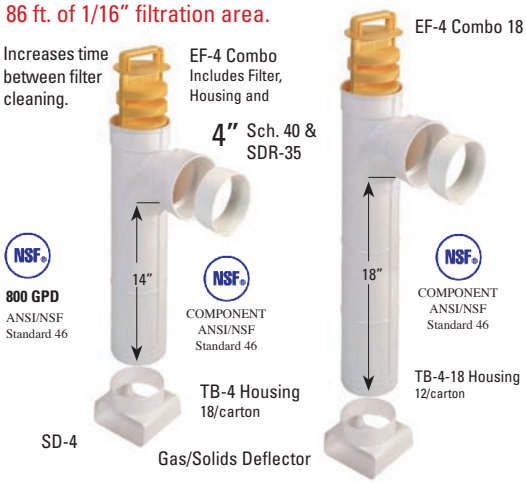

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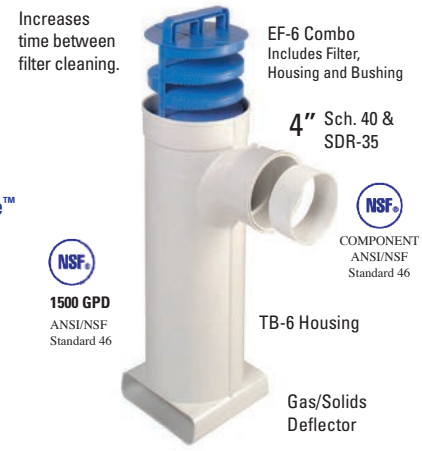

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- Easy to clean

6" Sanitary T-Baffle™

Injection molded T-Baffle™.

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- Simple to install
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Cover the Bases By David Steinkraus

ON THE COVER:
McKim Septic has been building and maintaining onsite systems outside of Washington, D.C., since 1972. Owners Walt and Lorraine McKim are shown in the company yard with one of their Kenworth vacuum trucks. (Photo by James Robinson)

Coming in October 2017

ISSUE FOCUS: Systems Repair/Drainfield Rejuvenation
Contractor Profile: Illinois installer accepts all challenges
System Profile: This Connecticut job is an uphill battle

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ADVERTISER INDEX

September 2017

Jim Kneiszel

Have an Interesting Case Study? Tell Us About It.

Our readers love to hear about difficult onsite projects. There are many reasons you should share how you overcame the latest big challenge.

It's the time of year when installers are frantically whittling away at the list of jobs they committed to for the 2017 construction season. If you're like many contractors I've talked to this summer, you have 25 jobs on the docket and a few more months to work before inclement weather starts to play a role in your scheduling. (Of course, we're talking mainly to the folks north of the Mason-Dixon Line, where snow and frozen ground are factors.)

It's a race to the finish line. Will you complete those projects this year or have to call some customers and give them the bad news that their new system will be a holdover until 2018? It's no fun making that call, but in many respects this is a happy predicament to be caught in.

Think back several years to the slow economic recovery after the bottom dropped out of the real estate market. Houses weren't being built, so you were missing out on a lot of new-construction systems. And with a dismal jobs outlook, many people who needed to replace an existing system were putting off the work as long as possible. At that time you were wondering how you could keep your crew busy without having to lay off good and talented workers.

In today's work world, employees want to be recognized for a valuable contribution and a job well done. We will name names and show your team in the trenches, literally.

BUSINESS IS BOOMING

It's a different story today. Rather than laying off workers, many of you are wondering where you can find a few good crew members to satisfy homebuilders and homeowners finally ready to address failing systems. The economic upswing is certainly having a positive impact on our industry. With more revenue coming in, companies are updating equipment, working on branding through marketing and new websites, and training young technicians who represent the next generation of professional installers.

In the midst of a flurry of work this fall, I ask you to keep in mind the industry coverage *Onsite Installer* provides. If an upcoming job will test the abilities of your technicians and designers, let us know about it. If you are working on an extreme home site that presents challenges for your equipment and system components, give us a holler. We're always looking for these types of projects to write about in these pages.

Your work season may be coming toward the end, but we still need to fill the magazine with System Profile stories that focus on the tough jobs you face. Sharing your tough-job experience will help the installer community in many ways:

Give kudos to your team: Installers are the unsung heroes of the construction industry. The work you do is dirty and difficult; your handiwork is covered up never to be seen again. Let's face it, a craftsman-like onsite job doesn't draw an ooh and aah from homeowners like a hardwood floor or a granite countertop.

A story in *Onsite Installer* provides the rare opportunity to showcase the skilled workers you are blessed to have on staff. Through words and photos, we can detail the straight trenches, level tanks, and clean plumbing and electrical work performed by your crew. In today's work world, employees want to be recognized for a valuable contribution and a job well done. We will name names and show your team in the trenches, literally.

Focus on your company's professionalism: What you do is not just hard, manual labor, it's bringing complex design plans to life that have a critical impact on your customers. You might spend some time every day on the working end of a shovel, but make no mistake, installers are professionals, pure and simple. You and your crews must decipher engineered plans, work with demanding regulators, manage big project budgets and be frontline protectors of our environment.

Sitting in on training at the WWETT Show for so many years, I am amazed at the depth and breadth of knowledge installers must possess. I like to convey that level of training and dedication to the industry as a way to motivate readers to always be upping their game. As a trade publication, the message goes out to other installers, but there's no reason you can't share the story with potential customers through social media, your local newspaper and on your website.

Build a successful installer network: Whenever I attend a wastewater industry event, I hear about the value of one-on-one networking between contractors. Installers meet and can share their problems and challenges for the betterment of their small businesses and the industry as a whole. Think of a System Profile story as a big networking opportunity. I've heard about

installers from opposite ends of the country developing a valued relationship after meeting through one of these stories. A reader calls the subject company because they shared a similar challenge and the two strike up a friendship. As contractors have told me, it's beneficial to find another professional who is not a competitor to swap ideas from time to time.

Raise awareness about new technology: Installers are always finding new products to improve treatment quality, work on smaller lots or in poor soils, and to promote more economical solutions for their customers. When you find a new technology that works, wouldn't you like to share the news with installers in other states or regions? If not just to help another installer, how about to promote the practical solution so the manufacturer can continue to make and sell it? Fractured regulations across the U.S. and Canada sometimes make it difficult for new technologies to reach a broader audience. When you tell us about a successful application of a new product, we can share the news.

Show the world how installers make a difference: Septic systems often get a bad rap. We see in the headlines that failing systems are often blamed for algae blooms and poor water conditions that close beaches. Unfounded claims sometimes lead communities to push for municipal sewer expansion that may be neither more environmentally friendly nor more cost effective than proper onsite systems. When our system profiles are shared through the *Onsite Installer* website or state wastewater associations that pass them along, the public perception can be — slowly and surely — changed. Our message can be that failing systems may be an issue, but that today's onsite technologies can solve those problems.

IT'S NOT TOO LATE

Sure, the leaves will soon be creating a colorful tapestry on the landscape and then falling to the ground. But you're not ready to hibernate for the winter and neither are we. Just like you're lacing up the boots and getting to work every morning, we're looking for more new systems to write about through the fall and into the winter months. And when the January landscape up north looks like a barren moon scene, we'll be talking to installers in Florida, Texas and Arizona where the work never stops.

If you have an interesting project to suggest for a System Profile, drop me a line at editor@onsiteinstaller.com and tell me about it. In the meantime, I hope you can check most of those 2017 jobs off the list before taking a well-deserved winter break.

Send your comments, questions or opinions to Jim Kneiszel at editor@onsiteinstaller.com.

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SYSTEM MALFUNCTION

Troubleshooting Mounds

Mound systems should perform hydraulically for 25 to 35-plus years but some systems do not perform as they should for that long. Problems are often traced to improper design and construction practices, but incorrect operation and maintenance of the system also contribute to problems. Here are issues to look for when dealing with a failing mound system. onsiteinstaller.com/featured

Overheard Online

"Formaldehyde has been reported to be a strong inhibitor of all microorganisms involved in anaerobic degradation."

– Pumping Formaldehyde From RVs — How Much Is Too Much?

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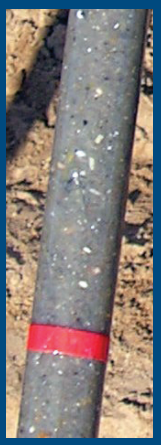
GRINDER PUMPS

Design and Dose



When grinder pumps are used in wastewater applications, minimizing the dose is important to allow for separation in the tank. It is recommended that each dose into the tank be between 1 and 5 percent of the total septic tank to limit turbulence. For more on design and use considerations for systems with grinder pumps, check out this online article. onsiteinstaller.com/featured

MOST VALUABLE TOOL

See What's Underground

If you're a full-service septic company — doing maintenance and repairs along with installations — you need a complete picture of what's going on underground in that faulty onsite system. McKim Septic, featured this month, provides a full range of services, including real estate inspections and repairs. Read about all the ways McKim uses its inspection camera in this exclusive online article. onsiteinstaller.com/featured

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COVER THE BASES

From installation to routine maintenance and repairs, McKim Septic is the jackknife of onsite wastewater companies in the busiest corner of Virginia

By David Steinkraus

The area around Washington, D.C., is busy, and in this thriving corner of northeastern Virginia, the McKim family has built a thriving onsite business. McKim Septic in Purcellville is a truly full-service wastewater company. Its technicians install private wastewater systems for single homes or entire subdivisions, and then maintain or fix them if they're mistreated.

With all of the population and commercial growth near the nation's capital, and with people moving in and out all the time, there is an expanding future for onsite installers and maintainers. At the same time, the leaders at McKim are trying to not grow. Yes, not grow, because growth brings costs that have nothing to do with investing in equipment and workers, and that can be detrimental to keeping the business thriving.

Finding people who do work the way the McKims want it done is hard. "Could we grow and do more? Yes, but we're trying not to because we do not want to trade quality for more work," says Walt McKim. At 81, he is the third generation of his family in the construction business and co-owns the company with his wife, Lorraine.

McKim Septic has two main divisions. One is for installation, one for service. The installation side is run by son Steve. Services — pumping, replacing failed drainfields, inspecting and maintaining systems — are overseen by daughter Michelle. (There is another arm to the family enterprise, too, an excavating division run by son Mike.)

The management team at McKim Septic includes, from left, Michelle, Lorraine, Walt and Steve McKim. (Photos by James Robinson)

REGULATIONS ENSURE BUSINESS

What makes the company work is its diversity. The onsite divisions generate 40 to 45 percent of the overall company income, and revenue from installation and service is about evenly split.

"But the service side has a habit of growing, so I think (Michelle) will outrun Steve eventually," Walt says. "Septic fields are always going to be here, there's always a market for repairs, and people don't like to do the dirty work. They would much rather install systems because everything is clean, so the competition is tougher for Steve."

Loudoun County, where Purcellville is located, has about 20,000 septic systems, and every year the county mails postcards to 5,000 owners requiring them to pump their systems. After five years, every system has been pumped, and the cycle begins again. Most Virginia counties are adopting similar rules, and as a result the market for pumping has become large and competition has increased. But it's still the dirty end of the business where competition is less fierce, Walt says.

With the growth, particularly on the maintenance side, it might seem logical that McKim would be adding to its busy fleet of vacuum trucks that play an important role in providing a full service to customers. But the decision to buy equipment isn't that easy, Walt says.

"People who will do the pumping right — the way we want — they're hard to find. And some of our competitors have lost their licenses because they cut corners, and the county found out," he says.

"But our business keeps growing. Our name is good, especially when customers find out Lorraine and I are still operating out of the office. We get letters and calls from our customers who tell us our crews and children treat them with such respect that they'll be our customers for life," Walt says.

McKim Septic

Location:	Purcellville, Virginia
Owners:	Walt and Lorraine McKim
Founded:	1972
Employees:	40
Service area:	100-mile radius from Purcellville
Services:	Onsite installation, system inspections and pumping
Associations:	Virginia Onsite Wastewater Association, NOWRA
Website:	www.mckimseptic.com

"Our name is good, especially when customers find out Lorraine and I are still operating out of the office. We get letters and calls from our customers who tell us our crews and children treat them with such respect that they'll be our customers for life."
Walt McKim

QUALITY ASSURANCE

It's one thing when an owner-operator does a job. The quality is there because the owner cares. When you're running a division with a couple dozen technicians, the key is transferring your standards to them.

Technician David Honeycutt, left, and Steve McKim set up Bosch laser level at a job site.

RULES OF THE ROAD

Safe driving is something the management at McKim Septic is always emphasizing with the work crews.

"Although our drivers are young, they're pretty good. But we still have accidents. We stress a following distance of four seconds behind the vehicle ahead even at a speed of 35 miles an hour," says company owner Walt McKim.

You may remember a different rule from driver's education: a two-second following distance.

"We settled on a four-second distance ourselves," Walt says. "Let me hit my brakes when you're two seconds behind me, and you're going to have a hole in your radiator from the tow bar on the back of my truck."

In a commercial vehicle, and when towing machines, vehicle weight is much heavier than the average car, says son Steve McKim, who runs the installation side of the business. "The more distance between you and the vehicles around you, the safer you are."

According to federal highway statistics, 415,000 large-truck crashes were reported to police in 2015. A large truck is one with a gross vehicle weight of more than 10,000 pounds. That number is easy to reach for dump trucks or work trucks hauling excavation equipment. Of those reported crashes, 3,598 (1 percent) involved a death, and 83,000 (20 percent) caused an injury.

About 60 percent of all fatal crashes occurred on rural roads, and only 25 percent happened on interstate highways. More than 80 percent of both fatal and nonfatal crashes occurred Monday through Friday.

On doors in the McKim shop are signs reminding drivers of the four rules they should follow: don't speed, don't change lanes often, don't tailgate, and don't use a phone while driving.

Walt's daughter, Michelle, who runs the services division, used to be a long-haul trucker. In that job, her following distance on an interstate highway was eight seconds.

There is no excuse for risky driving, Walt says. "We tell them, 'You think you're a bad-ass driver, but we think you're just a bad driver.'"

From left, Steve McKim, David Honeycutt, Joe Naggey and Michelle McKim talk about the repairs to a septic system.

"It's repetitive training," Steve says. "We hold in-house classes with our technicians for pumping and installing. We teach them about new ordinances, new products and new techniques. Our distributor does training, too, and we send our people there to learn."

Indoor training for installation crews happens a couple of times a year on a rainy day or a day when the schedule is light. Everyone gathers in the shop, and they'll talk for an hour or two first thing in the morning or at the end of the day. Technicians may have questions or may have a different technique they want to share with others. Most training for installer technicians takes place out in the field so they can see how to do something. On the service side, training happens every four to six weeks.

"Most of what we do is subdivisions, but we do install for small builders and individual systems along with some light commercial," Steve says.

Most of the subdivision work is individual systems, but they have done some community systems that collect wastewater from a group of homes and send it to a private treatment plant serving all the homes. There will always be more individual subdivision lots to work on, but community systems have become increasingly popular during the past five years, Steve says. Developers are starting to realize a central plant is more economical is some situations. The largest community system in the company's portfolio was 68 homes. Other subdivision jobs, with one system per home, have ranged up to 150 homes.

Conventional septic systems are still common, but Steve says the number of ATUs will also increase in the future. New state and local regulations are driving this, in particular the rules to protect the waters of Chesapeake Bay. What is used in any given installation is, of course, up the engineer, but in this part of Virginia, Microfast units from

> "We hold in-house classes with our technicians for pumping and installing. We teach them about new ordinances, new products and new techniques. **Our distributor does training, too, and we send our people there to learn."**
> Steve McKim

Bio-Microbics and EcoPod systems from Delta Environmental are most common.

The work keeps three installation crews busy every day.

FAMILY IN THE BUILDING TRADES

The onsite work follows a rich family history working construction.

"My grandfather built beautiful homes in Pittsburgh during the 1930s — old brick and stone with steel casement windows. In the attic were oak floors that my father stained and finished," Walt says. Building was not for Walt — at least not at first. For a decade he worked at the Central Intelligence Agency. He met Lorraine there and they fell in love.

"And after 10 years of shaving and putting on a tie every day, I came to my wife and said 'I would like to build houses like my grandfather and my father did,' and like Ruth and Naomi in the Bible, she said wherever I go, she'll go," Walt says.

As they had the first of eight children, (seven of whom are still living) they broke into the building business. Over the past 30 years, the company

David Honeycutt searches for an existing line into a septic tank.

Technician Joe Naggey uses a Caterpillar excavator to dig a trench for locating a line to hook up a new septic tank.

developed its specialty in excavation and onsite work. The McKims made the change from above-ground construction to counter the boom-and-bust cycles of the building business.

"We lost out in the '70s, and then we started again in the '80s. We got stuck when interest went to 21 percent — and nobody was buying houses at 21 percent when carpenters were making $6 and $7 an hour. So then we got into full-time excavation and septics and repairs, and that's where we stayed. In the meantime, we've seen a lot of companies in the homebuilding business come and go," he says.

> **"We got into full-time excavation and septics and repairs, and that's where we stayed.** In the meantime, we've seen a lot of companies in the homebuilding business come and go."
>
> **Walt McKim**

When their children became involved and decided to stay with the business, they expanded to excavating for large builders constructing hundreds of homes a year in northern Virginia and West Virginia.

The company's excellent reputation attracts that business and keeps it, Walt says. And no small part of that is thanks to his children, he says.

Before coming to work for her parents, Michelle, the McKim's oldest child, started her own dump truck business. The economy knocked that out from under her, but she knew that semis run all the time. With her parents' help she bought a truck with a sleeper cab, found a broker to get her work, and went on the road for six years. She left every Monday, came home on Friday, and in between ranged across the eastern U.S., as far north as Vermont, south to Key West, Florida, and as far west as Texas.

"There are days I miss it. I enjoyed driving, but I enjoy working for my parents. But I haven't listened to a radio since I came to work. In the truck the first thing I did in the morning was turn on the radio, and the last thing I did at night was turn it off," she says.

Steve is the youngest.

"I always worked for Dad. I had a couple of jobs after high school, but I also worked for him," he says.

EQUIPMENT UP TO THE TASK

A diverse company needs a large selection of equipment. McKim maintains:

- Eight loaders, a mix of Cat 953s and 963s
- Four Cat backhoes, two 416s and two 420s
- Four Cat D3 bulldozers
- Two Cat mini-excavators, one 303 and one 303.5
- Eight Takeuchi skid-steers, six TL130s and two TL230s
- A Cat 320 trackhoe
- Two 2009 Kenworth vacuum trucks with 3,800-gallon aluminum tanks
- A 1998 Freightliner vacuum truck with a 3,000-gallon steel tank and a Presvac PV750 system

Dump trucks are equipped with Reading boxes, and two lowboy trailers were built by Talbert Manufacturing Inc. Service trucks are from Ford or Chevy.

continued >>

Most of the equipment, especially the big stuff, goes with son Mike for the excavation division. To the installation and service side go four Takeuchi skid-steers, four backhoes, two mini-excavators, usually a loader, and a trackhoe. But if there is a need for the big equipment, for example to clear trees from a site, Mike is a phone call away.

Three full-time mechanics keep all the equipment running. They work six days a week. They can't rebore a head for new pistons — that work goes to the Cat dealer — but they fix everything else down to the chainsaws, says Michelle, who oversees the shop.

PEOPLE POWER

Recruiting and retaining mechanics and others on the staff can be difficult. In part it's the competitive labor market around the capital city. It's also looking out for the quality of work.

"We're pretty careful about whom we hire. We're always short, but that happens because of turnover. On any given day there are two to four people not at work for various reasons," Walt says.

The company pays full benefits: health insurance, dental and vacation that accrues at one day for every two months of work. Walt says they like to run lean. When people are absent, co-workers earn overtime, and that provides incentive to stay, he says. Also, the company does not risk the inefficiency of having someone idle, which can happen if there are too many people and a lull in work.

"We have a lot of companies head-hunting our employees because they're pretty good. Fortunately, most of our people stay because they know we have a pretty good company," Michelle says.

Employees are split between divisions. About 20 employees work for the excavation division, and the other 20 work in installation and service.

Part of taking care of their crew is safety. "We stress that every day with our crew," Walt says.

Every once in a while, Walt says, he will see something wrong while driving around and checking on crews. It may be a machine parked facing downhill. It may be a bucket left in the air when a machine isn't running.

"We have a meeting on the spot to remind the technician of proper practices so he doesn't forget it the next time," Walt says.

KEEP 'EM HAPPY

But it's the customers who are key to the McKims' success, and they don't skimp on service.

Whenever they install a drainfield, they review the procedure with the customer, Steve says. Customers learn what they have, where all components are located, and what they should and should not put down their drains.

It's just another part of the company's culture of service and a desire to make sure its customers can have their wastewater needs met, whether those needs are a full system or simple maintenance.

Walt McKim may not want the family company to grow much more, but with its long history and the wide range of services it offers, McKim's customers would probably have a different answer. ☐

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Give Me a Vintage Truck and Hardworking Employees

Rob Ratta enjoys running older rigs for installing and pumping work, and thinks recruiting good workers is the biggest challenging facing the wastewater industry

Compiled by Betty Dageforde

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

Rob Ratta, owner

Business: R.M. Ratta Corp., Ayer, Massachusetts
Age: 45
Years in the industry: Ratta Corp., is a third-generation family business operating for over 60 years.

Association involvement:

I'm new to YOWA (Yankee Onsite Wastewater Association) but over the years our family has belonged to this association as well as others.

Benefits of belonging to the association:

It gives us an opportunity to see how other small businesses are adapting to the changing market, and a chance to share information. It also keeps us informed about the ever-changing technology that is key to our performance.

Biggest issue facing your association right now:

Finding help. Let's face it, being a pump truck operator can be a physically demanding job and it's tough filling those spots with quality help. We try to set the bar high for the level of service.

Our crew includes:

Technicians

- My cousin, Fred Ehwa, is my right hand. He has been running with the pumping business for the last couple of years and is doing an amazing job.
- Scott Goodman has been with our family for 20 years, pumping and doing inspections. Customers ask for him by name. You won't find a better service provider out there than Scott.
- My brother-in-law, Matt Robinson, has been here almost as long as Scott. He's our lead Title 5 inspector, and with the market as good as it's been lately he's always in the field.
- T.J. MacGregor is one of our "newbies," with a year under his belt. Already he's made his mark as a crucial part of the team. He'll be running his own construction crew before we know it.
- My cousin, Nick Ratta, has recently come back to the family business and we couldn't be happier. His flexibility and attitude are one of a kind. He may start the day in a pump truck, take the 10-wheeler to deliver some material, and finish up the day helping with a system repair or installation, all with a smile and ready to do it again the next day.
- Jon Olden came to us when we purchased the portable toilet division of a company a few years back. He has the highest attention to detail and demand for perfection with every portable unit that is in service. Like Scott, customers ask for him by name.

Office

- Our office team is a close-knit group. My wife, Jen Ratta, keeps us on track and has assembled a team I could not be more proud of.
- Mark McKenna has been with us the longest and handles all our commercial accounts. He is tenacious in growing that side of the business and keeping the construction pipeline filled.
- Lynne Bourque manages the portable restrooms and the Title 5 inspections, and has an incredible drive for knowledge of the

continued >>

industry. Recently she became a Certified Grade 2M operator, and we can't wait to see what she decides to tackle next.

- Mary Trainor started as a backup for Jen and has worked side by side with her for the past four years. There isn't much that Mary can't handle in the office.

Typical day on the job:

I cannot really say that any day is "typical." We run a small crew here considering the size of our business. On any given day my construction crew may consist of just T.J. and myself, and that is OK. With some creativity and hard work, we are able to get the job done. The guys on my team are all resourceful, and not one of them would say, "that's not my job." I've been doing this long enough that I know how the job should go, but sometimes Mother Nature just doesn't want to cooperate and we need to adapt.

Helping hands — indispensable crew member:

This is a tough one, as every one of our employees is a key component to what makes this business successful. I would have to say there are two — my cousin, Fred, and my wife, Jen. I trust Fred immensely and could not be more proud of where he is taking our pumping business. The relationships he has built with plant operators, homeowner associations and property management companies are a solid piece of this business. I don't have to worry or second-guess what he's doing. At times I really wish I could clone him. Jen keeps me grounded.

The job I'll never forget:

Two jobs really solidified our reputation as an installer. The first was a sewer main extension and preliminary treatment plant updates for the Groton School. The job was a bit of a challenge and a blast to do. The second was the replacement of a septic system at the Fruitlands Museum in Harvard, Massachusetts. This was an enormous undertaking for both the museum and us. The project lasted four months and through the winter. It was 28,000 square feet of leaching network, a series of collection tanks, a Microfast 9.0 system, and a host of additional utility upgrades. Never once did we feel like we bit off more than we could chew.

My favorite piece of equipment:

They are all my favorites. Most of our trucks are old, vintage even. We still run a 1979 International pump truck that my dad bought brand new. It has been overhauled once or twice, and it's a showpiece to go down the road. It still will work circles around some of the newer technology that is out there. My dad is still running his 1972 Brockway with a 4,000-gallon IME tank on it up in New Hampshire.

Most challenging site I've worked on:

I would have to say that the most challenging sites have involved dealing with groundwater and controlling it.

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

"How did you do that?"

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

Like our Title 5 inspector's license, I would like to see Massachusetts adopt a statewide pumping and installers license like New Hampshire does.

The job site crew at R.M. Ratta includes, from left, Matt Robinson, T.J. MacGregor, Fred Ehwa, Nick Ratta and Scott Goodman. (Photos courtesy of R.M. Ratta Corp.)

The office staff includes, from left, Mary Trainor, Jen Ratta, Lynne Bourque and Mark McKenna.

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

Well, that would be from Dad and it goes something like this — "Care about what you do, do your best all the time, and treat your customers like they're family. You have to be able to lay your head down on your pillow at night and be proud about what you've done."

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

I don't think I will ever be able to get completely away from the industry. I tell my wife all the time when I retire I am going to run the pumpout boat at a marina someplace warm.

This is my outlook for the wastewater industry:

This is a construction trade. The population and the technology are growing faster than the number of qualified people to operate it. I am concerned that there is not enough of the younger generation taking an interest in this field to keep it moving forward and keep up with the technology. It can be a labor-intensive job, and folks just don't want to get their hands dirty anymore, which leads us to having inexperienced operators in the field that don't necessarily understand the job in front of them. It takes years of experience in this trade to be good at what you do, and the technology is outpacing the experience.

Would you like to see someone in your state or provincial wastewater trade association profiled in Snapshot?
Send your suggestions to Jim Kneiszel at editor@onsiteinstaller.com.

SYSTEM PROFILE

<< A picture from the Dig-It drone shows the job site with sand beds in the foreground and the credit union building in the background. The treatment system is located on the far side of the building. (Photos by Lucian Witmer, Lucian Allen Photography)

Dual Aero-Tech ATUs Solve Treatment Challenge In Michigan

A new credit union is placed just out of the practical reach of a municipal sewer. Dig-It Excavating delivers an elaborate onsite system to save the day.

By David Steinkraus

Honor Credit Union was building a new operations center in southwestern Michigan about 16 miles from the Indiana border, and the organization had two problems: heavy soils and expensive sewer.

Municipal sewer was only about 1/4 mile away from the site northwest of Berrien Springs, Michigan, but the fee for extending a main that distance and paying monthly charges was cost-prohibitive for the company, says Dervin Witmer of Dig-It Excavating Inc. His company, based in Cassopolis, Michigan, won the contract to install the onsite system that was the eventual solution.

The credit union building is three stories in its tallest part, a single story elsewhere, and at 19,430 square feet the building houses more than 100 people working in marketing, collections, accounting, the customer call center, and other business services. Given the size of the need and the soils, the state of Michigan said only an ATU system would work. The designer chose an Aero-Tech system manufactured not too far away in Plymouth, Indiana.

Aero-Tech units are not complex, Witmer says. The manufacturer does some work in South and Central America, so the units are designed for simplicity of installation and maintenance. Although the up-front cost of the system is expensive, that initial cost plus the cost of continuing maintenance presented a financially attractive solution for the credit union.

TANKS, TANKS AND MORE TANKS

The system consists of 11 tanks, some to intercept trash, some for dosing, and some for housing the Aero-Tech treatment units. All of the tanks are of fiberglass-spun construction from Aero-Tech.

Ryan Bunker of Dig-It Excavating works on one of the sand beds at the Honor Credit Union building near Berrien Springs, Michigan. In the foreground is one of the 3-inch manifold lines feeding two 50-foot-long 1 1/4-inch laterals. Pipes were bedded on 6 inches of washed stone and topped with another 6 inches of stone.

"We're pumpers at heart. We're maintenance guys. We like the ongoing work. We like to troubleshoot. We like to change pumps, all that kind of stuff."

Dervin Witmer

Effluent pipes emerge from the credit union building at two points. Two 4-inch Schedule 40 lines run to the basement. One line serves one half of the building, including an exercise area and showers, and the other 4-inch line collects wastewater from the other half of the building. Each trash tank is equipped with a Polylok PL-525 effluent filter.

The two drainlines empty into a lift station, a 1,500-gallon tank with duplex N267 Zoeller pumps. The pumps lift wastewater from the level of the basement to the level of the treatment tanks outside. From this point, sloping ground beside the building allows the wastewater to flow through the initial treatment chain by gravity.

Water from the lift station first enters a pair of 1,000-gallon tanks connected in series. These tanks tie into a 1,000-gallon equalization tank and a 2,000-gallon dosing tank for feeding the ATU tanks. These are connected at top and bottom. A 1,000-gallon trash tank for wastewater from the three-story section of the building also ties into the surge and equalization tanks. The 2,000-gallon surge tank houses duplex N57 Zoeller pumps. The pump time-doses dual Aero-Tech AT-1000 ATUs through a distribution box that divides the flow equally.

Effluent from the ATUs flows by gravity into another 1,165-gallon duplex effluent lift station. Here a pair of A.Y. McDonald 404011EF effluent pumps send water 410 feet through a 2-inch line to a 2,000-gallon dosing tank. A pair of Myers WHR7 pumps send water alternately to two sand beds through a 3-inch Schedule 40 pipe.

Each bed is 33 feet wide and 127.5 feet long, and both are set into the slope of a slight hill. To make the beds, Dig-It technicians first stripped off 10 inches of topsoil and built up a 3-foot sand base. They added 6 inches of septic stone and laid 1 1/2-inch pressure line on top of that. Another 6 inches of stone went around and on top of the pipes and was covered with geotextile fabric.

The 3-inch line enters each bed at its center and feeds 54-foot-long sections of the 1 1/4-inch pressure laterals laid to each side of the 3-inch line. Each orifice on the laterals is equipped with a deflector.

There are clean-out caps at the end of every lateral, and technicians put in 4-inch clean-out observation ports at the end of each lateral so they can look at what's happening inside a bed during maintenance visits.

System Profile

Location:	Berrien Springs, Michigan
Facility served:	Honor Credit Union
Designer:	Sean Nalepka
Engineer:	Debra S. Hughes, P.E.
Plans:	Stuart Meade/DSH, Meade Septic Design
Installer:	Dig-It Excavating Inc., Cassopolis, Michigan
Type of system:	Aero-Tech ATU
Site conditions:	Loamy clay
Hydraulic capacity:	2,000 gpd

Dervin Witmer in the Cat 308E2 excavator, James Sanders, center, and Ryan Bunker, right, add sand to one of the beds for the Honor Credit Union building in the background. A 1,500-foot run of pressure line connects the treatment system at the building to a pair of sand beds.

Dervin Witmer, in the cab, and Ryan Bunker set an Aero-Tech tank into place at Honor Credit Union.

James Sanders checks tank heights at the Honor Credit Union building. The slope of the site meant wastewater lifted to the top of the slope could flow through the initial treatment chain by gravity.

"I suggested that a good solution might be shifting the tanks around and using a larger dosing tank. … **It delayed the job about a month, but we worked it out."**

Dervin Witmer

A total of four NEMA 4-rated SPI control panels at each pump tank operate the system, as well as two control towers for the ATU tanks.

Dig-It technicians used a Cat D5 bulldozer for the heavy work of stripping soil and preparing the site. A Cat 299D multitrack loader and a Cat 308E2 excavator handled the rest of the installation.

DIFFERENT FROM THE PLANS

When Dig-It was preparing for the installation, Witmer and his team discovered the piping installed by plumbers did not match the design plans. Those plans called for three 4-inch pipes bringing wastewater out of the building's upper level. Instead, the plumbers had combined two drainlines inside the building and brought two 4-inch lines out at the basement level and one at grade.

"That totally changed the system. I suggested that a good solution might be shifting the tanks around and using a larger dosing tank. We went back and worked with the designer and the Michigan Department of Environmental Quality. It delayed the job about a month, but we worked it out," Witmer says.

When the new design was ready, Witmer contacted Aero-Tech, and the company shipped a new tank and a different control panel.

The panel is a simple model without any way to collect performance data that can be loaded into a spreadsheet. Technicians servicing the unit will manually check the controls and floats, and visually inspect the liquid levels in tanks.

Because the sand beds were installed on a slope, the technicians also had to construct a berm to prevent wastewater from flowing out of the bed in the event something plugged or failed. They made the berm out of clay. It was 10 to 12 feet wide and sloped from a height of 2 feet down to grade.

Sand beds were topped with 10 inches of topsoil and planted with a mix of plants native to that area of Michigan.

PLENTY OF RESERVE

Because the system has double everything, a problem in one half of the treatment chain will not stop wastewater flows completely. There is also about a day and a half of storage capacity in the surge tank and first dosing tank.

"For us this job was on the large side, and we try to do about one of these every year," Witmer says.

Anyone considering such larger projects should realize it's not much different from a residential job.

"The whole design and installation is similar. The only difference is scale. You're doing more tanks, more controls, and a lot more pipe," Witmer says. He starts by breaking the project into steps: Where does the flow come in, and what step comes next?

But the real reason he wanted to get into advanced treatment systems is the ongoing maintenance contract.

"We're pumpers at heart. We're maintenance guys. We like the ongoing work. We like to troubleshoot. We like to change pumps, all that kind of stuff," he says.

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Jim Anderson, Ph.D., and David Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. David is extension onsite sewage treatment educator. Jim is former director of the university's Water Resources Center and is now an emeritus professor. Readers are welcome to submit questions or article suggestions to Jim and David. Write to ander045@umn.edu.

Why Reinvent the Wheel When it Comes to Onsite Procedures?

Following a proven inspection or operations and maintenance checklist means more effective and efficient performance to benefit your customers and your bottom line

By Jim Anderson and David Gustafson

We have previously written columns on inspections and operation and maintenance, as well as installation. Following these efforts, one or two people have sent questions about using and obtaining procedural checklists to guide their work. We thought it might be time to address those questions. This is not meant to be a comprehensive look at all the checklists or tools available, but to share an idea of some that we have been involved with over the years that you can look at and decide if they are helpful.

Regardless of specific purpose, all checklists and activities start with identifying your client and gathering as much information and documentation about the system as possible. Based on the information collected, a course of action can be identified and begun to gather or determine missing information.

Two of the most comprehensive sets of checklists were developed by the Consortium of Institutes for Decentralized Wastewater Treatment. In both cases, CIDWT created the checklists as part of an effort to provide standardized educational materials that could be used nationwide for O&M providers and installers.

All checklists and activities start with identifying your client and gathering as much information and documentation about the system as possible.
Based on the information collected, a course of action can be identified.

ESTABLISHED PROTOCOLS

These efforts were undertaken due to requests from consumer advocates and progressive industry leaders to help define a basic level of service and expected level of knowledge on the part of O&M service providers and installers.

CIDWT started by developing the O&M program, completed in 2005, after an extensive period of working with practicing professionals, university researchers and extension personnel. In addition to checklists, extensive PowerPoint presentations were prepared, a comprehensive O&M manual was developed along with other materials that could be used to develop a comprehensive education program by states or private entities interested in providing the training and education.

A similar process was used to develop materials for an installer program in 2008. Both programs' checklist series start with a form to capture and record as much information as possible about the existing system, if there is one, household water use practices, site and soils. This recognizes the importance of gathering information about the property and use patterns before any work begins. The importance of continual contact and communication with the client cannot be overstated.

The second checklist in the O&M series involves an inspection checklist for an existing system. During the inspection process, each system component is identified and current operation condition determined, which provides direction to individual checklists for each component of the system. When finished, a service provider has a complete record of the system that can be used to determine O&M or replacement needs into the future.

ACCESS TO MATERIALS

The manuals, checklists and educational materials are available from Midwest Plan Service at Iowa State University in Ames, Iowa. Visit their website to order materials www-mwps.sws.iastate.edu. There will be a charge for the manuals and shipping. O&M manuals can be obtained from the National Association of Wastewater Technicians (NAWT) also for a charge plus shipping.

The checklists are quite extensive and most are several pages long, which may become unwieldy for the service provider in the field. NAWT simplified the forms, and if you are a member the forms can be downloaded from their website. Many service providers we talk to find the simplified forms helpful.

In 1995, NAWT established an educational program for conducting an operation-level inspection of existing systems, primarily for real estate transfers. The program was developed by practitioners to set the standard for real estate inspections at the request of consumers and real estate agents.

Basic sewage treatment and inspection procedure manuals were prepared, along with PowerPoint presentations and an inspection checklist. These materials were revised in 2007 and are currently undergoing another revision. Manuals and checklists can be obtained either by attending a

NAWT class when presented in your area or by contacting NAWT through their website www.nawt.org. There will be a charge for the materials.

We also need to put in a plug for our University of Minnesota Onsite Sewage Treatment Program website. Here you will find information for service providers, installers and homeowners with a variety of checklists and materials. Go to www.septic.umn.edu to find these materials. Check with your state university or regulatory agency because they likely have materials and checklists available, most of which come from one of the efforts described above. There are also materials through the U.S. Environmental Protection Agency and their website www.epa.gov.

If you have been looking for or trying to develop your own checklists, hopefully these materials will help you in the process.

Trump Orders New Look at Waterway Issues

By David Steinkraus

In its early steps in rewriting the Waters of the U.S. Rule, the U.S. Environmental Protection Agency recently sent letters to several governors asking for state advice in how to modify the rule that governs what bodies of water are subject to federal pollution oversight.

When it was issued in 2015, the rule drew vocal opposition from business. The head of the National Association of Homebuilders said a developer would face higher hurdles building on a piece of rural land. In February, President Donald Trump signed an executive order requiring the EPA to rewrite the rule.

Revising the rule will consist of two steps, and both supporters and opponents of the rule agree the process will take time. One step will rework current regulations to conform with what courts have said about the existing rule. The second will formulate a new, narrower rule. The EPA must develop technical evidence supporting any revision, and any proposed changes must go through a period of public comments and hearings.

The 2015 rule was originally an attempt to clarify what waters are subject to federal oversight. The Clean Water Act gave the federal government jurisdiction over "navigable waters," and since the act became law several court cases have been filed over the meaning of that phrase.

The 2015 rule took inspiration from the opinion of Supreme Court Justice Anthony Kennedy's opinion in a 2006 lawsuit over the meaning of navigable waters. Kennedy wrote the term should refer to water significantly connected to navigable rivers and seas, including a biological or chemical connection. The executive order from Trump requires a rule consistent with the opinion of the late Justice Antonin Scalia in the same case. Scalia had a narrow interpretation of the term. He described navigable water as water that had a relatively permanent flow or had a surface connection to waters with a relatively permanent flow.

At the moment, Waters of the U.S. is not in effect because the Sixth Circuit Court of Appeals issued a nationwide stay in 2016 as the result of a lawsuit brought by several industry groups and states. In the meantime, there is a Supreme Court case pending because of a dispute over what court can hear lawsuits — a federal district court or a federal appeals court. Lawyers are still filing briefs on this case, and a date for oral arguments before the court has not been set.

News reports quotes Ellen Gilinsky, a former EPA official who advised on the rule, as saying many fears of opponents are overblown. Supporters of the rule say states don't have the resources to ensure the health of water, and Gilinsky said she hopes the revision procedure will get all sides to finally agree on what waters should have federal oversight.

Florida

When the current legislative session ended, a bill that would have required property buyers to be notified of the presence of a septic system died with it.

The bill, authored by Rep. Randy Fine, R-Brevard County, originally required a wastewater system inspection at the time a property is sold. Fine represents a part of Florida adjacent to the Indian River Lagoon, a 50-mile-long stretch of water that is separated from the Atlantic Ocean by a narrow strip of barrier island and has water contaminated by faulty or failing septic systems.

As the bill progressed through the Legislature it was altered to remove the requirement for an inspection. Instead, the bill required property sellers to only inform buyers of the presence of a septic system, and sellers would not have been required to disclose problems. Buyers would have been required to sign a form telling them systems need pumping every three to five years.

News reports said the Florida Real Estate Association was concerned the original bill would discourage people from buying properties with septic systems.

Fine's bill also would have required the state Health Department to create a statewide database and map of existing septic systems.

A separate bill that would have allocated $20 million annually to help property owners retrofit septic systems or connect to sewer lines also died for lack of legislative action.

Also, county commissioners in Indian River County — adjacent to the Indian River Lagoon and immediately south of Brevard County — voted to raise septage dumping fees from $7.51 to $15 per wet ton. A memo from county attorneys said the previous rate covered only about half of the cost at the county's biosolids facility. In May, commissioners restricted waste coming in from out of the county.

Earlier this year the state Department of Environmental Protection cited the county for periodic discharges of organic matter, nitrogen, and phosphorus at its West Regional Wastewater Treatment Facility between November 2014 and February of this year.

New York

Suffolk County, which occupies the eastern end of Long Island, has a new program to help fund wastewater system upgrades that combat nitrogen pollution. County executive Steve Bellone signed the Reclaim Our Water Septic Improvement Program into law earlier this year. The county approved a $10 million grant program to fund the initiative. Citizens may

apply for grants of $10,000 to $11,000 per home to pay for about 200 systems annually to be converted from cesspools to advanced nitrogen-removal systems. About 360,000 homes in Suffolk County — about 75 percent of all homes — use cesspools. County officials said the program will prioritize homes in low-lying areas.

The county is working to provide predictable pricing of the four approved systems: Norweco Singulair and Hydro-Kinetic, Orenco AdvanTex, and Hydro-Action.

The county has set up a website (www.reclaimourwater.info) as a point of contact for the public.

California

The owner of a wastewater company in San Marcos and the company have agreed to pay up to $4.1 million in restitution for illegally dumping wastewater from portable restrooms into municipal wastewater systems. The owner of Diamond Environmental Services, Eric De Jong III, and the company's chief operating officer, Warren Van Dam, pleaded guilty in federal court to conspiracy to unlawfully discharge pollutants. Ronald Fabor, the company's safety and compliance manager, has been charged with perjury in the case.

Employees were instructed to build dump stations inside five company facilities between San Diego to the Greater Los Angeles area. Drivers emptied their tanks in the stations without creating a billing record for the local municipal wastewater agency. At a cost of about $75 per 1,000 gallons, that means the company avoided between $1.3 million and $4.1 million in fees.

Also in California, Residents near Malibu want to know why they are being pushed to connect to a sewer system when they say onsite technology would accomplish the same goal at a lower cost. The state has ordered 444 homeowners to stop using their septic systems in the next few years. State and federal officials are concerned about the nutrients these systems are adding to the Malibu Lagoon and to the ocean at Surfrider Beach. The estimated cost of a new sewer system is $35 million. Residents of Serra Retreat asked why they could not install less-expensive advanced treatment units instead of paying for a new plant.

Massachusetts

The Massachusetts Association of Onsite Wastewater Professionals is no more. Instead, the organization is returning to its previous name: Yankee Onsite Wastewater Association. Although the organization will continue to focus primarily on Massachusetts, the name change reflects a membership that is regional and the organization's goal of making YOWA a New England organization, according to association President Tom Groves. This is the only organization focused on the onsite industry in the region, Groves said in the association's most recent newsletter.

Colorado

The latest revision of Colorado's onsite regulation took effect June 17. In 2013, the state adopted its first revision of Regulation No. 43 in more than 30 years. After experience with it, officials and professionals identified some parts that required tweaking. Interested parties held 16 meetings beginning in August 2015. The revisions were adopted by the state Water Quality Control Commission in May. Local agencies will have one year to bring their ordinances into compliance with the revised regulation.

Ohio

To reduce water contamination, local governments in the Toledo area covered $75 of cost of septic pumping for homes in the watershed of Wolf Creek. That figure equals the per 1,000-gallon dumping fee at treatment plants associated with the program. Wolf Creek empties into Lake Erie at Maumee Bay State Park, and tests have found that bacteria from the creek contribute to water quality problems at the park's beach. About 400 homes in the watershed are on septic systems, officials said.

Montana

The owner of a bar and restaurant in Four Corners — about 6 miles west of Bozeman in the southwestern part of the state — filed suit against the Gallatin County health officer for denying a food serving permit because of problems with the restaurant's septic system. Jerry Ritter, owner of the Korner Klub, told a reporter that his system had a rough time just after it was installed in 2013. A pipe broke and power to its pumps was off for several months, Ritter said. Septage surfaced, filling an open pit for several months, but the system is fine now, he said.

Matt Kelley, the county health officer, said Ritter is delaying repairs and is threatening public health. In 2015, engineers for the business submitted documents saying the 1,600 gpd design capacity of the system needed to be expanded because the business was producing 2,000 to 2,500 gpd.

Just after the county Board of Health voted down the Korner Klub's 2017 food license, Ritter opened for business as usual, said a report in the *Bozeman Chronicle*. Meanwhile, county and state officials disputed which level of government was responsible for enforcement since Ritter was apparently serving food without a proper license.

Distribution Equipment and Systems

By Craig Mandli

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The **Tru-Flow Splitter** from **Clarus Environmental** is a distribution box that can accurately split wastewater effluent flows up to 30 gpm into two to five distribution lines. It is constructed of lightweight, noncorrodible materials, making it easy to install and long-lasting. It consists of a diverter basin and cover and the diverter. The bubble level design allows for simple post-construction adjustments, solving the problems associated with distribution box settling. The unit may settle as much as 15 degrees to the front or to the back and/or 12 degrees to one side or the other and, when adjusted, will still evenly split effluent. With a 4- or 6-inch riser to the surface, it is easy to inspect, adjust and maintain. **800/928-7867; www.clarusenvironmental.com.**

Polylok 20-inch Drainage/Distribution Box

The **20-inch Drainage/Distribution Box** from **Polylok** is ideal for large applications such as golf courses, but is also a suitable size for home. There's no need to worry about different-colored fittings or plugs to inventory because as well as accepting 2-, 3- and 4-inch pipe, the units also accept 6-inch pipe. They will also accept Polylok's 20-inch risers to easily bring the unit to grade. **800/765-9565; www.polylok.com.**

Tuf-Tite Distribution Box with Speed Leveler

The noncorrosive **Tuf-Tite Distribution Box** with a **Speed Leveler** in each outlet provides a simple, stable, reliable and permanent means for dividing septic tank effluent flow. 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 SDR35 or Schedule 40 pipe, including corrugated, for ease of installation. **800/382-7009; www.tuf-tite.com.**

DRAINFIELD MEDIA/COMPONENTS

Anua Puraflo Dn

The **Puraflo Dn** peat fiber biofilter system from **Anua** provides enhanced denitrification below 20 mg/L through recirculating 50 percent of the treated effluent back to the front end of the septic tank, according to the maker. Flow proportioning is accomplished through simple adaptations to external plumbing, allowing for a single pump system with no aerators. In recirculation mode, each module is rated for domestic strength at 240 gpd total hydraulic loading equivalent and 120 gpd forward flow. It can be designed and installed as a combined treatment and effluent dispersal system. Treated effluent exits the modules via weep holes around the perimeter at the module base, and flows into the dispersal system situated directly beneath the modules. Available dispersal system options are in-ground pad or mounded pad. **336/547-9338; www.anuainternational.com.**

Bio-Microbics BioBarrier MBR

The **BioBarrier MBR** system from **Bio-Microbics** is designed to simplify the settling, screening, direct aeration and ultrafiltration of the wastewater treatment process to remove 99.9 percent of contaminants. Certified to NSF/ANSI 40 Class I, NSF/ANSI 245 (nitrogen reduction) and NSF/ANSI 350 standards, this black water/graywater treatment system establishes the material, design, construction and performance requirements for onsite residential and commercial applications. Installed below or above grade, it offers flows from 500 to more than 27,000 gpd, and meets water quality requirements for the

reduction of chemical and microbiological contaminants for nonpotable water use. Treated wastewater can be used for restricted indoor water use and/or unrestricted outdoor water use. **800/753-3278; www.biomicrobics.com.**

Eljen Corporation GSF

The **GSF (Geotextile Sand Filter)** advanced wastewater treatment and dispersal system from **Eljen Corporation** is designed to provide treatment and dispersal in the same footprint, while keeping installations easy and maintenance minimal. Comprised of a two-stage pretreatment process, the geotextile modules apply filtered septic tank effluent to the soil, increasing the soil's ability to accept the effluent and increase the long-term acceptance rate. Its design provides increased surface area for biological treatment that greatly exceeds the module's absorption area. Open-air channels within the module support aerobic bacterial growth on the module's geotextile fabric interface, surpassing the surface area required for traditional absorption systems. The result is simple installations in a smaller soil absorption area. The system is tested and certified by NSF to NSF/ANSI Standard 40. **800/444-1359; www.eljen.com.**

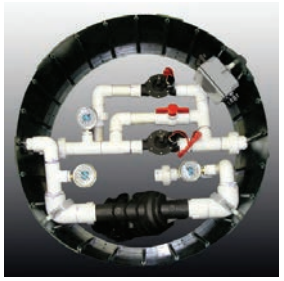
SeptiTech STAAR

The **SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculating)** filter's design is a palatable treatment system ideal for various wastewater applications. ETV-EPA verified and NSF/ANSI Standard 40/245 certified, systems from 500 to more than 200,000 gpd flows remove high levels of TSS, BOD and TKN from raw sewage. With an easy, continuous, automatic operation, the filter allows for reliable equalization and clarification process, and maintains low levels of Nitrate-N with all belowgrade components. The low-maintenance designs and low energy input makes it affordable and robust with low sludge production, and designs accommodate peak flow periods and fast recovery after power outages. Modular designs benefit both the environment and communities, and are easily upgradeable to meet growing capacity loads and location-specific demands. **800/318-7967; www.septitech.com.**

Geomatrix Systems GST Leaching System

The **GST Leaching System** from **Geomatrix Systems** uses a removable form to accurately shape and construct leaching fingers along the sides of a central distribution channel. The system is constructed with 3.4 inches of washed stone and is surrounded with ASTM C-33 sand. The fingers increase the sidewall surface area by more than six times that of a traditional stone trench. The narrow profile of the leaching fingers and central distribution channel, combined with the uniform profile of the sand treatment media, enhance oxygen transfer efficiency, resulting in better treatment of the wastewater pollutants and a leachfield with a longer life span. Its direct stone-to-soil contact enhances long-term performance. It can be configured with standard gravity, pressure and/or time-dosed distribution. **888/764-5247; www.geomatrixsystems.com.**

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 preinstalled pressure gauges to monitor pressure drop across the filter component and regulate pressure to the dripfield. The package 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 complete drip disposal field package that complements the effluent quality produced by 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.**

Pagoda Vent

Septic vents from **Pagoda Vent** can help enhance system function with landscape appeal and homeowner approval. The premade units are designed to provide the necessary ventilation to the drainfield, and have a durable, lightweight exterior that won't fade or rust. The units encourage a healthy subsurface environment, mitigate harmful gases and preserve concrete component integrity by diminishing the opportunity for microbial-induced corrosion. Optional odor filter cartridges are available and fit concealed in the vent unit. **888/864-1468; www.pagodavent.com.**

Presby Environmental EnviroFin

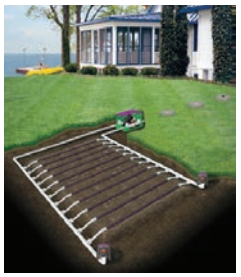
The **EnviroFin** passive onsite wastewater treatment and dispersal system from **Presby Environmental** is designed to have a small footprint and ship easily, while maintaining and exceeding NSF/ANSI Standard 40 treatment. Effluent leaves the septic tank and enters the fin distribution unit, where it settles and breaks down suspended solids. Skimmer tabs located at the perforations prevent grease and suspended solids from leaving the FDU. Effluent is distributed to the eight treatment fins, which are filled with coarse green plastic fibers, filtering and digesting more suspended solids while creating a massive bacteria treatment area. Each treatment fin has a perforated pipe functioning as an air duct across the top, providing oxygen to promote bacterial growth. **800/473-5298; www.presbyenvironmental.com.**

The Dirty Bird

The Dirty Bird provides an alternative to the standard septic vent required by many towns in new residential and commercial construction. It is a septic vent shaped like a birdbath. Meeting U.S. Environmental Protection Agency septic venting regulations, it controls odors through a replaceable charcoal filter and vents gases through holes at the bottom of the pedestal, so nothing enters the septic system. It installs in five minutes. Fade-resistant (UV stabilized), lightweight and recyclable, it is available in granite, sandstone and terra-cotta colors. It is constructed of 100 percent low-density polyethylene and stainless hardware. It is 32 inches high, with a basin width of 23 inches and footprint of 12 1/4 inches. **866/968-9668; www.thedirtybird.com.**

DRIP TUBING

Norweco Subsurface Drip Disposal System



The **Subsurface Drip Disposal System** from **Norweco** is engineered to uniformly apply treated effluent below the surface of the ground. This method of pressure distribution is suited for all conditions, as effluent is delivered directly to the infiltrative surface of the soil using polyethylene tubing with built-in turbulent flow emitters. Properties with marginal soils can be developed using wastewater treatment systems and drip disposal technology. The U.S. Environmental Protection Agency and environmental protection agencies throughout the world have determined that subsurface drip disposal is a reliable and efficient method of effluent distribution. Even the most difficult sites can be developed by taking advantage of gradual soil absorption, nutrient uptake by vegetation and evapotranspiration. **800/667-9326; www.norweco.com.**

PUMPS

Flygt - a Xylem Brand Concertor

The **Concertor** smart, interconnected wastewater pumping system from **Flygt - a Xylem Brand** senses the operating conditions of its environment, adapts its performance in real time and provides feedback to pumping station operators. It offers energy savings of up to 70 percent compared to a conventional pumping system, along with reducing inventory by up to 80 percent due to flexible performance, according to the maker. Clog-free pumping operation and clean wet wells can save up to 80 percent in vacuum cleaning costs. Its compact design reduces cabinet size by up to 50 percent. It offers a wide performance field from which to choose the right operating point, making it simple and facilitating performance fine-tuning. **855/995-4261; www.xylem.com.**

Orenco Systems Biotube ProPak Pump Package

Biotube ProPak Pump Packages from **Orenco Systems** are complete, ready-to-install pump packages in a box. 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 the specific package you purchase. Multiple models are available. Free ProPak Select software provides fast, error-free hydraulic calculations and generates system curves. **800/348-9843; www.orenco.com.**

Sulzer Pumps Solutions ABS Piranha

ABS Piranha submersible grinder pumps from **Sulzer Pumps Solutions** provide effective and economical wastewater transport using small-diameter discharge pipes as opposed to larger-diameter pipes required for gravity systems. They are suited for private residences and community subdivisions; municipal wastewater transport; commercial wastewater handling of domestic sewage in business parks, restaurants, hospitals and industrial areas; industrial wastewater handling in industrial areas, slaughterhouses, food processing plants, paper mills and agricultural applications; and hazardous locations requiring certification in accordance with ATEX (EX II 2 G k Ex d IIB T4), with FM and CSA available. **203/238-2700; www.sulzer.com.**

Grundfos SE and SL

Designed for demanding situations, **Grundfos SE and SL** pumps ensure optimized performance with high wire-to-water efficiency. The SL range is for submerged installation and the SE range for dry and submerged installation. They are available with an S-tube impeller designed to meet today's wastewater challenges, such as dry solids content variation and water use fluctuation. The S-tube impeller offers hydraulic efficiency without compromising free passage. **630/236-5500; us.grundfos.com.**

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Franklin Electric

Drip disposal system designed for school with limited disposal area

Problem: A school in Missouri had an outdated wastewater treatment system that was not meeting the criteria in a newly issued permit. Design flow was set at 5,000 gpd and the school's administration needed a solution for an updated treatment system with subsurface disposal that could be worked into the very limited property space.

Solution: **Delta Environmental** combined an **ECOPOD** treatment system with a pre-engineered drip disposal system. Using the soils report provided by the contracted soil scientist, Delta was able to design a treatment and drip disposal system that worked within the parameters of the project site, consisting of a disc ring filter, submersible turbine pumps, PLC control management system, electric solenoid valves, water meter, wastewater-grade drip tubing, and all accessories to complete a hydraulically balanced system. The filter rack was used in conjunction with a PLC filter control panel to direct timed releases to multiple zones. It also provides backwash and field flush commands, all programmed to run under unattended, automatic operation.

Result: The six-zone system, with 15 looped laterals per zone, accommodated the permit effluent requirements and still fit within the small area designated for treatment disposal. **800/219-9183; www.deltaenvironmental.com.**

Chambers solve compacted soil challenges for YMCA

Problem: Expansion of the South Mountain YMCA campus in Wernersville, Pennsylvania, included adding cabins, expanding the dining hall, and increasing bathroom facilities from two to 18 toilets. The existing septic system was unable to handle the daily flow increase to 8,500 gpd. The site for a new septic drainfield was the central playing field, however, compaction concerns due to the 300-plus children using the playing field, coupled with typically large rainfall and wet soils in the area complicated the system design.

Solution: Engineer Roger Lehmann of All County & Associates designed a system that includes 12 tanks (a grease trap, seven septic tanks and four pump tanks). The absorption area is divided into two beds, with each dosed by a separate pump to allow for operation and maintenance. Each bed is center-fed with 28 laterals per bed and five 1/4-inch holes per lateral. The septic field includes 580 **Quick4** standard chambers from **Infiltrator** with 112 Multiport Endcaps. To provide additional strength to support the weight of the children, the system design specified 12 inches of cover. The depth of installation was unrestricted because the seasonal high groundwater table is 72 inches.

Result: After installing 580 chambers, two beds and 2,408 linear feet of SCH40 PVC pipe in less than six hours, Jim Mack Excavating was impressed with the ease and speed of installation. The engineer was pleased with the strength of the chambers and the product's ability to handle pressure distribution and allow air movement. **800/221-4436; www.infiltratorwater.com.**

Dosing system helps camp meet discharge permit

Problem: With a staff of 75, the Hole in the Wall Gang Camp in Ashford, Connecticut, serves up to 150 seriously ill children at a time. With daily wastewater flows from 20 septic tanks exceeding 10,000 gpd, renewal of their wastewater discharge permit required the camp to install a dosing system capable of delivering approximately 3,000 gallons and increase the number of distribution points to the existing leaching system (2,696 linear feet of 18-inch concrete galleys) from the current one to 17 for a maximum of 150 feet between connection points.

Solution: After discussing a custom **Flout** design with Jim Richard of **Rissy Plastics**, the chosen design included two modified 1,500-gallon septic tanks that provided the room necessary for a 17-outlet Flout dosing system with a drawdown of 44 inches. The two tanks were joined together so they fill and drain equally. A 10-outlet Flout and seven-outlet Flout dose at the same time, initiated by a third trigger Flout. Each is equipped with a dose counter that allows the staff to closely monitor daily flow and synchronization.

Result: The dosing tanks and additional distribution piping were approved by the Connecticut Department of Energy and Environmental Protection and installed in 2011. A wireless Monnit monitoring system was installed in 2017. A daily visit is no longer necessary to monitor the system. **877/221-4426; www.flout.net.**

PRODUCT NEWS

Franklin Electric pump selector software

The FE Select from Franklin Electric is an online tool that assists with product selection, configuration and quoting for water systems. It has basic application data such as flow and total dynamic head demands. Other features include a quick-price option for selecting submersible motors, drives and controls, and simple software navigation for quoting complete pump packages. 260/824-2900; www.franklinwater.com.

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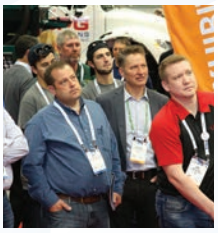

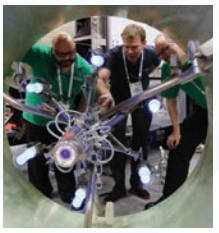

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Delaware On-Site Wastewater Recycling Association; www.dowra.org

FLORIDA

Florida Onsite Wastewater Association; www.fowaonsite.com; 321/363-1590

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Georgia Onsite Wastewater Association; www.onsitewastewater.org; 678/646-0379

Georgia F.O.G. Alliance; www.georgiafog.com

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Onsite Wastewater Professionals of Illinois; www.owpi.org

INDIANA

Indiana Onsite Waste Water Professionals Association; www.iowpa.org; 317/889-2382

IOWA

Iowa Onsite Waste Water Association; www.iowwa.com; 515/225-1051

KANSAS

Kansas Small Flows Association; www.ksfa.org; 913/594-1472

KENTUCKY

Kentucky Onsite Wastewater Association; www.kentuckyonsite.org; 855/818-5692

MAINE

Maine Association of Site Evaluators; www.mainese.com

Maine Association of Professional Soil Scientists; www.mapss.org

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Maryland Onsite Wastewater Professionals Association; www.mowpa.org; 443/570-2029

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Yankee Onsite Wastewater Association; www.maowp.org; 781/939-5710

MICHIGAN

Michigan Onsite Wastewater Recycling Association; www.mowra.org

Michigan Septic Tank Association; www.msta.biz; 989/808-8648

MINNESOTA

Minnesota Onsite Wastewater Association; www.mowa-mn.com; 888/810-4178

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Nebraska On-site Waste Water Association; www.nowwa.org; 402/476-0162

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New Hampshire Association of Septage Haulers; www.nhash.com; 603/831-8670

Granite State Designers and Installers Association; www.gsdia.org; 603/228-1231

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Professional Onsite Wastewater Reuse Association of New Mexico; www.powranm.org; 505/989-7676

NEW YORK

Long Island Liquid Waste Association, Inc.; www.lilwa.org; 631/585-0448

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North Carolina Septic Tank Association; www.ncsta.net; 336/416-3564

North Carolina Portable Toilet Group; www.ncportabletoiletgroup.org; 252/249-1097

North Carolina Pumper Group; www.ncpumpergroup.org; 252/249-1097

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Ohio Onsite Wastewater Association; www.ohioonsite.org; 888/294-0084

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Pennsylvania Association of Sewage Enforcement Officers; www.pa-seo.org; 717/761-8648

Pennsylvania Onsite Wastewater Recycling Association;
www.powra.org

Pennsylvania Septage Management Association;
www.psma.net; 717/763-7762

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Tennessee Onsite Wastewater Association;
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TEXAS

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www.nowra.org; 800/966-2942

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Ontario Onsite Wastewater Association;
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www.oasisontario.on.ca;
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