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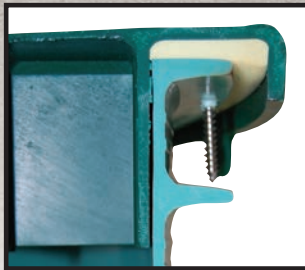
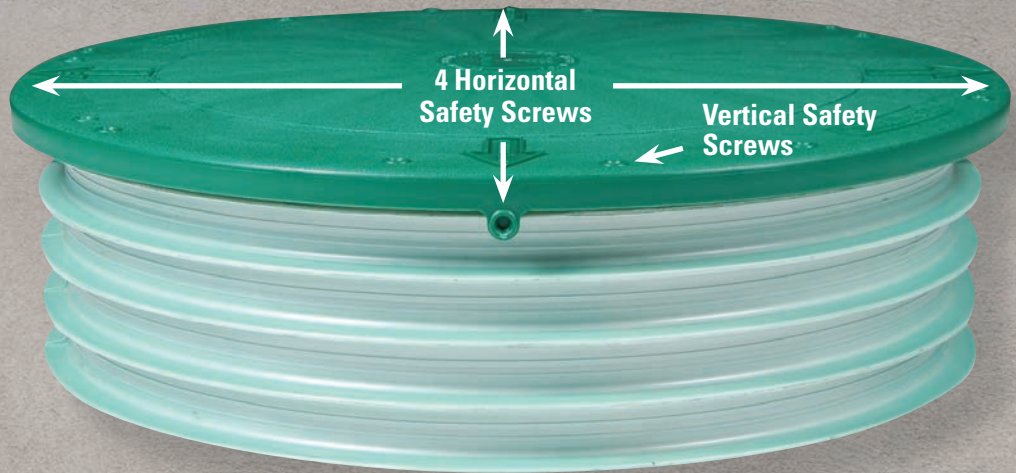
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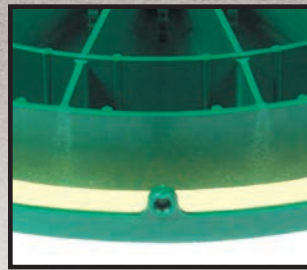
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Back to School
By Scottie Dayton

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Continuing education and diversified services play major roles in the success of MEINCO Wastewater Services. Owners David and René Meints are shown in the company yard in Alexander, Arkansas. (Photo by Tim Rand)

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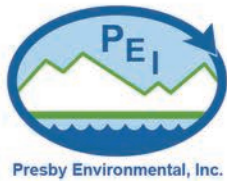
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Enjoy this issue!

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.

Don't Let an Internet Glitch Ruin Your Day at Work

Be prepared to keep humming along even as technology crashes threaten to derail your business

My office internet service dropped off for a full day and into a second day this week. I wasn't able to receive or send emails. The internet-based VoIP (Voice over Internet Protocol) phone service wasn't working. I couldn't access files stored on the cloud. Websites couldn't be updated. I felt helpless and isolated and, for a time, at a loss for what to do next. I suddenly had to rethink my workday and figure out if I could conduct any valuable business or if I should simply write off the day.

I've been in the work world for a long time, and before we started to rely so heavily on online technologies, we never had such catastrophic meltdowns. I guess if the power went out, we could light a candle and get on the landline phone to get the job done. Way back when, I was writing stories on a manual typewriter and editing with a red grease pencil, so nothing to break down.

Life was probably simpler for installers in the old days as well. The onsite systems were typically less complex in a bygone era, and you seldom had to consult online plans or keep in constant contact with clients and regulators to make sure the designs were followed precisely. There were no tablets or cellphones, so when you headed out to the work site for the day, you just kept pushing dirt until the job was done.

But today, no small business can operate without a reliable internet connection — even for a day. And any type of technology failure can slow your productivity or cost you future revenue when impatient customers can't reach you and move on to the next contractor. So while I was twiddling my thumbs without access to the web, I started to think about ways small-business owners could cope if — or should I say *when* — they encounter the same disaster.

Here are a few tips to overcome office technology problems:

Have alternate ways to reach customers.

Business communications have moved away from the good old telephone calls to faster, more convenient avenues like VoIP phones, services like Skype and WhatsApp and email, all which rely on a working online connection. However, a breakdown in internet service requires you to find other ways to conduct pressing business. First, go back to the mobile phone or landline and make sure you have all-important customer and vendor contacts saved in your phone list or — shutter — written out on a Rolodex. (For those under 50 years old, this is a handy rotating alphabetical card file you can keep on the desk and thumb through to find your contacts.) If you aren't already doing it, preemptively send out a notice to contacts with your mobile and

office numbers and ask them to save these in the event of a failure in the internet, electric power or a server snafu. It might be a nice idea to occasionally place a phone call to suppliers and active customers to have a conversation, even if there is no communication breakdown, just to keep your chitchat skills sharp.

Don't throw out *all* of your filing cabinets just yet. It might be prudent to keep a printed file of key documents in case you can't access everything digitally.

Manage important files for crisis situations.

As you work with onsite system designs and other work plans, be sure to save all files related to active projects locally on your desktop or laptop computer. Don't just rely on cloud storage. Keep these files close at hand if you will need to access them in the next month in case there's a lingering internet problem. To protect your work against any other failures, such as a fried computer, theft, fire or natural disaster, invest in three types of backups for all of your business files. First, buy a cloud service so your files are constantly being updated and saved to offsite drives via the internet. Second, connect a backup drive to your computer so you always have a mirror backup to the original drive on your computer. Third, back up your computer to a portable drive — weekly is a good interval — and store that drive in another building. It's always good to have a backup you can get your hands on immediately in the event your computer fails or is stolen.

Replace old hard drives with solid-state drives.

Older hard drives store information on a spinning platter, which is easily susceptible to failure. The rule of thumb has been to update these drives every three to five years. Today, computers come with solid-state drives, or SSDs, which have no moving parts and will perform more reliably — and usually speed up the performance of your computer, too. As the prices for these drives have dropped quickly, it's a good idea to replace all spinning hard drives with SSDs.

Print out important documents.

We're swiftly moving toward a paperless workplace, and that's a good thing for the most part. But this also means it would be easier for your business to grind to a halt during a power outage or internet failure. So don't throw out *all* of your filing cabinets just yet. It might be prudent to keep a printed file of key documents in case you can't access everything digitally. Once a month, print out your updated active customer and vendor lists. Print out records, as-built plans, and notes for all upcoming systems and those you've finished over the last six months in case you need to access them in an emergency situation. Keep things like your safety protocols, employee handbooks and basic payroll and equipment records in a printed form so you can access them anytime.

Plan to be able to work 12 hours without the internet.

Chances are if your internet or power goes down, it's a very localized problem or an issue with your provider. You might have service at home, the local library or the coffee shop a mile away. Have a plan formulated to keep the office running remotely by tapping into a functioning communications grid. Consider replacing desktop computers with laptops that workers can take anywhere to keep the workflow moving. How about helping the office staff set up the option of working from home occasionally, when they need the convenience, preparing them to have the systems working in the event of an outage? If possible, employ different internet service providers at home and at work so if one goes down, the other might still work fine. If you provide mobile devices for your employees, choose a mix of internet service providers so someone is able to communicate with customers, update the website or access financial software if one signal goes down.

BE PREPARED

We rely more and more on digital technology and the internet in our daily lives, and that's been a huge productivity advantage in every area of small business. But as I was reminded recently, a glitch in the system can create big problems. If you can't communicate with customers or regulators, you might have the crew sitting on their hands during the busiest time of the year. If you can't process online billing or payments, your financial world may quickly be in disarray. Sooner or later, you will suffer an inconvenient technology breakdown. ... Hopefully you will have contingencies in place to help you to serve customers without missing a beat. □

DROP US A LINE

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BUSINESS BLUEPRINT

Drafting a Plan

If your business is new, you need a plan in place in order for it to grow. Business plans keep owners on track in their goal of developing a successful company. To get started, check out this article about what you need to organize your entrepreneurial journey.

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PUMP TROUBLESHOOTING

No Water

The pump troubleshooting series continues with an article about what to look for when the pump starts but does not deliver any effluent. There are two main areas to check: the pump, and the tank or piping. Read this exclusive online story for all the details.

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Overheard Online

“Trained professionals can identify warning signs and recommend corrective action long before issues spiral out of control.”

– 5 Ways a Financial Adviser Can Help Your Onsite Business Succeed

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PREVENT PROBLEMS

Equipment Care

In the daily management of job site priorities, busy installers risk having preventive maintenance of vehicles and equipment fall by the wayside. But avoiding downtime and keeping your equipment in good working order is so important. Follow these tips to establish key service intervals and correct minor problems before they become major headaches. onsiteinstaller.com/featured



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BACK TO SCHOOL

Going to the University of Arkansas for a master's degree in soils helped seasoned system designer and installer David Meints perfect his craft and build a reputation

By **Scottie Dayton**

Before becoming a passion, doing weekend percolation tests and drawing onsite designs in CAD for an engineer was an additional revenue source for David Meints. He worked in various fields as an industrial engineer in Arkansas.

When his part-time labors became lucrative, Meints earned his designated representative license in 1996 (Arkansas Department of Health certification for percolation tests, system designs and inspections) and opened MEINCO in Alexander, just southwest of Little Rock, the state capital. Although still a part-time business, revenue doubled each year. In 2000, his wife, René Meints, traded her day job for full-time work in the company.

◀ The team at MEINCO Wastewater Services includes, from left, Preston Johnson, Josh Wright, René Meints, David Meints, Philip Johnson, Joe Glover and Laura Miller. (Not pictured Terri Belvins) (Photos by Tim Rand)

In 2001, the couple incorporated the now full-time business as MEINCO Septic Systems and branched into installations. Nine years later, they added a maintenance division and changed the company's name to MEINCO Wastewater Services. "When the Arkansas Department of Environmental Quality mandated National Pollutant Discharge Elimination System permits, homeowners with package treatment units were forced to hire a Class II wastewater operator and a service provider to remain compliant," David Meints says. "I have both licenses."

Today, the \$1.4 million company has one crew installing 75 to 100 systems annually, another crew servicing 450 maintenance contracts totaling 1,200 to 1,500 yearly visits, and two office assistants.

LEADING BY EXAMPLE

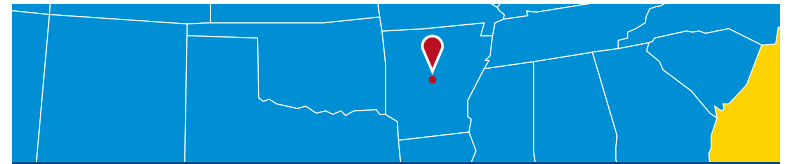
In the 2000s, Saline and Pulaski counties each issued 250 to 400 septic permits annually, but half the designers on the state health department designated representative list were retired or semiretired. "I took the projects no one else wanted and learned from them," Meints says.

A degree in industrial management helped him develop his business model. According to Sam Dunn, health department senior environmental health specialist, it is unique to the state. "People are watching and trying to emulate David's model," Dunn says.

Meints work philosophy drives the model. He still tweaks or fixes systems he installed 20 years ago. "I take responsibility for everything I touch," he says. "That gets around." Health department personnel and environmental health specialists also know he will troubleshoot problems with them or mentor newcomers.

Nevertheless, Meints has a problem; and Dio Vannucci, with Cornerstone Home Lending, identified it as economies of scale — obtaining larger production returns through division of labor. In other words, until Meints relinquishes responsibility to qualified individuals, the company will run him instead of the other way around. "Once you don't have to show up for work and the company still makes money, then you've made it," Vannucci tells him.

▶ Technicians Josh Wright, left, and Preston Johnson use a Sim/Tech Filter TruCore sludge sampler to measure solids in a septic tank during a service call.



MEINCO Wastewater Services

Alexander, Arkansas

Owners: David and René Meints

Founded: 1996

Employees: 11

Service area: Arkansas

Specialties: Onsite design, installation and maintenance

Associations: National Onsite Wastewater Recycling Association, Water Environment Federation, National Association of Wastewater Technicians, National Environmental Health Association, Arkansas Water Works & Water Environment Association, Arkansas Rural Water Association, and Arkansas Professional Soil Classifiers

Website: www.meincowastewater.com





▲ David Meints and Philip Johnson, lead service technician, meet in the company yard to discuss the onsite projects for the day.

▼ Technician Adam Ault at the workbench, piecing together PVC connections for a new onsite system in Little Rock, Arkansas.



Meints is willing to surround himself with more accomplished people, but they cost money. “Where am I going to get it?” he asks. “What do 500 more service customers look like?”

Meints’ ace in the hole has always been his wife and business partner, the person on whom he leans when making decisions. “René is correct more times than not,” he says. “When I don’t listen, I venture into something I shouldn’t have.” His wife is a certified designated representative, installer, service provider, Class III operator (IV is highest) and registered sanitarian, and she graduated magna cum laude with a degree in health science.

“René is correct more times than not. When I don’t listen, I venture into something I shouldn’t have.”

David Meints

KNOWLEDGE IS POWER

Education is another major component of Meints’ business model, for it exposes technicians to new technologies or helps them remain current. He insists his employees are licensed by the state and certified by manufacturers. Before hiring someone, he asks how easily the individual learns and would he or she be comfortable traveling to various vendors around the country to get certified on their products. Those anxious to expand their knowledge find a good home with the company.

“I’m willing to risk training possible future employees for my competition versus having employees who can’t answer customers’ questions,” he says. “The first time my guys changed out a programmable logic unit on an Orenco MVP control panel without me standing there was worth whatever I spent to get them to that point.”

Meints practices what he preaches. In May 2019, he earned a Master of Science in crop, soil and environmental science from the University of Arkansas. The degree evolved from meetings he attended in which half the people in the room held professional licenses or degrees and the other half lacked knowledge. Being in the latter group didn’t suit him.

In 2012, Meints earned his professional soil classifier license, but the state classes were limited in scope. Realizing he wasn’t done learning, Meints spent five years in the master’s course. “I’m overqualified to design, install or service wastewater systems, but I’m no longer plagued by questions I had in 2012,” he says. “What I learned enables me to push the limits of soil and know when to tell clients I can’t help them.

“Learning how to say no is a big milestone in business,” he continues. “If you say yes and fail, that’s all people remember. If you tell them what they are asking is unrealistic and explain why, they’ll respect that.”



▲ Installer Joe Glover monitors an excavation site while Kevin Castleberry of Whitten Precast Concrete Products places a tank for a new onsite system.

TOP OF HIS GAME

Education also produced a bolder Meints who, over the last 10 years, has accepted projects that pushed him out of his three-bedroom comfort zone. His first 3,000-gpd design-install was for a recreational vehicle park in Alexander, but that is not why he remembers the 2009 job.

“René and I were trading off excavating trenches and laying chambers,” he says. “She was overheated and exhausted but refused to stop working. I realized if we wanted to continue growing, we couldn’t go on like this or we’d kill each other. That year I hired my first employee.” His son, David Meints II, owner of Enviro-Tech Solutions, acts as engineer of record.

Three years later, the senior Meints tackled a complex, two-prong design-install project totaling 5,000 gpd for a marina and resort. The owner wanted to add 14 cabins and seven mobile home sites, but the existing septic system was failing and too close to the lake. The system also collected septage pumped from houseboat holding tanks.

For the first phase, Meints installed a solids containment basin next to a restaurant to collect wastewater from the building and marina. A pump sent wastewater 2,000 feet to three 1,500-gallon tanks in series: a primary tank, settling tank with two AquaWorx Remediators (Infiltrator Water Technologies), and a dose tank feeding seven 60-foot-long trenches of EQ-26 chambers (Infiltrator Water Technologies).

For phase two, a tank at each cabin or mobile home pad sent effluent to a centralized 4,500-gallon recirculation tank. Wastewater from the tank gravity-fed to an AX100 AdvanTex textile filter unit (Orencia Systems), which was plumbed for a second AX100 if needed. Treated effluent flowed to a 1,500-gallon dose tank pressurizing a 20,000-square-foot dripfield in four equal zones.

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>> Joe Glover digs a trench with a John Deere 60G excavator while Adam Ault waits to check the grade using a Lasco Laser and Instrument AGL LS-100.

"I'm willing to risk training possible future employees for my competition versus having employees who can't answer customers' questions."

David Meints

TIME TO LEARN

The septic code in Arkansas requires the bare minimum — four hours — of continuing education for license renewals. David and René Meints, owners of MEINCO Wastewater Services, believe designated representatives should have the same amount of continuing education as wastewater operators.

The couple noticed a jump in company sales and projects after implementing what they learned from their first Education Day year ago at the Pumper & Cleaner Environmental Expo (now the Water & Wastewater Equipment, Treatment & Transport Show). "I can link my confidence and the ability to do my job to those classes and continuing education through NOWRA (National Onsite Wastewater Recycling Association), NEHA (National Environmental Health Association) and the W/WETT Show," David Meints says.

Since 2014, the couple has taken their employees to local trade shows and the W/WETT Show. "At the 2018 W/WETT Show, Philip Johnson and Preston Johnson (no relation), who had been with us for less than 18 months, had enough knowledge to hold their own at roundtable sessions," Meints says.

For Meints, the ripples from education spread far. "I encourage my peers to attend national and local trade shows," he says. "Those who invest in themselves reap the returns."

"This was a large field for me," Meints says. "I developed and mounted my own tool on the excavator to plow in the tubing a row at a time. Now we have a Ditch Witch 410 vibratory plow."

STRETCHING THE IMAGINATION

As work evolved, so did the company's dynamics. Today, 75% of installs are for new construction, with 80% residential and 20% commercial. Installations generate 50% of annual revenue, while design and maintenance contracts average 25% each. (The contract renewal rate is 95%.) Effluent disposal is 50-50 dripfields or surface discharge with NPDES permit. The latter produced a memorable case.

In 2016, wastewater backed up into the local animal shelter, and effluent from the 3,000-gpd treatment plant with surface discharge was non-compliant. The system had a 10,000-gallon aerated primary clarifier gravity-feeding a 10,000-gallon secondary clarifier next to the building's side door. Staff walked dogs around this tank.

When Meints arrived, he was stunned to see a mat of dog hair and debris in the secondary clarifier thick enough to foster a 6-foot-tall tree growing through the protective grates. The tank, in constant flood stage, pushed water through the pressure manifolds in the sand filter. In addition, someone had dug up the bed and replaced the 1.25-inch pipes with 3-inch pipes.

He removed the grates and used his Kubota KX121 compact excavator to extract the top mat. After the clarifier settled a little, he called a pumper who emptied both tanks in seven trips. Meanwhile, Meints repaired the return activated sludge pump, jetted the laterals, added pumps to pressurize them, and installed a control panel to manage flows and return activated sludge. The system is functioning as originally designed.



▲ Technician Adam Ault lays out an EZflow drainfield septic system from Infiltrator Water Technologies.

SETTING NEW GOALS

As revenue permitted, the couple built an office on their 3 acres and converted an 864-square-foot barn into a shop. Today, besides the equipment already mentioned, Meints owns three GMC trucks, three AGL lasers (GeoMax), a John Deere 60G compact excavator and Kubota machines: a KX040 excavator and SVL75 skid-steer. He hired Terri Belvins as his administrative assistant and part-time service provider in 2015.

Yet one item has been slow to change: When soils don't meet standards for subsurface disposal, regulations still defer to surface discharge. "Arkansas doesn't have empirical data on secondary treated effluent and how it would behave in reduced drainfields," Meints says. "The topic became the research for my master's thesis because I had access to the customers, infrastructure and unsuitable soils. Whatever the data showed, it would be something no one else had done in the state."

His conclusions have initiated conversations in health departments and opened minds. For example, Terry Paul, Arkansas Department of Health branch chief of Environmental Health and Protection, asked him to look at a challenging site with suitable soils but limited disposal areas. Paul wondered if a reduced drainfield would be applicable.

Meints' next goal is to hit \$1.5 million in sales. "Adding two more employees this year for a second half service-half installation crew will help secure 500 more maintenance contracts," he says. "Then I'll keep growing until they become a dedicated service crew." ■

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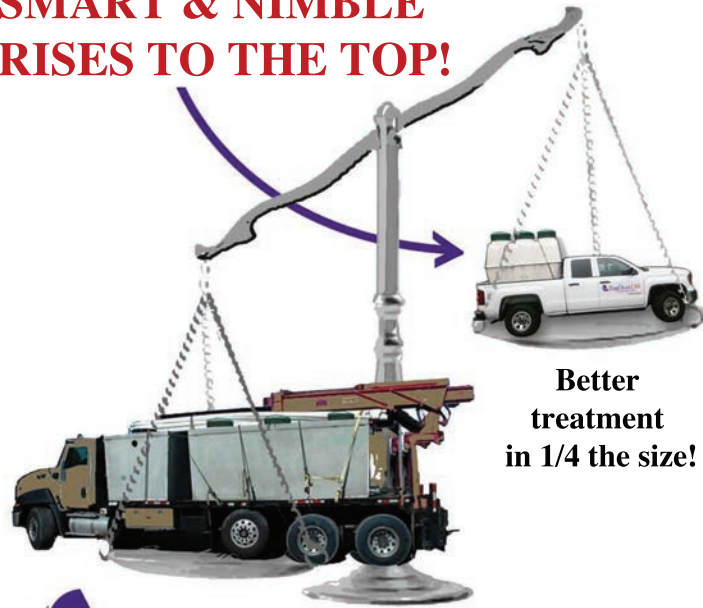
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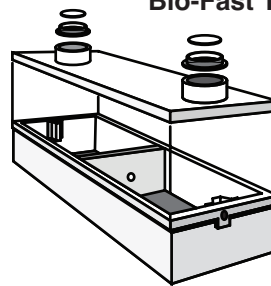
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Don't Let Your Soil Texture Evaluation Skills Get Rusty

Periodic hands-on training with soil samples will sharpen the abilities of seasoned onsite professionals and lead to better system design

By Jim Anderson and David Gustafson

Over the years, we have conducted hands-on classes on basic surveying techniques and the determination of U.S. Department of Agriculture soil texture class using the *feel* method. Also, in conjunction with some soil scientist colleagues, we teach a course in soil description, which involves determining soil texture as well.

We have always maintained that installers and local inspectors/regulators — with a little training — can determine soil texture class accurately enough to help determine the soil sizing factor to plan for system size. We expect that training on the techniques used to determine texture by feel, combined with a little practice on soils found in the areas they work, will allow them to make better decisions on system sizing and location.

With a little investment of time and effort, we believe professionals in our industry can be trained on how to evaluate soil texture and write soil descriptions to provide necessary information for system design.

As evidence, we have offered up information from a study conducted with University of Arizona students in a beginning soils class. With a few hours of training and practice, the students could identify the correct soil texture class approximately 70% of the time. There are 12 texture classes in the USDA textural classification system, so this is impressive for novices with no experience. We always highlight in our classes that installers and inspectors can do better than any college student.

A new comprehensive study looked at the ability to determine textural class by professional soil scientists, university students and seasonal employees trained to evaluate texture in their inventory work to gather rangeland data. There were no real surprises. When soil texture by feel estimates were compared with laboratory data, the results were often different — with those differences being more frequent for individuals with less experience.

IMPROVING ACCURACY

Professional soil scientists for the National Cooperative Soil Survey were able to identify soil texture with more accuracy than university students or seasonal workers. How well texture could be identified was directly related to the amount of training the individuals received.

The results showed that training increases accuracy. Professional soil scientists outperformed people who have had a day of training on how to describe soil profiles, and the lowest group were those who had 1.5 hours of training. With additional training and practice, the accuracy for all groups could be improved.

Researchers looked at the data a little closer and noticed something else. Even though the absolute accuracy in estimation fell with the less-experienced groups, they weren't off by much. Accuracy improved from 40% to 80% if they used the texture classes next to the correct texture class in the textural triangle identified in the laboratory.

This caught our attention because the purpose of evaluating soil texture is to determine which of the four or five soil loading factors, depending on your state code, is used in the design of the soil treatment unit. For our purposes, identifying the soil sizing factor texture estimates need only distinguish the major textural breaks to assign the proper values. This research shows individuals with very little training can do this with 80% accuracy. With more training and practice, these numbers can be improved.

There was one other interesting result: Apparently if the skill is not used regularly, there is a need to recalibrate. This was true for all the groups, even professional soil scientists! The authors suggest what they feel are necessary steps to ensure “citizen scientists” learn and maintain the skills to accurately estimate soil texture. As an aside, yes, installers and inspectors are citizen scientists!

PRACTICE MAKES PERFECT

They suggest continued practice with known samples to keep the skills fresh. In places like Minnesota, practicing during the long winter months is important. In the past, we have talked about having texture samples available to practice. If they are not obtainable from a nearby university or a geotech supply house, work with a professional soil scientist to put together a set of soils for practice.

Another suggestion is to go in the field in an area (the area you work) and look specifically at the local variability and ranges in texture. This is the reason we established regional soils workshops for septic professionals

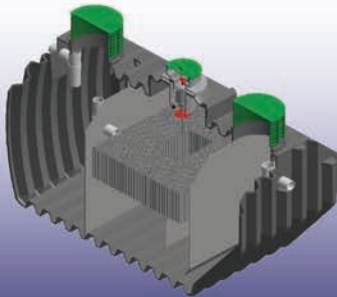


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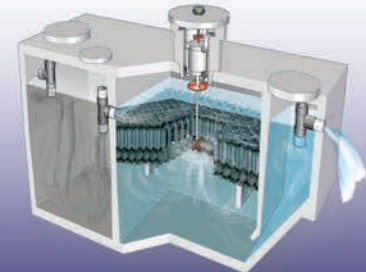
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as part of our Minnesota training program. When installers and inspectors from a region evaluate the soils, they can discuss differences in interpretation in a nonconfrontational setting, which can help avoid disagreements in the future. We have also conducted these workshops for other states. If your state does not have a professional program featuring these activities, it would be a good idea to investigate how to start them with your state regulators.

Their final suggestion was that support systems should be developed with information-loaded cellphones and carried into the field to help the decision-making process. We expect to see these types of applications developed. We do know that some site evaluators and designers have created some of these applications for their own use.

With a little investment of time and effort, we believe professionals in our industry can be trained on how to evaluate soil texture and write soil descriptions to provide necessary information for system design. One does not need to be a soil scientist. However, working with a soil scientist in your area can improve your soil evaluation skills, leading to better system design and installation. □



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New Hampshire Septage Processor Caught in Budding PFAS Problem

By David Steinkraus

Biological Recycling Co., a New Hampshire company that processes septage and spreads sludge on fields, has been notified by the state that it is the likely source of per- and polyfluoroalkyl substance (PFAS) contamination of private drinking water wells. PFAS is an umbrella term for a category of chemicals used in a wide variety of products.

Because of the contamination, Biological Recycling Co. of East Kingston is supplying bottled water to six affected homes near its property, according to news reports. Because there is no public water source near the homes, the likely solution will be a water treatment system at each house, says Jim Martin, a spokesman for the state Department of Environmental Services.

A news report says tests of four drinking water wells found combined concentrations of perfluorooctanoic acid and perfluorooctane sulfonate (also called PFOA and PFOS) ranging from 83.5 to 174.8 ppt. The state standard for water is 70 ppt. Seven of 10 groundwater monitoring wells on or around the company's property exceeded standards.

The state accuses company owner Daniel Bodwell of spreading nonresidential sludge on land. Judy Houston, a DES enforcement engineer, was quoted as saying that Bodwell did not mention an intent to stockpile and compost dewatered septage, and this is not covered by his permit. The state also accuses him of building an unpermitted lagoon to store material, and the state says groundwater on that part of the property is too high for safe construction of a lagoon.

Only household sludge may be land-spread because septage from schools or commercial buildings may contain cleaning chemicals that contain PFAS, Houston says.

"Until (Bodwell) can verify with his septic haulers what kinds of sources the material comes from, we don't know if it came from just toilets. It could be janitors' sinks at a school or nursing home," Houston says, according to the news website www.seacoastonline.com. "There would be the potential for PFAS in wax strippers or degreasing products in kitchens."

New Hampshire is not the only place where PFAS is a budding issue for the wastewater industry. All sewage sludge tested by the Maine Department of Environmental Protection was contaminated with PFAS, according to news outlet *The Intercept*. The state tested 44 samples from farms and other facilities that spread compost made with sludge, and all samples showed at least one PFAS chemical. Only two of the samples had PFAS concentrations below the standard that Maine set in early 2018.

In March, Maine said it would temporarily stop sludge spreading when milk from a dairy farm in Arundel was found to be contaminated with PFAS that likely came from sludge used as fertilizer.

There are currently 37 bills in Congress that address PFAS chemicals.

One would add PFAS to the federal government's Toxics Release Inventory. Another would require blood tests for Defense Department firefighters. One use of some PFAS chemicals is in firefighting foam, and there have been several reports of well water contamination near military airfields. A third bill would list PFAS under the U.S. Environmental Protection Agency's Superfund environmental cleanup program. A fourth would phase in a complete ban on the manufacture and distribution of the substances.

When the National Defense Authorization Act passed the Senate in June, it carried an amendment that requires manufacturers to report air and water discharges of PFAS chemicals, adds PFAS to the list of chemicals tracked by the U.S. Geological Survey, and requires public utilities to test tap water for PFAS chemicals. The House of Representatives is expected to consider the bill.

PFAS have been made since the 1940s and are used in a wide variety of products including carpet, fabric, paper packaging and some firefighting foams. Two members of the chemical family, PFOA and PFOS, were voluntarily phased out by manufacturers and replaced with a new class of PFAS compounds called GenX.

Although research on the effects of PFAS is not complete, results so far suggest that high concentrations in humans may increase cholesterol levels, decrease response to vaccines, increase risk of thyroid disease, decrease fertility in women and increase the risk of high blood pressure or preeclampsia in pregnant women.

New York

A bill in the New York Legislature would let Suffolk County voters decide whether to charge themselves for wastewater projects, but the measure is not gaining traction.

A fee on each gallon of water could raise up to \$70 million for water projects including nitrogen-removing onsite systems, municipal sewer expansions and wastewater plant upgrades. Advocates of the bill estimate an annual cost of \$60 to \$70 for the median user, but the Suffolk County Water Authority, which does not support the idea, estimates an annual cost of \$165 for the average household.

Suffolk County, which occupies the eastern tip of Long Island, is plagued with algae blooms tied to high concentrations of nitrogen, and in turn tied to the large number of cesspools used for home wastewater treatment. The county and some municipalities have passed laws requiring nitrogen-reducing onsite systems in all new construction and remodeling projects.

Also in New York, a town of Carmel board member faces fines of up to \$37,000 per day for not having a septic permit for his lakeside restaurant.

Blu restaurant, owned by council member Mike Barile and a partner, has a drainfield under its parking lot, he told state inspectors, according to *The Journal News* of White Plains. The field is 50 to 80 feet from the shore of Mahopac Lake, which supplies water to 450 families. The onsite system was to have been repaired in 1991 when it served a smaller hamburger stand, but no documents exist to show the repair was completed, the newspaper says.

Iowa

According to an investigation by the Environmental Working Group and the Iowa Environmental Council, private wells in the state are contaminated with unsafe amounts of coliform bacteria and nitrate. Both contaminants enter groundwater from farms, and both are linked to human health problems.

Between 230,000 and 290,000 state residents depend on private wells for their drinking water, yet in 16 years of testing, only 55,000 wells were tested for nitrate or bacteria, or both. Of the wells tested, 22,000 were positive for coliform at least once. More than 4,300 wells tested positive for bacteria every time. *The Onsite Observer*, newsletter of the Iowa Onsite Waste Water Association, summarized the study.

Wyoming

The Laramie City Council received a report saying septic tanks near the city are leaching nitrate in an area where the Casper Aquifer is especially vulnerable to contamination. The aquifer supplies about 60% of the city's drinking water.

The study — funded primarily by Albany County and with some contributions from the city — found high levels of nitrogen and ammonia as deep as 35 feet. The sandstone of the aquifer starts at a depth of 25 feet.

Elected officials at the meeting questioned how much they could do since the septic systems in question are just outside the city limits.

Florida

Last summer, the city of Venice began sending letters offering septic tank inspections for people within the city limits. Inspections will be done by certified contractors at no cost to homeowners. This is part of the city's response to a 2018 algae bloom. Only 45 properties in the city limits have septic tanks, and the city did not require them to connect to municipal sewer because of the cost of \$8,000 to \$25,000 per property.

Washington state

More than 150 wineries will pay new permit fees as part of a rule revision by the state Department of Ecology.

Large and midsize wineries now must have a wastewater discharge permit like those required of manufacturers. The new rules limit irrigation with recycled water that was used to clean bottles, barrels, tanks and other equipment. The rules also govern storage ponds and use of water on dusty roads. Wastewater containing cleaning chemicals and organic matter could be a source of pollution, the department says, but it also has never documented such an incident.

Rules apply to wineries that make at least 17,835 gallons of wine or juice annually. Fees range from \$296 to \$33,196 annually depending on production.

Also in Washington state, the Clallam County Board of Health is proposing a \$13 annual fee on septic tanks to fund its onsite management program. Historically, the program has been funded with grants, but officials say funding has not been sustainable, according to the *Peninsula Daily News*. The county's Environmental Health division requires regular onsite inspections, ensures failing systems are repaired and maintains records.

A fee on each system would generate about \$260,000 annually and fund 2.5 staff jobs. The board is considering eliminating fees to review contracts and system status reports. That would cut revenue by about \$34,000.

There are about 20,000 onsite systems in the county, and since 2007, about 700 have failed. The county is northwest of Seattle along the top of the Olympic Peninsula.

If approved, the fee would take effect in 2021 when grant money runs out.



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SYSTEM PROFILE

◀◀ Josh Williams, Atomic Septic technician, keeps the depth gauge ready while Ken Williams prepares a tank site as part of the wastewater system replacement at the Sawmill RV Park. (Photos courtesy of Atomic Septic)

It's Back to the Basics for Florida RV Park Onsite System

When a large-scale ATU failed after a few years, designer Carl Irwin and installer Ken Williams chose to build conventional gravity drainfields to handle the flow

By David Steinkraus

The Sawmill RV Park is a fixture in Dade City, Florida, and it has been expanded numerous times. As a result, it has several wastewater systems serving its cabins and campsites. The problem that brought in Atomic Septic was the failure of an aerobic treatment unit.

The ATUs were installed in 2014, says Ken Williams, who owns Atomic Septic, and failure came quickly. To solve the problem, Williams and his crew installed a new system, replacing the ATUs with a conventional system of tanks and a drainfield designed by Carl Irwin of Advantage Engineering.

Tank and drainfield

An 8-inch Schedule 40 pipe brings wastewater to the beginning of each new system. There are two: one called coconut and the other called cherry.

For coconut, Atomic Septic technicians converted a 3,200-gallon tank from the ATU system into a surge and settling tank. A Liberty pump moves water from this tank about 8 feet into a pair of new 3,000-gallon concrete tanks for septic treatment. Like all the concrete tanks installed, those came from Florida Septic in Eustis.

Wastewater flows a few feet into two preexisting 2,000-gallon tanks that dose the drainfield. These were the original dosing tanks from the ATU system. Each dosing tank is equipped with a pair of 1.5 hp Liberty

System Profile

- Location:** Dade City, Florida
- Facility served:** Sawmill RV Park
- Designer:** Carl Irwin, Advantage Engineering, New Port Richey, Florida
- Installer:** Atomic Septic, Lakeland, Florida
- Type of system:** Conversion of aerobic treatment unit to conventional septic
- Site conditions:** Clay soil close to river
- Hydraulic capacity:** 5,875 gpd

pumps, and each pump feeds one of four zones in the drainfield. Pumps moved water through about 380 feet of 2-inch force main that dropped to 1.5-inch laterals.

The coconut drainfield is 36 lines of Infiltrator Water Technologies chambers, and each line is 80 feet long.



◀◀ As Ken Williams does finish work at Sawmill RV Park, a lid comes down on a new tank for one of the park's wastewater treatment systems. Lids and risers on the tanks are from Polylok.

▼ To create new drainfields, technicians from Atomic Septic excavated the loamy clay, removed the drip tubing from the previous system and raised the grade with about 2 feet of clean sand. Casey Williams is running the Kubota skid loader, and Ken Williams is handling the Bobcat mini-excavator. Chambers are from Infiltrator Water Technologies.

For the cherry system, the first tank is a 2,000-gallon settling and trash tank. A 1 hp Liberty grinder pump sends wastewater into a pair of 1,000-gallon tanks connected in series. Last is a 2,000-gallon dosing tank also equipped with Liberty pumps that need to move water only about 10 feet to the drainfield.

For the cherry system, the drainfield is eight lines of chambers from Infiltrator, each 84 feet long.

Technicians excavated the loamy clay from drainfield trenches and put in about 24 inches of clean sand under the Infiltrator chambers. About 10 inches of cover went on top, producing a mounded system. Workers brought in 110 loads of fill dirt.

Lids and riser came from Polylok. A pair of Septic Products Inc. duplex panels run the system.

To do the job, the Atomic Septic crew used a:

- John Deere 225D excavator
- IHI 35N mini-excavator
- Bobcat E32 mini-excavator
- Kubota 90 skid-steer
- John Deere 3032E tractor for moving stuff and people around the job site because the two locations were about a quarter-mile apart.

"We pretty much had every piece of equipment in our company out on the job," Williams says.

Bad install

Atomic Septic's crew pulled out all the old ATUs — seven units in all. Removal of the drip tubing for those ATUs was part of the operation to install a new drainfield for the septic systems.

Because Atomic Septic wasn't involved with the ATU system, it's hard to tell exactly what went wrong, Williams says. It looked as if the soil wasn't excavated properly before the drip tubing was installed, and the size of the drainfield was reduced by 25% from what would be normal. Yet



"Pretty quickly they started experiencing problems, which they passed off as groundwater maybe or just things that weren't going to happen all the time. About 2016 was when they realized this system was in failure. It actually started blowing out of the ground."

Ken Williams

SYSTEM PROFILE

▼ To replace a failed aerobic treatment unit system at the Sawmill RV Park, Atomic Septic technicians repurposed some tanks that had held the ATUs and added some new tanks like these. A continuing challenge was proximity to the park's buildings because customers were using the campground while technicians worked on the wastewater systems.

►► A new tank is ready for its lid at the Sawmill RV Park. The big John Deere was brought to the job for clearing trees. To create enough space for a new drainfield, a number of large oaks had to be removed.



the park sometimes has an influx of visitors on weekends, and the wastewater flow can reach 10,000 gpd.

The ATUs couldn't handle that load because there wasn't enough settling time in the treatment train. A week after the system's filters were cleaned, it looked as if no cleaning had ever been done, he says. "Once that stuff gets into drip tubing, you're done for."

The previous system was installed in 2014.

"Pretty quickly they started experiencing problems, which they passed off as groundwater maybe or just things that weren't going to happen all the time. About 2016 was when they realized this system was in failure. It actually started blowing out of the ground."

Working around events

To enlarge the area for the drainfield, the crew had to take out some large oak trees, which is why they brought out a big John Deere 250. But the real challenge on the job was working around the park operations.

It's a very popular place, Williams says, and it is not unusual for a weekend event to draw 10 times the number of people using the park on weekdays.

They started the project on Jan. 17. "They wanted us to finish within 60 days, and we finished it up within 45," Williams says.

"The first system was right in the middle of the park and right next to the pool. So to avoid the crowds and cars and parking and traffic — and everybody was interested in what we were doing — we tried to get it done before they had their main event," he says.

This was also the time in Florida when people come from other parts of the country to escape winter, and the weather in Florida during the installation period was beautiful, Williams says. Even without a special event, some weekends the park was so busy that the crew wasn't allowed in to work. But wastewater still accumulated quickly.

"We also had a truck on site, and we would have to pump those tanks almost daily," Williams says.

Some campers stay two to three months at a time, and there are two RV sanitation stations to handle the demand when visitors pull out on a Monday morning.

"That's one of the reasons we wanted to do the time dose: to help with those flows because on one day, in a couple of hours, you've got 50 RVs that empty their tanks that hold 50 or 100 gallons each," he says.

Drainfields were marked off with rope connected to 4-inch posts. Williams would have preferred a sturdier barrier to deter people from pitching tents on the drainfields, but the owners preferred the aesthetics of the rope and posts.

The work is done, and because Atomic Septic also maintains other equipment in the park, Williams is able to monitor the performance of the replacement system. So far, he says, there hasn't been a problem.



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'We Are the Actual Boots on the Ground Protecting Groundwater in a Significant Way'

Saskatchewan wastewater contractors push the government to require system design and installation by certified professionals

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 Saskatchewan Onsite Wastewater Management Association.



Jason Holtvogt, owner and operator

Business: Holtvogt Sand and Gravel, Humboldt, Saskatchewan

Age: 42

Years in the industry: The company is 45 years old, started by my father, Herb Holtvogt, so I grew up in the business. But the rule in our house was to go to postsecondary school. I have a degree in computer-aided design and drafting, or CADD, and worked as a drafting technologist for 11 years, first in manufacturing and then with the city of Saskatoon engineering department. There wasn't a lot of room for advancement, and after about five years there, my dad approached me about buying into the company and working with him. I've been working at Holtvogt Sand and Gravel for the last 12 years.

Association involvement:

I've been a member of the Saskatchewan Onsite Wastewater Management Association since it was formed. I've been a director for three years.

Benefits of belonging to the association:

When I run into a situation I'm unsure of, I can call the association and they'll give me some feedback or send me to an experienced installer who can help me. It's a good group you can call on. And they do a really good job of training. All the training you need you can get through the association. Also, they advocate for us when the government does reviews of their disposal guides. The association is in direct communication with the government and will provide suggestions when regulations start coming out or when modifications are made.

Biggest issue facing your association right now:

The government does not require systems to be designed or installed by certified installers. Anyone can install a septic system. The systems have to meet minimum requirements, but as certified installers, there are often options you can provide homeowners that will work better for them. Often a "just pass" mentality equals a system that doesn't fit the homeowners' lifestyle and becomes ineffective. I don't believe the Saskatchewan Health Authority provides enough money to properly train its inspectors, so many of them struggle to do inspections. This happens in areas of the province where onsite wastewater hasn't been fully accepted. It's frustrating when you've spent so many years in the industry investing in improving your skills, making sure you're providing the best systems, and then the inspectors are struggling to understand the requirements. Things are improving, but it's time to give mandatory training to all the inspectors and give the homeowners the best chance at having a successful system by making it mandatory to use a certified installer.

Our crew includes:

My dad is 74 and still does stuff around here as much as he can. We talk every day and get things lined up. The crew fluctuates. There are usually three or four of us in any given year who do the septic work — but also other things. We're like a jack-of-all-trades. When you've got something to dig holes with, you end up digging holes for everything.

Typical day on the job:

Typically I'm going out on sites or getting prepared for an installation, which starts with a lot of planning. The prep work involves design, consultation with the homeowners, site evaluation and making sure that what we're going to install meets the requirements of the province, site and

homeowners. The day of installation is really just the culmination of all that prior work. So one day we'll be getting the tank in, maybe doing the trenching, and then having that inspected and prepping for installing the field. Depending on weather, everything should go smoothly, and within two or three days, you have everything completed for the homeowner and turned over.

The job I'll never forget:

I was asked to come out and see if I could fix a septic tank beside the homeowner's house. I drove into the yard and it was atrocious. There was garbage everywhere. They were like, "Everything's still working. It's all fine." I found where the septic tank was and half of it was collapsed. They had a pump just sitting on the ground in the tank pumping out what they could, what was coming in there. But they wanted the tank fixed. They didn't want to replace it. I can understand their financial constraints, but there comes a point. I told them it couldn't be fixed and showed them their options but never heard back from them.

My favorite piece of equipment:

My excavator — I use it for everything. It's a Case CX210. The industry has changed a lot, going from using backhoes to excavators, which have become the most versatile piece of equipment we now have. When dad started in 1974, he had one backhoe and would consistently put on 4,000 hours a year. Right now, it's maybe 250 hours a year. Excavators were very uncommon then. There are probably no contractors around here able to make a living on one backhoe today.

Most challenging site I've worked on:

In 2010 we had an extremely wet year. In an average year, we get about 9 to 12 inches of rain. That year we had 4 feet. We had an installation site where there was a slough nearby. The water table was high, but we were able to find another location on the property to stay away from the water table. We got enough vertical separation to the water table that the mound went in without a hitch. It just took awareness of the site as to where to place everything.

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

"To start this tank, my neighbor told me I should throw a dead chicken in it." I've heard it multiple times. It doesn't make any sense, but they're dead serious. They think they need to put a dead chicken in there to get the bacteria working.

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

To have a requirement that only certified installers can install systems.

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

Make sure you've got more money coming in than you've got going out.

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

I'm sure I'd be doing something with construction equipment.

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

I think we're very close to a change in the wastewater industry in Saskatchewan. The Health Authority made changes to the Saskatchewan Onsite Wastewater Disposal Guide in 2018 that significantly improved it. The guide was very basic before. But even though we made big strides in this edition, it may be another 10 years before we see further changes. The wastewater industry is the most down-to-earth environmental protection industry you could be in. We are the actual boots on the ground protecting groundwater in a significant way through the proper treatment of wastewater. When that is recognized, then maybe changes to our industry will happen much quicker than they are now. □



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By Craig Mandli

AEROBIC TREATMENT

Knight Treatment Systems White Knight Microbial Inoculator Generator

The White Knight Microbial Inoculator Generator from Knight Treatment Systems offers an enhanced form of aerobic treatment that introduces, cultivates and releases selected microorganisms. It is designed to be simple to install in most septic tanks. It can be used to retrofit outdated aerobic treatment units and package treatment plants and enhance the performance of community and high-strength wastewater treatment systems in addition to septage processing facilities. 800-560-2454; www.knighttreatment.com.



SeptiTech STAAR

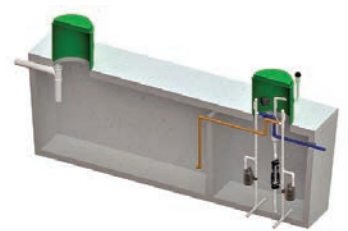
SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculation) filter systems are designed for multifamily domestic and high-strength commercial wastewater from 100 to more than 150,000 gpd for residential and commercial wastewater treatment applications. The systems use partially submerged media to treat high organic loads. The simple, automatic and reliable equalization and clarification process

treats high-organic loads that integrate with other technologies and accessories, according to the maker. The biological trickling filter technology also maintains low levels of Nitrate-N with all below-grade components that fit in readily available concrete, plastic or fiberglass tanks. Smart technology allows the system to go into a sleep mode that will dial down activity and eventually shut power off until normal flow conditions are detected. This reduces operating costs and power requirements. 207-333-6940; www.septitech.com.

ADVANCED TREATMENT UNITS

Anua PuraSys sequencing batch reactor

The Anua PuraSys sequencing batch reactor ships in a boxed kit that can be installed in hours in any standard septic tank. The kit includes a control panel, floats, predrilled siphon pipe, PVC pipe stands, siphon/sludge pump, aerator and a drainfield pump. It can be used for new construction or retrofitted into existing tanks to renovate biologically failed trenches or sand mounds. It uses a batch process where the treatment steps are done in a timed, sequential manner. The process is energy efficient; treatment occurs as needed using intermittent aeration, mixing and settling. It is certified to NSF/ANSI 40 Class I and NSF/ANSI 245 (nitrogen reduction). Residential and commercial configurations are available. 336-547-9338; www.anuainternational.com.



BioMicrobics MicroFAST

MicroFAST wastewater treatment systems or MicroFITT-ee (energy-efficient version) systems from BioMicrobics are integrated into a standard septic tank. With the SFR feature, alternate modes include intermittent operation of the blower to reduce electricity usage up to 45% and recirculation of nitrified wastewater to the primary settling chamber for added denitrification. Biosolids treatment and sludge digestion are designed to reduce treatment cost and maintenance. Available in 500- to more than 9,000-gpd configurations, technology scales for larger residential and commercial flows. A stable treatment process with fully submerged, fixed-film media and activated sludge treatment help in difficult applications and where infrastructure may not be available, according to the maker. The effluent meets secondary quality requirements and can be distributed to a soil treatment system or water reuse applications. Larger MyFAST and MacroFITT configurations offer up to 2 million-gpd flow. 913-422-0707; www.biomicrobics.com.



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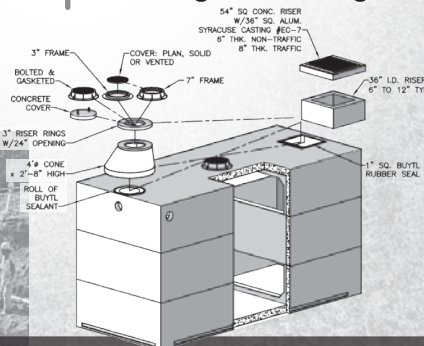
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Clarus Environmental Fusion

Clarus Environmental's Fusion treatment systems are drop-in wastewater treatment units designed for decentralized applications where effluent quality must meet or exceed secondary treatment standards. They are designed for residential, commercial and small community applications and are available in 450- to 4,000-gpd treatment capacities. All models up to 800 gpd are NSF/ANSI Standard 40 certified to produce effluent quality of 9 mg/L CBOD₅ and 9 mg/L TSS. The design enables installation without a pretreatment tank, making it suitable for sites with limited space. Effluent disposal options include conventional trenches, dosed systems, drip irrigation or disinfection with direct discharge. 800-928-7867; www.clarusenvironmental.com.

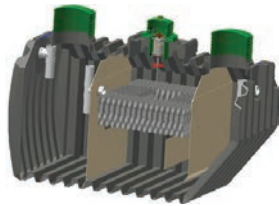
Delta Treatment Systems ECOPOD-N

The ECOPOD-N fixed-film bioreactor (FFBR) system from Delta Treatment Systems is a self-contained device that houses engineered PVC media designed to treat domestic wastewater. Five models accommodate daily flows of 500 to 1,500 gpd, with customizable options for commercial applications up to 100,000 gpd. It is suitable for individual residential installations, cluster designs and commercial wastewater treatment applications. It is certified to ANSI/NSF International Standards 40 and 245 and is Federal Housing Administration and Veterans Affairs acceptable. It can be inserted into a standard-size septic tank or vault providing quiet, odorless operation and is suitable for intermittent usage with an average nitrogen reduction greater than 50%. It also minimizes sludge production, reducing pumpout frequency. 800-219-9183; www.deltatreatment.com.



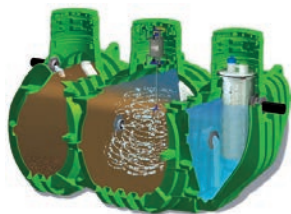
Jet Inc. J-500-800PLT

The J-500-800PLT plastic tank from Jet Inc. offers a lightweight alternative to concrete J-1500 Series BAT Media Plants. Treatment capacity is variable from 500 to 800 gpd. They are rotational molded out of lightweight polyethylene for a seamless tank with maximum strength and durability. They are easy to transport and install in difficult site conditions. 800-321-6960; www.jetincorp.com.



Norweco Singulair Green

The Singulair Green advanced treatment unit from Norweco is designed to quietly, efficiently and automatically treat all domestic wastewater in just 24 hours. The durable, watertight HDPE tank can be used for either new or replacement applications. It is easily installed and offers single-tank convenience. The all-in-one system contains pretreatment, aeration, clarification, filtration, flow equalization, and optional disinfection and dechlorination. The unit incorporates support ribs and an inherently strong arch shape designed for a



long life span. Designed for domestic wastewater flows up to 600 gpd with treatment performance meeting or exceeding strict state and county requirements, it is certified by NSF to Standards 40 and 245 for nitrogen reduction. 800-667-9326; www.norweco.com.

Orenco Systems AdvanTex AX-RT Series

The AdvanTex AX-RT Series of advanced wastewater treatment systems from Orenco Systems is designed for system repair and rehabilitation. All interior components are installed, plumbed and adjusted at the factory. Units can be shallowly buried for use between a functional, watertight septic tank and a functioning drainfield. The three-in-one design includes recirculation, treatment and discharge in a single unit to simplify installation and eliminate the need for additional tanks, basins, risers and lids. The system can be maintained with an annual service call. Filters and textile media are accessible and cleanable, and control panels are touch-safe. No blower is needed for the passively vented system. An optional UV disinfection unit is available. 800-348-9843; www.orenco.com.



SEPTIC SYSTEM BACTERIA

Bionetix International Eco-Sept

Eco-Sept pouches from Bionetix International contain pink, granular powder with a high concentration of beneficial bacteria (28 billion per pouch), enzymes, biological nutrients and stimulants designed to improve the microbial action of a septic system. When added to a septic tank, they reduce the frequency of pumping by degrading paper, grease, vegetable waste and other organic wastes quickly, according to the manufacturer. This helps keep sewer lines open, prevents drain blockage and backups, extends life of leachfield lines and reduces foul odors, the maker says. It is safe to use and will not damage pipes or fittings. It comes packaged in 1-ounce water-soluble pouches, 400 per pail. For 500- to 800-gallon tanks, the initial dose is one pouch per day for four days, followed by a one-pouch-per-month maintenance dose. For tanks of 1,000 to 2,500 gallons, the initial dose is two pouches per day for four days with a maintenance dose of two pouches per month. 514-457-2914; www.bionetix-international.com.



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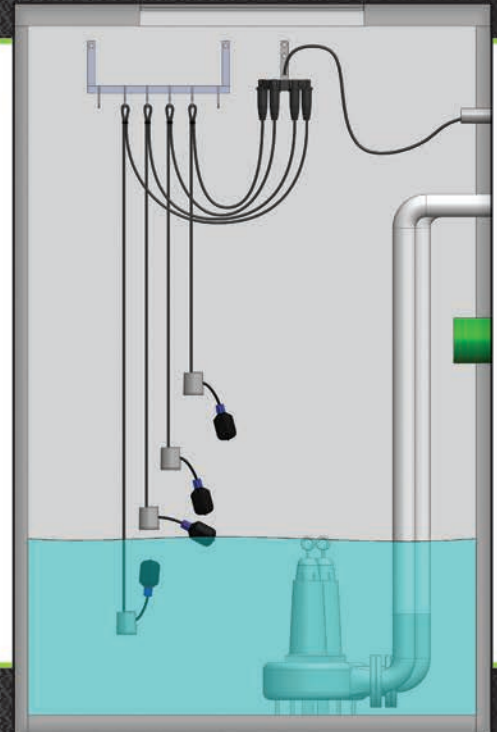
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SEPTIC SYSTEM CHEMICAL

Arcan Enterprises Septic-Scrub

Septic-Scrub chemical additive from Arcan Enterprises is designed to help remove sludge that builds up and sticks to the stone in a drainfield, pit or sand mound to rejuvenate the drainfield. According to the maker, it works in the first 24 hours after application. It can serve as part of a maintenance program. It works with all types of systems, is safe to handle and is environmentally friendly. 888-352-7226; www.arcan.com.



SEPTIC DRAINFIELD RESTORATION

Eljen GSF

The GSF, or Geotextile Sand Filter, advanced wastewater treatment and dispersal system from Eljen is designed to provide treatment and dispersal in the same footprint while keeping installations easy and maintenance minimal. Utilizing 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, according to the maker. 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, according to the maker. The system is tested and certified by NSF to NSF/ANSI Standard 40. 800-444-1359; www.eljen.com.



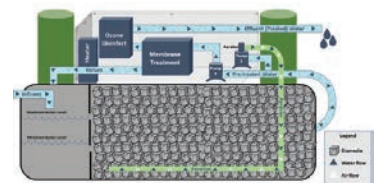
Geomatrix Systems SoilAir

SoilAir from Geomatrix Systems intermittently aerates the drain/leachfield and surrounding soils rather than constantly aerating wastewater in a tank. This process allows rapid rejuvenation of failed septic systems, extends the life span of new leachfields and enhances treatment, according to the maker. Systems can serve single and multifamily homes, as well as challenging and high-strength waste streams, such as restaurants, hotels, marinas, laundromats, health care facilities, grocery stores, food processing facilities and convenience stores. 860-510-0730; www.soilair.com.



NextGen Septic retrofit

Retrofit technology from NextGen Septic can be installed into any approved septic tank and works to repair a clogged soil drainfield in as little as eight to 12 weeks, according to the maker. The technology offers a compact, stand-alone, automated, two-stage treatment system for domestic sewage that produces a clean water output. The sewage is collected in the tank for the first stage, which has been retrofitted with biomedica and aeration technology. The second stage, which occurs in a separate treatment unit, removes nitrogen, phosphorus and harmful contaminants through a no-maintenance-required membrane and ozone disinfection systems. When the clear, disinfected water output is distributed into the clogged soil drainfield, it reduces the growth of aerobic bacteria and allows dissolved oxygen to kill some of the thickness of the biomat in the soil, according to the manufacturer. 513-262-9506; www.nextgenseptic.com. □



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Arkansas Onsite Wastewater Association;
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Onsite Wastewater Association of Idaho;
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Indiana Onsite Waste Water Professionals Association;
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Iowa Onsite Waste Water Association;
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Kansas Small Flows Association;
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Maine Association of Site Evaluators;
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Missouri Smallflows Organization;
www.mosmallflows.org;
417-631-4027

NEBRASKA

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

NEW HAMPSHIRE

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

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

NEW MEXICO

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;
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OHIO

Ohio Onsite Wastewater Association;
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Oregon Onsite Wastewater Association;
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Pennsylvania Association of
Sewage Enforcement Officers;
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Pennsylvania Onsite Wastewater
Recycling Association;
www.powra.org

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

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Wisconsin Onsite Water
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www.wlwca.com; 888-782-6815

NATIONAL

Water Environment Federation;
www.wef.org; 800-666-0206

National Onsite Wastewater
Recycling Association;
www.nowra.org; 800-966-2942

National Association of
Wastewater Technicians;
www.nawt.org; 800-236-6298

CANADA

ALBERTA

Alberta Onsite Wastewater
Management Association;
www.aowma.com; 877-489-7471

BRITISH COLUMBIA

British Columbia Onsite
Wastewater Association;
www.bcossa.org; 778-432-2120

WCOWMA Onsite Wastewater
Management of B.C.;
www.wcowma-bc.com;
877-489-7471

MANITOBA

Manitoba Onsite Wastewater
Management Association;
www.mowma.org; 877-489-7471

Onsite Wastewater Systems
Installers of Manitoba, Inc.;
www.owsim.com; 204-771-0455

NEW BRUNSWICK

New Brunswick Association of
Onsite Wastewater Professionals;
www.nbaowp.ca; 506-455-5477

NOVA SCOTIA

Waste Water Nova Scotia;
www.wwns.ca; 902-246-2131

ONTARIO

Ontario Onsite
Wastewater Association;
www.oowa.org; 855-905-6692

Ontario Association of
Sewage Industry Services;
www.oasisontario.on.ca;
877-202-0082

SASKATCHEWAN

Saskatchewan Onsite Wastewater
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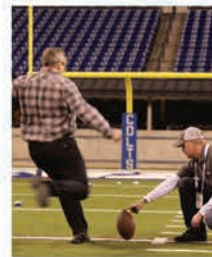
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