

October

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pump choices  
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Treatment system  
for a mine  
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2012



## Diagnosis FIRST

For new systems or repairs,  
Steve Buttermore starts  
with a thorough evaluation

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By Gil Longwell

**ON THE COVER:** Steve Buttermore, owner of Buttermore's Septic Service, strives for professionalism in every phase of business. That includes diagnosing system trouble completely before suggesting a remedy to a customer. (Distribution box shown in background pipe from Tuf-Tite). (Photography by Vincent Scarano)

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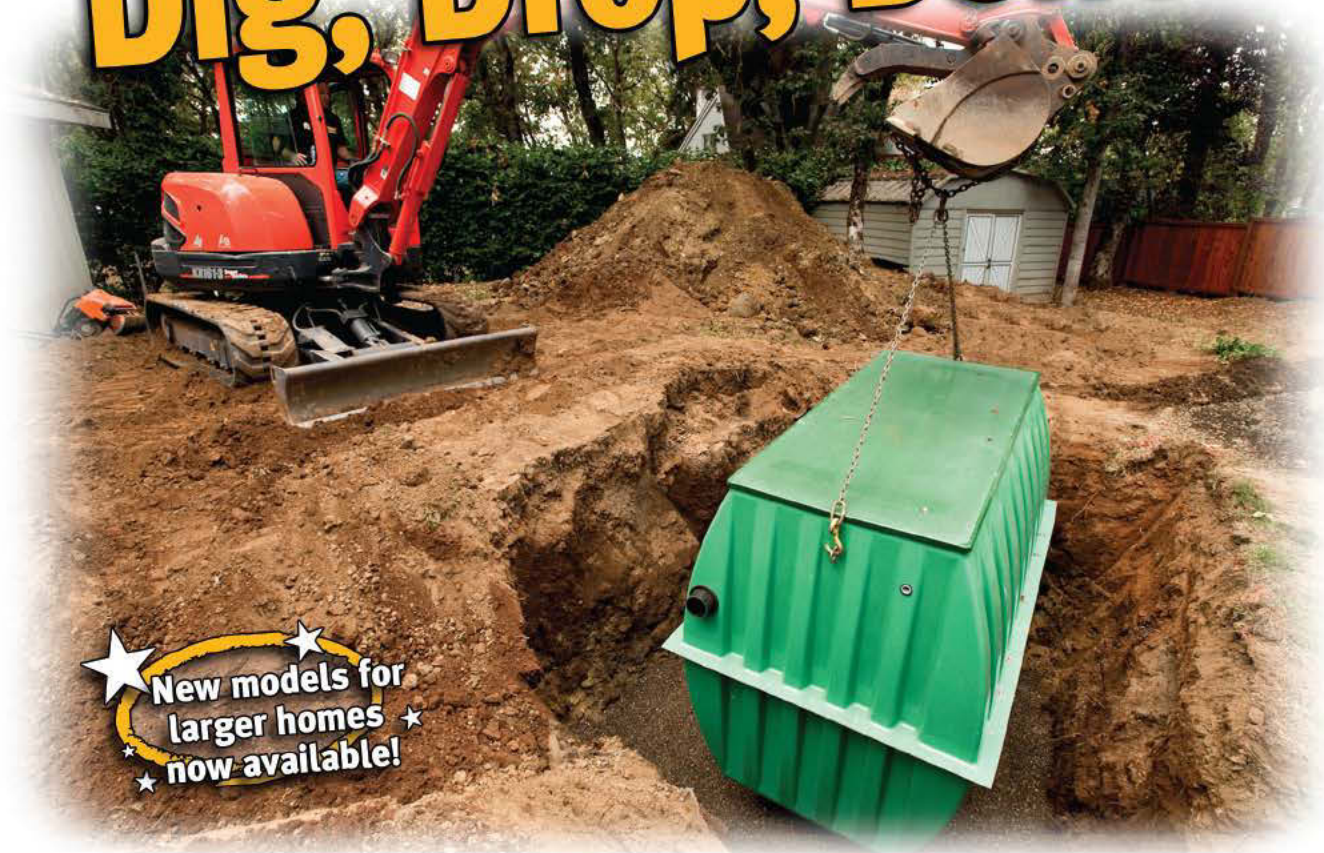
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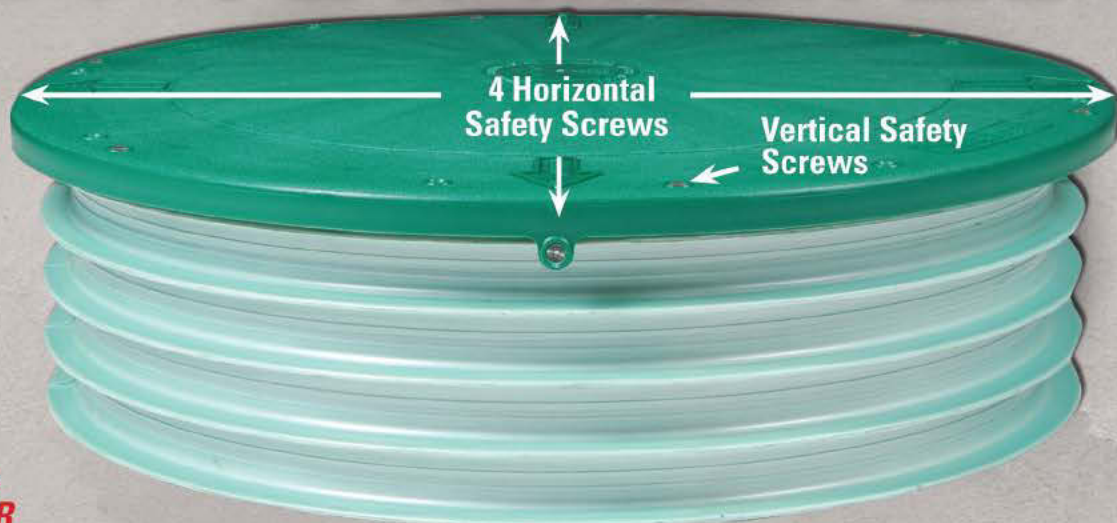
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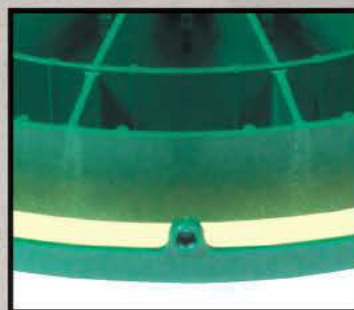
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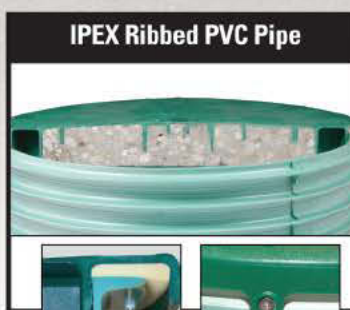
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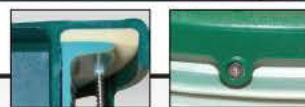
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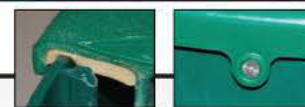
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# Who's More Efficient

A research report says onsite cluster systems use much more energy per gallon treated than a large-scale wastewater plant. Is it true? And does it matter?

By Ted J. Rulseh, Editor



**N**o less than the U.S. EPA has stated that onsite treatment systems should be a permanent part of the nation's wastewater management infrastructure.

The advantages of onsite are clear: Lower cost than “big pipe” systems, flexibility, adaptability to site conditions, suitability for small communities or clusters of homes and businesses and, perhaps most important, effectiveness (especially given the array of advanced treatment and dispersal technologies available).

Now comes a study by researchers at Lawrence Berkeley National Laboratory, with a surprising finding that a central wastewater treatment system had a smaller environmental footprint per gallon treated than an onsite cluster.

## Less energy?

The report, “Energy and air emission implications of a decentralized wastewater system,” acknowledges that centralized and decentralized wastewater systems have their own “distinct engineering, financial and societal benefits.”

It looked at one centralized treatment facility serving about half a million people against one decentralized residential cluster serving a community of 47 homes. It compared energy use, greenhouse gas emissions and criteria air pollutant emissions from the two and found that “the scale economies of the centralized plant help lower the environmental burden to less than a fifth of that of the decentralized utility for the same volume treated.”

The report goes on to say: “The centralized facility also reduces greenhouse gases by flaring methane generated during the treatment process, while methane is directly emitted from the decentralized system. The results are compelling enough to indicate that the life-cycle environmental impacts of decentralized designs should be carefully evaluated as part of the design process.”

## Gallon for gallon

The researchers used a computer model to make a full life-cycle comparison of the systems and found that economies of scale made the centralized system far more energy efficient. “The centralized system requires an enormous amount of infrastructure and operational energy in absolute terms, but the energy impact from this resource demand is reduced when normalized

against the enormous volume of wastewater being treated,” lead researcher Arman Shehabi stated.

He also pointed out that decentralized systems have advantages: They enable a developer to tailor treatment specifically to a small community, and provide flexibility to add capacity incrementally instead of having to undertake a huge construction project.

**Now comes a study by researchers at Lawrence Berkeley National Laboratory, with a surprising finding that a central wastewater treatment system had a smaller environmental footprint per gallon treated than an onsite cluster.**

Shehabi concludes that planners should not assume that a decentralized system will have a lower energy impact than a centralized system – that they should conduct a life-cycle analysis before installing any wastewater treatment facilities to discover and account for hidden impacts.

## But is it reality?

While I mean no disrespect to Lawrence Berkeley lab or its researchers, I have to question what seems to be an underlying assumption of this study: That at some given juncture in a community's development there comes a time to choose between building either a set of cluster systems or a centralized treatment plant and collection system.

It strikes me that more often the question is whether to extend sewers to somewhat remote areas or develop those areas with onsite treatment. And then, it seems to me, the driving factor is the pure cost of each option, not whether one is more or less energy intensive than the other.

In any case, it appears to me that the energy used to install a collection system for a central treatment plant – with all the excavating, blasting and earth moving that it entails – would outweigh any energy savings from a central plant's treatment process itself.

Then again, I wasn't the one doing the study, and it doesn't make much sense to look at this as an either-or proposition – one type of system good, the other bad. Both central and decentralized systems have their places, and the choice will always come down to balancing many factors.

You can read the full report at <http://iopscience.iop.org/1748-9326/7/2/024007/article>. Let me know what you think by dropping a note to [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com). □



## Looking For Solutions

To the Editor:

I truly appreciated your article "A Wake Up Call" (July *Onsite Installer*). Before I became an inspector for the Arkansas Department of Health, I had no idea so many in my county might not have the means or the resources to have a properly installed and functioning septic system.

However, we see these situations every day. When we respond to a complaint of a failing septic system and find an elderly or disabled person or other low-income household that has absolutely no means of repairing the problem, it is very frustrating. We could send the case to the prosecuting attorney for enforcement, but that won't solve the problem. We are more interested in solutions than prosecution.

Frustrated by what we were seeing, our health unit reached out to the grants administrator for our county government. She had extensive experience with water and sewer grants. It was her idea to use the Innovative Use Clause of the HUD Community Development Block Grant to assist low- to moderate-income families in repairing their septic systems. In September 2009, the county was awarded \$128,700 for our project.

We installed 14 new septic systems with money left over. We were allowed to keep the remaining funds and apply it toward repairing 24 more systems. We are just beginning that process (lots of paperwork). To our knowledge, this is the first time HUD CDBG money has been used to repair failing septic systems in Arkansas.

I really respect and enjoy your publication. I hope to see more human interest stories in the future. They remind us of why we do what we do.

Piper Satterfield  
Environmental Health Specialist  
Arkansas Department of Health-Benton County

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The Buttermore's crew installs a Geomatrix GST leaching system with a 1,000-gallon concrete septic tank from Jolley Precast. (Photography by Vincent Scarano)

# Diagnosis FIRST

Whether for new systems, replacements or repairs, Steve Buttermore performs a thorough evaluation to make sure the customer gets the right solution

By Gil Longwell

**S**uccessful onsite system repairs are built on an understanding of the “what” and “why” of the problem. “Without this understanding, I will not start a repair job,” says Steve Buttermore, owner of Buttermore’s Septic Service. His approach is similar for new and replacement systems: A thorough site assessment comes first.

Buttermore strives for professionalism in every aspect of his business, from customer interactions to the appearance and performance of his employees. These attributes set his company apart from competing installers and pumpers.

Working in a 50-mile radius from Gales Ferry in southeastern Connecticut, Buttermore’s is locally known as the septic system specialist. “Onsite systems are all we do,” Buttermore says. The firm specializes in repairs on constrained or soil-impaired sites.

New installations and repair work, driven by his vacuum truck service, keep the company forward-focused and busy even in slow economic times. Inspections for estate transfers generate business too – all in one way or another related to onsite systems. It wasn’t always that way.

### Things evolved

“I got started with a grass-cutting business in high school,” says Buttermore. “As soon as I graduated, I bought a backhoe and dump truck and

expanded into landscaping, and then hardscaping.” By 2004, after expanding into utility installation, he was looking to continue the evolution. When a friend asked him to install an onsite system for his new home, he agreed.

To prepare, he studied onsite systems and state regulations, and he completed the Connecticut Onsite Wastewater Recycling Association installer

### Buttermore’s Septic Service, Gales Ferry, Conn.



<b>OWNER:</b>	Steve Buttermore
<b>YEARS IN BUSINESS:</b>	32
<b>MARKET AREA:</b>	50-mile radius
<b>ANNUAL REVENUE:</b>	\$475,000
<b>SPECIALTY:</b>	Challenging repairs on constrained or soil-impaired sites
<b>EMPLOYEES:</b>	4
<b>AFFILIATIONS:</b>	Connecticut Onsite Wastewater Recycling Association
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(continued)



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course. “I had local installer friends willing to help me through the apprentice phase of credentialing so that I could become a certified installer,” Buttermore says. By 2005, credentials in place, he focused his business entirely on the onsite market. In 2008, he added a vacuum truck, installing a used 2,000-gallon tank and a used Jurop R 260 pump on a 1997 International 4900 chassis.

“The vacuum truck let us add an obviously complementary line of service,” he notes. “Pumpers or plumbers are the first to get the call for help. Homeowners don’t think they have a septic system problem – they think they have a clogged drain line.” Often, plumbers call him when they find the problem is beyond their scope.

“Our vacuum truck operator finds the problems, and then our repair crew fixes them,” Buttermore says. This cycle opens countless doors. Baffles, faulty or absent effluent filters and risers are big opportunities: they are legitimate repair issues that generate revenue and, more importantly, build relationships.

Today, pumping and related management services comprise 30 percent of the business. New systems and replacements account for 60 percent, and the balance comes from system inspection, waterjetting and miscellaneous services.

**“The vacuum truck let us add an obviously complementary line of service. Pumpers or plumbers are the first to get the call for help. Homeowners don’t think they have a septic system problem - they think they have a clogged drain line.”**

Steve Buttermore

### Understanding why

Educating customers is the company’s most important job. “Homeowners like to learn about their systems,” says Buttermore. “When they understand how it works and why it failed, they are better customers and more responsible system users.” Asking probing questions about unusual events – big parties, a newborn, an elderly family member – all contribute to a better understanding. It also tells Buttermore what the owner expects the system to handle.

“I use the problems I find as teaching examples when talking to the customer,” he says. “I tell them a failed system is a condition. Next, I explain the cause. The openness builds a sound bond between my company and my customer.”

First and foremost a learner, Buttermore continually takes whatever training he can. As new system types come along, continuing education also qualifies him to install or service them. “Aerobic treatment units are not



Owner Steve Buttermore, left, and Grant Buttermore install an onsite system using a Geomatrix GST leaching system.

currently allowed in Connecticut, but when they are, I’ll be registered for the first class on them,” he says.

### Listening to the system

Onsite systems have a lot to tell Buttermore, and he has learned to be a good listener. “You must open the main tank access and look inside,” he says. “The liquid level says a lot about the entire system, not just the tank. Overfull tanks are that way for a reason.” The first potential cause is an effluent filter clogged from lack of maintenance. If that isn’t the problem, then it must be farther downstream, he reasons.

(continued)

## Empowering Customers

Onsite system inspectors in Connecticut have the option to use a state-published Recommended Minimum Existing Septic System Inspection Report. System inspections are a relatively new service offering for Buttermore’s Septic Service. It was not until owner Steve Buttermore crafted his own inspection process and protocol that he was willing to do inspections. His process ensures that he has all the information he needs to understand the system and, when requested, complete the optional report form.

Buttermore knows report conclusions are only as valid as the inspection process on which they are based. “Our conclusion does not affix the ‘Passed’ or ‘Failed’ label,” he says. “Rather, we generate a report that describes the current system and compares it to the performance that would be expected from a new, regulation-compliant system.”

The customer then makes informed conclusions on whether to continue using, modify or replace the system. Customers are empowered. This often leads to management relationships based on a new understanding of what the system does, how it does it, and how important it is to preserve the value of the owner’s investment.



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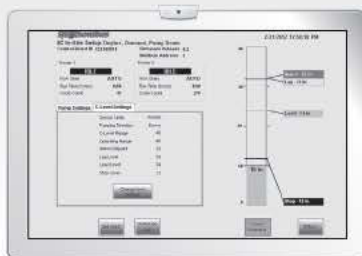
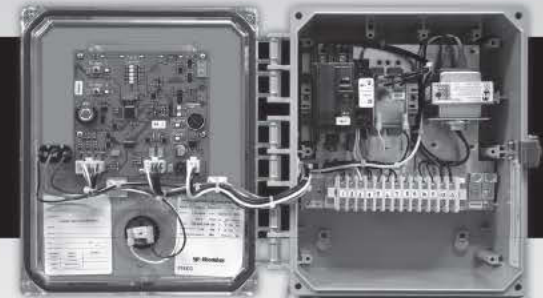
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**Steve Buttermore gets to the bottom of customers' onsite system problems before he recommends remedies.**

move out into the environment." What he found ruled out a soil issue. Inadequate tank maintenance, a garbage grinder and lack of an effluent filter all became potential suspects.

Buttermore calls the failure of a system with less than 20 years of use "premature." He has traced many such failures to the inappropriate discharge of water softener backwash to the septic tank. "In Connecticut, there are no regulations governing the disposition of backwash water," he says. He believes these flows are not addressed in current system sizing regulations. His practice is to redirect this water to a separate, purpose-built chamber absorption system.

When there are no obvious problems, Buttermore asks the basic questions about water use and the home occupants' behaviors. Pondering on top of or

**"Homeowners like to learn about their system. When they understand how it works and why it failed, they are better customers and more responsible system users."**

**Steve Buttermore**

downslope from an absorption area is another red flag systems display. "It could be intentional and unrecognized excessive water use, a faulty distribution box or unsuitable soils," he says. "I don't know unless I recognize the flag's message and look for the underlying cause.

"I have excavated a trench parallel to the edge of an absorption area to better understand the soil next to a ponded area. Sometimes, though, it's necessary to excavate within the absorption area to find the problem."

On one site, he encountered alternating dry and saturated areas. "There, we discovered an aggregate alternative made by surrounding a perforated pipe with a geotextile. The geotextile had clogged, slowing the rate at which liquid could

### **First contact**

The tone of the problem-solving process is set the moment a customer calls. "Customers should be greeted by no voice other than mine," says Buttermore. He's available to every customer – new or returning. Whether he's on a machine, driving a truck or in the office, all calls reach him.

He assigns work to his employees for follow-up. His wife and office manager, Diane, dispatches the vacuum truck and helps coordinate materials orders. Their daughter, Danielle, 14, helps her mom with data entry and website administration. Technology plays an important role in the call management plan, and Buttermore realizes that as the company grows, he may have to delegate first-contact duties.

"Something as simple as caller ID lets me know whether to break away from a task or wait to handle the call during a slower moment," he says.

*(continued)*

The Buttermore's Septic Service crew includes, from left, owner Steve Buttermore, office assistant Danielle Buttermore, office manager Diane Buttermore, crew worker Grant Buttermore and crew worker Joe Wessell.





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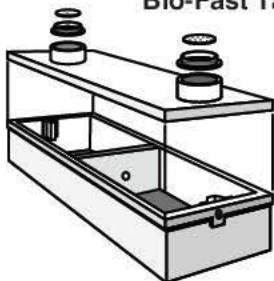
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**LEFT:** The Buttermore's crew installs a plastic septic tank from Infiltrator Systems. **ABOVE:** Joe Wessell cleans and pumps out the septic system - maintenance is a significant part of the company's business mix.

### Trained and focused

Confidence in well-trained employees has a freeing effect on Buttermore. Joe Wessel, a licensed installer and equipment operator, carries out assignments with limited oversight. Buttermore's son Grant, a senior at the local technical school, works as a laborer and installer apprentice. At 17, he is already well on his way to obtaining his pumper and installer credentials. "He is my right-hand man," says Steve. "In a period of transitioning personnel, he has picked up the slack and lightened my load."

### "Customers should be greeted by no voice other than mine."

Steve Buttermore

the system. In his designer role, Buttermore takes full advantage of the site. "I never like to design a system to the minimums," he says.

"Whenever I can, I work to educate the owner as to why bigger than minimum is a good thing," he says. His preferred option is to maximize a new system's footprint without taking reductions for alternate media. When designing repairs with limited space, he tries to use all the available space. The process is a balancing act, and it includes consideration to preserve some space on the site for yet another repair, should it be necessary.

Licensed installers in Connecticut can design new onsite systems and repairs for existing systems, except for systems proposed in areas of special environmental concern. In these areas, an engineer must design

As jobs demand, employees can rely on an equipment fleet that includes three dump trucks, a 1996 Case 9020B excavator, a 1998 Bobcat 331 mini-excavator, a 1999 Bobcat 873 skid-steer and a 2007 Bobcat 337 excavator. Supporting the pumping operation are a 2005 International 4300 vacuum truck, a Vivax-Metrotech inspection camera, and related special tools.

While on site with sanitarians for site evaluations, Buttermore discusses location and other configuration options. "Before we part company, I want my concept to get a preliminary OK from the sanitarian," he says. "Back in my office I'll convert that concept into a design."

### Promotion happens

Buttermore's business is growing at unexpected rates in an economy that, at best, is holding its own. A small Yellow Pages ad, a website and a Little League team sponsorship make up the company's formal advertising. The website, with its comfortable red-and-white calico background, presents useful information in a low-key, informal manner. Phrases like "We've been digging around town for over 25 years," and "The clean, green pumping machine" say what needs to be said.

Word of mouth is Buttermore's best business generator. He builds that by successfully completing jobs, solving problems and answering homeowners' questions. Realtor referrals for inspections are common, as his inspection reports are factual statements of performance milestones, rather than cold pass-fail conclusions.

Everyone in the company is responsible for every positive outcome: It's a shared responsibility that has led to success Buttermore very openly shares with all he encounters. □

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Jim Anderson and David Gustafson are connected with the University of Minnesota onsite wastewater treatment education program. Dave is Extension Onsite Sewage Treatment Educator. Jim is former director of the university's Water Resources Center and is now an emeritus professor, as well as education program coordinator for the National Association of Wastewater Transporters. Readers are welcome to submit questions or article suggestions to Jim and Dave. Write to [ander045@umn.edu](mailto:ander045@umn.edu).

# Pump Choices and Settings

Here are the basics of selecting a pump, and for determining float settings in demand-dose situations

By Jim Anderson, Ph.D., and David Gustafson, PE.

**W**e get a lot of questions about pumps and how they are used in onsite systems. From an installer standpoint, if there is a pump in the system, either you or the designer should have worked out its size and characteristics for the specific site and application.

We will highlight some of the basics of selecting a pump and of determining float settings in pumpout situations.

A single-stage pump has one impeller, is easy to maintain, and handles small pieces. Lift and horsepower are directly related. A multi-stage pump has more impellers and smaller tolerances and has a higher head with lower horsepower. Multi-stage pumps have been used for a long time in delivering water from wells.

know the amount the pump needs to deliver (say, 15 to 45 gpm), and the total dynamic head based on the elevation difference between the pump and the discharge point.

If that was determined from the design as being 16 feet of total dynamic head, we would be looking for a pump able to deliver more than 15 gpm, but less than 45 gpm, at 16 feet of head. This information can be taken to the pump supplier and, based on the pump curve for selected products, a suitable pump can be selected. One note of caution here: To ensure operating efficiency in any pump selection, a pump should be chosen that does not lie with 10 percent of either end of the pump curve.

**We like to think a pump has two key specs: the first is the delivery capacity in gallons per minute, and the second is the total dynamic head or pressure necessary to push the water to the delivery point.**

## Key specifications

We like to think a pump has two key specs: the first is the delivery capacity in gallons per minute, and the second is the total dynamic head or pressure necessary to push the water to the delivery point.

In pressure distribution systems, the flow rate is set by the distribution network, the number of perforations, their size and the discharge pressure. The total dynamic head is set by location, which is a combination of the elevation difference, the piping length and size, and the amount of friction loss through the system.

The simplest application of a pump is to pump up to a higher elevation to a drop box or distribution box and have the effluent distributed by gravity. To select a pump for this application, we only have to

There are many kinds and sizes of pumps to choose from; selecting the right one for the job is important.







Floats must be installed properly so that the correct amount of effluent is delivered when the pump turns on.

### Pressure systems

In a pressure system, the routine is similar. Here, the head is determined by the elevation difference, the flow rate and the friction loss, while the pump capacity is determined by the number of pipe perforations, their size, and the operating pressure. So if we received a design calling for a pump that could deliver 30 gpm at 11 feet of head, we would find a pump able to meet those requirements.

Another note here is that these are the minimum requirements, and the actual operating point on the pump curve is going to be higher. Since the pressure system is self-compensating, this is not a problem, as long as the design values are under the pump curve.

So now let's assume we want to determine how to set the floats in a demand-dose system to deliver the desired dose. In a demand-dose configuration, the pump is turned on whenever a prescribed volume of effluent flows into the pump tank and activates a switch by way of floats or sensors. Thus the dose to the next component is subject to the variations in water usage.

### Getting control

This is a socially controlled system, regulated by the people using it. It is the simplest form of dosing, but it results in a variable delivery of effluent. The people using the system are in control. Now, how many of the people using their systems know how those systems work? Very few. So there is little or no true control in a demand system, except that only the set dosing volume is sent to the next component at any one time.

The simplest control for this type of system is a piggyback plug. A float switch and a pump are both plugged into an outlet, and the float turns the pump on and off. The problem with this design is that there is zero ability to manage it. There's no method to keep track of the flow or to see if the pump is delivering too much or too little.

So what we've done with the piggyback control is take out the one place where we can have a little bit of knowledge. It is better to use a panel, because then we have a few more tools for management, including cycle counters and timers. The advantage of the piggyback is that it is the simplest setup, and most service providers can legally do the maintenance.

### How much per inch?

The first step in setting floats is to find the amount of effluent that must be delivered. Then we have to determine the gallons per inch contained in the pump tank. Typically, the dose volume in a demand system is set by delivering 25 percent of the daily flow, plus drainback. So a 600 gpd system should deliver 150 gallons, plus any drainback from the supply pipe.

So suppose we have a rectangular pump tank, 7 feet long by 4 feet wide, we want to deliver 150 gallons per dose, and the drainback is 10.2 gallons. How far apart do we set the floats to deliver the desired pump dose?

First, we determine the tank gallons per inch. To do this, we calculate the area of the tank in feet (length times width), assume one foot of depth, and multiply by 7.5 (the number of gallons in a cubic foot). Then we divide by 12 (the inches in a foot).

So for the tank in this example, 7 feet (length) times 4 feet (width) equals 28 square feet, or 28 cubic feet at one foot of depth. Now, 28 cubic feet times 7.5 gallons per cubic foot equals 210 gallons per foot. Dividing that by 12 yields 17.5 gallons per inch in the tank.

Now, if we need to pump 160.2 gallons, we divide that by the gallons per inch (17.5), yielding 9.38 inches. So we need to set the floats 9.38 inches apart. See how easy that was? In some of our upcoming articles, we will further explore the concepts of dosing. □

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# Flush the Kids

Agencies in Minnesota use an innovative approach to educate students about the relationship between wastewater and groundwater

By **Scottie Dayton**

To help instill environmental awareness and a stewardship ethic in students, educators are “flushing them down the toilet” in Pine County, Minn. The activity, part of the annual Freshwater Festival for fifth grade students, is sponsored by the Pokegama Lake Association, and it includes students from Mora, Hinckley and Pine City.

At the event, classes rotate through five stations where students learn about protection, preservation and conservation of water resources in a fun atmosphere. This year, Gretchen Sabel, subsurface sewage treatment system coordinator, and staffer Barb McCarthy from the Minnesota Pollution Control Agency, presented the components of wastewater and the septic system.

## Fun and affordable

Sabel found the Flush the Kids activity at the website of the Cape Cod (Mass.) Groundwater Guardian Team ([www.capecodgroundwater.org](http://www.capecodgroundwater.org)). “Finding the YouTube video of how it worked made it so simple,” she says.

Sabel chose cardboard boxes from a snowblower and a refrigerator to become the toilet and septic tank. “Be sure to use heavy-duty boxes because

they get a lot of use,” she says. “We had more than 150 kids crawl through them.”

Piping connecting the two boxes and signifying the drainfield consisted of kiddie play tunnels. After cutting a large, rectangular hole in the side of the refrigerator box, Sabel covered it with garden fencing from her backyard. She bought fleece to illustrate the scum and sludge layers and loosely sewed them to the wire to create pockets.

**“Be sure to use heavy-duty boxes because they get a lot of use. We had more than 150 kids crawl through them.”**

**Gretchen Sabel**

To assemble the treatment train, Sabel cut holes in the boxes to insert the tunnels, then labeled the inlet and outlet pipe openings in the “septic tank.” More labels identified the scum layer, effluent and sludge layer on the front of the box, which Sabel covered with an artificial putting green.







A teacher works his way through the system.

"I laid an old drape over the snowblower box, then mounted the rear of the toilet seat to a piece of wood for stability before putting it in position," she says. The drainfield discharged to a lake, represented by a pan of water. Next to it, bottled water covered with more putting green signified groundwater.

### Making 'sewage'

Meanwhile, McCarthy assembled sewage packages: food storage bags with slips of colored paper labeled as grease, solids, bacteria, phosphorous and nitrogen. "Barb thought of adding a sheet of toilet paper to make the concept of solids real for the kids," says Sabel.

Sabel and McCarthy coached the students on where the contaminants were treated and why it is important to remove phosphorous and nitrogen. Then teachers "flushed" them down the toilet to an appropriate sound effect from McCarthy's laptop computer. As the kids crawled through with their sewage packages, they put the solids slip of paper in the sludge layer and the grease slip in the scum layer.

Emerging from the drainfield, they left the bacteria and phosphorous slips where they would bind up in the soil. Once out in the environment, they put the nitrogen slip next to the lake, then took a bottle of water.

"It reinforced the importance of properly treating wastewater because it eventually becomes someone's drinking water," says Sabel. □

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# Stop, Thief!

Theft of construction and earth-moving equipment is common and costly. Here are some steps you can take to reduce your risk of loss.

By Erik Gunn

Every year heavy equipment worth millions of dollars is stolen from contractors across the nation. In 2010 alone, more than 13,000 machines were reported stolen, says Ryan Shepherd, operations manager for the National Equipment Register (NER). That number is based on police reports, insurance data and reports to the NER, so it might leave out thefts that go unreported.

Nineteen percent of the equipment reported stolen – about one in five pieces – was recovered, according to the NER’s 2010 annual report. Where does stolen equipment go if not recovered? Mostly for resale to used-equipment buyers or to scrap metal processors. If you’re buying on the used market, a really good deal may be “hot” in more ways than one.

## National register

The NER (www.ner.net), in place for just over a decade, is a private company that, for a fee, will register contractors’ equipment to make it easier to trace. Established in 2001, the register works with insurers, manufacturers and equipment owners to maintain a database of equipment in use across the country.

Any owner of a car or truck probably knows that motorized vehicles are all registered with states and carry unique identification numbers. Once a car is reported stolen, its information is entered in the National Crime Information Center database, so that police officers everywhere who come across the vehicle and run a license plate check can get an alert that it has been stolen.

The NER aims to provide a similar database for equipment that isn’t captured by the state motor vehicle registration systems. Equipment owners can register their gear with the NER online. Fees start at \$40 for the life of one piece of equipment, or \$60 for five items for a year. There’s a series of sliding scales based on the total volume of equipment a contractor registers.

Additionally, several manufacturers have begun registering their products with the NER on behalf of purchasers. And several insurers now offer clients

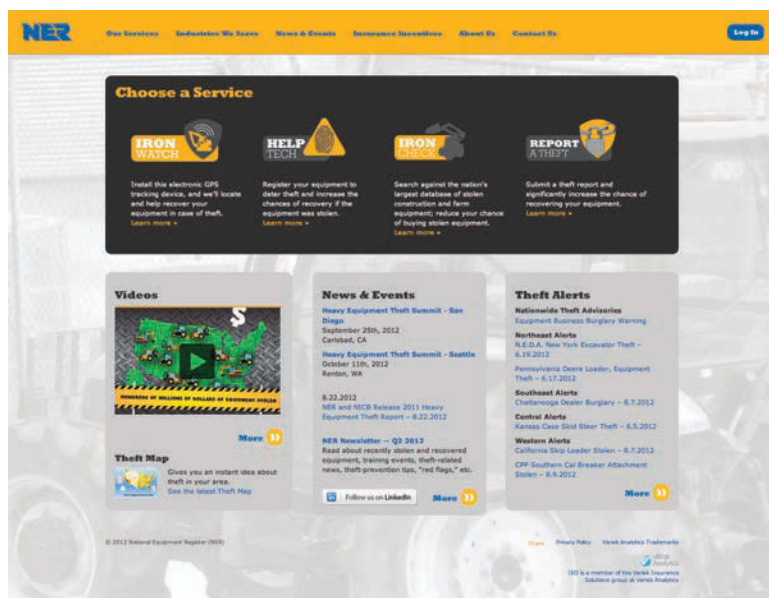
**Where does stolen equipment go if not recovered? Mostly for resale to used-equipment buyers or to scrap metal processors. If you’re buying on the used market, a really good deal may be “hot” in more ways than one.**

incentives, such as reduced premiums or waivers on deductibles, for registering their equipment with the NER. To date, some 25 million pieces of equipment are on the register. Owners receive decals to display on equipment showing that it has been registered – a low-tech way of deterring thieves.

## Educating police

The NER is also working to educate police officers about its database, Shepherd says. Some 6,000 officers nationwide, most of them specialists in auto theft crimes, are trained to use the register to help identify suspected stolen equipment. If the NER is informed of the theft of a registered machine, it sends alerts to police departments. But even if the theft has not been discovered, registration can help recover the equipment, Shepherd says.

Consider, for instance, a driver stopped for speeding who is towing a stolen skid-steer. An officer familiar with the register will know to ask the driver to whom it belongs, check the NER list, and find out its real owner. “Thirty percent of recoveries happen through ownership information – not a theft report,” Shepherd says. That is critical, because equipment can easily be stolen and then sold at auction before its owner even knows it’s gone.





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The NER also offers ancillary services, including a GPS-based device that can be attached to equipment to enable tracking and recovery via the national AT&T network. Another program enables buyers, sellers, banks and dealers to get a history of a machine before completing a transaction, if that machine has been registered with the NER.

## Common sense

With or without a listing on the register, there are common-sense steps that Shepherd and others recommend to help prevent theft of your equipment.

First, secure the storage site. If that's a yard at your business, make sure you have a sturdy fence, top-grade locks and lighting, and electronic alarms. Security is even more critical if the equipment is kept at a temporary job site. Portable fencing and lighting can help deter thieves.

Other steps include simple measures like removing battery cables to stymie electric-start equipment and removing wheels from mobile equipment, such as trailers or generators. Hiring security for a temporary site can be a wise investment. For a job site you may be on for an extended time, consider removing equipment on weekends to a more secure location.

Most important, don't rely on any one tactic to prevent theft. The most secure approach relies on "layering techniques," so that if one particular measure falls short, others are in place as backup, Shepherd says.

Taking steps to reduce the risk of theft is an important part of running your business. And when you consider the replacement cost of a stolen machine, an investment in theft prevention can be money well spent. □

## About the author

Erik Gunn is a magazine writer and editor in Racine, Wis., where he operates Great Lakes Editorial Services. Readers may direct inquiries to him by contacting this publication at 800/257-7222 or emailing [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com).



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# State's Largest

A high-pressure dosing system enables the construction of a changing facility for workers at a coal mine in central Illinois

By **Scottie Dayton**

**O**fficials at Arch Coal-Viper Mine in Williamsville, Ill., wanted to build a changing facility with showers and restrooms for 180 miners. Extending the city sewer to the site two miles away would cost \$320,000.

Joe Olson, P.E., manager of technical services, asked Rick Maguire of Maguire Backhoe Co. in Virden, Ill., to design an onsite system that would work in a small area with a seasonal high water table. The state Department of Health had just accepted EZflow by Infiltrator geosynthetic media, enabling construction of a shallow drainfield.

"Dennis Hallahan, environmental engineer and product consultant at Infiltrator Systems, helped with the design," says Maguire. The system, with duplex pumps and high-pressure dosing, cost half as much as tying to the sewer and is the largest pressurized system in the state.

## Site conditions

The site, a topsoil berm with 4:1 slope, has silty clay loam (6E) soils with a loading rate of 0.52 gallons per square foot per day. The water table is 29 inches below grade with seasonal high water at 12 inches.

## System components

Hallahan and Maguire designed the system to handle 3,600 gpd. Major components are:

- 5,000-gallon single-compartment concrete septic tank. All tanks from Wieser Concrete, Maiden Rock, Wis.
- 5,000-gallon single-compartment dose tank with dual 1/2 hp turbine STEP (septic tank effluent pump) vaults from Clarus Environmental
- 4,200 feet of EZflow geosynthetic aggregate
- Two distribution valves from K-Rain
- Intelligent Pump Control duplex panel from Aquaworx by Infiltrator *(continued)*

## SYSTEM PROFILE

<b>Location:</b>	Williamsville, Ill.
<b>Facility served:</b>	Arch Coal-Viper Mine
<b>System designers:</b>	Rick Maguire, Maguire Backhoe Co., Virden, Ill.; Dennis Hallahan, Infiltrator Systems
<b>Installer:</b>	Rick Maguire
<b>Site conditions:</b>	Silty clay loam soils with 0.52 gpm loading rate; seasonal high water table 12 inches below grade
<b>Type of system:</b>	High-pressure dosed
<b>Hydraulic capacity:</b>	3,600 gpd



Steve and Shane Matli (left) and Jim Scott lay bundles of EZflow media. Backfilling has begun on the first zones. (Photos courtesy of Maguire Backhoe)





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LEFT: Workers from Wieser Concrete prepare to set the bottom half of the dose tank. ABOVE: The 1/2 hp turbine septic tank effluent pump (STEP) vaults from Clarus Environmental.

### System operation

Wastewater flows 180 feet through a 6-inch Schedule 40 PVC lateral to the septic tank, then to the dose tank. Alternating pumps send effluent to the 21- by 600-foot dripfield, which has six 100-foot zones divided by 30-inch strips of soil 12 inches high to contain effluent. An area the size of two zones is reserved for future expansion.

Every 90 minutes, the first pump sends 650 gallons 425 feet to zone 1; 150 gallons drain back to the pump vault to prevent water from freezing in the 3-inch line. The second pump, on an identical dosing schedule, sends 800 gallons almost 600 feet to zone 4; 300 gallons drain back.

The distribution valves automatically switch the zones. Each pair – zones 1 and 4, zones 2 and 5, and zones 3 and 6 – are separated by 200 feet, enabling the media to dry out before the next dose. “Pressure dosing brings oxygen from the pumps to the media, slowing the development of a biomat,” says Maguire.

Doug Bennett plows a zone with a Caterpillar 259B rubber-track multi-terrain loader while Ben Jackson excavates another zone behind him using a Caterpillar 320 trackhoe.



### Installation

The Department of Mines and Minerals requires Illinois coal mines to strip and stockpile topsoil for reclamation. “Before we could excavate a portion of the berm to grade, we needed permission from the agency

to cut into it,” says Maguire.

Permission granted, workers used a Caterpillar 320 excavator to level an area, leaving a bank of soil 2 feet high on the low side and 4 feet high on the high side. “We had various compaction layers from 7 to 12 inches, so I bought a two-bottom plow and an adapter plate that I modified for the job,” says Maguire.

**“Pressure dosing is new to the state and we had plenty to show them.”**

**Rick Maguire**

After the dripfield was plowed with the plow mounted to the front of a Caterpillar 259B rubber-track multi-terrain loader, dump trucks deposited prewashed sand just inside the zones. “We leveled the sand to a foot deep with a skid-loader,” says Maguire. “It has a ground pressure rating of 6 pounds per square inch for operating over sensitive surfaces, and it has a Bullseye laser receiver from Apache Technologies on the bucket.”

It took six workers three days to install the dripfield. Maguire purchased titanium-tipped drill bits for boring 1/8-inch holes on 4-foot centers in 4,200 feet of 1.5-inch PVC pipe. “The diameter of the orifices achieves our squirt height and allows water to scour the holes to keep them open for as long as possible,” says Maguire. Workers ran the smaller pipe through the distribution pipes, each with a 1.5-inch ball valve.

Zones have 10 rows of aggregate seven bundles laid side-by-side with a 3-foot-tall standpipe on the end of every row to confirm equal distribution of effluent. There also is access for cleaning the lines.

The two distribution valves, protected by 18-inch Tuf-Tite risers, have a length of clear 1.5-inch PVC piping running to the zones, enabling service providers to see what zone the valve is on by cycling the pump.

To help lower seasonal high groundwater, the crew dug a trench 10 feet from the dripfield and laid a 5-inch corrugated HDPE drain tile (Springfield Plastics) encased in filter fabric. They then backfilled the dripfield with topsoil – 24 inches on the low side and 48 inches on the high side.



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Jim Scott and Doug Bennett backfill using two Caterpillar skid-steer loaders. The drip field has 49 risers.

The tanks were set on 6 inches of sand and plumbed. The pump vault cover has two 24- by 30-inch stainless steel service hatches. As a safety precaution, workers set six pipe bollards around the tanks to keep vehicles from driving over them. Maguire installed a RockWorks system from RockWare on the control panel to ensure that only his company could access information and make adjustments.

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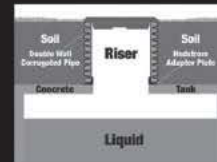
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Throughout the installation, state health department officials and the team from the Sangamon County Health Department visited the site. "Pressure dosing is new to the state and we had plenty to show them," says Maguire.

### Maintenance

Maguire Backhoe holds the annual maintenance contract. A technician services the system twice a year, cleaning the effluent filters in the pump vaults and pumping the septic tank as needed. □

### MORE INFO:

#### Apache Technologies, Inc.

800/874-6253  
www.trimble.com

#### RockWare

800/775-6745  
www.rockware.com

#### Aquaworx/EZflow by Infiltrator

800/221-4436  
www.aquaworx.com

#### Springfield Plastics

800/252-3361  
www.spipipe.com

#### Clarus Environmental

800/928-7867  
www.clarusenvironmental.com  
(See ad page 19)

#### Tuf-Tite, Inc.

800/382-7009  
www.tuf-tite.com  
(See ad page 5)

#### K-Rain

800/735-7246  
www.krain.com

#### Wieser Concrete Products, Inc.

800/325-8456  
www.wieserconcrete.com  
(See ad page 17)



# System Repair/Drainfield Rejuvenation

By Briana Jones

## ATUs

Aerobic Treatment Units from **Aero-Stream** are robust systems that allow a variety of tank configurations from virtually any tank manufacturer. The process incorporates extended aeration in a three-chamber design. Air is provided by a durable and efficient UL-recorded compressor, allowing the units to be installed remotely from the tank near a power outlet.



The system includes the Aero-Alert self-contained power cell alarm, which monitors compressor health and high-water events. The low-voltage alarm system contains a high-efficiency flashing LED and a piezo-electric 96 dBA audible alarm that can emit a continuous alarm for more than 60 days. 877/254-7093; [www.aero-stream.com](http://www.aero-stream.com).

## Drainfield restoration

Septic-Scrub drainfield flow restorer from **Arcan Enterprises** is a chemical treatment that oxidizes sulfides and releases oxygen into the drainfield. The process is similar to letting the system rest, but works faster, according to the supplier. The environmentally friendly treatment is added between the septic tank and the drainfield and can be used for preventive maintenance. System use does not need to be restricted during treatment. 888/352-7226; [www.arcan.com](http://www.arcan.com).



## ATU tanks

FAST Systems from **Bio-Microbics** are aerobic treatment units for new construction or existing tanks. The systems work with polyethylene, fiberglass, injection-molded, copolymer polypropylene, steel or concrete (precast or poured) tanks. Simple to install and maintain, the Fixed Integrated Treatment Technology (FITT) allows robust aerobic treatment and fits inside most watertight tanks.



The systems create an optimized environment with consistent aeration and mixing throughout the media for maximum biomass generation. They can withstand periods of high and low input. They are complete packages for specific applications and can reduce drainfield size, eliminate the need for a drainfield, repair failed fields, and reduce soil depth requirements. Systems also can remove nitrogen and allow effluent to be released into environmentally sensitive areas, or enable water reuse. 800/753-3278; [www.biomicrobics.com](http://www.biomicrobics.com).

## Compact treatment units

Compact, lightweight **Envirocycle G7** series treatment units are inexpensive to buy, install and operate. They require no extra trash or dose tanks. The treated wastewater digests biomat and unclogs failed soil treatment beds. The units require no preventive maintenance and are safe for drip tube dispersal. 888/694-4633; <http://cole.thesepticexperts.com>.



## Cart jettters

O'Brien cart jettters from **Hi-Vac Corp.** clean up to 8-inch residential and commercial sewer lines. An optional lateral cleaning kit allows users to leave the engine outside the building while cleaning an inside line. An automatic throttle valve enables the engine to respond to water usage, revving up to increase flow and idling down to reduce noise, pump and engine wear.



The 1220-J electric jetter cleans 4-inch or smaller lines, while the 2511-J has an 11 hp electric-start gasoline engine and triplex pump that delivers 4 gpm at 3,000 psi. The 13 hp 2513-J jetter has a manual-start gasoline engine and triplex pump that delivers 4.8 gpm at 3,000 psi. 800/752-2400; [www.obrienmfg.com](http://www.obrienmfg.com).

## Cold pressure washer

Steam Jenny direct-drive cold pressure washers from **Jenny Products** provide a compact, economical alternative to belt-driven models while yielding the performance of commercial-grade units. The units are powered by 9 hp or 13 hp Honda GX Series engines and use a triplex ceramic plunger pump. Pressure ratings range from 3,000 to 4,000 psi and flow rates from 3 to 4 gpm. Flow and pressure can be customized.



Standard features include thermal pump protection, an unloader valve, and a high-pressure relief valve to prevent damage to the pump. To protect the engine, the unit is automatically shut down if low oil levels are detected. The chassis is made with powder-coated 7-gauge steel for durability. 814/445-3400; [www.steamjenny.com](http://www.steamjenny.com).

## Aerobic treatment in lightweight tank

The **Singulair Green** aerobic wastewater treatment system from **Norweco** incorporates advanced aerobic treatment in a durable, watertight polyethylene tank. Effluent can be safely returned to the environment by ground absorption or surface discharge. The unit is designed for new or retrofit applications and easy installation even with only a backhoe. Integral support ribs and a strong arch shape ensure structural integrity and reliable performance. The system is NSF certified and designed for domestic wastewater flows up to 600 gpd. 419/668-4471; [www.norweco.com](http://www.norweco.com).



## Four-in-one design

AdvanTex AX-RT treatment systems from **Orencia Systems** are designed for system repair and rehabilitation. Units can be installed after a functional, watertight septic tank and produce reuse-quality effluent. All interior components are pre-plumbed, installed and adjusted at the factory. The four-in-one design





includes recirculation, treatment, disinfection and discharge, simplifying installation and eliminating additional tanks, basins, risers and lids.

The UV disinfection unit is optional and is protected within the unit. It uses no chemicals, has no moving parts, and needs only annual cleaning and every-other-year bulb replacement. Filters and textile media are accessible and cleanable. Panels are touch-safe, and no blowers are needed. 800/348-9843; [www.orenco.com](http://www.orenco.com).

### Advanced secondary treatment

**Ecoflo Biofilter** high-performance advanced secondary treatment from **Premier Tech Aqua** is light, robust and easy to handle. The system uses organic natural filtering media. Designed for all climates, the system can restore drainfields with biomat buildup. Installed between an existing septic tank and drainfield, the system reduces the organic load. 800/632-6356; [www.premiertechaqua.com](http://www.premiertechaqua.com).



### Pressure filter

The **STF-100A2** pressure filter from **SIM/TECH FILTER** helps maintain proper year-round operation of mounds, sand filters and other pressurized distribution systems. It can be used for prefiltration for drip irrigation. The low headloss (0.21 psi) unit mounts on the discharge side of an effluent pump, preventing plugged holes and reducing effluent TSS. The mounting location extends the time between servicing.

The vortex action created by the pump scrubs the screen. Backflow through the filter after the pump shuts off washes debris back out of the filter. The 2-inch filter can handle flow rates up to 83.3 gpm. The 2-inch filters in the manifold can be designed to handle almost any flow rate or load. Larger 3- and 4-inch filters are available. The standard screen filters to 1/16 inch, and optional stocks allow for additional filtration to 600 microns (0.024 inch), 190 microns (0.007 inch) or 100 microns (0.004 inch). 888/999-3290; [www.simtechfilter.com](http://www.simtechfilter.com).



### Cart-mounted hydrojetter

The **Model 727** cart-mounted hydrojetter from **Spartan Tool** is available in a hybrid version that runs on gasoline or propane, allowing operation indoors or outdoors with no loss of pressure or flow. It is suited for jetting septic system lines and drainfields and produces 3,000 psi, adequate to scour 6-inch lines with 4 gpm flow.

Pulse technology reduces line friction so that the unit reaches the corners of drainfields, while 200 feet of 9/16-inch hose provides enough length to get the unit through most fields in one shot. Standard equipment includes 75 feet of 3/16-inch trap hose for tight bends, seven nozzles, a washdown wand with adjustable nozzle, jetting gloves, easy winterization for cold climates, and an electric-start motor. 800/435-3866; [www.spartantool.com](http://www.spartantool.com).



### Flow control unit

The **Speed Leveler** from **Tuf-Tite** is a one-piece component that allows installers to control flow or rest a line. Users can rest one or more of the outlets by rotating the unit so that the 2-inch non-concentric hole is at the top of the outlet pipe, not allowing any effluent to pass. This rests the line, allowing that portion of the drainfield to restore. 800/382-7009; [www.tuf-tite.com](http://www.tuf-tite.com). □



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# System Repair/Drainfield Rejuvenation

By Scottie Dayton

## Geosynthetic aggregate replaces traditional drainfields

### Problem

A homeowner on Madeline Island, Wis., needed to replace an old lakeside dry well and was challenged to find a drainfield system that would meet the state surface water protection regulations. The island location made environmental factors and delivery of construction materials critical.

### Solution

After a study of options to meet setbacks and other rules, the system designer recommended EZflow by Infiltrator engineered synthetic aggregate for its light weight and ease of delivery by ferry and its cost relative to gravel. The Madeline Island system handles 450 gpd. The installer kept the existing 1,000-gallon concrete septic tank, adding a filter system to treat effluent before discharge. A 500-gallon pump tank pumps wastewater to the septic tank and a distribution box evenly splits the flow from the septic tank to two 65-foot runs of drainfield bundles.

### RESULT

"The whole installation was completed in a day using a single backhoe," says installer and master plumber Adrien Cady of Washburn. 800/221-4436; [www.infiltratorsystems.com](http://www.infiltratorsystems.com).



## Bioremediation saves drainfield

### Problem

After finding effluent ponding at the end of the drainfield, a homeowner called Chris Lanou of ADC Septic in Blackstone, Mass. The customer requested minimal disturbance of the extensively landscaped property.

### Solution

Lanou pumped the septic tank, jetted the drainfield laterals, and treated the system with Septic Kit from Lenzyme. The kit includes two oxidizers, one drainfield biological activator, and a two-year supply of monthly treatments. Lanou added the oxidizers to the drainfield to restore biological balance, and the biological activator to the septic tank. He told the customer to flush a treatment packet once a month.

### RESULT

A month later, the ponding had dried up and the system was working as designed. 800/223-3083; [www.lenzyme.com](http://www.lenzyme.com). □



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**Florida**

The Jackson County Commission became the second county commission to vote unanimously to opt out of the state-designed septic tank inspection law. Nineteen counties with first-magnitude springs are required to conduct limited inspections unless they opt out by Jan. 1, 2013. Hernando County Commission was the first.

**Indiana**

The state Department of Health announced rulemaking to update and clarify requirements for the design, construction, installation, operation and maintenance of residential and commercial onsite systems.  
[www.in.gov/isdh/19094.htm](http://www.in.gov/isdh/19094.htm)

**Iowa**

Final regulations on private septic systems and commercial septic tank cleaners took effect on Aug. 15. Maintenance contracts will be required before installation of systems that require maintenance, but language was added to ensure that lower-maintenance systems are used where applicable.

The department says changes to the time-of-transfer inspection rules simplify and clarify existing practices without significantly changing the regulation. Other changes, including setbacks from public wells, flow rates per bedroom, use of effluent screens, size of risers, and standards for plastic septic tanks were made to reflect current practices.

[www.iowadnr.gov/Portals/idnr/uploads/water/septic/files/6869notice%20final%20adoption%202012%20v2.pdf](http://www.iowadnr.gov/Portals/idnr/uploads/water/septic/files/6869notice%20final%20adoption%202012%20v2.pdf)

**Maryland**

St. Mary's County has submitted its required plan to reduce nitrogen and sediment from Chesapeake Bay, but officials say there is no way to pay for it, and questioned the science behind the regulations. A staff memo says costs to septic tank owners and sewer system customers "is unaffordable" and "beyond the ability of the county to fund without significant funding assistance from state or federal sources."

The Department of Environment (MDE) proposed regulations requiring best available technology (BAT) units for removing nitrogen from onsite system effluent for all new construction, and ongoing maintenance and operation for all BATs in perpetuity. The proposed regulations are in the comment period.

**Michigan**

The state Supreme Court ruled that local governments are responsible for sewage discharges from private septic systems into public waterways. The ruling overturned an appeals court that found in favor of Worth Township in a dispute with the Department of Environmental Quality.

State law now requires local governments that ban land application of septage to provide a receiving facility large enough to accept all local septage.  
[www.legislature.mi.gov/documents/2011-2012/publicact/pdf/2012-PA-0041.pdf](http://www.legislature.mi.gov/documents/2011-2012/publicact/pdf/2012-PA-0041.pdf)

Rep. Ken Goike, working with the Michigan Septic Tank Association, proposed legislation requiring a state sanitary code. Goike is a member of the association and a former president.

**New Jersey**

New state regulations, N.J.A.C. 7:9A, require replacing cesspools at the time of property sale or transfer, recommend replacing 4-inch effluent filters with 6-inch filters, and reporting onsite system malfunctions to the health department during inspections for real estate transfers of property. The regulations went into effect on April 2, 2012, and are [www.state.nj.us/dep/dwq/pdf/njac79a.pdf](http://www.state.nj.us/dep/dwq/pdf/njac79a.pdf).

**New York**

The Long Island Regional Economic Development Council joined the Town of Oyster Bay to implement an educational outreach campaign for Coordinated Environmental Solutions for Septic Problems Occurring on Long Island. The effort is supported by a \$45,000 award the town received as part of Governor Andrew Cuomo's Regional Council initiative. The project increases regional public awareness of onsite water treatment systems and water quality on Long Island and has the potential to create employment opportunities in the cesspool service industry.

**Washington**

In a report to the Flathead Regional Wastewater Management Group, Carver Engineering of Kalispell, Wash., identified 6,026 unpermitted septic systems in the Flathead Valley, bringing the number to more than 20,000, treating 4.1 mgd. The Kalispell County Board of Health used the study as a planning tool to combat nutrient pollution harming Flathead Lake and aquifer. □



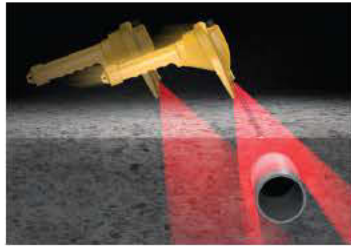
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## SubSurface PVC pipe detector

The AML PVC pipe detector from SubSurface Instruments utilizes patented microwave technology to find underground PVC pipelines in tough conditions including clay, wet soil, snow or standing water without the need for a separate transmitter, receiver or wires. Designed specifically for locating buried PVC pipes, the AML has a durable housing, LCD indicators, laser marker and sensitivity switch. 855/422-6346; [www.ssilocators.com](http://www.ssilocators.com).



## HydroLogex moving bed bio-film reactor

The EnviroMBBR (moving bed bio-film reactor) system from HydroLogex provides stable treatment under load variations in a compact package to meet reduced ammonia TMDL (total maximum daily load) requirements. The add-on system features high surface area and non-clogging bio-film media for trouble-free operation. 615/975-4773; [www.hydrologex.com](http://www.hydrologex.com).



## SJE-Rhombus C-Level starter box

C-Level starter box control panels from SJE-Rhombus are made to control a 120-volt AC, single-phase motor. Applications include pump chambers, sump pump basins, lift stations, dewatering and rainwater harvesting. A floatless sensor converts water pressure to a frequency signal that is read by the control panel that activates a power relay to turn the motor on and off. The box utilizes a NEMA 4X enclosure and includes start, stop and motor run indicator lights, manual run switch and terminal block. 888/342-5753; [www.sjrhombus.com](http://www.sjrhombus.com).



## Leonard Green acquires Tank Holding Corp.

Leonard Green & Partners acquired Tank Holding Corp., including polyethylene tank manufacturers Snyder Industries and Norwesco. THC's executive management team, co-CEOs Tom Smith and Tom O'Connell, are investors in the transaction and will continue to lead the company.

## Rugby launches interactive website

Rugby Mfg. launched an interactive website, [www.rugbymfg.com](http://www.rugbymfg.com), featuring its complete line of Class 3-7 dump truck bodies, landscape bodies, platform bodies, truck and trailer hoists, related truck equipment and accessories. □



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**ABOUT THE AUTHOR**

Eric Larson is co-owner of Septic Check in Milaca, Minn., and is a member of the NOWRA board of directors. For more information about NOWRA or to join, visit [www.nowra.org](http://www.nowra.org) or call 800/966-2942.

# Can It Recover?

Drainfield rejuvenation can be an iffy process, but when properly applied, it helps homeowners and bolsters the onsite industry

By Eric Larson

**S**epic system repair and rejuvenation has become more common for many contractors since the economic downturn. Many others have been doing it for some time. More and more pretreatment products are being marketed for drainfield rejuvenation, and many excellent recovery techniques have been developed around the country. If you are considering such work, there are a number of issues to address.

The first may well be legal: Does the local code allow the type of repair needed? For example, you may be troubleshooting a ponded drainfield that could be recovered physically but is non-compliant for vertical separation. Some jurisdictions may allow portions of a system to meet an older code, while others may require all system components to be updated if any one component is updated or repaired.

The nature of the repair will drive the decision process. Control panel problems, leaking risers, broken lids, missing baffles and such are typically

successful. In other words, if 60 percent of the clogging mat is biological, that is the maximum amount of capacity that could be recovered. But if successful, would that provide enough capacity for your customer?

## What's the current loading?

It is also important to determine the current loading of a system. We used to be surprised at how strong residential waste can be, but not anymore. The fast-growing use of household products and pharmaceuticals has changed the nature of waste compared to 40 or even 20 years ago. It is not uncommon to have BOD5 well over 300 mg/L in residential septic tank effluent at troubled sites. COD can also be extremely high due to cleaners, sanitizers and similar products.

Restaurant systems that we once expected to generate BOD5 in the 600 to 800 mg/L range now commonly produce 1,200 to 1,800 mg/L. One recent

**A common belief is that if system clogging is biological, it can be recovered biologically. How do you know? If it is clogged, why is it clogged? Is it simply a matter of years of use? Or has its loading exceeded capacity?**

straightforward. Drainfield recovery is more complex than a new installation because many variables can be involved.

## Many questions

A common belief is that if system clogging is biological, it can be recovered biologically. How do you know? If it is clogged, why is it clogged? Is it simply a matter of years of use? Or has its loading exceeded capacity?

If you suspect the system has been overloaded, is it flow? Waste strength? Both? What if the problem is only too much water? What if the problem is only too many suspended solids? What if the issue is short periods of heavy loading, like a 6-week season at a resort or camp?

What about construction problems? Are the tanks properly sized? Are they watertight? Is the drainfield level? Is the pump strong enough to properly dose the field? All of these issues can lead to ponding and hydraulic failure that cannot necessarily be solved only with drainfield rejuvenation products.

Some repair experts have found the most certain way to determine if clogging is biological is to sample the biomat for percentage of organic content. If the organic (volatile) percentage is high enough, a biological repair should be

report indicated that quaternary ammonia – commonly used in food service facilities – can have a nine-day residence time in plumbing. Degreasers are extremely effective at moving grease from plumbing, but then the grease can potentially reach the drainfield.

## What's the upside?

Also, it is important for your customer to know what degree of success to expect with the recovery procedure, and what can be done if it is unsuccessful. It might be that it's best to build a new system. If pretreatment were to be selected as part of a replacement system anyway, then installing a pretreatment component that can help rejuvenate the system could be a good option, even if your confidence in recovery is not high.

Sometimes, because of its condition, a system cannot be recovered. For example, if drainfield rock is full of sand, installing aerobic treatment will not re-establish proper flow.

Drainfield rejuvenation provides great value to many septic system owners. Properly applied, it is also a benefit to our industry. □



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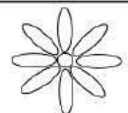
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## Risk Management

The Missouri Smallflows newsletter reprinted an article from Alteris Public Risk Solutions in which a landlord requested a lender-required inspection of an older onsite system at a rental property. The inspector noticed the outer diameter of the concrete lid on the concrete riser was chipped and spalled. Because the customer was not present and had pre-paid for the inspection, the inspector's office left a voice mail message about the hazard. The inspector never received a return phone call.

Six months later, a child fell into the septic tank and died after the lid collapsed. The parents sued the landlord and the inspector. Alteris concluded that the inspector could have managed the risk by sending someone out to replace the lid and billing the customer, or by sending the customer a certified-mail, return-receipt-requested letter explaining the hazard and offering to replace the lid. The second option is far less expensive and, more importantly, transfers the risk directly to the property owner.

## O&M Position Filled

The Oregon Onsite Wastewater Association appointed Dustin Kendon of Oregon Wastewater Services in Oregon City to the operations and maintenance position on the board of directors. His company installs and repairs systems, pumps septic tanks, and provides operation and maintenance. Kendon is a NAWT-certified inspector.

## Good Deed

The Washington On-Site Sewage Association (WOSSA) donated labor and materials to replace a failing onsite system for a low-income family in Whatcom County. Dave Mitchell of Mitchell Septic in Mount Vernon designed the system. The Samish Tribe donated \$2,500 to the association's Education Scholarship Fund in gratitude.

The association partnered with Local Health Jurisdictions to offer joint education days every six months in northern Puget Sound and in Island and Skagit Counties. WOSSA also worked with the Snohomish County Health Department Septic Issues Committee to establish an operation and maintenance licensing program.

The WOSSA Scholarship Program awarded \$2,000 to Haley Bronson and \$1,000 to Naomi Morgan. Six other recipients each received \$500. Bronson, a freshman at Brigham Young University in Utah, is studying anatomy and physiology for a career in radiologic technology.

## CALENDAR OF EVENTS

### Oct. 7-9

Virginia Onsite Wastewater Recycling Association Conference and Trade Show, Williamsburg Hotel and Conference Center, Williamsburg. 540/465-9623; [www.vowra.org](http://www.vowra.org).

### Oct. 15-16

Delaware Onsite Wastewater Recycling Association Conference and Exhibition, Dover Downs Casino and Conference Center, Dover. Call Niki Glanden at 302/359-2210, Hollis Warren at 302/284-9070, or visit [www.dowra.org](http://www.dowra.org).

## TRAINING & EDUCATION

### Video covers septic tank inventory project

Wilkin County was one of the first counties in Minnesota to complete a full inventory of its onsite systems and repair those in failure. The county produced a video to highlight how it accomplished the 10-year project. It includes a resident who upgraded his system and how four small unsewered communities addressed their wastewater issues. Watch it at [www.youtube.com/watch?v=yLZYi7bzZfE&feature=youtu.be](http://www.youtube.com/watch?v=yLZYi7bzZfE&feature=youtu.be).

### Alabama

Licensing classes are the joint effort of the Alabama Onsite Wastewater Association (AOWA) and University of West Alabama (UWA). Courses are at UWA Livingston campus:

- Nov. 14-16 – Advanced Installer II Class
- Dec. 6-7 – Continuing Education Class

The first day of Continuing Education classes is for installers and the second day is for pumpers and portable restroom operators. Call the training center at 205/652-3803 or visit [www.aowatc.uwa.edu](http://www.aowatc.uwa.edu).

### Georgia

The University of Georgia's Center for Urban Agriculture is offering Onsite Wastewater Management classes on:

- Nov. 2, Fulton
- Nov. 16, Brunswick

Contact the Continuing Education Center at 770/229-3477, [conteduc@uga.edu](mailto:conteduc@uga.edu), or [www.ugaurbanag.com](http://www.ugaurbanag.com).

### Iowa

The Iowa Onsite Wastewater Association is offering the Basic and Advanced Certified Installer of Onsite Wastewater Treatment Systems Installation Overview and Test Nov. 16-17 in Newton. Contact Alice Vinsand at 515/225-1051, [execdir@iowwa.com](mailto:execdir@iowwa.com), or visit [www.iowwa.com](http://www.iowwa.com).

### Minnesota

The University of Minnesota Water Resources Center has these classes:

- Nov. 28-29 – Installer Continuing Education, Brainerd
- Nov. 29 – Pipelayer Certification, Brainerd
- Dec. 5-6 – General Continuing Education, St. Cloud
- Dec. 12-13 – General Continuing Education, Mankato

Call Nick Haig at 800/322-8642 or visit [www.septic.umn.edu](http://www.septic.umn.edu).

### Missouri

The Smallflows Organization has these CEU courses:

- Nov. 13 – Troubleshooting, Liberty
- Nov. 14 – Hydraulics, Liberty
- Nov. 27 – Drainfields and Water Management, Springfield
- Nov. 28 – Pumps, Panels and Electrical, Springfield
- Dec. 11 – Drainfields and Water Management, Camdenton
- Dec. 12 – Troubleshooting, Camdenton

Call Tammy Trantham at 417/739-4100 or visit [www.mosmallflows.org](http://www.mosmallflows.org).



## New England

The New England Onsite Wastewater Training Center at the University of Rhode Island in Kingston has these courses:

- Nov. 1 – Rhode Island Designer Examination Prep
- Nov. 8 – AutoCALCS - Automated Bottomless Sand Filter Sizing, Pump Calculations and Support Material
- Nov. 15 – Identifying and Managing High-Strength Wastewater
- Nov. 29 – Regulatory Setbacks and Buffers
- Dec. 6 – Nitrogen in the Environment and Onsite Systems
- Dec. 13 – Designing Nitrogen Removal Technologies

Call 401/874-5950 or visit [www.uri.edu/ce/wq](http://www.uri.edu/ce/wq). For soil courses, call Mark Stolt at 401/874-2915 or email [mstolt@uri.edu](mailto:mstolt@uri.edu).

## North Carolina

The North Carolina Pumper Group and Portable Toilet Group has a septage management training and land application seminar on Dec. 8 in Raleigh. Call Joe McClees at 252/249-1097 or visit [www.ncpumpergroup.org](http://www.ncpumpergroup.org) or [www.ncportabletoiletgroup.org](http://www.ncportabletoiletgroup.org).

## Oregon

The Chemeketa Community College in Salem has a Maintenance Operator CEU class Nov. 7-8. Call 503/399-5181 or visit [www.chemeketa.edu](http://www.chemeketa.edu).

## Washington State

The Washington On-Site Sewage Association and Washington State Department of Health in cooperation with Washington State University are offering these certification courses at the training center in Puyallup unless stated otherwise:

- Nov. 7 – Troubleshooting Onsite Systems
- Nov. 15 – Advanced Soils
- Nov. 28 – Design/Install Subsurface Drip
- Dec. 5 – CAD Design for Onsite Systems, Centralia
- Dec. 12 – Monitoring and Maintenance
- Dec. 27 – First Aid/CPR

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