

October

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used in Pa. repair
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A man with a mustache, wearing a grey short-sleeved work shirt and a dark blue baseball cap with the 'HACKER' logo. He has his arms crossed and is wearing work gloves. He is standing in front of a piece of heavy machinery, possibly a backhoe loader. The background is slightly blurred, showing trees and the structure of the machine.

Supply and DEMAND

Every time Indiana's Hacker Plumbing & Drilling supplies a new onsite technology, customers emerge to demand more work from the family operation **PAGE 12**



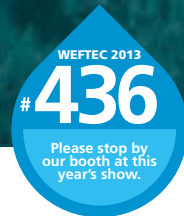
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ON THE COVER: Mark Hacker, owner of Hacker Plumbing and Drilling Service in Vincennes, Ind., has used attendance at the Pumper & Cleaner Environmental Expo International and membership in the Indiana Onsite Waste Water Professionals Association as a springboard to adopting new technologies. Also a member of the National Association of Wastewater Technicians, Hacker believes continuing education and networking can help build a successful business. (Photo by Curtis Hustace)

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Stump For Septic Incentives

You are the expert local governments need to hear from when it comes to promoting onsite system infrastructure improvements

By Jim Kneiszel



It seems to me that government programs to help homeowners update an aging decentralized wastewater infrastructure are on the rise. Thanks to the power of the Internet and Google Alerts (if you haven't used them, Google the term) I am frequently directed to stories on a town, county or city somewhere promoting incentives to people to fix or replace their ailing septic systems.

Another example popped up in my email this morning. Rice County, Minn., reported a number of Clean Water Legacy grants were available to help homeowners update their septic systems. A Voluntary Septic Upgrade Incentive Rebate Program offers \$300 to homeowners who fix a system that poses a health threat. A Septic Loan Program offers low interest rates to complete repairs. A 50 Percent Cost-Share Grant Program for low-income residents helps cover new system construction.

Random stories about these incentive programs prompted a question: What can installers do to promote similar programs to encourage healthier onsite systems in their own communities? That includes urging local officials to tap into federal Clean Water Act programs, for instance, or legislate their own incentive programs to replace aging septic systems.

YOU CAN MAKE A DIFFERENCE

I am developing a little background in the art of political persuasion these days. In the midst of serving a term as alderman in my local city of about 20,000 people, I receive calls from residents wanting to sway my opinion on any variety of issues, everything from major downtown building projects to a street-parking squabble between two neighbors.

What I've determined is that sound arguments, well presented, can rouse a local board or council to action. Now I realize that convincing an entire group of local elected officials to agree with your position can be like herding cats, but passionate parties can certainly make enough headway to set a course on an important issue.

I would argue that repairing our onsite system infrastructure is one of those important issues, and that onsite installers are a passionate party that can speak out and make a difference. And it seems to me that installers are in a no-lose situation when it comes to promoting system upgrades. Sure, these incentives would bring more work for installers. But finding ways to repair and replace these systems is just the right thing to do for everyone in the community.

So if you want to call your county board representative, town board

chairman or local health officer to encourage action on onsite system incentives, here are a few arguments that might get them to take notice:

Let's clean up the environment.

Who doesn't want a pure groundwater supply? Few images are more compelling than the prospect of a failing system leaking septage or inadequately treated effluent into the drinking water supply or our treasured lakes and streams. Do local officials want to do something to end the closings at their local beach in the summer? Do they want to find a solution to algae blooms that threaten the fish populations and irritate lakefront homeowners? You can bet that stopping contamination from failing septic systems is a cause local elected officials can get behind.

Failing septic systems can be the root cause of some of the nastiest neighborhood battles, and with good reason. Nobody wants to live next to a home with wastewater surfacing in the backyard.

Promote economic development.

Like schools and effective public safety, proper sanitation is a basic driver to economic development in any community. Ensuring problem onsite systems are cured and that incentives are available to replace older systems will encourage people to build new homes and companies to locate in your community.

Raise the tax base.

When a septic system is upgraded, the attached home or commercial building becomes more valuable. Sales prices go up and the tax base is expanded. An increased tax base brings in more dollars to fund other improvements, like a new fire truck, a ball diamond at the park or new streetlights. Those improvements make the community a more desirable place to build, raising the tax base again.

Help the elderly and low-income homeowners.

Since a new septic system is a major expense, retirees on a fixed income

and those living paycheck to paycheck will put off necessary upgrades. If failed systems are allowed to deteriorate further, the most vulnerable people in our community might lose their homes. That's no way to treat our elders or struggling families, is it? Incentives might provide the boost necessary to make a difference for these residents.

Encourage an end to blight.

Failing septic systems are just one symptom of a blighted neighborhood. Buried underground, they are not as obvious to the passerby as peeling paint or an unkempt yard, but they are a serious threat to the community. Surfacing wastewater causes odors and a public health hazard. If we don't strengthen community standards for wastewater treatment, blight will worsen, making neighborhoods undesirable to live in.

Support a local industry.

Companies like yours generate good local jobs with family-sustaining wages. Installers maintain offices, buy supplies and equipment and provide a valuable service. Onsite project incentives will generate more work for your company, allowing you to create more local jobs to fuel the local economy. The more revenue you bring in, the more money your workers will have to spend at other local businesses, boosting the health of the entire community.

Prevent neighbor complaints.

Believe this: Your local elected officials don't enjoy being drawn into squabbles between neighbors, and they will be receptive to ideas that can short-circuit frequent neighbor complaint calls. Failing septic systems can be the root cause of some of the nastiest neighborhood battles, and with good reason. Nobody wants to live next to a home with wastewater surfacing in the backyard. Your local representatives can relate to this scenario and want to prevent these situations from occurring.

YOU'RE THE BEST WASTEWATER ADVOCATE

As the editor of your trade magazine and as a local elected official, I'm encouraging you to speak up on behalf of an improved septic system infrastructure. Your background gives you unique insights into the state of onsite wastewater treatment in your community. Your opinions and recommendations would be well received ... I'm certain of that. □

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By Jim Kneiszel

Got a few minutes between appointments for septic system work? Is your smartphone or tablet handy on the road, or are you sitting near your desktop computer in the office? Then we have a bonus for you – additional *Onsite Installer* content is available online. Find more of the latest wastewater industry news – from product releases to videos and podcasts to my editor's blog – at www.onsiteinstaller.com. Here's just a sampling of the latest content you can find online:

EDITOR'S BLOG:

SAFETY ALERT – WORKER PINNED DURING TANK INSTALLATION

A news account of a septic system installer being pinned by a concrete tank is a sober reminder about the dangers of your job and the importance of stressing safety in a work zone. The worker escaped serious injury after a cable snapped and trapped the lower half of his body under the tank. This incident prompts two important safety reminders. First, be sure to always situate workers out of harm's way in the event of an equipment failure. And second, check your equipment every day to make sure it's working properly and won't let you down. Turn this bad situation into a learning opportunity by talking about it at your next tailgate safety meeting. Learn more and see a video in my online blog.

TOP 10 QUESTIONS TO ASK WHEN CREATING OR UPDATING A WEBSITE

Writer Beverly Lewis explains how a website is an important marketing tool for today's installer. Her story shares the questions you should ponder as you build a new website or retool your current site for the future. She suggests hiring a professional designer rather than using a do-it-yourself program to put together your site. “Good design combined with an effective optimization strategy is an investment that will be returned — with interest. In today's marketplace, we never get a second chance to make a good first impression,” she says. Her first three questions to answer are: How does a website work with my overall marketing strategy? What is search engine optimization and why is it important? Are Google analytics and webmaster tools installed? Go online to see the other seven questions.

SMARTPHONE APPS FOR SKILLED TRADES

How did we get along in business without a smartphone? That's a question business writer Erik Gunn asks in this online-only story. It's interesting to think of all the ways small businesses have benefitted from all the technologies this pocket-sized computer and telephone have brought onsite installers. Gunn shares some of the latest phone apps that can help your business run more efficiently and build profits in many ways. Among other things, the apps mentioned help manage vehicle and equipment fleets, generate project reports figure out time and materials costs and track business expenses. For more details on money- and time-saving apps, read the online exclusive story.

Check these out at
www.onsiteinstaller.com/ec/2013/October.

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Supply and DEMAND

Every time Indiana's Hacker Plumbing and Drilling supplies a new onsite technology, customers emerge to demand more work from the family operation

By Scottie Dayton

Attending one of the first Pumper & Cleaner Environmental Expos in Nashville, Tenn., was a turning point for Mark Hacker, co-owner of Hacker Plumbing and Drilling in Vincennes, Ind. It convinced him to concentrate more on the onsite industry.

“We had installed conventional gravity systems since the late 1960s, but it was more of a sideline to the well drilling business,” says Hacker. “I saw the future at the show, and it was advanced secondary treatment and commercial systems.”

While the center of Vincennes is sewered, many of its 25,000 residents have onsite systems with failing drainfields and limited space for replacements. Hacker’s quest for alternative technologies quickly established him as a leader in onsite repairs. Working with local regulators, Realtors, business owners and plumbers soon gained him a reputation as a problem solver.

Hacker has been an early adopter to a variety of onsite technology, including a recirculating gravel filter with drip irrigation, and the Fusion purification tank imported from Japan by Zoeller Corp. He credits much of his success to the benefits derived from membership in the Indiana Onsite Wastewater Professionals Association and what he learns at the Pumper & Cleaner Expos.

REPAIR AND REPLACE

While older brother Tim managed the well drilling branch of the company, Hacker, 50, built the onsite side through referrals from business associates, suppliers, county sanitarians and plumbing contractors. His parents ran Delbert Hacker Plumbing & Heating for 28 years, creating a great referral network.

Hacker Plumbing and Drilling, Vincennes, Ind.

- OWNERS:** Mark and Tim Hacker
- YEARS IN BUSINESS:** 48
- EMPLOYEES:** Six
- MARKET AREA:** 60-mile radius
- ANNUAL REVENUE:** \$1.4 million
- SPECIALTY:** Installing and repairing residential and commercial onsite systems, pumping, pipe cleaning and inspecting, plumbing
- AFFILIATIONS:** Indiana Onsite Wastewater Professionals Association, National Association of Wastewater Technicians
- WEBSITE:** www.hackerplumbing.com



<<< Joel Ray, left, and owner Mark Hacker use the Trimble Spectra Precision Laserplane unit to check the ground level. (Photos by Curtis Hustace)

Much of the work focused on repairs, as the agricultural community lacked large tract housing developments. In the late 1990s, Hacker enrolled in onsite courses, and joined IOWPA and the National Association of Wastewater Technicians to become better versed in his profession.

“Indiana doesn’t have a state licensing program,” says Hacker. “It’s up to counties, which began requiring contractors to be licensed in the early 2000s. I wanted certification to prove I was a professional.” He works in seven Indiana counties and four in Illinois.

Hacker doubled annual onsite revenue for the first three years by installing advanced treatment units and repairing troubled drainfields. Space limitations were his main challenge. He read everything he could find on alternative technologies, and certified through manufacturers to install them.

“Our record year was 2011 with 30 installs and 30 repairs. Many contractors took their excavators to the rapidly expanding coal mine fields that year, and they either referred their onsite jobs to me or turned over the workload.”

Mark Hacker

SHOW AND TELL

While literature from various agencies helped Hacker explain the need to fix ponding drainfields correctly, his biggest challenge was convincing homeowners to spend the money. Another concern was having their property torn up. Hacker’s installation of the RGF broke the dam.

“Although I had an alternative space, I installed 1,224 feet of Geoflow drip tubing in my front yard,” he says. “In two months, all signs of the burial disappeared.” The strategy converted reluctant homeowners.

Hacker turned the RGF installation into a field day for IOWPA members, and invited state and county health department regulators from Indiana and Illinois.

When the Zoeller representative arrived with the components, he had a Fusion tank in the back of his pickup truck. After it was unloaded, Hacker climbed up a ladder, looked inside and knew the perfect place for it.

After only six years, effluent was ponding at an upscale home with a conventional system. “The small lot had very poor soils, and replacing the drainfield would use up the remaining back yard,” says Hacker. “Mike Beaman of the Knox County Health Department was at the Field Day and granted permission for me to install the unit.”

Hacker convinced the owner to accept the product. “I’ve been certified to install Zoeller systems for years, and felt confident in guaranteeing the



Owner Mark Hacker uses a backhoe to dig a field bed, while Jordan Winning installs a Quick4 Plus low-profile chamber system from Infiltrator Systems.

unit would extend the life of his system tenfold,” says Hacker. “It is still working flawlessly.”

The installations had a ripple effect. Homeowners with septic problems began calling Hacker. Local sanitarians and health departments approached him for advice and solutions. “We were well on the way to becoming recognized as onsite specialists,” he says.

LOTS OF CHANGE

The road to that point began in 1965 when Delbert and Mary Hacker opened their business. Delbert’s brother joined them in 1973. By 1993, the



LEFT: Owner Mark Hacker uses a backhoe to dig a field bed, while Joey Ray surveys the height of the bed. **ABOVE:** Jordan Woning, left, and Joel Ray organize the distribution chamber system from Infiltrator Systems prior to installation.

company had 26 employees and offered plumbing, heating, air conditioning, irrigation, swimming pool, electrical and well drilling services. Then the brothers went their separate ways. “It was like a storm roaring through the forest knocking down dead wood,” says Hacker. “We abandoned avenues that weren’t making money and concentrated on well drilling, plumbing and onsite systems.”

Just as the dust was settling, the second shoe dropped. One Saturday morning in 1993, Hacker met his brother in the office for their weekly meeting with their father. When Delbert joined them, he threw a contractual agreement and his shop keys on the desk. “Dad announced that he needed a heart transplant, offered to sell us the business, said he was going to Florida for 30 days and walked out the door,” says Hacker.

The brothers bought the company and renamed it Hacker Plumbing and Drilling. Mark Hacker had worked in the shop while earning a two-year associate’s degrees in business administration from Vincennes University.

He joined the company as a plumbing and service technician in 1982. Older brother, Tim, who had worked there since 1976, was a rotary drill rig operator and Master Certified Groundwater Contractor.

Today, 40 percent of the company’s annual \$1.4 million revenue comes from onsite, 10 percent from pumping and the remainder from well drilling. It has six full-time employees and two seasonal workers. They average 20 residential installations per year and 25 repairs. “Our record year was 2011 with 30 installs and 30 repairs,” Mark Hacker says. “Many contractors took

their excavators to the rapidly expanding coal mine fields that year, and they either referred their onsite jobs to me or turned over the workload.”

The brothers operate out of a 13,000-square-foot shop with eight service bays and 3,000 square feet of office space on 10 acres. They also have a 10,000-square-foot warehouse. “We keep our equipment inside as much as possible, and have a full-time and part-time mechanic to service it,” says Hacker.

CUSTOM PACKAGES

The company branched into commercial onsite systems after Hacker installed a mound system for the local John Deere dealership. “We realized small commercial systems could be just as lucrative as residential ones, especially if they required a maintenance contract,” says Hacker.

Hacker develops the designs, then works with Scott Rexroth, P.E., president of Clear Water Environmental Systems in Noblesville, who



finalizes and stamps the plans for systems greater than 2,000 gpd. The association enabled Hacker to offer customers complete packages from design to maintenance.

The state mandates maintenance contracts for drip irrigation, advanced treatment units and commercial systems. Hacker received his operation and maintenance certification through NAWT, developed a three-year service contract, and today averages 75 contracts that require biannual visits. Most customers renew on schedule.

Repairing and maintaining systems led to sewer and drain line cleaning and inspections using a RIDGID SeeSnake system. Most service calls involved blocked laterals that couldn't be cleaned until the septic tanks were pumped. The money lost waiting for the pumper to arrive convinced Hacker

(continued)

Association has novel way to raise scholarship funds

Mark Hacker, co-owner of Hacker Plumbing and Drilling in Vincennes, Ind., is chair of the Indiana Onsite Wastewater Professionals Association Scholarship Committee. It awards two \$500 scholarships annually, and the committee is responsible for fundraising.

Their biggest success has been the annual Summer Field Day. "IOWPA installs a system for a low-income family and uses the day as a continuing education class," says Hacker. "Since most materials and labor are donated, we ask the family to donate to our scholarship fund based on what they could have paid for the system."

Of the four years the association has used this approach, the 2011 Field Day was the most challenging. "My crew installed a drip irrigation field on a 30 to 35 percent slope of pure sand," says Hacker. "Our code considers a 15 percent slope to be steep."

Purdue University paid Hacker to install the residential system. After subtracting his labor and fuel costs, he donated the rest of the money to the scholarship fund.

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Owner Mark Hacker, left, and Knox County Health Department inspector Mike Beaman discuss plans for a drainfield.

Hacker also sits on the Indiana Environmental Health Association Wastewater Management Committee. IEHA represents county and local health departments. “The committee is the liaison between IEHA, IOWPA and the state health department,” he says. “We enjoy a great working relationship.”

“The contacts and friends I’ve made over the years, the business advice I’ve gleaned, and the networking have repaid my membership dues tenfold.”

Mark Hacker

EXPANDING INSPECTIONS

One example of that relationship is the development of IOWPA’s inspector certification course. “The state has no mandate requiring onsite inspections for transfer of property,” says Hacker. “That interest is driven by buyers or financial institutions, but county inspectors were checking only the septic tanks.”

Hacker, a NAWT-certified inspector, argued that such inspections were not doing justice to the buyers. His message received a lukewarm reception until he held an information luncheon for Realtors in 2009. After he explained the inspection process, the terms

and why inspectors needed to be certified, his audience wanted thorough inspections.

IOWPA rose to the occasion and began developing the necessary certification and testing. When state health department officials learned of the effort, they helped bring it to fruition. The program should roll out before the end of the year.

Meanwhile, Hacker continues to embrace new technologies, such as the Advanced Enviro-Septic system from Presby Environmental. “The treatment pipes have been the only answer for some really tight sites,” says Hacker. “They saved homeowners from buying additional property that may not be accessible from their lot for the replacement drainfields.” □

to buy a used 1978 GMC vacuum truck with 1,200-gallon tank and Masport pump. In 2009, he upgraded to a 2006 International with 2,300-gallon steel tank and Battioni pump built by Wee Engineer.

LEARNING MATTERS

Like his father, Hacker believes in education. “My dad said that if you’re going to keep chopping wood, you have to stop occasionally to sharpen your ax,” he says. “We did that by attending product training sessions.”

Today, Hacker and his crew earn half their CEUs during Education Day at the Pumper & Cleaner Expo and half through IOWPA’s annual conference. The association also offers a voluntary installer certification course accepted by more than half of Indiana’s counties in lieu of their own licensing programs. “This has been a tremendous cost and time-saver for installers,” says Hacker. “One of my biggest business challenges is the time I spend recertifying in the different states and counties.”

Hacker’s father also told him that if he joined an organization, he’d get out of it only what he put in. When Hacker joined IOWPA in 1998, he couldn’t sit in the back of the room. Before long, he was helping organize Summer Field Days, then leading an occasional event. He worked on conferences, was elected to the board of directors and became its president in 2007. “The contacts and friends I’ve made over the years, the business advice I’ve gleaned and the networking have repaid my membership dues tenfold,” he says.

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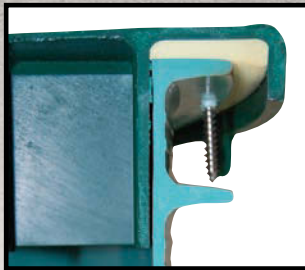
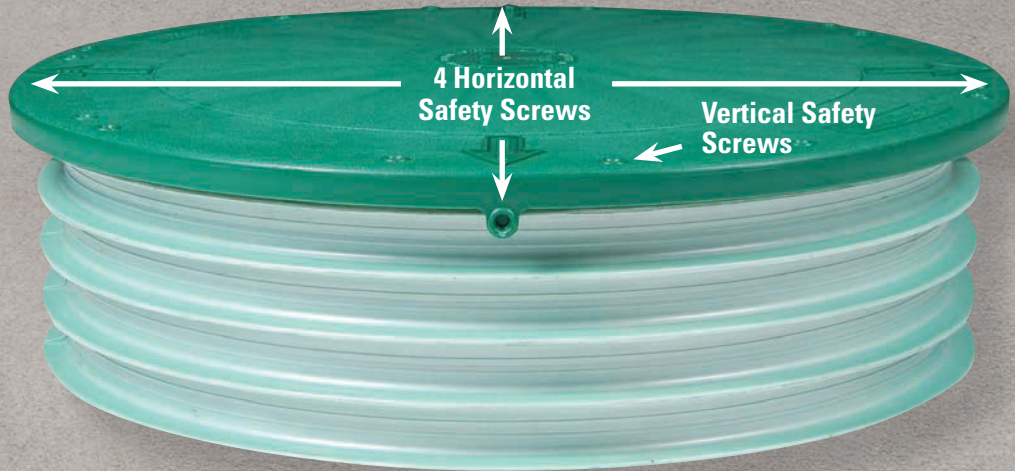
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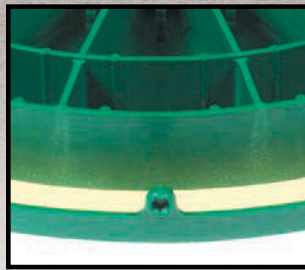
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Jim Anderson, Ph.D., and David Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. David is Extension Onsite Sewage Treatment Educator. Jim is former director of the university's Water Resources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

Gentlemen, Start Your Engines

Before you rev up your machines and dig into the next installation, know your equipment needs and work out important finishing details with customers

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

We don't often talk about equipment except in the context of performing a specific task. This is because we are not equipment experts. Equipment choices involve personal preferences, and there are many more qualified people to talk about specific pieces of equipment. The following are a few of our observations about selecting and using equipment based on our discussions with installers.

First and foremost, the equipment needs to match the work you do. We have seen a number of people who think that because they own a backhoe and have dug basements or pools they can move right in to installing onsite systems. It's not that simple.

Before making equipment decisions, ask yourself: "What kind of systems or system components will I be installing?" If most of the systems installed in the area are mounds or at-grades, having track equipment will

be a must. Another example is in areas where drip systems are installed, a trencher and some other specialized equipment will be required.

COST VS. BENEFITS

Having the right equipment requires evaluating what is needed for primary jobs, what is already owned, additional types of systems the company wants to install and the cost of equipment relative to the number of potential systems, and then balancing up-front costs with long-term costs and return. This will help determine if new or used equipment is the answer, or if leasing or renting should be used until the costs and benefits are well established.

A part of the cost-benefit analysis should be an assessment of the time it takes to do a job, with the equipment needed reflecting the amount of time to do a task. An example would be having a backhoe that can dig trenches in an hour or two, but having backfill equipment that requires four to five hours. This is not a good match for the tasks required.

There is one area where we've seen potential for problems: having the right equipment to move machines to and from installation sites. The trailers and trucks need to match the equipment being hauled, and all of it needs to be in the proper condition with lights and brakes working properly, as well as having the proper paperwork in the truck. This

Before you get to work digging a big trench in their yard, sit down with customers and talk about their expectations for the landscaping and look of the area after the job is done. (File photo)



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includes any necessary time logs, registration papers, emergency response plans, etc. It can be expensive and frustrating to find yourself parked on the side of the road having a conversation with the state highway patrol.

Make sure equipment fits the site – you have to be able to maneuver once you're at a work location. Remember not all jobs are on newly developed lots. We have discussed this before from a planning perspective, but it bears mentioning again. Equipment must get to the site and maneuver to install all components of the system. So even if you can get your pickup to the site, that doesn't mean the truck delivering a tank or other materials can reach the location.

We have seen situations where an installer tries to get by with a piece of equipment that can do the job, but not efficiently . . . If your excavator is on the edge of being able to dig to the proper depth or the skid-steer takes a long time to backfill, consider an equipment change.

TALK TO YOUR CUSTOMERS

At the outset, have a discussion with the homeowner about what may be necessary to complete the installation. The job may involve building a temporary roadway into the site, removal of trees or damage to lawns, and all of these factors should be discussed and an agreement put in place with provisions before any work begins. For some customers, losing even one tree is a traumatic occurrence and if no agreement is in place about handling this type of situation, you may face a nasty discussion after the fact.

Evaluate whether all the necessary equipment is available for the installation. Plan to have the right equipment on location for each job. We have seen situations where an installer tries to get by with a piece of equipment that can do the job, but not efficiently. The result is increased time and rising costs to accomplish the task. If your excavator is on the edge of being able to dig to the proper depth or the skid-steer takes a long time to backfill, consider an equipment change.

A related issue goes back to planning for the work. It is important for the installer to have a plan for spoils and materials placement to minimize the number of moves required by the equipment. Extra moves of a spoils pile or longer trips to transfer materials also increases time and costs associated with a job.

One aspect of installation work we have seen grow in importance over the past five years is having an erosion control plan in place. This can be as simple as installing silt fencing, which may limit movement around the site and impact the type and size of equipment you may be able to use. The bottom line is: materials, spoils piles and erosion protection all need to be staged and factored into equipment selection.

SWEAT THE DETAILS

Finally, have you agreed with the homeowner about what the finished job will look like? What constitutes a finished or complete installation? If the expectation is to leave the site roughly graded after backfill with someone else doing landscaping, then there may not be additional equipment needs. But if landscaping is part of the project, you may need additional equipment. Hopefully that has been spelled out as a part of the bid and the agreement. If not, there is room for having a callback from an unhappy customer. □

Injection-molded, two-piece tank captures Expo interest

By Ed Wodalski

Something old, something new was the theme for Infiltrator Systems at the 2013 Pumper & Cleaner Environmental Expo. On display was the IM-1060 injection-molded polypropylene septic tank, while talk focused on the soon-to-be-released IM-540.

“We had graphics of the [IM-540] tank and displays of the tank, but we did not have an actual tank,” says Jim Bransfield, marketing manager for Infiltrator Systems. Feedback on both tanks focused on their injection-molded, two-piece construction.

Bransfield says visitors he talked to at the Expo were a mix of installation companies and distributors of other technologies. “It was a combination, and we’ve been able to turn it into some excellent projects and work.”

Last year’s successful show launch of the IM-1060 convinced Infiltrator to convert its entire 1,000-gallon septic tank line from single-piece rotomolded to two-piece injection-molded units. “That’s really the value proposition of this tank,” he says. “You’re able to put the plastic and the wall thickness in the places you need structure. So we’re able to use higher strength plastics, as compared to rotomolded tanks, and then we can put structural ribs and design elements in the tanks.”

Like its larger brother, the 500-gallon IM-540, introduced this summer, features heavy-duty green lids that interconnect with custom-fit TW risers. The lids are rated for a light traffic load of 6,000 pounds per axle. “But we don’t encourage driving over any septic system at any time,” Bransfield says. Safety features include a locking screw fastener. “We also recommend a padlock method that you can drill through the lid.”

Structurally reinforced 24-inch access ports eliminate distortion during installation and pumpouts. The tanks can be installed with 6 to 48 inches of cover and pumped dry during pumpouts.

Suitable for use as a pump tank, trash tank or rainwater (non-potable) tank, the IM-540 can be paired with the IM-1060 as the second compartment of an in-series septic tank. No special installation, backfill or water filling is required of either tank.

Both tanks have a mid-seam EPDM rubber gasket, the same gasket used in sewer pipes. The seam is permanently fastened using a series of noncorrosive plastic alignment dowels and locking clips for a watertight seal.

“We’ve produced over 20,000 of these tanks and in many markets we’re



Jim Bransfield (right), marketing manager for Infiltrator Systems, explains features of the IM-1060 septic tank to Expo guests. (Photo by Ed Wodalski)

required to vacuum test every tank we sell, and we’ve had zero failure on the gaskets themselves,” he says. “When they do fail, it’s incorrect assembly or application.”

The IM-1060 has a working capacity of 1,070 gallons and total capacity of 1,247 gallons. It has 0.2-inch (5.1mm) walls, is 127 inches long, 62.2 inches wide, 54.7 inches tall and weighs 320 pounds.

The IM-540 has a total capacity of 552 gallons and 476-gallon septic working capacity. It is 64.9 inches long, 61.7 inches wide, 54.6 inches tall and weighs 169 pounds. Expected to complete the injection-molded line is a 1,500-gallon tank, scheduled for release in January.

“A lot of the show for us is really meeting with our existing customer base,” Bransfield says. “The last few years we’ve actually been able to leverage international contacts at the show, and we’ve had pretty good luck with that.”
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rulesandregs

Rhode Island considers new onsite regulations

By **Scottie Dayton**

The Rhode Island “setback” bill (5425-A) seeks to standardize wetlands and onsite system regulations by authorizing the state Department of Environmental Management to establish them. It also would require municipalities to ensure their standards do not exceed those set by the state. The bill also creates a task force to draft the legislation.

A proposed bill being studied by the Committee on Environment and Natural Resources would require property owners to replace cesspools with onsite systems or sewer tie-ins within one year of the properties’ sale. □

“Rules and Regs” is a monthly feature in *Onsite Installer*™. We welcome information about state or local regulations of potential broad interest to onsite contractors. Send ideas to editor@onsiteinstaller.com.



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The Big Fix

An elevated sand mound and directional drilling provide a quality solution for a failed system in violation of a Pennsylvania township code

By **Scottie Dayton**

During a mandatory four-year pumpout and inspection at a three-bedroom home in Rapho Township, Pa., a service provider from Thomas H. Erb and Sons found the rear door of a tractor trailer and other material covering the collapsed 350-gallon metal septic tank.

A dye test revealed sewage flowing from a clay tile pipe that surfaced 50 feet from the septic tank, then running downhill to a stream. The condition continued for three years before the township issued a sewage violation and gave the owners 30 days to comply.

“When a copy of the violation notice arrived in June, we didn’t have a design or septic permit,” says installer Ray Erb, based in Lititz, Pa. “We also had to line up three extremely busy subcontractors and obtain a permit to cross the road.” Rainy weather and other unexpected situations extended what should have been a four-day install right up to the deadline.



Tom Erb moves the Gehl 383Z mini-excavator into position to backfill around the septic tank.



The rear door of a semi-trailer and other material cover the collapsed 350-gallon metal septic tank. (Photos courtesy of Thomas H. Erb and Sons)

SYSTEM PROFILE

Location:	Rapho Township, Pa.
Facility served:	Three-bedroom home
Designer and installer:	Thomas H. Erb and Sons, Lititz, Pa.
Site conditions:	Silty clay loam, percolation rate of 46 minutes per inch, seasonal high water table at 46 inches
Type of system:	Conventional with elevated sand mound
Hydraulic capacity:	400 gpd

BELOW: Green dye marks puddles of effluent as it flows downhill past a water trough and toward a stream. RIGHT: Tom Erb installs the 4-inch lateral from the house to the septic tank.



“After a long, fruitless search for the breaker, he finally pulled the electric meter off its base and cut the wires.”

Ray Erb

Site conditions

Soils are silty clay loam with a percolation rate of 46 minutes per inch and a seasonal high water table at 46 inches. The property, a boarding stable, has a 4 to 6 percent slope.

System components

- Erb designed the system to treat 400 gpd. Major components are:
- 1,000-gallon single-compartment concrete septic tank. Tanks made by Monarch Concrete Products, York, Pa.
 - 500-gallon single-compartment settling tank with PL-122 Polylok effluent filter
 - 750-gallon single-compartment dose tank with 1/3 hp Goulds effluent pump
 - 55- by 18-foot elevated sand mound

System operation

Effluent flows by gravity through the first two tanks, then to the dose tank. The on-demand pump sends 225 gallons per cycle at 35 gpm through 2-inch Schedule 40 PVC pipe to the drainfield. A 2-inch manifold in the middle of the mound feeds effluent left and right to three 27.5-foot-long 1.5-inch laterals on 6-foot centers. Effluent disperses through 0.25-inch holes drilled 6 feet apart.

Installation

The only location for the tanks, set in series, had trees growing into overhead power lines running from the house to the stable. “Wires and trees had to come down, but coordinating the effort between the two contractors’ schedules was fun,” says Erb. “However, they knew our deadline and did their best to accommodate us.”

One week later, the electrical contractor arrived and found nothing to code. The only circuit breaker box had no main breaker to kill the power. “After a long, fruitless search for the breaker, he finally pulled the electric meter off its base and cut the wires,” says Erb. “Then we waited another five days for the tree surgeon to remove the trees.”

Knowing they’d hit water at 22 inches when excavating holes for the

>> Loading the dump truck.

tanks, Erb had Monarch Concrete waterproof them before delivery. Son Tom Erb used a Gehl 383Z mini-excavator to dig close to the house, and just missed hitting a buried 1/2-inch flexible PVC water pipe running parallel with the trench. “Fortunately, Tom could excavate back and pull the line out of the way,” says Erb.

Water seeped slowly into the 7-foot-deep excavation for Erik Pinkerton to level 4 to 6 inches of gravel in the hole before the crane set the first two tanks. “Although the water line was just for the horses, we sleeved it in 1-inch flexible PVC pipe to meet code,” says Erb. “That left a 2-foot buffer between the tanks and line.” After plumbing the tanks, the workers backfilled them.

With room to maneuver, Tom Erb used a Caterpillar 312B excavator to dig a 10-foot-deep hole for the dose tank. Its side outlet enabled the supply line to run straight down the driveway and under the road before making two 45-degree turns toward the elevated sand mound 188 feet away. “The tanks never became buoyant,” says Erb. “The pressure from 3 feet of soil was sufficient to prevent them from floating.” Setting and plumbing the tanks took two days.

Erb hired L & N Zimmerman Excavating, of Newmanstown, Pa., to bore 50 feet under the road using a directional drill from Vermeer Corp. However, the land dropped 4 feet from the mound to the dose tank. To guarantee the bore bit achieved the proper elevation, workers excavated the bore hole 30 feet from a 9-foot-deep observation pit. The distance enabled the bit to maintain the proper pitch before leveling off and boring to the 5-foot-deep entry pit at the driveway entrance.



The machine operator then pulled back 3-inch HDPE pipe to sleeve the pressurized supply line. Meanwhile, Tom Erb and Pinkerton open-trenched from the dose tank to the entry pit and from the bore pit to the drainfield. “We planned one day for the bore, but it took half that long, enabling us to backfill the driveway pit and trench before nightfall,” says Erb.

To install the sand mound, workers scarified the soil, leveled the slope with 20 to 32 inches of sand, then covered it with 6 inches of 2B crushed stone. They laid the laterals and delivery lines, covering them with 2 inches of stone and geotextile fabric topped with 12 inches of soil. “We ran two dump trucks and brought in 120 tons of soil,” says Erb. “Fortunately, we had the tank excavation spoils to use when building the berm.”

Maintenance

The township’s management program requires cleaning and inspecting the tanks every four years. □

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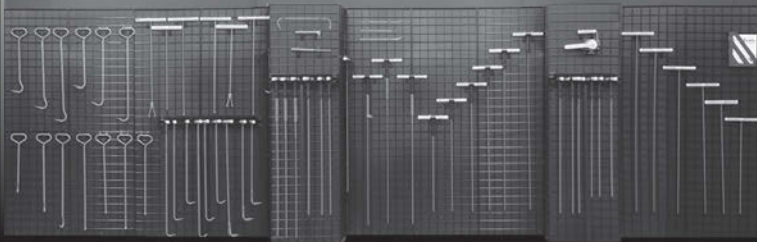


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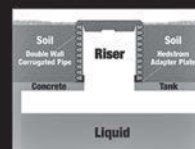
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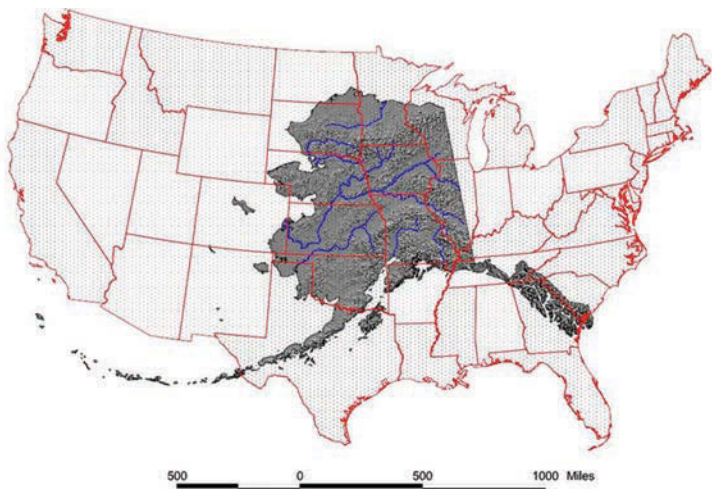
By Doug Day

The state marine animal is a whale. Texas would fit within its boundaries – twice. There are 39 mountain ranges, 3 million lakes and 5,400 islands (2,700 with names). Some locations have average winter temperatures around 3 below zero and snowfall is often measured in feet – the annual snowfall record for one location is 81 feet.

Life is different in Alaska. And so is the way onsite systems are installed and monitored.

About 25 percent of the state's homes have septic systems. There are about 125 certified onsite system installers, but no professional trade association for them. A crew of just five onsite wastewater inspectors – each with a territory a little larger than Oregon – monitor new and replacement installs.

The manager of the Engineering Support and Plan Review Section for the Alaska Department of Environmental Conservation is Gene McCabe. He and his wife Wendy grew to love the Land of the Midnight Sun when he was based there for the Air Force, and moved back there after he retired from the military.



Five onsite wastewater inspectors cover the entire state of Alaska, which is larger than all but 18 countries in the world and has 47,000 miles of coastline. (Photos courtesy of Engineering Support and Plan Review Section for the Alaska Department of Environmental Conservation)

Installer: What is your biggest issue for onsite systems?

McCabe: We're continuously running into undocumented or under-documented installations. That causes delays for home buyers and sellers since lenders want to see documentation for the onsite systems. It also makes it difficult to help homeowners if their system fails and they don't know what has been installed.

Installer: Does Alaska have a Certified Installer program?

McCabe: This spring we trained and tested more than 125 installers. Contractors get training from our Water Division and take a certification exam that allows them to install conventional onsite systems for single-family homes, duplexes and small commercial facilities of 500 gallons per day or less of domestic waste. The certification is valid for two years and requires a refresher course and exam to renew.

Advanced systems must be engineered, submitted for plan approval, and the engineer must certify the installation was done correctly. This year, some of our experienced installers brought up the idea of a second level of certification. We are looking into certification for advanced systems. We are definitely seeing growth and more public interest in the advanced systems, especially where traditional soil absorption systems just don't work.

Installer: With so much area and so few people, do you inspect every onsite system installation?

McCabe: We're really happy with our certified installers. The field office will inspect systems as available, but 100 percent inspection is not required. Installers self-certify and submit as-built documentation within 90 days. Installers must notify the closest division office at least 24 hours prior to installation, but if they can notify us further ahead, the better we can schedule an inspection. If they get two complete inspections in a season, they are exempt from having to take the written exam that year.



Gene McCabe

Installer: What challenges does the unique Alaskan environment pose to installation?

McCabe: Cold temperatures in the range of -40 definitely play a large role. We have areas where the ground is so rocky or the water table is so high that conventional onsite systems simply do not work. We have vast areas of permafrost where the ground is frozen all year. Many of our towns and villages are not on a road, so equipment and materials must be brought in on barges or flown in. [About 90 percent of the state is not served by a road. There are only 13 state roads, but there are 600 airports and more than 3,000 airstrips.]

Installer: So out of necessity, you must still have a lot of outhouses.

McCabe: They are an allowed waste treatment system because they are sometimes the only system available. We don't regulate outhouses, but we do publish guidance on setback distances from surface water, hole depths to protect groundwater, and restrict them only to human waste; you can't discharge graywater into them.

"We're continuously running into undocumented or under-documented installations. That causes delays for home buyers and sellers since lenders want to see documentation for the onsite systems. It also makes it difficult to help homeowners if their system fails and they don't know what has been installed."

Gene McCabe

Installer: What are you working on for installers in Alaska?

McCabe: Our biggest project by far is the complete revision of our Certified Installers Manual to make it field friendly and a resource to turn to. We got feedback this year from many of our initial certification students that they would like the course to be more than one day. The course is truly a lot to take in and then take an exam all in one day. We're going to see if we can break the class down to two days. And we're investigating accepting continuing education credits from other professional training events toward recertification credit.

Installer: What is the program's biggest accomplishment of the last few years?

McCabe: I'm really happy with our installer database and the amount of detail we have on the certified installer program. It's probably the strongest point of our program that we have an accurate database on everyone's contracting license, certifications, exam results and inspection reports. Our system is really solid and is our biggest accomplishment in the last five years. Before that, it was highly regionalized and there was no central point for having all that data.



"Outhouses are an Alaskan fixture and we have an affinity toward them," says Gene McCabe. **"We put skis on them in winter and race them."** The World's Largest Outhouse Races in Anchorage are held during the annual Fur Rondy Festival, which dates back to 1925 in celebration of the state's fur trade.

As we get information from installers, we put it into the statewide Septic Tracking System online database. It has septic installation data for every single-family home. The public can see it, especially those who don't know what they have for a system or people who are trying to buy or sell homes. There is no state requirement for an inspection before sale, but many lenders are becoming much more savvy about onsite systems and requiring that they have been approved. Alaska has a lot of history around septic and we do run across a fair amount of homes that have systems installed but there is no documentation, so lenders will require an engineer to conduct adequacy tests.

Installer: Are there areas of Alaska that will never have sewer or septic?

McCabe: There are small, remote villages where it just doesn't make sense. We definitely have places without flushing toilets or running water that have designated honey bucket [typically a 5-gallon bucket and liner] dump sites as their primary waste treatment. Alaska has several agencies that help villages with sanitation, especially native villages where they still practice subsistence living, not because of poverty but because it is their way of life. It's a combination of providing a technical solution the village can support and education at the same time.

Installer: It is certainly a different way of life, why did you choose to live there?

McCabe: Nobody says "I don't know where to live, let's try Alaska." We've been here four years. I was stationed here for three years and we decided that we wanted to live here after I retired from active duty. It worked out that my experience in managing environmental issues in the Air Force lined up with what DEC was looking for. It's the lifestyle here, and the natural beauty. You can live in a city of 300,000 people like Anchorage, drive an hour and be by yourself. The ability to do so many outdoor activities is almost overwhelming. From snow machining, ice fishing and cross country skiing in winter, to spring hunting, summer fishing; at times it's almost exhausting. But it feels like a waste to sit inside. □

Natural Gas Trucks

Should you look at a burgeoning domestic fuel option as you plan to upgrade an aging dump truck or equipment hauler?

By Jim Kneisz

The next time you buy a dump truck or equipment-hauling medium-duty flatbed or semi tractor-trailer, will you be sticking with tried and true diesel engine technology or looking toward an emerging natural gas-powered rig?

A lot of factors should go into your choice of a familiar diesel system – which comes with the drawbacks of more pain at the pump and high-maintenance emissions components – or to become an early adopter to a technology using a now-abundant North American fuel source.

A significant number of small-business fleet owners are sitting on a parking lot of aging on-the-road vehicles. Conservative company owners who run work trucks hard and use them every day may have put off new truck purchases after the 2007 and 2010 changes to emissions systems. And they may have stayed out of showrooms as the economy has started its recovery.

But now, many of those work trucks are at or past their end-of-life date and need to be replaced. And as contractor companies are getting busier with infrastructure work and the economic upswing, the last thing they want is to have crews idled by breakdowns involving older trucks.

NO FOREIGN OIL

Many American business owners like the idea of using domestic energy supplies to power their fleets and reduce the nation's reliance on foreign oil. And if those same business owners could save on fuel bills, while eliminating the problematic maintenance of emissions equipment on their diesel trucks, they'll start to take notice of natural gas.

Oklahoma-based Seaboard Foods and its subsidiary, High Plains Bioenergy, just invested in a natural gas fleet of Kenworth trucks to transport its B99 biodiesel product and live hogs to its food processing plant. The company purchased two Kenworth T660 trucks with Cummins Westport ISX12 G heavy-duty natural gas engines for the biodiesel transport and 43 T800 short hood day cabs using the same powerplant for hauling animals.

“We see adding CNG-powered Kenworth trucks as a great opportunity to further our commitment to sustainability and environmental stewardship,” Terry Holton, president and CEO of Seaboard Foods, says. “The availability of a 12-liter natural gas engine really makes it possible for our operation to run CNG-powered trucks because it provides the right amount of power and torque for the loads our trucks carry.”

According to the U.S. Department of Energy, 112,000 vehicles are powered by natural gas in this country, and 14.8 million worldwide.



This Cummins ISX12G natural gas engine shares 80 to 90 percent of its components with a traditional diesel engine. The fuel storage and delivery system is more complex in a natural gas powerplant. (Photos courtesy of Kenworth)

According to the Department's Alternative Fuels Data Center, CNG is best for high-mileage vehicles that operate in a limited territory. The LNG options are better for vehicles that have longer hauls, according to the Department.

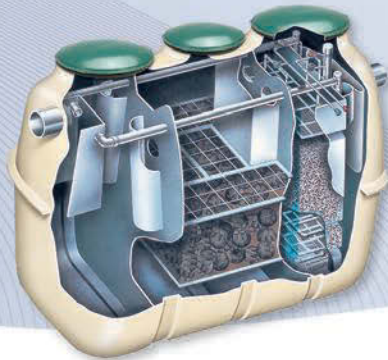
In the LNG technology, gas is cooled to a cryogenic state, at -260 degrees F, changing it from a gas to a liquid. The fuel is kept in liquid state in big, dual-walled stainless steel tanks until it's conveyed to the engine for burning. In CNG technology, natural gas is kept at 3,500 psi in storage tanks until it's fed into the engine. Storing either fuel on the truck requires expensive tankage.

(continued)

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LOCAL, REGIONAL

Whether these engines make sense for your business depends on a variety of factors, according to Andy Douglas, Kenworth's national sales manager.

"Everything to date has been more local and regional haul," Douglas says. "The long-haul side of things is still awaiting the maturing of the fueling infrastructure."

Kenworth offers three new Cummins Westport engine choices fueled by natural gas: the ISX 9 liter, the ISX 12 liter being used by Seaboard Foods, and a 15 liter, which is essentially an ISX powerplant modified to allow a small amount of diesel fuel to be mixed with the natural gas. One huge benefit to the 9-liter and 12-liter models is that diesel emissions equipment is eliminated, a prospect that appeals to truck owners, Douglas says.

"You don't have the diesel emissions system to maintain, and cleaning the filters and replacement. When you tell [truck buyers] that, their eyes get huge," he says. "You've got their attention when you start talking about diesel emissions."

Here are a few questions to help you determine if your business is a good candidate for using a natural gas-fueled truck:

Do you have established fueling stations in your area?

The infrastructure of fast-fill natural gas fueling stations necessary for these trucks is in its infancy, but there are areas of the country where it's better established. Check around your shop location and the areas where you drive most to see if you'd have access to enough fuel stations to make the conversion practical. Keep in mind that if natural gas trucks grow in popularity, fueling stations should proliferate as well. So even if natural gas doesn't seem to be the best option for you today, it might make more sense down the road.

"You don't have the diesel emissions system to maintain, and cleaning the filters and replacement. When you tell [truck buyers] that, their eyes get huge. You've got their attention when you start talking about diesel emissions."

Andy Douglas

Do you put on enough miles to maximize fuel savings?

With diesel prices hovering around \$4 per gallon, you could expect to save about 25 percent or more on fuel costs going with natural gas. While 80 percent of the diesel and natural gas engine componentry is identical, the fuel storage and delivery systems in natural gas trucks drive the cost of the trucks up. Douglas was hesitant to give examples because every truck specification will be different, but you'll have to consider whether you'll be dollars ahead going with the more expensive new technology offset by lower fuel costs. Another thing to consider is whether you think the price of diesel fuel will continue to rise and if natural gas will continue to be a cheaper alternative.

Will your truck have enough room for the expanded tankage?

Fuel tankage takes up significantly more space on natural gas-powered rigs. According to Douglas, tanks for LNG engines take up twice the amount of space as diesel fuel tanks, and tanks for CNG engines take up four times



This High Plains Bioenergy rig is powered by a Kenworth T660 truck with Cummins Westport ISX12 G heavy-duty natural gas engine.

as much space as traditional diesel tanks. Like diesel trucks, these tanks can be mounted on the frame rail, but they can also be installed behind the cab. So there is some flexibility on installation depending on how you use your trucks.

Does your state offer incentives for conversion?

The federal government at one time offered attractive incentives for truck buyers to switch to natural gas, but that went away a few years ago, according to Douglas. But he says a number of states, including California, Oklahoma, Pennsylvania and Texas, continue to offer grants and rebates for upgrading to natural gas trucks. To search the incentives offered in each state, check out the U.S. Department of Energy website: www.afdc.energy.gov.

Are you more comfortable with the old reliable diesel?

Many truck buyers will want to stick with the technology they know best, and that's OK. Douglas says manufacturers continue to improve diesel technology to make the engines more efficient and reduce pollution. "Diesel is not going anywhere," he says. "But for certain segments of our industry and applications, natural gas may be an alternative that people will be considering."

Another option is hybrid technology, combining a diesel engine and electric motor to save fuel. This option makes sense for trucks working in a lot of stop-and-go traffic; for example, Coca-Cola uses 700 medium-duty delivery trucks using hybrid Kenworth engines. Some companies weigh the potential benefits of being early adopters to technology and make the jump.

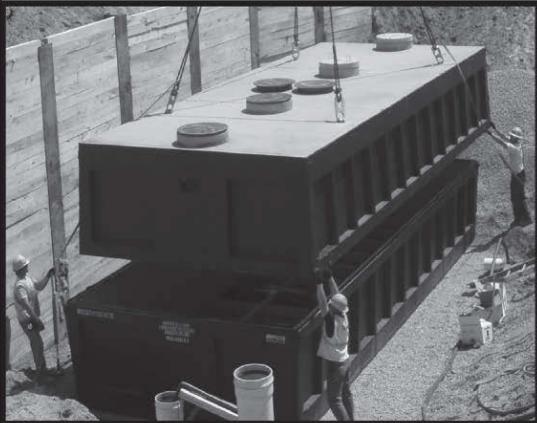
NATURAL GAS OUTLOOK

Douglas says the impact of natural gas on heavy-duty trucks is going to be profound.

"Natural gas today is such a huge game changer for North America," he says. "This resource, for the most part, is something that wasn't fully realized until the last few years. The magnitude is significant and the price associated with it is very good, too. It's a cheap and abundant fuel source that works well in heavy trucks." □

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System Repair/Drainfield Rejuvenation

By Craig Mandli

Products that repair or rejuvenate failing systems can save homeowners substantial cost and frustration. Included here are additives, aerobic treatment units, jetters and pressure washers/sprayers designed to help installers get the most out of a struggling system.

BIO/ENZYME ADDITIVES

Drainfield flow restorer

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. 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.



Wastewater disinfection tablets

Accu-Tab aerobic wastewater tablets from Axiall don't contain stearates, but instead are Hi-Sil silica, an erosion modifier that provides a steady source of available chlorine. They have a beveled edge and 2.5-inch diameter to reduce the impact of wicking, and are compatible with standard 2 5/8-inch aerobic wastewater feeders. They use an erosion modifier, Hi-Sil H-303 silica from PPG Industries instead of potentially hazardous aluminum stearate, to deliver equivalent dissolve rates and provide a steady source of available chlorine. They are available in convenient, easy-to-store 100-, 43.5- and 27.5-pound pails. They are NSF-60 compliant, have no foreign ingredients and a slow dissolve rate. 724/325-5959; www.accu-tab.com/wastewater.



Bioremediation restorative

AfterShock soil absorption restorative from Cape Cod Biochemical Co. restores drainage to clogged and sluggish drainfields and drainage structures. It also prevents backups and eliminates odors. It contains multi-strain bacillus spore-bearing bacteria as well as a bacteria-friendly, time-release oxygen source. It biologically digests solid material that normally clogs soil absorption areas. It accelerates the bacterial activity for an extended period, promoting unusually fast biological activity of the organisms. Additionally, it helps degrade the sulfides in the biomat to further promote drainage. The bacteria are naturally occurring, USDA-approved, laboratory-enhanced, primarily aerobic organisms. It is effective in residential and commercial drainfields,



cesspools and seepage pits, and is ideal for use in conjunction with high-pressure water jetting and soil fracturing equipment. Its consortium of bacteria and oxidizer can be applied at the same time, eliminating the need to keep the system exposed for repeated site visits. 800/343-8007; www.septiconline.com.

Grease-eliminating digester

Bio-GEM grease-eliminating microbe digester from Norweco is a blend of cultured bacteria, aggressive enzymes and natural growth accelerators developed to digest grease, fats and oils in wastewater treatment systems, lift stations, septic tanks, sand filters, drain lines and commercial grease traps. It works in aerobic or anaerobic conditions to quickly convert common grease, fats and oils into carbon dioxide and water. This organic digestion process is more effective and reliable than emulsifying grease, fats and oils, which simply sends the problem to downstream treatment processes. Regular use will eliminate odors, stabilize effluent quality, reduce system maintenance and minimize tank pumpout frequency. It is available in 1- or 5-gallon containers or 55-gallon drums. 800/667-9326; www.norweco.com.



Hardpan soil repair solution

Septic Drainer from RCS II repairs the soil in a septic drainfield damaged by hardpan soil issues. This hardpan soil layer causes aerobic bacteria to die off because of the restriction of airflow in the soil. Only anaerobic bacteria can survive without air. Anaerobic bacteria produce a waste product called biomat, which compounds the drainfield failure. An application of 4 gallons of the product directly in the field lines after pumping and cleaning the lines is required. The application amount of 4 gallons is based on an average size home consisting of a 1,000-gallon system or 180 to 250 feet of drainlines. 518/812-0000; www.septicdrainer.com.



Sewage treatment tablets

Mighty Mike U & F-BOOST! sewage treatment tablets from Scienco/FAST, a division of Bio-Microbics, optimize tank capacity and reduce pumpout frequency. They are formulated with over 25 billion active Class 1 organisms per gram, which make them ideal for enhancing natural biological activity in holding



tanks and small conventional septic systems. The fast-acting, water-soluble tablet immediately activates once introduced into the waste stream, and feeds on the surrounding waste to provide a healthy population to rapidly break down organic waste. No premixing, premeasuring or presoaking is necessary, and the tablets are free of Salmonella, Shigella, and E. Coli strands. They are ideal in the event of toxic shock, no loading, overloading, restart or intermittent use. 913/422-0707; www.sciencofast.com.

ATUS

Moving bed biological reactor

PuraMax packaged product from Anua is a moving bed biological reactor (MBBR) and is suitable for high-strength waste pretreatment.



Following a primary tank, biological treatment is provided by an attached-growth process. Recycled plastic biocarriers, suspended in the tank, provide large surface area for bacteria to attach and grow. An aeration grid supplies oxygen to the biofilm, along with the mixing energy required to keep the biocarriers suspended throughout the tank. Biosolids are naturally sloughed off the biocarriers, which along with the treated effluent, flow by gravity to a clarifier for solids separation. It is compatible with most off-the-shelf tanks, and is suitable for high-strength applications such as food service establishments. It operates effectively under shock loading, underloading and intermittent flow. 336/547-9338; www.anua-us.com.

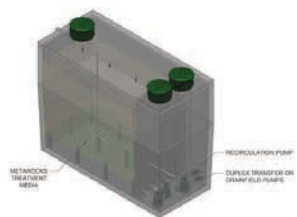
Fixed integrated treatment system

MicroFAST wastewater treatment systems from Bio-Microbics use Fixed Integrated Treatment Technology (FITT) to produce clear, odorless effluent with nutrient-reduction that is suitable for subsurface irrigation or surface discharge with additional disinfection (where regulations permit). The attached-growth process has been engineered to fit most treatment capacities, between 500 to more than 100,000 gpd for residential and commercial applications. Systems are LEED eligible with the U.S. Green Building Council GreenBuild program, and are ideal for remote locations or in temporary situations, such as construction sites, or for communities, subdivisions, commercial flows and residential clusters. 800/753-3278; www.biomicrobics.com.



Versatile treatment system

The 620C from Eliminite is an advanced treatment technology ideal for high-strength waste applications like RV parks, ski resorts, golf resorts, microbreweries, taverns, churches, schools, restaurants, convenience stores, highway rest areas and more. It is especially useful for remote oil and gas development projects where wastewater from man camps, hydraulic fracturing and residential development in nonmunicipal locations needs to be treated for reuse or safe disposal. It is also designed to serve residential community developments where a centralized community treatment solution is preferable. The system is engineered to satisfy stringent nitrogen removal requirements, and is proven to function optimally under adverse cold-weather, high-altitude conditions, requiring little maintenance and virtually no active operation effort. Systems can be fit to unique site requirements. 888/406-2289; www.eliminite.com.



Sand filter

The GSF Geotextile Sand Filter from Eljen Corporation provides advanced treatment and dispersal in the same footprint. The internal design provides sufficient void space to allow for aerobic conditions, while the Bio-Matt fabric promotes biological growth on its multiple surfaces. The fabric enhances system performance and keeps the biological growth away from native soil, preserving the soil's long-term acceptance rate. The unit's lightweight and easy-to-handle modules allow for quick and convenient delivery and installation. 800/444-1359; www.eljen.com.



Compact treatment system

The Envirocycle G7-Series 1200 GPD install-anywhere treatment system from Envirocycle USA exceeds ANSI-NSF 40/245/350 performance requirements with no extra trash or dose tanks needed. It requires no preventive maintenance and is safe for drip tube dispersal. Lightweight and compact, it can be airlifted to remote installation sites. Full remote monitoring and control is standard. Up to 3,600 gpd can be treated in a footprint of less than 98 square feet. EnviroSentry remote monitoring and control protects the environment, keeps service expense to a minimum and allows for efficient, low-cost regulatory compliance. 530/888-6480; <http://cole.thesepticexperts.com>.



Septic system remediator

The Aquaworx Remediator from Infiltrator Systems is a simple, easy-to-install septic system remediation technology that rejuvenates most failing septic systems with minimal landscape disruption. Inserted into an existing septic tank of a malfunctioning system, it reverses the biological clogging process causing the failure in as little as two weeks, and requires nominal operation and maintenance cost. Under normal operation, a septic system builds a biological layer (biomat) that over time can become overly restrictive, clogging soil pores and causing a system malfunction. The technology introduces oxygen into a bacterial growth media column, allowing it to thrive and consume organic matter. These bacteria combine with the oxygen-rich effluent in the tank and move to the drainfield, reducing the clogging layer and associated odors and wet areas in the yard. 800/221-4436; www.infiltratorsystems.com.



Non-submerged attached growth system

Utilizing an enhanced, non-submerged attached growth system, the M400, M550, and M750 treatment process from SeptiTech – a subsidiary of Bio-Microbics, comes standard in a two-stage HDPE plastic or reinforced concrete septic tanks. ETV-EPA verified and NSF/ANSI Standard 40/245 certified, the nitrogen removal technology achieves top level performance in total nitrogen reduction, while maintaining effluent Nitrate-N levels consistently below 10 mg/L and achieving over 98 percent BOD and TSS removal. They are designed to treat wastewater with minimal operator oversight while delivering high-quality treatment during peak, low or intermittent flows. Commercial sizes are also available and with an optional touch-screen operator interface terminal. This programmable logic controller can manage and monitor all system functions, and report back automatically if there is an alarm condition. 800/318-7967; www.septitech.com.



(continued)

JETTING

Jetter/pressure washer combo unit

The Performance line of trailer-mounted jetter/pressure washer combo units from **Amazing Machinery** features rugged, heavy-duty construction. They are designed for easy trailing, and the large water supply tank allows technicians to jet anywhere. A rear-mounted 12-volt electric hose reel and rear stack-mounted manual pressure washer and garden hose reel provide ample hose space. They come standard with 300 feet of jetter hose, two nozzles and a complete set of washdown accessories. The triplex ceramic plunger pump provides pressures up to 4,000 psi and flow rates up to 15 gpm. 800/504-7435; www.amazingmachinery.com.



Versatile water jetter

The M30 MaxBlaster jetter from **MyTana Mfg. Company** is a portable jetter delivering 4.5 gpm at 3,000 psi, and is powered by a 390 cc Honda engine. It is mounted on a maneuverable cart with the motor, pump, reel and hose. The hose reel is removable, and the unit is also equipped with a reel stand and 50-foot jumper hose, so it can be operated indoors while the gas engine remains outside. It comes with 200 feet of 3/8-inch thermoplastic jetter hose, 75 feet of 1/8-inch hose for sink or drainfield lines, and a set of three nozzles for each hose – penetrating, cornering and blind thrust. 800/328-8170; www.mytana.com.



Portable water jetter

The KJ-3100 water jetter from **RIDGID** clears blockages in 2- to 10-inch drainlines with 3,000 psi working pressure and 5.5 gpm flow. It is powered by a 16 hp gasoline engine, and is mounted on a heavy-duty, two-wheeled cart that fits through standard-sized doors and negotiates tight turns. The hose reel quickly detaches from the cart for easy loading into service vehicles, and permits easy access to hard-to-reach drains. The 3/8-inch jetter hose is 200 feet long. The unit includes pulse action, which allows the cleaning head and hose to maneuver through traps and bends. The high-pressure pump is a triplex design with a corrosion-resistant brass head. The unit comes with



a propulsion nozzle that helps carry the hose quickly through pipes to obstructions, and a penetrating nozzle to cut through ice and sludge. 800/769-7743; www.ridgid.com.

Hybrid hydrojetter

The Model 727 cart-mounted hybrid hydrojetter from **Spartan Tool** runs on either gasoline or propane and the fuel source can be easily switched by flipping a lever, allowing it to be operated indoors and outdoors without any loss of pressure or flow. It produces 3,000 psi, which provides pressure to scour any line up to 6 inches in diameter, while 4 gpm of flow moves debris downstream. Pulse technology reduces line friction, allowing it to maneuver the corners of drainfields, while 200 feet of 9/16-inch hose provides enough length to get through most fields in one shot. Standard equipment includes 75 feet of 3/16-inch trap hose for tight bends, seven nozzles for various jetting situations, a washdown wand with adjustable nozzle, jetting gloves, easy winterization for cold climates and an electric start motor. 800/435-3866; www.spartantool.com.



Professional-grade jetting system

Professional-grade jetter systems from **Water Cannon** feature Honda GX 390 engines, flow rates of either 4 or 4.8 gpm, pressure of either 3,200 or 4,200 psi, and either a 200- or 300-foot jetter hose. They have stable tilt-back style portable frames with roll cages, plus a pulsation valve for instant pulsation on demand to quickly loosen and flush blockages. They also come with a ball valve, high-capacity Hosetract hose reel and four nozzles. 800/333-9274; www.watercannon.com.



PRESSURE WASHERS/SPRAYERS

Direct-drive cold pressure washer

Steam Jenny direct-drive cold pressure washers from **Jenny Products** are powered by 9 or 13 hp Honda GX Series engines, and feature a triplex ceramic plunger pump. They are available with pressure ratings between 3,000 and 4,000 psi, and flow rates vary between 3 and 4 gpm. A customizable option allows customers to choose a unit with pressure and flow ratings based on specific needs. Standard features include thermal pump protection, an unloader valve and a high-pressure relief valve. To protect the engine, the unit will automatically shut down if low oil levels are detected. The chassis is made with powder-coated, seven-gauge steel. Included is a professional-grade insulated trigger gun with safety lock, quick-connect nozzles with nozzle control, high capacity in-line water strainer, gun/wand holder, hose reel mounting adapter and dual rubber isolators. They feature ball bearing wheels on a solid axle. The flat-free pneumatic tires are ideal for moving over any terrain. 814/445-3400; www.steamjenny.com. □



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System Repair/Drainfield Rejuvenation

By Craig Mandli

Gravel filter and drip irrigation package keeps owner in home

Problem: A homeowner located in Noblesville, Ind., was dealing with a failed lateral field on a typical septic gravity system. Surfacing sewage was becoming a health concern for the resident and his neighbors. The Hamilton County Health Department determined a secondary treatment system with a new location for the effluent disposal area was needed.

Solution: A 450-gpd recirculating gravel filter combined with a timed-dose drip irrigation disposal package from **Clarus Environmental** was installed by a local contractor. The recirculating gravel filter has the treatment capability of less than 10 mg/L BOD5 and less than 10 mg/L TSS. Utilizing turbine effluent pumps made it possible to redirect the treated effluent to the drip irrigation disposal area. The total package included a control panel, effluent pumps, effluent filter, gravel filter with components and drip irrigation.



Result: The Hamilton County Health Department approved the secondary treatment system and the resident maintained occupancy. 800/928-7867; www.clarusenvironmental.com.

Biofilter peat system solves septic clogging issue

Problem: An existing drainfield on a single residential property located in Bucks County, Pa., was malfunctioning to the ground. Biomass had clogged the septic system and wastewater backed up into the soil over the drainfield and surrounding area. Lot topography, restrictive site soils, a high water table and shallow limiting zone did not allow for a conventional or alternate septic system to be installed. The only available area was slightly off contour and next to an existing swale.

Solution: Rob Bowie, a soil scientist from Bux-Mont Home Inspection Services in Doylestown, tested the area and permitted an experimental septic system as the only suitable solution. The septic system selected was the **Ecoflo Biofilter** peat system from **Premier Tech Aqua** for effluent infiltration with a DiUV self-cleaning ultraviolet radiation unit for disinfection light. The station produces a quality effluent of less than 10 BOD mg/L, 10 TSS mg/L and 200 cfu/100 mL fecal coliform, which is then pumped into a conventional sand mound for final treatment and dissipation.

Result: The Pennsylvania Department of Environmental Protection and the Bucks County Health Department approved the wastewater treatment solution, which eliminated a health concern and ongoing surface malfunction. Installation work was performed by Mullenax Excavating in Ottsville, Pa. 800/632-6356; www.premiertechaqua.com.

ATU provides solution for home with failed drainfield

Problem: Homeowners outside Chapel Hill, N.C., had a conventional septic system with a drainfield dispersing into poor soils. When the drainfield failed, the lot was too small to put in a new one, and sewer service wasn't available. Facing the possible loss of their home, the homeowners needed a solution to meet both their space constraints and permit limits of less than 30 mg/L BOD5/TSS, as well as less than 200 cfu/100 mL fecal coliform.

Solution: Engineer Kevin Davidson suggested installing an **AdvanTex AX20-RTUV** advanced wastewater treatment system from **Orenco Systems**. Featuring UV disinfection, it eliminates the need for a discharge tank and separate UV basin, and produces effluent that meets the state's surface discharge standards, making the drainfield unnecessary. The North Carolina Division of Water Quality approved the repair and the system was installed as designed, with disinfected effluent discharging to a ditch.



Result: Operation is well within permit limits, with effluent quality of 5.8 mg/L BOD5, 4.1 mg/L TSS, and 72 cfu/100 mL fecal coliform. This was the first North Carolina installation of this particular system for surface discharge. 800/348-9843; www.orenco.com.

Bush camps require transportable systems

Problem: Northern Ontario, Canada, is booming with remote mining exploration and forestry “fly-camps,” many with running water, but most with only rock and muskeg swamp and no free-draining soil. Importing sand or soil to treat sewage is expensive, often impossible, and when the camp moves on, this contaminated component was being left behind. The Ontario Ministry of Environment stipulated camps needed a lightweight, reuseable system with a permanent filtration medium that could be moved from camp to camp by light truck or helicopter.

Solution: After discussions with Canadian Shield Consultants, the Ministry of Environment approved a new design by Waterloo Biofilter Systems and fabricated by D & L Products that met the removable/transportable criteria and minimized pollution in the wetlands. For surface discharge, 10 mg/L CBOD and TSS is required, clear enough to be disinfected by ultraviolet radiation. Using an absorbent foam medium, a biofilter tower is made by stacking individual flat cylindrical segments in a series, the height depending on the flow.

Result: The segments are easily transportable and assembled, even rolled along by hand. They can be installed with the septic tank inside a transport trailer. When used outside, they are disassembled and reused in another stack made at the next site. The absorbent foam filtration medium is contained within the segments and nothing is left on site except treated effluent. The Ministry of Environment reports no issues with the systems in use. 519/856-0757; www.waterloo-biofilter.com.



New onsite system keeps septage leeching in check

Problem: A 300-gallon steel septic tank located at a private, single-family residence in Prospect, Conn., collapsed unexpectedly in the winter of 2012. Not only was this a serious safety issue, but also a major health issue. Upon further investigation, it was found that the septic tank was not up to code in terms of its distance from the well, and septage was actually leeching into the family’s yard instead of the drainage fields.

Solution: A contractor from Green Construction Management LLC, worked with the Chesprocott Health District to design and install a new, up-to-code septic system. A large crane was brought in to move the tank to the required distance of 75 feet from the well. In addition CULTEC’s plastic Contactor(r) 100 chambers were installed in place of concrete galleries or a conventional pipe and stone system. These chambers maximize contact area by using fully open bottoms and perforated sidewalls.

Result: The new septic system meets all of the codes set forth by the Chesprocott Health District and works efficiently and effectively. 800/428-5832; www.cultec.com. □



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Felling compact loading trailer

The compact loader trailer line from Felling Trailers is designed to haul a mini skid-steer and attachments. The trailer has steel pan-style sides with multiple D-rings. Models FT-6 CL, FT-10 CL and FT-12 CL have a gross vehicle weight rating of 7,000 to 14,700 pounds. Features include full spring-assist mesh ramp, attachment mounts, removable trencher/auger tray, auger bit holders, land leveler or bucket rest, and pallet fork holders with hold-on chains. 800/245-2809; www.felling.com.



Trimble wireless remote laser display

The Spectra Precision RD20 wireless in-cab remote display from Trimble works with LR laser receivers to provide grade information to help operators improve productivity and safety. The remote display can be positioned without cables for optimal viewing from the cab. Red, blue or green LED lights signal high, low or on-grade with an audible signal that enables the operator to focus on the job. 800/874-6253; www.trimble.com/mgis.



Ditch Witch ride-on trencher

The RT30 ride-on dedicated trencher from Ditch Witch has a 24.8 hp Kubota diesel engine and can dig a trench up to 8 inches wide and 42 inches deep. The 42-inch boom provides a 36-inch cover depth. 800/654-6481; www.ditchwitch.com.



Pagoda ornamental septic vents

Ornamental septic vents from Pagoda Vent Co. are made from recycled materials and manufactured using non-VOC paints and zero-emission coating processes. Vents are available in moss, bark and granite and a variety of heights. A carbon filter cartridge is optional. 888/864-1468; www.pagodavent.com.

Rugby Eliminator LP dump bodies

Redesigned steel, aluminum and stainless steel Eliminator LP dump bodies from Rugby Mfg. are available in 9- and 11-foot lengths. A 12-foot model is available in steel and aluminum. The steel model features a seamless, one-piece, 10-gauge floor. All models are available with fold-down sides and EZ-LATCH upper tailgate mechanism. 701/776-5722; www.rugbymfg.com.



SJE-Rhombus industrial-grade control panel

The 32S control panel from SJE-Rhombus is designed to control two three-phase pumps in industrial and commercial water and sewage systems. One panel handles three voltages and a variety of pump motor amperage requirements by field installing overload modules, up to 32 amps each. Features include padlockable, stainless steel NEMA 4X enclosure, single-point incoming connection and IEC hp rated motor starter (10 hp max at 208, 240 and 480 volts). 888/342-5753; www.sjerrhombus.com.



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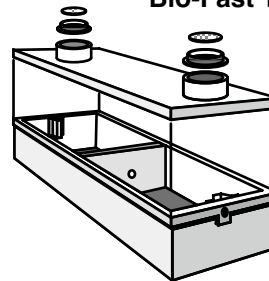
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AquaKlear selects California distributor

AquaKlear, manufacturer and supplier of residential and commercial wastewater treatment systems, selected AquaKlear of California to market and distribute its fiberglass and concrete lines throughout Northern California.

Franklin Electric rebrands Cerus Industrial

Franklin Electric rebranded its latest acquisition, Cerus Industrial, as Franklin Control Systems. Based in Hillsboro, Ore., the company will focus on the design and production of electronic drives and controls for water pumping and industrial systems. Products made by Franklin Control Systems will carry either the Franklin Electric or Franklin Control Systems brand.

Infiltrator Systems launches product website

Infiltrator Systems launched a new website, www.infiltratorsystems.com, featuring an easy-to-navigate mobile platform, installation videos and product specifications.



Atlantic Ultraviolet makes 50th anniversary

Founded in 1963 by Hilary Boehme and Tom Dituro, Atlantic Ultraviolet Corp. of Hauppauge, N.Y., celebrates 50 years of developing and manufacturing ultraviolet residential and commercial disinfection systems.

Bio-Microbics acquires SeptiTech

Bio-Microbics acquired SeptiTech, manufacturer of PLC controlled onsite wastewater treatment systems for residential and commercial applications.

Kobelco names VP, managers, analysts

Kobelco Construction Machinery named Ron Hargrave vice president of marketing and sales, Eric Hoffman national parts manager and George Lumpkins product marketing manager. The company also named Dennis Hines technical parts assistant, Javier Marin parts pricing analyst/inventory control, Jordan Lumpkins technical publication/IT specialist and Karla Rodriguez data entry specialist. □

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MINNESOTA

MPCA videos help onsite training

The Minnesota Pollution Control Agency requires county, city and township onsite program administrators to receive basic training from agency staff. The training has progressed from workshops to a webcast to 12 online videos of less than 15 minutes each. "Online training is best served in small doses," says Gretchen Sabel, subsurface sewage treatment system coordinator. "This format makes it easier to find and view specific topics." Each video segment includes a summary and quick quiz to help viewers understand and remember key issues. The videos are at www.pca.state.mn.us.

MISSOURI

Smallflows group names new board members

The Missouri Smallflows Organization announced that Kerry Clark of New Bloomfield and Tom Dewitt of Rogersville replaced board members Nancy Leighton, president, and Tracy Rank. Clark is working toward her Ph.D. in soil science; Dewitt is a professional soil scientist. The board elected Michael Bowers as president.

PENNSYLVANIA

Association supports land application practices

The Pennsylvania Septage Management Association joined 10 other organizations, including the Mid-Atlantic Biosolids Association and the Pennsylvania Water Environment Association, in filing a friend-of-the-court brief supporting a decision that land application of biosolids is a normal farming practice protected by the state's Right-to-Farm Act. The issue is whether private lawsuits can be brought against those who apply biosolids despite being compliant with state and federal requirements and protected by the law.

The association also submitted a letter opposing a petition from the Delaware River Riverkeepers to the state Environmental Quality Board. The letter suggested that the petition, if granted, would hamper economic development in the middle and upper parts of the Delaware River and would pose difficulties in the installation of onsite systems, affect biosolids applications and increase costs to municipal wastewater treatment plants.

CALIFORNIA

November conference planned

The California Onsite Wastewater Association Integrated Water Technology Conference and Exhibition is a collaborative effort with the American Rainwater Catchment Systems Association, Graywater Alliance and stormwater interests. Held at the LEJ Eco Center in San Francisco on Nov. 12-13, the event recognizes all onsite water resources and the benefits and effects they have on treating wastewater. Panels of industry experts and a regulatory representative will cover design, installation, operation and maintenance, and a concluding discussion on commonalities. 530/513-6658; www.cowa.org.

CALENDAR OF EVENTS

Oct. 6-8

Virginia Onsite Wastewater Recycling Association Annual Conference, Sheraton Roanoke Hotel and Conference Center, Roanoke. 540/465-9623; www.vowra.org.

Oct. 8-10

Onsite Water Protection Conference, Jane S. McKimmon Conference & Training Center, Raleigh, N.C. Contact Joni Tanner at 919/513-1678, soils_training@ncsu.edu or visit www.cvent.com/events/29th-annual-onsite-water-protection-conference/event-summary-733a0e99dfd84a8eb17f28e297bc425d.aspx.

Oct. 15-16

Delaware On-Site Wastewater Recycling Association, Harrington Raceway and Casino/Delaware State Fair grounds, Harrington. Contact Hollis Warren at 302/284-9130, Dan String at 302/854-9450, or www.dowra.org.

Oct. 31-Nov. 2

Ontario Association of Sewage Industry Services Conference and Expo, Waterloo Inn Conference Hotel, Waterloo. 877/202-0082; <http://oasisontario.on.ca>.

Nov. 12-13

California Onsite Wastewater Association Conference, LEJ Eco Center, San Francisco. 530/513-6658; www.cowa.org.

Nov. 12-13

Trenchless Technology Road Show, Holiday Inn, Boxborough, Mass. <http://trenchlessroadshows.com>.

Nov. 17-20

National Onsite Wastewater Recycling Association Technical & Education Conference and Trade Show, Millennium Maxwell House Hotel, Nashville, Tenn. 800/966-2942; www.nowra.org.

TRAINING AND EDUCATION

Alabama

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

- Nov. 6-8 – Advanced Installer II
- Dec. 5-6 – Continuing Education

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 <http://aowatc.uwa.edu>.

California

The California Onsite Wastewater Association is offering these classes:

- Nov. 12-13 – Integrated Water Technologies, Sacramento
- Dec. 4-5 – National Association of Wastewater Technicians

Operations and Maintenance Level 2, Sonora
Call Kit Rosefield at 530/513-6658 or visit www.cowa.org.

Delaware

The Delaware Technical Community College-Owens Campus has these courses:

- Online: Pumps, Motors and Controls – enrollment until Dec. 13
 - Nov. 7 – Innovative and Alternative Onsite Systems
 - Nov. 7 – DOT Regulations Review For Pumpers
 - Nov. 8 – Pumps: Installation, Maintenance and Repair
 - Nov. 13 – Risers, Baffles and Filters: Installation and Repair
 - Nov. 13 – Vacuum Truck Basics
 - Nov. 13 – Operation and Maintenance of Innovative and Alternative Systems
 - Nov. 14 – Aggregate-Free Alternatives for Onsite Disposal Systems
 - Nov. 15 – Pump Hydraulics
 - Nov. 20 – Alternative Treatment and Disposal Options for Wastewater Facilities
 - Nov. 22 – Onsite Control Systems
 - Nov. 22 – Submersible Pumps
 - Nov. 26 – Soils-Based Approach to Siting Wastewater Disposal
 - Nov. 27 – Replacement of Onsite Systems
 - Dec. 4 – Onsite 101
 - Dec. 5 – Biological Nutrient Removal Process Control
 - Dec. 12 – Soils
 - Dec. 18 – Tracking Water Movement Through Doppler and Transit Time Flowmeters
- Call Hilary Valentine at 302/259-6384.

Georgia

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

- Nov. 2 – Fulton
- Nov. 16 – Brunswick

Contact the Continuing Education Center at 770/229-3477, conteduc@uga.edu or www.ugaurbanag.com.

Iowa

The Iowa Onsite Waste Water Association has an Installation Overview with CIOWTS test Nov. 22-23 at Knoxville. Contact Alice Vinsand at 515/225-1051, execdir@iowwa.com or visit www.iowwa.com.

Minnesota

The University of Minnesota Onsite Sewage Treatment Program has these classes:

- Nov. 20-21 – General Continuing Education, St. Cloud
 - Dec. 9-11 – Introduction to Onsite Systems, Mankato
 - Dec. 12-13 – Installing Onsite Systems, Mankato
 - Dec. 16-17 – General Continuing Education, Brainerd
 - Dec. 18-19 – Installer Continuing Education, Mankato
 - Dec. 19 – Pipelayer Certification, Mankato
- Call Nick Haig at 800/322-8642 or visit <http://septic.umn.edu>.

Missouri

The Missouri Smallflows Organization has these CEU courses:

- Nov. 5-6 – Operations & Maintenance, Liberty
 - Nov. 25-26 – Operations & Maintenance, Springfield
 - Dec. 11 – Drip Irrigation, Camdenton
 - Dec. 12 – Pumps, Panels and Electrical, Camdenton
- Call Tammy Trantham at 417/739-4100 or visit www.mosmallflows.org.

New England

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

- Nov. 5 – AutoCALCS - Automated Support Materials for Pump Timers, Tanks, Chambers, Bottomless Sand Filter Sizing and Buoyancy Calculations
 - Nov. 14 – Identifying and Managing High Strength Wastewater
 - Nov. 21 – Rhode Island Regulatory Setbacks and Buffers
 - Dec. 5 – Nitrogen in the Environment and Onsite Wastewater Systems
 - Dec. 12 – Designing Nitrogen Removal Technologies
- Call 401/874-5950 or visit www.uri.edu/ce/wq.

North Carolina

The North Carolina Septic Tank Association has these classes:

- Nov. 11 – Installer/Inspector, Greensboro
 - Nov. 12 – Pumper and Land Application, Greensboro
- Call 336/416-3564 or visit www.ncsta.net.

The North Carolina Pumper Group and Portable Toilet Group have an educational seminar on septage management and land application Dec. 14 in Raleigh. Call Joe McClees at 252/249-1097 or visit www.ncpumpergroup.org or www.ncportabletoiletgroup.org.

Oregon

The Chemeketa Community College in Salem has a Maintenance Operator class Nov. 4-5. Call 503/399-5181 or visit www.chemeketa.edu/busprofession/ccbi/customizedtraining/deq/classes.html. □



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