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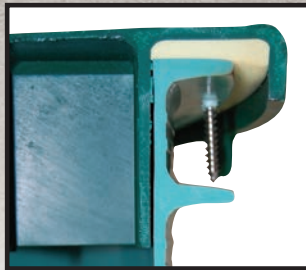
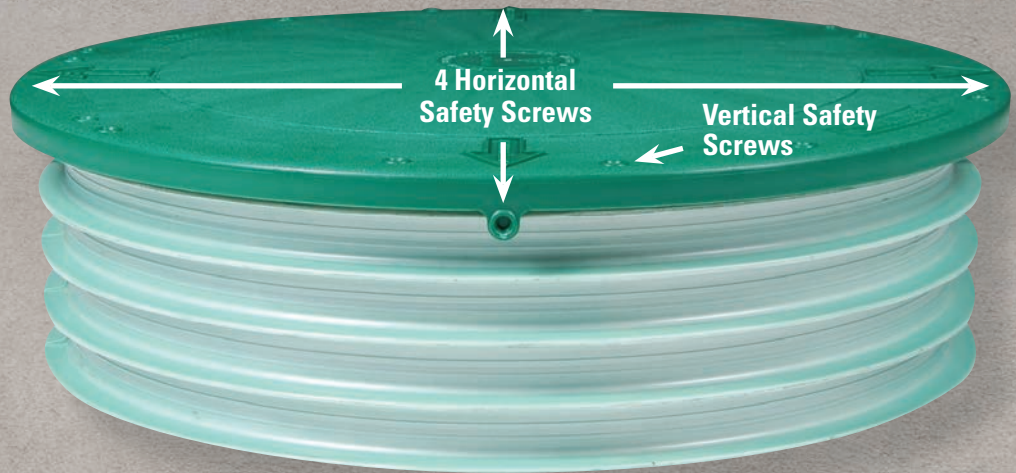
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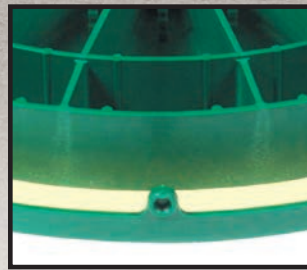
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By Ted J. Rulseh

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Van Delden Wastewater Systems has been serving the folks of Boerne, Texas, for 83 years. Fourth-generation owners and siblings Courtney and Chad Van Delden are shown on the job with a CASE backhoe and TUF-TITE risers in the background. (Photo by Mark Greenberg)

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### Enjoy this issue!

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



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

# Top 10 OSHA Violations Revealed

Review the citation list, and use it as a catalyst to improve work site safety for your valued crew

It's the height of the construction season, and onsite installers are likely juggling the greatest number of projects right about now. Often caught between a builder's schedule and customers who want the job done yesterday, installers can face multiple unreal deadlines in the late summer. You're hustling to meet everyone's timelines while dealing with distraction and exhaustion at the same time.

What does that mean? Mistakes can be made. And we're not just talking about an error in the slope of a drainfield pipe or failure to order enough bedding stone for a work site. God forbid you face a safety violation that results in the injury of one of your valued teammates. Working in haste, corners can be cut or your crew might forget one safety step that could endanger everyone moving earth and laying pipe that day.

So it's a good time to review the most common safety snafus that companies face in construction-related industries. And it's easy to do that because the Occupational Safety and Health Administration reports the Top 10 most frequently cited workplace safety violations every year. The federal agency has released the 2019 numbers, and most of the categories could touch on the onsite industry.

Here's the 2019 list with the number of violations and the percentage change in violation totals compared to 2018:

1. Fall Protection, 6,010 citations, down 17%
2. Hazard Communication, 3,671 citations, down 19%
3. Scaffolds, 2,813 citations, down 16%
4. Lockout/Tagout, 2,606 violations, down 12%
5. Respiratory Protection, 2,450 citations, down 46%
6. Ladders, 2,345 citations, down 17%
7. Powered Industrial Trucks, 2,093 citations, down 12%
8. Fall Protection – Training Requirements, 1,773 citations, down 11%
9. Machine Guarding, 1,743 citations, down 12%
10. Eye and Face Protection, 1,411 citations, down 8%

## WE HAVE WORK TO DO

Lorraine Martin, president and CEO of the National Safety Council, had this to say when the new Top 10 list was announced: "Far too many preventable injuries and deaths occur on the job. The OSHA Top 10 list is a helpful guide for understanding just how adept America's businesses are in complying with



▲ These workers are wearing proper reflective vests and hard hats while moving components during an installation. (file photo)

Working in haste, corners can be cut or your crew might forget one safety step that could endanger everyone moving earth and laying pipe that day. ... **It's a good time to review the most common safety snafus that companies face in construction-related industries.**

the basic rules of workplace safety. This list should serve as a challenge for us to do better as a nation and expect more from employers. It should serve as a catalyst for individual employees to recommit to safety."



◀◀ Frequent work site safety reviews with employees will help prevent injuries. (file photo)

▼ Tripods are required on many jobs where workers are lowered into a tank for maintenance or inspection. (file photo)

Martin's advice is important and should be heeded every day when workers and installer team leaders head out in the field. I have similar thoughts every time — it's far too often, actually — that I see a photo submitted for an *Onsite Installer* feature that shows an obvious safety violation. It might be a worker without a hard hat or high-visibility vest shoveling under the bucket of an excavator. Sometimes it's a worker standing deep in a trench with no shoring equipment or nearby ladder for exit. Or it's a septic technician or inspector working around wastewater without gloves or eye protection.

## INTERPRETING THE LIST

When you examine the OSHA list, obvious trouble spots emerge for the installer community. Let's look at a few areas where the general workforce — and wastewater professionals — could make some improvement:

- **Fall protection.** Adding railings on elevated platforms comes to mind when you think of fall protection. But installers face other falling hazards, such as working on and around tanks being placed in excavations or on uneven terrain with operating machinery. Refresher training and effective company-provided personal protective equipment can go a long way to preventing these mishaps.

- **Lockout/tagout.** This speaks to the control of hazardous energy — machinery that produces dangerous electrical, mechanical, hydraulic, pneumatic and other energy. It could be your power tools, your earth-moving equipment, electrical panel work — everyday tasks that, if not properly safeguarded, could lead to injury or death. Lockout means securing with locks all tools or equipment that can pose a hazard. Tagout means tagging equipment that cannot be locked with a prominent warning device that must be removed before equipment is operable.

- **Machine guarding.** Have you inspected your machinery lately to ensure it will be operated safely? Workers have been known to remove safety guards that seem to make work inconvenient or slow down operations. But it is the company's responsibility to use all appropriate factory-installed safety equipment on machinery or face potential fines when an OSHA inspector visits a work site.

- **Eye and face protection.** Aside from proper shoring of excavations, the lack of PPE — including safety glasses, hard hats and gloves — represents the most frequent OSHA violations I see at work sites and in photos that come to the magazine. Think of how crucial and fragile your



eyesight is. And how would you be able to function without the use of your hands? Be sure to have your crew geared up the right way to protect their bodies ... and their livelihood.

## SOBERING STATISTICS

At first glance, the 2019 decline in citations for each category on the Top 10 list looks like good news. But enforcement efforts are likely lagging, too. OSHA total workplace inspections declined from 39,228 in 2013 to 32,408 in 2018. Many news outlets have reported a decline in the number of OSHA inspectors enforcing safety laws in recent years.

Even if you take OSHA's statistics into account, it seems certain that violations are commonly missed in the onsite industry and across the construction industry in general. The agency says it has 2,100 inspectors to track the safety of 130 million workers on 8 million work sites across the country, meaning there is one compliance officer for every 59,000 workers. In 2018, OSHA reported that 5,250 workers died on the job, which is 3.5 per 100,000 workers, or an average of more than 100 deaths per week, or 14 per day.

Certainly any number of workplace fatalities is too many. And while OSHA clearly has a positive impact on safety compliance across the construction industry, we can't rely on those inspectors alone to protect our onsite workforce. It's up to everyone in the onsite industry to promote safety every day. □

## Drop Us a Line

Have a comment about an article you've seen in *Onsite Installer*? An experience from a job that you'd like to share? *Onsite Installer* would love to hear from you. Email comments and photos to [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com)



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### SEPTIC CARE

#### No Food Flushing

Some may think because many homes have a garbage disposal it is OK to just use a toilet to get rid of food waste. And stay-at-home orders have increased this bad habit. Remind your customers that there are several reasons why it is not wise to flush food down the toilet. This article breaks down the talking points. [onsiteinstaller.com/featured](https://onsiteinstaller.com/featured)

### Overheard Online

“It’s ironic, but lack of communication ranks among the top killers of friendship-driven businesses. Don’t assume your partner will always feel the same way you do on key business matters.”

– *Can Friendships Survive Business Partnerships?*

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### NEW NORMAL

#### Keep Employees Safe

As we enter the next leg of the COVID-19 pandemic, many business owners are beginning to wrestle with a crucial question: How do you resume some semblance of normal operation while also keeping your employees safe? It’s important to think about steps you can take to protect these employees, both in the near future and in the long run. Here are a few suggested safety guidelines to consider.

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### TESTING THE SITE

#### Sizing for Soil Treatment

Testing to predict how water will move through the soil with a morphology or percolation test helps determine a soil treatment area’s size. Both methods, if performed properly, can predict how water will move through the soil. A summary of each, along with applications, is discussed in this online article.

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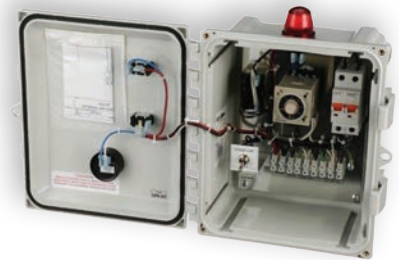
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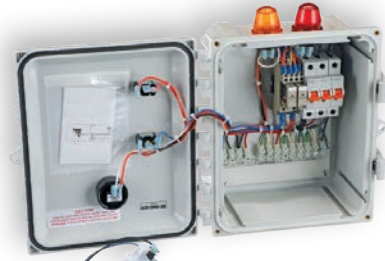
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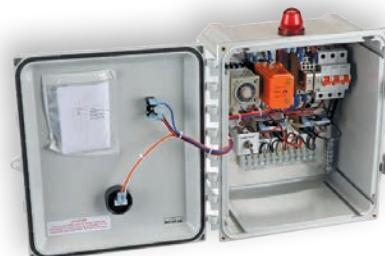
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# TECH SAVVY IN TEXAS

Van Delden Wastewater Systems embraces technology to streamline recordkeeping, boost efficiency and sharpen marketing

By Ted J. Rulseh

**A** lot has changed in the past 10 years for Van Delden Wastewater Systems.

Chad Van Delden and his sister Courtney Van Delden have taken ownership as their parents, Garrett and Pam Van Delden, retired. Yellow Pages have given way to diverse online marketing. New service management software has integrated the essential business functions. The workforce has grown, and onsite installations are now booked three to six months out as the company contracts with builders to serve entire new subdivisions.

What hasn't changed at all is Van Deldens' dedication to comprehensive onsite service, quality work and customer satisfaction.

The company, first profiled in *Onsite Installer* in May 2010, now has 22 team members, plus Garrett and Pam, who still help in their retirement years. Based in Boerne (pronounced "Bernie"), Texas, about 30 miles northwest of San Antonio, the fourth-generation business includes thriving installation, septic system pumping and aerobic system maintenance divisions.

▲ Ted Talavara operates a CASE backhoe during the installation of a residential septic system. (Photos by Mark Greenberg)

➤ Michael Foley operates a Ditch Witch trencher during a residential septic system installation.



## LONG HISTORY

The company's roots go back 83 years to Chad and Courtney's great-grandfather, Frank Van Delden. He was succeeded by son Gary, whose son Garrett came on board in 1977. Twenty years later, Garrett and Pam bought the business, then called Van Delden Service Co. Courtney joined the firm in 2003 and Chad in 2006. Since taking over, they have aggressively modernized operations while winning new customers with an old-fashioned work ethic.

Chad runs the installation division, while Courtney runs the pumping and

"The area where our office is located has boomed. ... Population growth has been exponential, and that has led to more business for us."

**Courtney Van Delden**

aerobic divisions and the office operation, which has expanded in recent years. The pumping side now has four vacuum trucks, and a fifth may be needed soon.

The company's market territory has expanded. "The economy is better off around the nation than it was 10 years ago," Courtney observes. "The area where our office is located has boomed. There's a stoplight at our corner, where before it was a country highway. Population growth has been exponential, and that has led to more business for us."

Some of the new subdivisions and other with larger lots are being built on septic systems.

Boerne used to be a small town unto itself. It is now home to about 16,000 residents and essentially blends with San Antonio.

## TECH SOLUTIONS

Growth in business has been a key motivator for taking the operation digital. One ongoing project, started nearly two years ago, involves scanning paper files and service work orders dating back to 1974. "We didn't have enough wall space anymore to accommodate file cabinets," Courtney says. "Every year we were adding more cabinets, and it was not sustainable. We still have at least a couple of years of scanning left."



## Van Delden Wastewater Systems Boerne, Texas

- Owners:** Chad and Courtney Van Delden
- Years in business:** 83
- Employees:** 22
- Service area:** 100-mile radius for pumping, 25 miles for installation, 15 miles for aerobic system maintenance
- Specialties:** Onsite installation, aerobic system maintenance, septic tank pumping
- Associations:** National Association of Wastewater Technicians
- Website:** [www.vdwws.com](http://www.vdwws.com)

More important is the digitization of business processes. Late last year the company went live with ServiceTitan software, which has integrated work orders, scheduling, dispatching and invoicing. Field team members now carry tablets instead of paper business forms. "The program tracks our technicians so we're able to know just by looking at the screen if they are on their way to the next job, if they've arrived and how long they've been there," Courtney says. "We're able to track their progress throughout the day."



▲ Michael Foley works on electronic components while installing a residential septic system. Van Delden Wastewater Systems installs about 80 systems annually from Clearstream Wastewater Systems.

▼ Ted Talavara uses a Lufkin measuring wheel to mark trench lines during an installation.



Meanwhile, a program called Verizon Connect provides tracking for the vacuum trucks, service vans and installation vehicles. “On the pump trucks, we can track the PTO and the time the pump is on and off. It tracks their speed, and we get notices of hard brakes and hard accelerations so we can keep on top of safe driving.”

The field technicians were thoroughly trained in the ServiceTitan program and went through a pilot testing phase. “They were very receptive to it and excited about it,” Courtney says.

“We’ll be quicker to complete work orders, generate invoices and get them out to our customers than we were able to be with paperwork.

“It’s a big change for us in a good way. We don’t have all that paperwork

to process, and we have a more efficient way to keep track of everything. We’ll have more time to work on expanding our services.”

## GROWTH TRAJECTORY

Business expansion has never been a problem. The installation side has taken a leap in recent years. Chad observes, “For the past five years, we’ve had contracts for full subdivisions. We’ve always done subdivisions, but not every lot. Now we have contracts with builders where we pretty much have the whole neighborhood.”

That business grew largely from word-of-mouth, but also through builders locating the company’s website and reading reviews and ratings. “Then they interviewed us and we got the contracts,” Chad says. Typically, the subdivisions include 75 to 80 homes.

“Our main thing is catering to the builders, keeping them happy and responding fast to any requests they have,” Chad says. “The builders work with a lot of contractors, and it can be a challenge getting in and out with everybody in the way. We try to be very responsive. Timeliness is a huge thing for them.”

Aerobic treatment units are increasingly prevalent because the area’s high limestone bedrock is not hospitable to conventional drainfields. “In the old days, you could install conventional systems in rock,” Chad says. “Nowadays you can’t. Probably less than 5% of the properties we serve get conventional systems.”

## BREAKING ROCK

Equipment on the installation side includes a 2011 Bobcat 630 skid loader, a 1999 CASE skid loader, four CASE 580 backhoes (models years 1999 to 2018), two hoe ram hydraulic rock breaker backhoe attachments, a 2006 Ditch Witch trencher with a rock saw, a Takeuchi mini-excavator, five Ford pickup trucks and a Ford flatbed truck.

Two crews install the first phase; the third crew does the second phase. “The first phase is tank installation, and it basically consists of a day or two of rock hammering to install the tank and sewer line,” Chad says. “We have

2,000-pound rock breaker attachments for our backhoes. The second phase includes the electrical wiring and the spray heads.”

The company installs ATUs from Clearstream Wastewater Systems. Secondary-treated effluent is delivered to a pump tank from which it is sent during night hours to strategically placed spray heads triggered by a timer. “We design the spray area to accommodate future pools, patios and other amenities that homeowners will likely build,” Chad says.

## STICKING WITH ONE ATU

Van Delden Wastewater Systems of Boerne, Texas, installed its first aerobic treatment unit in 1990. Today the company installs about 80 ATUs per year, all of them from Clearstream Wastewater Systems.

“About 80% of them are the 600-gpd 600NC3T models,” Chad Van Delden says. “The rest are 600NU, 750N and 1000N units. Clearstream has been around since the beginning of aerobic systems, and they are one of the most popular and well-respected brands.”

Courtney Van Delden adds, “We installed our first aerobic system before they started being regulated in Texas in 1997. We had to convince the county to let us install one. When aerobic systems started coming out in other areas of the country, our parents did their research on the brands. They even went to the manufacturers to check them out.

“We started with Clearstream, and we have never wanted to change. One thing I like about them is that we have the flexibility to put the control box and aerator on the side of the house, rather than having a preset unit where those items are sticking out in the customer’s yard. They are aesthetically appealing.”

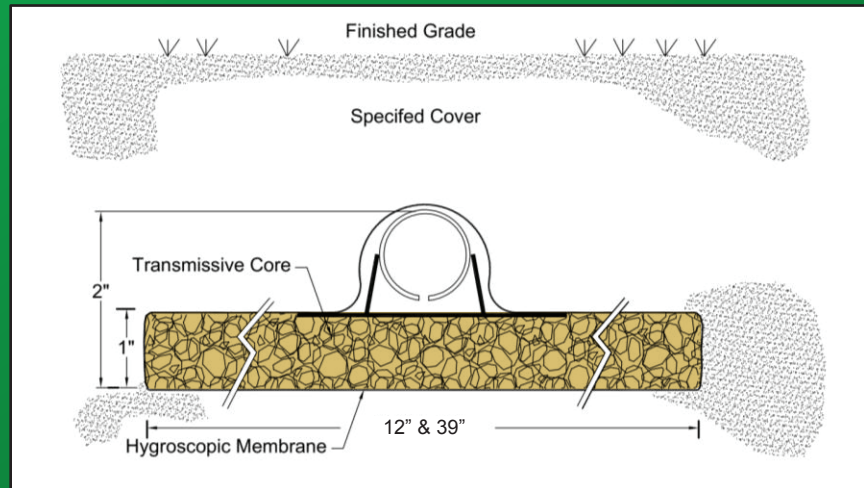
The supply source is convenient since Clearstream is headquartered in Beaumont, about five hours away, and it has a plant and sales outlet in Johnson City, about an hour away from the Van Delden Wastewater Systems office.

“We’ve always done subdivisions, but not every lot. Now we have contracts with builders where we pretty much have the whole neighborhood.”

Chad Van Delden

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» The team at Van Delden Wastewater Services stands with equipment at the company headquarters. (Courtesy of Van Delden Wastewater Services)

“After system replacements, we educate the owners on what the aerobic system is since they may or may not be familiar with the technology.”

**Chad Van Delden**

Sprays irrigation fields typically require 4,000, to 5,000 square feet and are best suited to lots half an acre and larger. On smaller lots where older conventional systems are failing, drip irrigation systems are the preferred solution.

### KEEP ‘EM RUNNING

Van Delden Wastewater Systems does a strong business in maintaining Clearstream systems, including some installed by other companies. That includes pumping of the tanks. “Around here, we have companies that just do installation, or just aerobic maintenance, or just pumping,” Chad says. “We’re trying to pick up the pumpings on brands for which we don’t do service.”

To service ATUs, a technician visits three times a year to perform a complete system check. Four Ford service vans are equipped with all the basic maintenance tools including a Sludge Judge (TG Wastewater), drill, ohmmeters and amp meters.

Courtney says, “They are fully stocked so the technicians can address whatever is needed at any job site they go to. The vans carry pumps and aerators, plus all the pipes, fittings and filters — everything that’s needed for regular maintenance and service. They should be able to take care of everything while they are there.”

The pumping fleet includes three Kenworth T800s (2017, 2016 and 2007), each with a 4,000-gallon aluminum tank and Masport 400XL pump, and a 1997 Freightliner with a 3,600-gallon aluminum tank and Jurop/Chandler pump.

continued »



» Jorge Garza fits a clean-out port to a concrete tank.

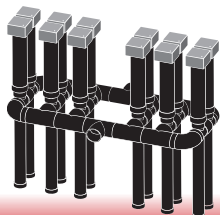
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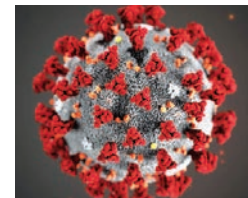
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“All our vacuum truck operators have been with us for a long time,” Courtney says. “They’re good at what they do, and they provide good customer service.” If the tank location isn’t obvious, the operators use probes or, in the most challenging cases, a metal detector or a Prototek locator with a flushable transmitter.

“When we pump, we’re not just pumping out the liquids,” Courtney says. “We pump out everything. In the past year, we’ve started using Crust Busters on every job. That helps us break down the heavy solids and get the tank pumped out efficiently. Sometimes the trash compartments of aerobic tanks are buried. We always dig those up and make sure we pump out everything from the system.”



▲ Jorge Garza operates a Takeuchi mini-excavator at a work site.

Septage disposal is increasingly expensive, as the local wastewater treatment plants tend to raise their rates each year. Dump sites are a San Antonio Water System plant located 45 minutes from the office and a land application site that’s about an hour away. To regulate costs, the drivers try to dump when relatively close to one site or the other.

## MARKETING ONLINE

While the company still advertises in neighborhood newsletters and through postcards, marketing has gone largely digital. It includes Google AdWords for pay-per-click advertising, as well as a presence on Angie’s List, Facebook and a Nextdoor website and app. “We check reviews on those sites often and respond quickly to any negative ones,” Courtney says. “Everybody looks at reviews these days.”

A refurbished website launched in 2012 has helped with search engine optimization and has brought in substantial traffic. Education blog posts on the website — typically two to four per month — help keep the company prominent in prospective customers’ internet searches. “Anytime I

get a question from a customer that I haven’t addressed before, I bring that question to the blog and answer it,” Courtney says. “We feel that the more our customers are educated, the better off they’re going to be.”

Education also extends to the field. Chad observes, “After system replacements, we educate the owners on what the aerobic system is since they may or may not be familiar with the technology. When I do an estimate, I explain what an aerobic system is, and after it’s installed, we do an orientation with the homeowner. The orientation book has a diagram and a copy of questions. We show them how the alarm works and show them the spray area.”

Courtney adds, “For the builders, once a system is completed and we know who the homeowner is, we do the orientation for all the aerobic installations. We’re going to service that system, and we want to be sure everyone is on the same page.”

## A QUALITY TEAM

Keeping it all together is an experienced and well-qualified team. Chad says, “A challenge across the industry is finding people who want to do this kind of work and are good at it. When we find them, we want to keep them.

“We pay the pumpers and technicians well. On the aerobic maintenance side, we hire people who have some electrical experience and can troubleshoot and diagnose all the mechanical components. On the pumping side, we train people well to locate the tanks and do a good, professional job.”

Courtney adds, “We have high standards, but we’re also easy to get along with. Usually once a quarter we schedule some sort of company outing or event. For the past five years, we’ve had a day where we take all the technicians to a lake. They get paid for the day and have a chance to bond and have fun. We do that for our office staff, as well. We give Christmas bonuses. We try to provide a nice place to work.” □

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# Don't Think You Can Dig Your Way Through Any Soils Challenge

Permeability and the presence of oxygen will help dictate the design and execution of an effective onsite system

By Jim Anderson and David Gustafson

**O**ur next few columns will be based on common questions we receive during workshops conducted with installers. They are the same questions we've heard at almost every training over the years — and this tells us they are important to address in the Basic Training column.

The first question comes up around a primary principle we've discussed many times: the keep it shallow, or KISS, principle, where the second S can be filled in using your imagination. The KISS principle is based on the concept that the most permeable and most biologically active part of the soil profile for both the acceptance and treatment of septic effluent occurs at the surface or upper portions of a soil profile.

The question is: If I have a limiting soil condition such as slowly permeable clay soil or the presence of dense soil layers or caliche — and I know there is a more permeable layer of sand and gravel deeper — why can't I just dig through the problem layer and install the system in the other material?

**In our part of the world ... this condition [in which systems are overwhelmed by water] usually happens soon after installation.** Homeowners are not happy to replace systems, and the installer is at the top of their call list.

Systems need to accept the amount of effluent generated within a residence and treat the effluent before it reaches groundwater or surface water or is discharged where there can be environmental or human health impacts. Treatment occurs through a combination of physical, chemical and biological processes. These processes require time, so it is important that effluent moves through soil slowly enough for this to happen.

Fortunately, if our systems are designed and installed properly, the balance between accepting the effluent and treatment occurs. This is done in gravity distribution systems by the formation of a biomat that slows down the flow and ensures flow through the soil is unsaturated. In pressure distribution systems, flow is controlled by operation of the pump and distribution of the effluent across the entire soil treatment area.

## **OXYGEN IS NECESSARY**

Unsaturated flow through soil ensures there is also oxygen present and in shallow soil horizons the presence of aerobic (oxygen-loving) organisms that are more efficient at breaking down organic components of the waste and tying up pathogenic bacteria and viruses. Having enough oxygen present under and around the system is necessary for treatment to occur. Placing systems in areas where the physical structure of the soil is permeable to both water and oxygen means locating them in areas where treatment happens.

For oxygen to be present at deeper depths in the soil, it needs to be able to move through the upper layers to depth. The deeper into the soil profile, the less oxygen. There are correspondingly fewer natural aerobic organisms present due to lower oxygen levels and the lack of organic matter as their food source. This is why one of the design criteria for soil



treatment units is to make them long, narrow and close to the oxygen source (surface).

Digging through the limiting layers introduces sewage effluent into an environment where, because of less oxygen and lower numbers of organisms, treatment times increase even if flow remains unsaturated. For gravity systems with less oxygen, a much thicker biomat will be formed. This potentially reduces flow to points where the soil will not accept the amount of effluent introduced, causing the effluent to continue to back up and pond over the infiltrative surface. When the pressure exerted by the ponded effluent is enough to push the effluent through the biomat, flow will be rapid and not allow treatment.

In the scenario where effluent is applied to a coarse, rapidly permeable sand and gravel layer, flow will be saturated and too rapid for treatment to occur. The untreated waste is then allowed to move directly into the nearby surface aquifer system, contaminating the groundwater with nutrients and pathogens.

### WATCH THE LIMITING LAYER

As an aside, this is also what happens in a cesspool or seepage pit — and it's the reason these systems are not allowed in most states. This has resulted in entire aquifer systems being contaminated and forced changes to drinking well locations and depths in many regions.

There is another very good reason not to dig through a limiting layer. If a limiting layer is cut through and some type of media is placed in the trench and backfilled, the area is likely more permeable than the problem layer. When it rains and saturates the upper layers, the trench that was cut through the layer acts like a drain. It is the easiest path for the excess water to take. The entire system can be overwhelmed by the drainage water, causing complete system failure.

In our part of the world, where we have significant precipitation every year and have installed drainage systems to remove stormwater, this condition usually happens soon after installation. Homeowners are not happy to replace systems, and the installer is at the top of their call list.

We have also seen this happen in more arid environments like Arizona. In one case, the convective thunderstorms that occur in the summer generated enough water draining into the deep trenches to completely wash out every system installed through the limiting layer in a residential development.

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# Texas Septic Systems Council Pushes for Independent Real Estate Inspection Reviews

By David Steinkraus

Frank Aguirre sees a problem with septic inspections, and he wants to do something about it by forming a citizens lobbying group through his Texas Septic Systems Council ([www.texassepticsystems.org](http://www.texassepticsystems.org)).

“The problem is there’s no law, and there’s no standardized procedure,” says Aguirre, who lives in San Antonio where he owns Septic Systems Express.

The issue is not with new installations, but with system inspections when properties are sold, he says. In Texas, these are called property transfer inspections; in other states, they’re known as point-of-sale or time-of-sale inspections.

Onsite professionals are not necessarily the people who do most of these inspections, he says. In addition, he adds, sales are very emotional situations. If a deal is derailed by an inspection report, “It can become very litigious and get very ugly very quickly.”

What Aguirre wants to do — and he says his idea is in its early stages — is push the Legislature to establish an inspection review board. The board would be a private entity that would write an inspection procedure and a form for inspectors to use and then review the completed reports.

After reviewing reports, members of the board would issue a pass-fail decision for a system based on the only two criteria that Texas law sets out for a failed system: wastewater backing up into a building or wastewater on the surface of the ground. Based on other results in the report, the board may issue a letter of recommendation to the buyer and seller, suggesting what could or should be done to ensure the onsite system is working properly.

Board members could meet virtually to save time and cost, and reviews wouldn’t take long, he says. “Many of us, like myself, can look at plans and know in a few minutes whether something functions.”

The board would have no enforcement power, Aguirre says, and could be funded by a small fee for reviewing a report. Because judgments and recommendations would come from the board, there would be no pressure on inspectors to produce a certain result to keep a deal moving, he says.

“I think we have to go that route until we have more detailed laws,” he says.

Aguirre says he is looking now for people interested in joining him because he wants to be ready for the next legislative session, which starts in January 2021. This will not be like a legislative day when people go to the capitol for a few hours of talking, he says; instead, this will be a focused effort to remain in continuous contact with lawmakers. From his own experience a couple of years ago, when he had a few sentences about graywater inserted into a bill, he knows what it takes to get state law changed.

“I found out then it doesn’t take numbers; it takes guts,” he says.

## Minnesota

All of the people working from home because of the coronavirus pandemic put such a strain on onsite systems that Gov. Tim Walz had to take action.

The problem, reports the news website Patch, is that having more people at home for longer times increased flows to onsite systems that in some cases could not handle the load. As a result, demand for emergency pumpouts soared.

To make work easier for pumpers, Walz signed an executive order last spring to lift seasonal weight restrictions only for trucks hauling septage. Truck weight limits in many Northern states are lowered during the spring because roads may be weakened as they thaw.

## Idaho

The approval of a rural subdivision without a sewer line drew criticism from the city of Lewiston.

Commissioners for Nez Perce County in northwestern Idaho approved a developer’s request to not build a dry sewer line for four of the 16 lots in a subdivision expansion. The \$80,000 line is not practical and is more than 1,300 feet from the most recent extension of municipal sewer, the developer says in his request to the county. He also says the state’s North Central District health office has found the soil capable of supporting onsite systems, reports *The Lewiston Tribune*.

The city is concerned about degradation of water quality. Its community development director wrote a letter that says adding a dry sewer line now will make it easier for homeowners to connect later without disturbing lawns or landscaping.

At a public hearing on the project, Douglas Havens, county commissioner, said a properly designed and installed onsite system can effectively treat wastewater. “You can’t just automatically say there’s something incorrect about every single drainfield,” he said. □

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

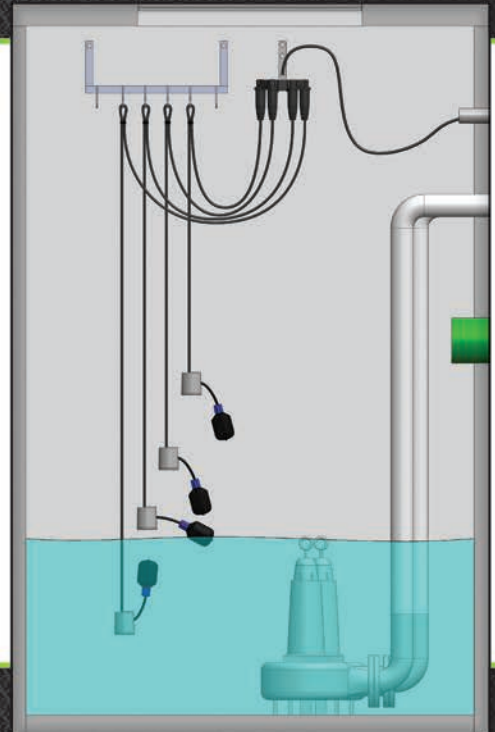
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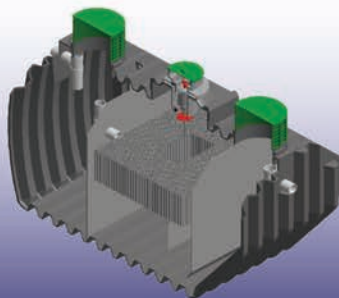
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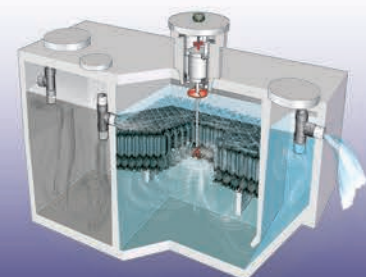


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	SeptiTech STAAR	500 to 200,000	1996	Received the EPA's Environmental Technology Innovator award as an advanced, Trickle Filtration Sewage Solution, these Smart Trickling Anaerobic/Aerobic Recirculating Filter Systems are designed for both residential and commercial properties with minimal operator oversight, while delivering consistent high quality treatment even during peak, low or intermittent flows. Utilizing an unsaturated, engineered textile media, reliable equalization/clarification process and maintains low levels of Nitrate-N with all below-grade components. The PCL Smart technology allows the system automatically goes into a sleep mode to achieve lower operating costs and power requirements. Systems are ETV-EPA verified, NSF/ANSI Standards 40/245 certified and achieves Provisional Use Performance Requirements.	
	FAST, FITT-ee, RollsAIR, BioBarrier	150 to 2 million	1996	These advanced, integrated, wastewater treatment systems are ideal for residential and commercial applications; MyFAST, MacroFITT, and RollsAIR systems are for larger applications with less maintenance. With the SFR feature of the FAST technology, alternate modes of operation include reduced electricity usage up to 45%, increased nitrification/denitrification processes, long-term performance goals, and/or wastewater recycling opportunities. The effluent meets secondary quality requirements and can be distributed to a soil treatment system or water reuse applications. BioBarrier MBR is for Ultrafiltration of the wastewater treatment process to remove 99.9% of the contaminants. Certified to NSF/ANSI 40 class 1,245 (nitrogen reduction), 350 (water reuse) and EN12566-3 standards.	
<p><b>Clarus Environmental Products</b> 3649 Cane Run Rd. Louisville, KY 40211 800-928-7867 • 502-778-2731 www.clarusenvironmental.com See ad page 33</p>	Z-Cell High Performance Wetland	450 to 36,000+	2001	The Z-Cell technology can be used in residential, commercial, or small community applications for treating residential strength septic tank effluent. The Z-Cell is a timed dose system and the wastewater has a 36" vertical path to an outlet pipe below the wetland's surface. By moving water vertically, the fluid must pass through the horizontally oriented plant root zone. This eliminates short circuiting, an issue common in conventional constructed wetlands. During the growing season, evapotranspiration through plant leaves reduces the hydraulic load to downstream components. Produces better than secondary quality effluent.	Contact Manufacturer
	Recirculating Media Filters	450 to 36,000+	2001	Designed for use in residential, commercial, or small community applications for treating residential strength wastewater from a septic tank. Treatment occurs below grade as the fluid trickles down through the pore spaces of the media where aerobic organisms feed on the nutrients. Effluent leaves the system through an outlet pipe in the bottom of the filter. Multiple RMFs can be used together when greater capacities are needed. Effluent can be discharged above or below grade. Above grade disposal must meet local health codes or guidelines. Produces better than secondary quality effluent.	Contact Manufacturer
	Fusion	450 to 800	2006	Drop-in wastewater treatment units that use anaerobic and aerobic zones to produce secondary quality effluent. The "drop-in" system is easy to install and maintain. Filter media are never removed or replaced. Key operating features include the constant recirculation of treated wastewater and a twice-daily automatic backwash cycle that returns residual sludge to the head of the system. A quiet, programmable compressor delivers oxygen to aerobic zones, while consuming as little energy as a 65-watt light bulb. The Fusion's unique design enables it to be installed without a pretreatment tank, making it ideal for use on sites where space is limited.	AL, AR, MI, NY, OH, VA
 <p><b>Delta Treatment Systems</b> 9125 Comar Dr. Walker, LA 70785 800-219-9183 • 225-665-6162 info@deltatreatment.com www.deltatreatment.com</p>	DF Series	500 to 1,500	1993	The process occurs entirely within the self-contained treatment unit which is comprised of outer mixing tank and a cone-shaped settling chamber. Raw, unsettled domestic wastewater enters directly into the mixing tank where mixing occurs through an air distribution system. The mixed liquid then enters the settling chamber from the bottom. The settling chamber maintains a quiet condition which allows solids to settle down and re-enter the mixing chamber for more processing. The liquid from the ANSI/NSF 40 certified system is hydraulically displaced upward and is discharged as a clear, odorless treated water which meets or exceeds state water quality standards.	AL, AK, AZ, BC, BWI, CA, CO, FL, GA, HI, ID, IL, IN, IA, KY, LA, ME, MI, MD, MN, MO, MS, MT, NC, NM, NV, NY, OH, OK, ON, OR, TN, TX, UT, VA, WA, WI, WV
	ECOPOD	500 to 100,000	2006	The ECOPOD Advanced Wastewater Treatment System is a FFBR (fixed film bioreactor) system that houses an engineered PVC media specifically designed to treat domestic wastewater. Five models accommodate daily flows ranging from 500 to 1,500 gpd, with customizable options available for commercial applications up to 100,000 gpd. The ECOPOD is ideal for individual residential installations, cluster designs, and small-to-medium commercial wastewater treatment applications. Self-contained, it can be inserted into a standardized septic tank or vault providing quiet, odorless operation. ECOPOD is certified to ANSI/NSF International Standards 40 and 245, FHA and VA acceptable, and suitable for intermittent usage.	
	Enviro-Aire Series	500 to 1,500	2005	The Enviro-Aire System consists of a three-step process to treat incoming wastewater. Raw wastewater enters the unit from a residence or facility. The first chamber is the primary chamber which separates the sludge (gross solids) and scum (floating solids) from the raw wastewater. Effluent then enters the aeration chamber where aerobic bacteria digest the organic waste. From the aeration chamber, the liquid enters the clarifier chamber, where additional water-solids separation occurs. Settled solids return to the aeration chamber for additional aerobic digestion. The air diffuser within the aeration chamber is a patented design to reduce back pressure on the air compressor and maintain constant, non-clogging air flow. The ANSI/NSF 40 certified system design is easy to operate and maintain and is engineered for low energy consumption.	

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS
 <p><b>Eliminite, Inc.</b> PO Box 359 Belgrade, MT 59714 888-406-2289 info@eliminite.com www.eliminite.com</p>	Eliminite Grizzly	Up to 50,000	1997	The Eliminite Grizzly system is designed for large-scale, high-volume, high-strength commercial applications where advanced nitrogen reduction is necessary. The system was originally developed to serve high-altitude commercial and resort developments in the Rocky Mountains where winter temperatures linger at or below 0 degrees F, and seasonal use patterns/dramatic fluctuations in flow and wastewater strength are the norm. It functions with little operator input and simple maintenance. C-Series systems serve high-altitude highway rest areas, resort communities, golf courses, ski areas, mixed-use residential communities, restaurants, RV parks, work camps, corporate retreats, business parks and convenience stores. It is suited for use in multi-stage treatment trains and as a means of reducing waste strength prior to conveyance to municipal treatment facilities.	US
 <p><b>Eljen Corporation</b> 90 Meadow Rd. Windsor, CT 06095 800-444-1359 info@eljen.com www.eljen.com See ad page 17</p>	GSF	Scaleable	1982	The Eljen Geotextile Sand Filter (GSF) is an advanced wastewater treatment and dispersal technology. The GSF's unique design provides treatment and dispersal in the same footprint while keeping installations easy and maintenance minimal.	North America and Australia
 <p><b>Fuji Clean USA</b> 41-2 Greenwood Rd. Brunswick, ME 04011 207-406-2927 Fax: 207-406-2929 info@fujicleanusa.com www.fujicleanusa.com See ad page 28</p>	CE Series	500 to 1,000 single tank systems		Fuji Clean's CE model series averages 50,000 systems being installed annually worldwide. The popularity is driven by a one-tank configuration, small footprint (about 7' x 4' for smallest model), low power draw (1.27kWh/day for most residential systems), easy plug & play installation, simple, efficient O&M and consistent treatment (90-95% BOD and TSS removal). No preceding septic tank necessary. NSF 40 certified. There are no moving in-tank parts. An external air blower (FujiMAC RII) introduces oxygen to aerobic chambers and powers two internal air lift pumps, which manage sludge return and discharge of clean effluent.	Most States
	CEN Series	500 to 1,000 single tank systems		Fuji Clean's CEN technology provides enhanced denitrification into its standard treatment process and produces a consistently high quality effluent (NSF 40/245 certified: 5 BOD, 6 TSS and 10 TN) from straight septic wastewater – no preceding septic tank necessary. No moving in-tank parts. The CEN5 is compact (about 8' x 4'), lightweight (about 475 lbs), highly maneuverable and features a low power draw (one 80 L/min blower drawing 1.27 kWh/day), plug & play installation and optional wireless telecommunication package that offers both dial and text capabilities. This model series is producing best-in-class numbers in multiple U.S. states.	
	Commercial Systems	1,000 to 6,000 single tank systems (cluster scaleable to 100,000+)		Commercial Fuji Clean systems provide all benefits of smaller systems - just scaled up in size. Fuji Clean's largest CE commercial system, the CE6KG, is now available to supplement its existing CE21 (1,900 gpd), CE30 (2,700 gpd) models and CEN21 (1,900 gpd). The CE6KG, which can treat up to 6,000 gpd, uses the same treatment technology, process flow and one-tank structure as the smaller CE systems and can be squeezed into the tightest of commercial sites with a footprint of only 36' x 6.5' (including built-in septic tank).	
 <p><b>Geomatrix Systems, LLC</b> 114 Mill Rock Rd. E Old Saybrook, CT 06475 860-510-0730 info@geomatrixsystems.com www.geomatrixsystems.com See ads on pages 13, 31</p>	SoilAir	1 - 100,000+	1998	SoilAir is a patented technology that intermittently aerates the leach field and the surrounding soils rather than continuously aerating the wastewater in a tank. The soils in the leach field become a massive enhanced treatment system. Since air has 21,000 times the capacity to hold oxygen than water, this process provides unprecedented rejuvenation of failed septic systems, extends the lifespan of new leach fields and enhances treatment. SoilAir is effective at treating high strength wastewater and has been successful at oxidizing ATU sludge out of systems. SoilAir's systems have been extensively tested.	US and Canada
	GeoMat	1 - 100,000+	2005	The GeoMat passive treatment and leaching system is ultralow profile, designed for maximum treatment and infiltration. GeoMat is 1" thick and available in widths of 12" and 39". It is comprised of an entangled filament core, a hydroscopic membrane and an internal gravity or LPP pipe. The shallow burial depth and high surface area to void space ratio of GeoMat results in unprecedented aeration. This increased oxygen results in increased removal of pathogens, B.O.D., T.S.S., and nutrients such as nitrogen and phosphorus. When installed on 6" of specified sand, GeoMat treatment levels have been tested to meet NSF/ANSI Standard 40.	Many States, Contact Manufacturer
 <p><b>Hoot Systems, LLC</b> 2885 Highway 14 E Lake Charles, LA 70607 888-878-4668 • 337-474-2804 questions@hootsystems.com www.hootsystems.com</p>	LA-Hoot	500 to 1,000	1986	LA-Hoot is an improved version from the original Hoot Treatment System introduced in 1984. Results are better than 10/10 mg/L on CBOD and TSS, with more than a 95% reduction of the wastewater influent. Two-year warranty/NSF Standard 40 certified.	Nationwide
	H-Series	500 to 1,200	1995	Five-stage, one piece system with a pretreatment tank, aeration chamber, final clarifier, optional disinfection device and a pump tank. Results are better than 5/5 mg/L on CBOD/TSS. A 99% reduction on CBOD and TSS. Marketed as BNR in MD and FL with Biological Nitrogen Reduction of >50%. Three-year warranty/NSF Standard 40 certified.	
	ANR	450 to 900	2007	Adds Advanced Nutrient Reduction to the Hoot System. Results of 5.8 mg/L on TN, better than 10/10/10 mg/L on CBOD/TSS and Total Nitrogen. Areas where 10 mg/L is the discharge limit for Total Nitrogen, the federal level for drinking water. Three-year warranty/NSF Standard 40 and 245 certified.	
	MTS	3,000 to 500,000	2011	The Hoot MTS, (Media Treatment System) is a series of larger treatment systems that were tested and verified under NSF Standard 40/245 protocol. The Hoot MTS is used for Residential, Commercial and High Strength wastewater applications and can also be set up to treat for Ammonia, Total Nitrogen, Phosphorus and other discharge parameters. Instead of selling a one size fits all box, or multiple boxes, Hoot can deploy our MTS technology into locally sourced concrete castings, retrofit into existing structures or fabricated for new, poured in place vessels. We have substantial experience with RV parks, camps, convenience stores, restaurants, shopping plazas, schools, churches, brewery/winery tasting rooms and other challenging applications.	

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS
 <p><b>Jet Inc.</b> 750 Alpha Dr. Cleveland, OH 44143 800-321-6960 • 440-461-2000 Fax: 440-442-9008 email@jetincorp.com www.jetincorp.com See ad page 21</p>	JCP	1,500 to 300,000	1970	Jet's Commercial Wastewater Treatment Extended Air and MBBR Plants are modular in design, can treat flows from 1,500 to 300,000 gallons of wastewater per day and allow for phased build out. This makes it possible for motels, shopping centers, restaurants, and service stations to be constructed along interstate highways far from any town. Factories and Subdivisions can be developed miles beyond sewer lines. Time-tested plants treat wastewater through the performance-proven aerobic digestion process that enables microscopic living organisms to transform wastewater into a clear, odorless liquid. Jet offers assistance with design, engineering, and construction as well as onsite 24/7 tech support, plant start up commissioning and operator training.	US and International
	J-Series	500 to 1,500	1993	J-Series BAT Media Plant is a natural, organic, chemical-free system that uses nature's own resources to reduce wastewater to a clear, odorless liquid in just 24-hours. Employing the patented Biologically Accelerated Treatment process that supplies oxygen to naturally occurring microorganisms found in wastewater. Microorganisms attach themselves to the submerged Jet BAT Process Media, forming a "Biomass" to quickly and effectively treat wastewater. The 700 Series Aerator supplies the oxygen and the mixing that supports our exclusive treatment process, converting wastewater into colorless, odorless liquids and gasses. The J-Series, tested to NSF Standard 40, is available in 500 to 1,500 gpd in concrete and 500 to 800 gpd in a seamless plastic tank. Multiple system control options are available.	
	CF-Series	500 to 1,500	2008	Jet's Nutrient Reducing BAT Media Plants offer variable capacity in a NSF-40/245 tested treatment system. The J-1500CF Series provides complete effluent treatment from 500 to 1,500 gpd. The 500 and 800 gpd PLT Series tanks are the lightweight, rotational molded alternative to the concrete J-1500CF Series. The seamless polyethylene tanks are easy to transport and install in the most difficult site conditions. J-1500CF Series utilize the proven 700++ aerator, effluent filter and the Jet 197 Control panel. The 197 Control panel cycles the aerator to reduce the nitrogen by over 60%.	
	R-Series	450 to 1,400	2016	R-Series utilize time proven BAT Media, Jet 700++ aerator and the Illumi-Jet UV Disinfection Unit to meet NSF Standard-350 for applications that require shallow discharge, direct discharge or reuse. The R-Series Plants offer variable flow capacity from 450 to 1,400 gpd in precast concrete and seamless, polyethylene tanks. The polyethylene tanks handle from 450 to 750 gpd that are the lightweight, rotational molded alternative to the concrete version. The seamless polyethylene tanks are easy to transport and install in the most difficult site conditions.	
<p><b>Knight Treatment Systems</b> 281 Cty. Rd. 51A Oswego, NY 13126 800-560-2454 Fax: 315-343-2941 mark@knighttreatment.com www.knighttreatment.com See ad page 37</p>	White Knight	Scaleable	2010	The White Knight Microbial Inoculator Generator from Knight Treatment Systems offers an enhanced form of aerobic treatment technology that introduces, cultivates and releases selected microorganisms. It is designed to be simple to install in most septic tanks. It can be used to retrofit outdated ATUs and package treatment plants and enhance the performance of community and high-strength wastewater treatment systems in addition to septage processing facilities.	US, PEI, Eastern Caribbean
 <p><b>MST Manufacturing, LLC</b> 23362 Medero, Ste. C Mission Viejo, CA 92691 877-473-7842 • 949-297-4590 Fax: 949-916-2093 microseptec@microseptec.com www.microseptec.com</p>	EnviroServer	600, 1,200 and 2,500	1998	The EnviroServer ES is a combination of primary treatment, flow equalization, and secondary treatment by both fixed-growth and suspended-growth aerobic processes. The system consists of five chambers in one compact pre-engineered unit. The first chamber is a primary clarifier, the second chamber is the first aeration zone, the third chamber is the second aeration zone, the fourth chamber is the final clarifier, and the fifth chamber is the effluent chamber where an optional pump(s) and disinfection device may be installed.	AZ, CA, DC, DE, MD, NJ, NV, PA, VA
 <p><b>Norweco, Inc.</b> 220 Republic St. Norwalk, OH 44857 800-667-9326 • 419-668-4471 Fax: 419-663-5440 email@norweco.com www.norweco.com</p>	Singulair Model 960 and Model TNT (Total Nitrogen Reduction)	500 to 1,500	1996, 2006	The Singulair system is the state-of-the-art alternative to a troublesome septic tank for domestic wastewater treatment. Employing the extended aeration process, the Singulair plant provides flow equalization, pretreatment, aeration, clarification, tertiary filtration and optional chemical addition within a single precast concrete tank. Designed for domestic wastewater flows ranging from 500 to 1,500 gpd, performance of the Singulair system is certified by NSF International (Standards 40 and 245) and the Canadian Standards Association.	North America, Central America, South America, Europe, Africa and Middle East
	Singulair Green Model 960 and Model TNT (Total Nitrogen Treatment)	600	2010	The Singulair Green aerobic treatment system incorporates Norweco's advanced aerobic treatment process into a durable, watertight polyethylene tank. It is ideal for new or retrofit applications and can be installed easily in the most difficult jobsite with just a backhoe. Incorporating support ribs and inherently strong arch shape, the durable Singulair Green tank will provide decades of reliable performance. Designed for domestic wastewater flows up to 600 gpd, with treatment performance meeting or exceeding the strictest state and county requirements, Singulair Green is certified by NSF International (Standards 40 and 245).	
	Hydro-Kinetic	500 to 1,500	2012	The Hydro-Kinetic wastewater treatment system employs innovative Hydro-Kinetic filtration technology to produce the cleanest, most consistent effluent quality available. The Hydro-Kinetic system uses the extended aeration and attached growth processes to treat wastewater, and features innovative nitrification-denitrification technology. The Hydro-Kinetic FEU system is the only NSF/ANSI Standard 40 and 245 certified residential wastewater treatment system to pass two consecutive back-to-back tests without performing routine maintenance for a full 12 months. The Hydro-Kinetic FEU system meets or exceeds regulatory standards and is performance certified and listed to BNQ Standards CAN/BNQ 3680-600 and NQ 3680-910. It quietly, efficiently and automatically pretreats, aerates, flow equalizes and filters all wastewater returning only the purest effluent back to the environment.	
	Singulair R3 and Singulair R3 Green	500 to 1,500	2018	The Singulair R3 reduces water consumption, reuses treated effluent and recycles water to conserve and recharge our groundwater. It provides the cutting-edge solution to chronic water shortages and reduces energy costs of water and wastewater treatment. The system efficiently treats incoming wastewater to the highest level for restricted indoor and unrestricted outdoor use. With unrivaled performance, the Singulair R3 system exceeds the effluent requirements of NSF/ANSI Standards 40, 245 and 350.	

Norweco continued >>



MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS
<b>Norweco, Inc., continued</b> 220 Republic St. Norwalk, OH 44857 800-667-9326 • 419-668-4471 Fax: 419-663-5440 email@norweco.com www.norweco.com	Singulair Solar	500 to 1,500	2020	The Singulair Solar system delivers an environmentally friendly solution for onsite wastewater treatment by utilizing renewable solar energy to generate electricity. Solar power is a 100% clean, renewable energy source that offers year round efficiency and reduces your carbon footprint. Singulair Solar technology requires no moving parts, providing quiet, efficient operation with minimal maintenance.	North America, Central America, South America, Europe, Africa and Middle East
 <b>Orenco Systems, Inc.</b> 814 Airway Ave. Sutherlin, OR 97479 800-348-9843 • 541-459-4449 info@orenco.com www.orenco.com <b>See ad page 19</b>	AdvanTex AX-RT	Up to 750	2000	The AX-RT is a "plug and play" wastewater treatment system that can be shallowly buried and installed right behind a septic tank, as easily as a septic tank. Its compact design fits on small lots and reduces costs for excavation and installation. That means property owners (residential and small commercial) can buy AdvanTex quality at a competitive price. The AX-RT is designed to be easily maintained with an annual service call, thanks to its accessible, cleanable filters and media. And its high-quality, high-head pumps have been known to last over 20 years (as seen in the Elkton, Oregon, sewer system).	North and Central America, Australasia, Europe, and Africa
	AdvanTex AX-100	2,500 to 12,000	2002	Orenco's patented AdvanTex Treatment Systems include the compact AX-100, which offers a small footprint, making it a viable option for small sites. It works as efficiently as a sand filter, enabling treatment of high-volume commercial and multi-family flows in tight spaces. The AX-100 is a premanufactured package, including the textile media, and has low maintenance requirements, low power use, and low life-cycle costs. It provides consistent, reliable treatment, even under peak flows, producing clear effluent that's ideal for reuse.	
	AdvanTex AX-Max	1,750 to 100,000	2010	The AX-Max is a completely integrated, fully plumbed, and compact wastewater treatment system for commercial properties and communities. It's ideal for projects with strict discharge limits, limited budgets, and part-time operators. Like all AdvanTex Treatment Systems, the AX-Max is a recirculating media filter that produces outstanding effluent that's suitable for reuse, with significant nutrient removal. AX-Max systems are highly energy-efficient and require minimal operation and maintenance.	
 <b>Presby Environmental, Inc.</b> <b>Presby Environmental</b> 143 Airport Rd. Whitefield, NH 03598 800-473-5298 • 603-837-3826 Fax: 603-837-9864 info@presbyeco.com www.presbyenvironmental.com <b>See ad page 5</b>	Advanced Enviro-Septic	Varies	1995	Advanced Enviro-Septic (AES) is a combined treatment and dispersal system. This effective and non-mechanical onsite system is designed for residential, commercial, and community use. AES has been proven to remove up to 99% of wastewater contaminants without the use of electricity or replacement media. AES does this quickly and naturally establishing multiple bacterial treatment environments throughout the system that break down and digest wastewater contaminants leaving the septic tank. This passive process allows the system to discharge highly purified wastewater, preventing soil clogging and groundwater contamination. AES has third party certifications from NSF, Cebedeau, BNQ, and SAI Global.	Worldwide
	EnviroFin	Residential/ Commercial	2016	The Enviro-Fin passive onsite wastewater treatment and dispersal system is designed to have a small footprint and ship easily, while maintaining and exceeding NSF/ANSI 40 Class-1 certified treatment. Effluent leaves the septic tank and enters the fin distribution unit, where it settles and breaks down suspended solids. Effluent is distributed to the eight treatment fins, which are filled with coarse green plastic fibers, filtering and digesting more suspended solids.	CA, HI, ME, NH
 <b>Waterloo Biofilter Systems Inc.</b> 143 Dennis St./PO Box 400 Rockwood, ON N0B 2K0 866-366-4329 • 519-856-0757 Fax: 519-856-0759 info@waterloo-biofilter.com www.waterloo-biofilter.com	Waterloo Biofilter Systems	Up to 50,000	1994	The Waterloo Biofilter is an efficient, low maintenance biological trickling filter for treating residential and commercial wastewaters. Fully scaleable and developed for cold climates, the system has small space and low energy and maintenance requirements. The patented filtration media carries a 20-year warranty. A variety of small to large plug & play configurations for ease of installation are available. This includes attractive self-contained modules in 5,000 and 50,000 gpd ISO shipping container units, and remote camp units transportable by helicopter. Versatile and robust systems include options for re-use, nitrogen and phosphorus removal, and remote monitoring.	US and Canada



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# Ample Tank and Component Access Is a Maintenance Must

Entry points from a clean-out at the outside wall of the house to an inspection port at the end of the drainfield make troubleshooting a breeze

By Jim Anderson

Over the years, I have seen a lot of access problems associated with sewage tanks, including septic, pump and aerobic tanks. As a part of any management program, regular maintenance of tanks must be performed. Some regulatory agencies require either periodic inspection or regular solids removal. Cleaning a septic tank properly requires access through a manhole or manholes that allow access to all corners or compartments of the tank.

This requires an opening at least 20 inches in diameter, allowing cleaning and inspection of the tank as a part of regular maintenance, as well as access to inspect tank baffles. In most areas, an effluent screen is required at the outlet baffle of the septic tank. I have been with service providers more than

once when the outlet baffle and effluent screen were under the lid, so the only way to clean the screen is to remove the lid. Working with the tank manufacturers to make sure the tanks have access to the baffles is important.

Providing proper access means the service provider will not have to hunt for an hour to find the tank and access points. This means bringing access points to the surface using risers and lids. Remember, though, that while the goal is to provide access to service providers, it is important that the lids be secure and prevent entry by unauthorized people such as children and homeowners. Every year you read in the news about a child who accidentally fell into a septic tank and was seriously injured or even died.

Securing lids if they are plastic products means that all the lid screws are in place, including the one “safety screw that is different from the others.” The weight of concrete lids is somewhat of a deterrent but not enough; they should be chained and locked to prevent entry. It is also good to have an additional safety device or net inside the risers above the tank. Numerous products on the market will keep people or items from falling into the tank itself.

Similar situations to the effluent screen occur in pump tanks. To service or replace a pump or control floats in a system, they must be accessible. It's important to use a pump tree for the pump and floats with a chain or rope attached so they can be removed from the tank for maintenance. This also means that the piping has quick-disconnect connections so the service provider does not need to cut the supply pipe to remove the pump.

## EXPAND YOUR ACCESS

Just like the tank and effluent filters, you want to plan ahead to provide easy access to all system components. If there is a problem or blockage in one part of the system, you want service providers to be able to identify and correct the issue without impacting or disturbing other parts of the system.

I remember a workshop that some colleagues and I conducted where we visited a residence and saw that wastewater was standing in the sewer pipe running from the house to the septic tank. The homeowners informed us that they had continual problems with backups in the sewer line. This was no surprise because the sewer pipe either was not laid on the proper grade or it was deflected during backfill. As a result, the pipe did not run empty between water-use events in the house. This allowed solids to accumulate in the pipe, resulting in blockages.

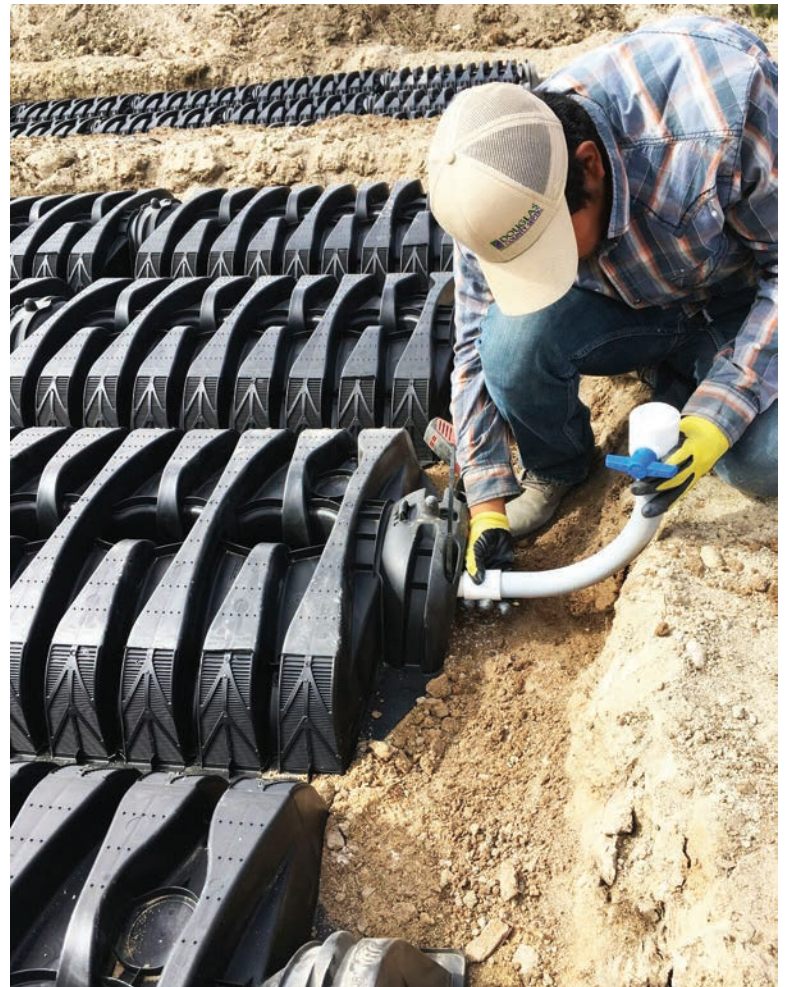
◀◀ The weight of concrete lids is a deterrent to removal by curious children, but heavy lids should also be secured with a chain and lock. (COLE Publishing file photos)





▲ For safety, follow the manufacturer's recommendations for properly securing access lids brought to the surface.

➤ When you bring a chamber system port to the surface, be sure to properly secure it so it is not disrupted.



**If there is a problem or blockage in one part of the system, you want service providers to be able to identify and correct the issue without impacting or disturbing other parts of the system.**

Properly laying and backfilling all piping is important to good system installation. An ASTM standard (2321) covers properly embedding and backfilling piping installed in trenches. The pipe should be surrounded and stable so that it stays on proper grade and does not develop dips that may collect solids and lead to blockages. I would add this also prevents water from collecting and freezing, causing blockages in cold climates.

Properly installed pipe must be on a compacted aggregate base or suitable natural soil, then the initial backfill, or haunching as it is called, is placed halfway up the pipe before final backfill around and above the pipe. Backfill should be clean, unfrozen material. This means no rocks that can deflect the pipe or crack or break it. Final backfill should be crowned to

allow for minor settling and to shed surface water. Final backfill should be suitable for establishing vegetation to prevent erosion and help with frost protection in cold climates.

In terms of access to the sewer line, a clean-out should be installed outside the residence. This should be a two-directional clean-out so it can be cleaned going both toward the residence and toward the septic tank.

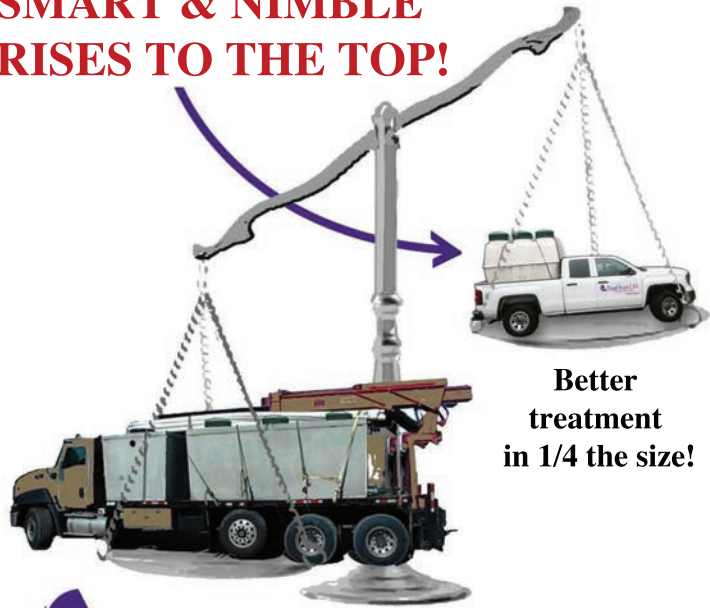
Having the clean-out outside means blockages — should they occur — can be removed without having access to the residence. This allows the service provider to work without having someone home to provide access and avoids the common issue around finished basements where the inside clean-out has become hidden by Sheetrock walls.

## INSPECTION PORTS

A key component of system management is to provide the ability to assess whether the soil treatment area or drainfield is accepting the effluent delivered. Again, many regulatory management programs require providing inspection ports in drainfield trenches or beds.

From a system management standpoint, this allows a quick way to see whether effluent is ponded in the system and what proportion of the system is being used. A number of years back, I remember recommending inspection ports in trenches. Some of the first installations resulted in what I would term “unsecured” inspection ports. They were easily extracted from the trench the first time the push-on cap was removed, rendering them useless.

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## SYSTEM MANAGEMENT

» Make sure the trench bed for piping is stable, and check the grade to make sure you don't have any dips where solids can collect and cause blockages.



Many homeowners object to a bunch of pipes sticking above ground, and they also seem to draw riding lawn mowers like magnets. An effective way to provide access is to bring them into a valve box at the surface.

The following are some guidelines for locating and securing inspection ports. They can be installed at both ends of the trench or bed. The pipe should extend to the bottom of the trench or bed. Holes should be drilled in the pipe up to the level of the top of the trench or bed. The pipe should extend from the top of the system to the ground surface or above. It should not be connected to distribution piping.

Many homeowners object to a bunch of pipes sticking above ground, and they also seem to draw riding lawn mowers like magnets. An effective way to provide access is to bring them into a valve box at the surface. That way they are easily found and identifiable. Caps on the pipe should be screw type. If slip or push-on caps are used, they should be slit on the side to allow easy removal.

There are three primary ways the inspection ports can be secured in rock systems. They can be anchored using a 12- to 18-inch section of rebar, a pipe tee created at the bottom of the pipe, or using and anchoring a toilet flange at the bottom of the pipe. The goal is to securely anchor the inspection port so it does not move around or get accidentally removed when accessed. It also ensures a consistent measurement of liquid depth.

For chamber systems, the pipe is attached to the chamber at the port location provided with stainless steel screws. In the chamber, the pipe extends to the infiltrative surface and is perforated to allow an accurate measure of liquid depth. For any proprietary products, remember to follow the manufacturer's instructions. □

This is the second article in a two-part series covering the design and installation of onsite systems with future management in mind. Jim Anderson is co-author of the Basic Training column in *Onsite Installer* and an emeritus professor at the University of Minnesota Department of Soil, Water and Climate.

# SP

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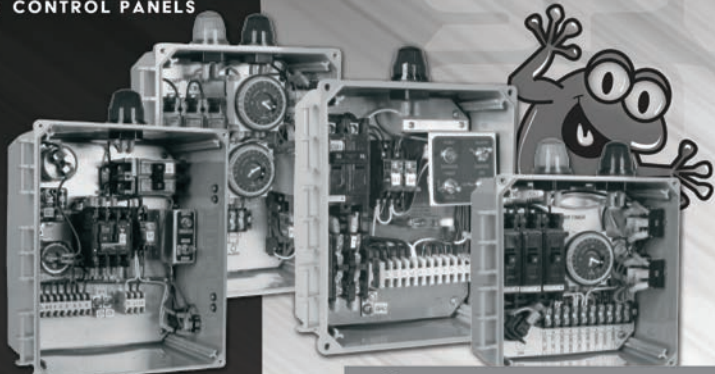
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# Precast Concrete Tanks Provide Custom Solution



Photos courtesy of Camp Precast Concrete Products Inc.

**Challenge:** A school district in the Northeast required a highly customized onsite system that could be installed with minimal disruption to students and teachers. The tank lids required 16 access points for the treatment devices as well as other customizations.

**Solution:** Officials turned to four 10,000-gallon precast concrete tanks that were installed quickly and backfilled with native soils, whereas alternative options would have required specific backfill to be delivered to the jobsite and more time to prepare the sub-base. The precast concrete manufacturer easily cast the access points into the lids and installed side-to-side and tank-to-tank piping at the plant to save even more time on-site.

**Quality-Engineered:** Precast tanks are designed and engineered to the latest industry standards, use quality raw materials and employ carefully controlled QA/QC processes in production.

**Customizable:** Precast concrete structures can be tailor-made for your exact needs. Whatever challenge your next project brings, precast can provide the solution.

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**PRECAST PROUD**



# North Dakota's New Association Aims for Unified Regulations

A fledgling group of wastewater professionals looks to work with government on sensible rule changes and utilize industry innovations

Compiled by Betty Dageforde

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



## Tom Schimelfenig

**owner**

**Business:** Tom Schimelfenig Excavating, Bowdon, North Dakota

**Age:** 65

**Services we offer:** Building site prep work, which requires installation of sanitary sewer or onsite wastewater septic systems; wetland restoration for the U.S. Fish and Wildlife Service and various other excavation work.

**Years in the industry:** 42. In 1978, started an excavation business, and septic was part of it.

### Association involvement:

I am the founder and president of the North Dakota Onsite Wastewater Recycling Association. I started the association in 2019 because I thought we needed to unify as a group and as a profession. In 2018, I brought up the idea with several guys when we were in Fargo for training. They thought it was an

excellent idea so I pursued it. I went to Minneapolis for the National Onsite Wastewater Recycling Association Mega-Conference to learn about it. That was an experience I'll never forget. NOWRA really offers a lot to the contractor. We started assembling the association in February 2019. There had been a group of us who got together before that, and we started reaching out to other contractors through email and at training conferences. We are growing slowly and steadily.

### Benefits of belonging to the association:

Before we formed the group, contractors had no place to go for questions when they had issues or about how things needed to be approached. We needed to have a unified group to work on various issues and to combat some of the overregulation. We were ending up with many different types of rules and regulations coming from every different health unit across the state.

### Biggest issue facing your association right now:

Getting the code set up in just one house in the government and getting it implemented right. The present system is in many sections of the government — the state Plumbing Board, the state Department of Environmental Quality, the North Dakota Department of Health, as well as 10 or 11 different health units across the state, which all have their own set of rules and their own opinions about how things should be done. We're trying to bring it to where everybody operates the same across the state. We were making good progress until the coronavirus hit, and that put an end to all meetings.

### Our crew includes:

I work by myself. I hired a guy last year, but he quit before Thanksgiving because he couldn't handle the cold weather. This job is not for everybody. It's stressful and labor intensive. I do all the invoicing, job planning and bidding. My wife, Peggy Schimelfenig, helps with the office work.

### Typical day on the job:

Every day is different. No two jobs are alike. I don't care where you go or what you do — everything you encounter changes your day. It could be the weather or a customer who has a different idea about what they want. You have to be flexible. My bookwork gets done in the evenings or on weekends.

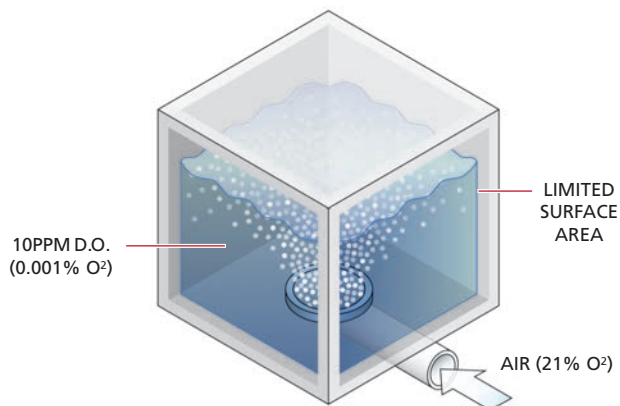
### The job I'll never forget:

I've done a lot of septic systems in my life, and every one is a challenge — meeting the requirements, sizing it right. Sometimes property owners want to

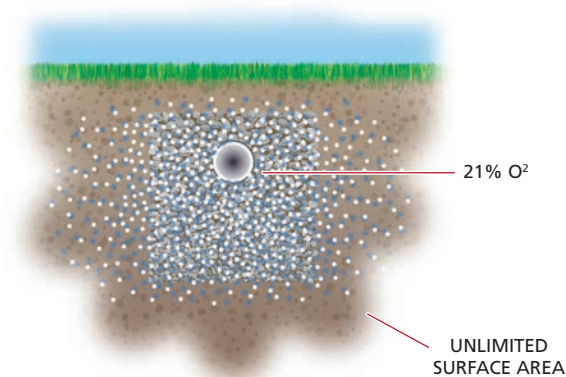
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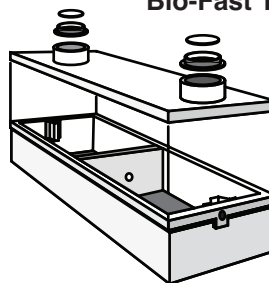
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## SNAPSHOT



add something to a project that isn't on the plan you bid on and at the end of the job some of them don't want to pay for it.

### **My favorite piece of equipment:**

When I was a kid, my dad moved a house on his farm; I watched a guy run the backhoe and I said that's what I want to do someday — just run a backhoe. I never dreamed I'd be running all this equipment — scraper, dozer, excavator, road grader. I like to sit on the dozer (D61 Komatsu with low-ground pressure tracks), and I love running the excavators, too (CASE 9030B and Caterpillar 304 mini).

### **Most challenging site I've worked on:**

The soils around here vary — clay, clay loams, sand, gravel, scoria in the western part of the state and shallow shale in the east — so the challenge is assessing the situation and using the right system. In the area I live in, getting a soil scientist is very expensive so I do all of it. If I run into a snag where I can't figure it out, I rely on Allen McKay, a guy who was an environmental health officer and is now a district health administrator. We use a number of systems, depending on the setback from the water table. The two main ones we put in around here are mounds where it's too wet to put anything else in and a system from Infiltrator Water Technologies with serial distribution. When we get into clays, we use very large systems to get the water to soak away into the soil and get treated properly.

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

I've had a lot of challenging projects, but I never had something I wished I hadn't done. If I see something isn't going to work, I'll stop and change it. You have to be flexible.

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

The question I get asked is why the systems have to be so big. People around here are used to what we did 30 years ago where you'd put a septic tank in and probably 100 feet of leachfield. Now we're putting systems in that are four, five and six times that size.

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

Everything that's out there is based on science and there is data proving effectiveness, so I haven't found a regulation that isn't protecting everybody's safety. Some of it may be overdone or is too tough on things, but that's just my opinion.

◀ Tom and Peggy Schimelfenig stand by a 2000 International 5500I tri-axle dump truck with a 16-foot Ox Bodies insulated box, a 2002 Felling Trailers FT-50-3 trailer and a 1998 Caterpillar 446B loader backhoe (as well as Casey the dog). (Photos courtesy of Tom Schimelfenig Excavating)

▼ Lukas Sculley works on installing a 1,600-gallon Brown-Wilbert septic tank for a new five-bedroom home; it has a pump chamber that lifts the effluent up into the drainfield, requiring 550-feet of chambers from Infiltrator Water Technologies for serial distribution, a CASE 9030B excavator (background) and Caterpillar 304 mini-excavator (foreground).



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

That comes from my mother. She told me to know what you're doing and be consistent so people can rely on you.

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

In my last three years of high school, I was in architectural drafting. But I'm the type of guy who likes to be outdoors, and I really didn't want to go to college. Now I wish I had because the architectural drafting part of it is what carries me through this industry because I know how to draw things out and how to read blueprints.

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

- Education is the key — this whole industry is all about education. One of our association's goals is to educate the people involved in this industry — contractors, homeowners, regulators and legislators — on how (onsite systems) work and what it takes to maintain them. I go every year to our training conference because there are always things I pick up that are new. You need to have an open mind when you go. As far as training new people coming into the industry, some contractors think we should go back to apprenticeship programs.
- Regarding drainfield material, I think chamber systems have really been a game-changer. It makes these systems more doable, gives them longer life and opens up the door for many different ways to put in a drainfield. And we're using nature more in doing it. We aren't doing the old rock-and-pipe thing; I don't think we got the life out of that product that everybody was thinking we would get. And aggregate supplies in this country are showing signs of being short.
- Another issue for the future is getting new people involved in the industry because 80% of us are going to be retiring in the next few years. □



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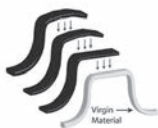
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# Hawaii Case Has Far-Reaching Implications for Designers and Installers

The U.S. Supreme Court says wastewater pros need to think about where discharges go

By David Steinkraus

**A**fter a lot of buildup, the U.S. Supreme Court's decision in a closely watched wastewater case turned out to be less than definite.

The case involved Maui County in Hawaii, which for years has disposed of effluent from its wastewater treatment plant in deep injection wells. Scientists found that effluent migrates through the soil and groundwater and enters the Pacific Ocean. Environmental groups sued and asked federal courts to require a National Pollutant Discharge Elimination System permit for the wells, just as permits are required for other discharges into navigable waters. The worry for wastewater professionals was that the court would say any discharge to groundwater, such as from an onsite system, would require an NPDES permit.

In a 6-3 opinion, the court says it would — or maybe not. It all depends.

## Some clarity

“What this opinion has effectively done is solidify the law to confirm that the Clean Water Act, in certain instances, does apply to discharges to groundwater,” says Joel Johnston, an associate in the Denver office of law firm Hall Estill. “So I think the court has provided a little bit of clarity.”

In doing that, the court threw out a test developed by the 9th U.S. Circuit Court of Appeals in San Francisco, which heard the case from Maui first. That test says permits would be required for discharges that are “fairly traceable” to a point source. But, Johnston says, the Supreme Court decided the appeals court test would require too many activities to have permits.

“And the court said, based on that, the Clean Water Act was not intended to address any discharge into groundwater. It's only intended to address discharges where the discharge is a functional equivalent of a discharge into a navigable water,” Johnston says.

From a technical regulatory point of view, the court laid out a seven-factor test that courts, regulators and installers need to look at in deciding whether a discharge is functionally equivalent, says Mary-Lynn Coffee, senior environmental partner in the Irvine, California, office of the law firm Nossaman.

Those factors include the time and distance a pollutant has taken to travel through groundwater, and these are generally the most important factors, the court wrote; the nature of material the pollutant has travelled through; the extent of dilution; the amount of pollutant entering a navigable water versus the amount discharged from the source; the manner by which the pollutant enters the navigable water or the area where it enters; and the degree to which the pollutant has maintained its identity.

“I think the test is as clear as any regulatory test ever is,” Coffee says.

“I thought it was very good that the court talked about what changes in the character of the pollutant had occurred, the degree to which the pollution had maintained its specific identity or changed into something else,” she says. “That factor allows consideration of the degree to which both chemical and natural filtration processes relied upon by onsite filtration systems provide treatment of waste prior to its arrival in a surface water.”

Whether a discharge needs a permit is now an issue to be resolved by lower courts and state and federal agencies, Johnston says. An important point in this case, he says, is the Supreme Court did not say that Maui County needs a permit. Instead, the case was sent back to the 9th U.S. Circuit Court of Appeals, which will make that decision.

How much onsite regulations will change depends on the state, Coffee says. In California there may not be many changes because the statewide policy already contains requirements like those the court outlined in the Maui decision, she says. In states that have not taken into account the potential for effluent to migrate to surface waters, expect new standards or perhaps an NPDES permit.

Both attorneys say the court's opinion still leaves a lot of gray areas. It also leaves room for a good deal of factual material and analysis by hydrologists, geologists, soil scientists and other specialists who can determine where a pollutant will go and what will happen to it, Coffee says. “So applying it on the ground, I think that's pretty tough. But so are the regulations that exist in many places today.”

## What you can do

For installers wondering how to avoid problems under the court's ruling, Johnston says the solution may be to talk to regulators before there are questions about a potential violation or noncompliance. But it's also not wise to simply ask whether a permit is necessary. Instead, he says, develop a position based on facts and an analysis of the situation, and ask the regulator if that position is correct.

Another type of uncertainty stems from the Clean Water Act itself because it allows for lawsuits by private citizens, Johnston says.

“That's where the risk is. If you don't get the permit and a citizen suit is brought, you could be caught having to spend substantial sums to deal with it,” he says. “We're corporate attorneys. From our perspective, the clarity my clients don't have is whether an activity is subject to permit.”

Coffee recommends two actions for wastewater professionals. First, when doing an onsite project, try to develop technical information about the

soils in the area, groundwater, groundwater flow, distance to surface water and other information related to the factors laid out in the court's functional equivalent test. Use that information to guide siting, installation and operation, and then keep the information as protection in case there is a legal or enforcement challenge. Second, she says, become involved with your state wastewater organization, and through that try to work with regulators in developing the rules they will use and the guidance they may produce to comply with the court's ruling. There is protection from liability for an onsite system owner and installer if a system has been installed in accordance with regulations, she says.

Although it is California-specific, Coffee says, the water board policy for onsite systems does take the court's ideas into account. If you want to look at it, follow this link: [www.waterboards.ca.gov/water\\_issues/programs/owts/board\\_adapted\\_policy.html](http://www.waterboards.ca.gov/water_issues/programs/owts/board_adapted_policy.html).

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## When doing an onsite project, try to develop technical information about the soils in the area, groundwater, groundwater flow, distance to surface water and other information related to the factors laid out in the court's functional equivalent test.

### The next disagreements

The majority opinion came from the four justices generally viewed as more liberal — Stephen Breyer, Sonia Sotomayor, Ruth Ginsburg and Elena Kagan — along with Chief Justice John Roberts and the newest justice, Brett Kavanaugh. Dissenting were the more conservative justices: Clarence Thomas and Neil Gorsuch in one opinion and Samuel Alito in another. If you want to read the full opinion, you will find it here: [www.supremecourt.gov/opinions/19pdf/18-260\\_jifl.pdf](http://www.supremecourt.gov/opinions/19pdf/18-260_jifl.pdf).

It's unlikely there will be more litigation about the rule right away in lower courts, Coffee says. "I really think the first battle we're going to see, because the court invited it, is a battle over (U.S. Environmental Protection Agency) regulations. The court invited the EPA to promulgate more specific implementing regulations consistent with their opinion," she says, "and when they do so, litigation over the regulations is probably inevitable."

But given the number of issues the EPA is already dealing with, she says, it's very unlikely any new regulations would be adopted before November.

### Reclamation started it

The case started with Maui County because for years it has sent municipal wastewater through its Lahaina Wastewater Reclamation Facility. That plant treats incoming wastewater, disinfects it with ultraviolet light and sends it out to irrigate golf courses and landscaping. Excess water is sent to several injection wells.

From 2011 through 2012, University of Hawaii researchers working for the EPA, Hawaii Department of Health, and U.S. Army Engineer Research and Development Center in Vicksburg, Mississippi, used a tracer dye to follow the flow of water from the injection wells. Their study found that treated wastewater was flowing into groundwater and back into the ocean near Kahekili Beach. There it was linked to algae blooms that smother coral reefs and cause other environmental damage.

The largest concentration of dye appeared in the ocean nine to 10 months after injection at the wells, the study says. Researchers estimated it would take about four years for the last bit of dye to enter the ocean.

In a column for *The Maui News*, Maui Mayor Michael Victorino writes, "The court's direction is what I have asked for all along — clear direction for regulation. The court's test gives the county and the state Department of Health a road map moving forward. It provides clarity before we commit taxpayer dollars toward long-term environmental solutions. So far, the county has spent \$48 million on recycled water projects, and it has another \$82 million in projects planned or in process in the near future."

In September 2019, the County Council voted to settle the case, which in most cases would have led to the withdrawal of the case before it was argued at the Supreme Court. But Victorino refused to settle. That set off a struggle over who had the ultimate power to determine a legal settlement, the council or the mayor, but it also ensured the case was argued before the court. □

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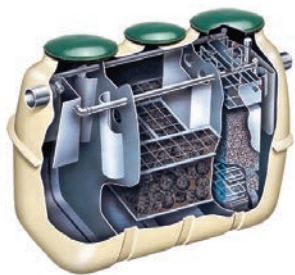
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## ADVANCED TREATMENT UNITS

### BioMicrobics BioBarrier HSMBR

The BioBarrier HSMBR (High Strength Membrane Bioreactor) system from BioMicrobics offers onsite installers an alternative way to treat and reuse all wastewater on a property. They don't require external pumps, valves, clarifiers and the associated control system, nor costly chemicals, additives or add-on disinfection. While conventional treatment processes focus on the degradation of the waste and nutrients (i.e., nitrogen and phosphorus), the membranes physically separate much smaller microorganisms and contaminants that create turbidity. Using biological processes and membrane separation to treat wastewater and engineered to fit most residential (small to large) and commercial applications, the system is designed to treat water to be 99.9% clean of contaminants. 800-753-3278; [www.biomicrobics.com](http://www.biomicrobics.com).



### Clarus Environmental Fusion

Clarus Environmental's Fusion systems are drop-in wastewater treatment units designed for decentralized applications where effluent quality must meet or exceed secondary treatment standards. They are designed for residential, commercial and small community applications and are available in 450- to 4,000-gpd treatment capacities. All mod-

els up to 800 gpd are NSF/ANSI Standard 40 certified to produce effluent quality of 9 mg/L CBOD5 and 9 mg/L TSS. The design enables installation without a pretreatment tank, making it suitable for sites with limited space. Effluent disposal options include conventional trenches, dosed systems, drip irrigation or disinfection with direct discharge. 800-928-7867; [www.clarusenvironmental.com](http://www.clarusenvironmental.com).

### NextGen Septic GenX Retrofit

GenX Retrofit septic technology from NextGen Septic can be installed in any approved septic tank and is designed to repair a clogged soil drainfield. It includes a compact, stand-alone, automated, two-stage treatment system for domestic sewage that produces a clean-water output. The sewage is collected in a tank, where solids break down under anoxic conditions, while the wastewater is aerated with biomedica and low-noise submersible pumps in the secondary compartment. The second stage occurs in a separate treatment unit, treating nitrogen and phosphorus through a no-maintenance membrane and ozone disinfection system. The process lets water and salt pass through, while rejecting the solids and dissolved organic contaminants to create an output suitable for surface discharge. According to the maker, the clogged field begins to percolate water in as little as eight to 12 weeks when the biomat is thin enough to allow water to get through at a reasonable rate. 513-673-3583; [www.nextgenseptic.com](http://www.nextgenseptic.com).



### Presby Environmental Advanced Enviro-Septic System

The Advanced Enviro-Septic (AES) System from Presby Environmental is a passive onsite wastewater treatment system for residential, commercial and community use that's designed to remove 99% of wastewater contaminants. It requires no replacement media or additives and no electricity or mechanical devices. The NSF 40 Class 1-certified system treats effluent efficiently, providing long system life while protecting the environment, according to the maker. It quickly and naturally establishes multiple bacterial treatment environments throughout the system that break down and digest wastewater contaminants that leave the septic tank. Following the filtering of suspended solids and biological treatment, it releases highly purified wastewater to the soil, recharging the groundwater and preventing soil and groundwater contamination. It is BNQ certified for secondary and advanced secondary treatment. 800-473-5298; [www.presbyeco.com](http://www.presbyeco.com).



## AERATION SYSTEM

### Geomatrix Systems SoilAir

SoilAir from Geomatrix Systems intermittently aerates the drain/leachfield and surrounding soils rather than constantly aerating wastewater in a tank. This process allows rapid rejuvenation of failed septic systems, extends the life span of new leachfields and enhances treatment, according to the maker. Systems can serve single-family and multifamily homes, as well as challenging and high-strength waste streams, such as restaurants, hotels, marinas, laundromats, health care facilities, grocery stores, food processing facilities and convenience stores. 888-764-5247; [www.soilair.com](http://www.soilair.com).



## AEROBIC SYSTEM

### SeptiTech STAAR filter systems

SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculating) filter systems are designed for residential and commercial properties with minimal operator oversight while delivering consistent treatment even during peak, low or intermittent flows. Using an unsaturated, engineered textile media to treat wastewater that meets strict permit limits, the commercial filter system provides a simple, automatic equalization and clarification process for 500- to more than 150,000-gpd flows. The biological trickling filter technology also maintains low levels of Nitrate-N, with all below-grade components that fit in watertight concrete, plastic or fiberglass tanks. Smart technology allows the system to go into a sleep mode to achieve lower operating costs and power requirements. Systems are ETV-EPA verified and NSF/ANSI Standard 40/245 certified. 800-753-3278; [www.septitech.com](http://www.septitech.com).



## DISINFECTION

### Scienco/FAST - a division of BioMicrobics SciCHLOR

SciCHLOR from Scienco/FAST - a division of BioMicrobics is a sodium hypochlorite generator designed to give a large span of markets a safe and effective way to disinfect. With salt, water and electricity, the system with multipass SciCELL electro-chemical activation, or ECA, technology will produce an available supply of 10 to 60



pounds chlorine-equivalent/day sizes. Connected to an incoming water source and with multiple operating modes, the brine solution makes multiple passes through the low-voltage DC electrolytic cell to provide a reliable method for the needs of medium to large onsite disinfection applications. Its recirculation method keeps control of desired chlorine concentration while the assembly minimizes maintenance downtime. 866-652-4539; [www.sciencofast.com](http://www.sciencofast.com).

## NITROGEN REDUCTION SYSTEMS

### Eliminite Commercial C-Series

The Commercial C-Series system from Eliminite is designed to provide reliable treatment with emphasis on total nitrogen reduction for high-strength waste applications such as work camps, RV parks, restaurants, ski and golf resorts, breweries, mines and agricultural operations. It is designed to work with locally sourced tanks and components when possible. MetaRocks treatment media is designed to withstand a variety of high-strength wastewater loading scenarios, particularly where clogging and odor control are major considerations. The system is scalable and may be adapted to suit specific phasing requirements, site constraints and unique demands. 888-406-2289; [www.eliminite.com](http://www.eliminite.com).



### Norweco Singulair Green

The Singulair Green HDPE system from Norweco offers a solution to difficult tank delivery concerns such as limited site access and steep grades. The system treats up to 600 gpd. Treatment occurs in the pretreatment, aeration and final clarification chambers. Activated sludge recirculates to the aeration chamber via a biostatic sludge return mounted in the aeration/clarification wall. Effluent in the clarification chamber enters the biokinetic filter and is equalized and filtered. Model TNT (Total Nitrogen Treatment) reduces total nitrogen by more than 68%. Designed for easy installation, operation and maintenance, the TNT system minimizes effluent nitrogen concentrations reliably and economically. 800-667-9326; [www.norweco.com](http://www.norweco.com).



## Orenco Systems AdvanTex AX20-RTUV

The AdvanTex AX20-RTUV treatment system from Orenco Systems is a self-contained module that treats typical septic tank effluent to better than secondary standards, with nitrogen reduction and UV disinfection. It is designed for homes with up to four bedrooms and is suited for small sites with poor soils or that require shallow burial. It helps protect surface waters and aquifers and can be an effective solution for areas that have strict discharge limits, according to the maker. It is installed following a septic tank equipped with Biotube effluent filters. The unit eliminates the need for separate recirculation, treatment, discharge and disinfection tanks and basins; and it reduces the number of risers and lids needed in the treatment train. 800-348-9843; [www.orenco.com](http://www.orenco.com).



## RECIRCULATING FILTERS

### Anua BioCoir

The BioCoir recirculating media biofilter from Anua is designed to be simple to install and easy to operate. It provides stable treatment across a broad range of applications, with no noisy blowers or motors running constantly, according to the maker. It uses a coconut coir media housed in a preassembled pod; coir refers to the fibers that make up the thick husk of a coconut fruit. The coconut fiber is low cost, an upcycled resource and high in lignin content, which results in a durable material. Pretreated effluent is time-dosed over the media using specially designed helical spray nozzles to provide uniform distribution. Treatment is optimized by recirculating effluent through the media multiple times. It is certified to NSF/ANSI Standard 40, Class I and third-party tested to reduce nitrogen by more than 50%. Residential and commercial configurations are available. 336-547-9338; [www.anuainternational.com](http://www.anuainternational.com).



## Delta Treatment Systems ECOPOD-N

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



## Ecoflo / Premier Tech Aqua Biofilter

The Ecoflo / Premier Tech Aqua Biofilter is an energy-free treatment that uses a renewable, compostable coconut husk filter, giving it a low carbon footprint. Most models come preassembled and ready to use. 800-632-6356; [www.ecoflobiofilter.com](http://www.ecoflobiofilter.com).



## UV DISINFECTION

### Jet Inc. Illumi-Jet UV disinfection unit

The Illumi-Jet UV disinfection unit from Jet Inc. is capable of reducing fecal coliform bacteria levels to well below the most stringent U.S. treatment standards, according to the maker. It uses a germicidal lamp that emits 95% of the ultraviolet energy at the wavelength of 254 nanometers. This wavelength is in the region of maximum germicidal effectiveness and is lethal to virus, bacteria, protozoa and mold. The disinfection chamber couples directly with any system's 4-inch discharge pipe, and it is permanently installed below grade. When fully inserted, the lamp housing is correctly positioned by an integrated keyway near the top of the disinfection chamber and creates a well-defined flow path, ensuring system effluent has the proper ultraviolet exposure time. Under standard operating conditions, fecal coliform reduction exceeds 99.9%. 800-321-6960; [www.jetincorp.com](http://www.jetincorp.com).



### Polylok PL-UV1 UV Disinfection Unit

The PL-UV1 UV Disinfection Unit from Polylok reduces bacteria levels from secondary effluent to achieve strict water-quality standards. Every component of the compact unit is engineered and constructed to provide reliable disinfection and long operational life, according to the manufacturer. It has a dual-pass design, a long-life UV bulb, weatherproof electrical components and no chemical residual or harmful byproducts. It is easy and inexpensive to install and operate, and it has low electrical usage. Flow rates for gravity flow only are 100 through 8,640 gpd, with 100 through 4,320 gpd with 30 mg/L BOD and 30 mg/L SS, and 4,321 to 8,640 gpd with 10 mg/L BOD and 10 mg/L SS. It offers a UV dose greater than 40,000 microwatt-seconds per square cm at 254 nanometers, with transmissivity of 65%. 888-765-9565; [www.polylok.com](http://www.polylok.com). □





**INDUSTRY NEWS**

**Ditch Witch announces new training modules**

With the introduction of four new modules, more underground construction and outdoor professionals can take advantage of Ditch Witch Certified Training. The modules include training for stand-on skid-steers, walk-behind trenchers, ride-on trenchers and the Roto Witch drilling attachment. Online training modules are available at no cost by visiting [www.ditchwitch.com](http://www.ditchwitch.com) and registering for a free MyDitchWitch account. In-person training is available at any Ditch Witch dealer. The modules vary in length, from 30 minutes for smaller units to several hours for more complex subjects like horizontal directional drilling operation. Testing is provided to ensure those taking the modules are retaining the information.



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**PRODUCT NEWS**

**SJE Rhombus EZ Series In-Site Bluetooth control panels**

The redesigned EZ Series In-Site CL data logging control panels from SJE Rhombus are available in simplex and duplex models. The panels use Bluetooth to connect to the new EZ In-Site Connect app, available for both Android and Apple smart devices. With the app, there's no need to open the panel for configuration, viewing status or downloading data. The Bluetooth module allows safe and secure access in all weather conditions. The panel configuration can be converted in the field to either timed dose or demand dose using a tablet or smartphone. The panels record up to 4,000 system events, including pump runtimes, pump cycles, alarm conditions, hand/off/automatic settings, power outages, service calls and more. The simple and accurate C-level sensor converts the water pressure in a tank into a low-voltage electrical signal read by a variety of level monitoring products manufactured by SJE Rhombus. 218-847-1317; [www.sjehombus.com](http://www.sjehombus.com).



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# Advanced Treatment Units

By Craig Mandli

## GSF system a fit for site with compacted soil



**Problem:** A two-bedroom home in Lawrence County, Indiana, had a failing system with effluent surfacing around the tank. The site has areas with drainage issues, and previous structures on the property created soil compaction in the remaining usable area.

**Solution:** The compacted soils were removed and replaced with 20 inches of Indiana Department of Transportation Spec 23 sand. An Eljen GSF (Geotextile Sand Filter) bed system was designed with an application rate of 0.25 gallon per square foot in the available area, and it has less overall height than a traditional mound. The drainfield consists of 24 A42 GSF units installed in three rows spaced 3.5 feet apart. The overall bed dimensions are 41 by 20 feet. The drainfield final elevation is above grade and flood dosed.

**Result:** A code-compliant system was installed on the difficult site. The GSF system manages biomat buildup, helping to protect the soils below, and is also able to disperse effluent over the slow soils. 800-444-1359; [www.eljen.com](http://www.eljen.com).

## Strict disinfection needs solved at oceanfront Malibu restaurant



**Problem:** Located on the oceanfront in Malibu, California, Duke's Malibu is a popular restaurant, named for Duke Kahanamoku, the father of surfing. Wastewater from the restaurant averages 6,000 gpd and must be treated on site and directly discharged to the sensitive, sandy beach environment. The existing wastewater treatment system was outdated and caused numerous water-quality and discharge violations.

**Solution:** Carlile Macy was selected to provide an upgraded treatment system in 2011. It chose an upflow sludge blanket filtration system, or USBF, and SALCOR UV disinfection, consisting of four 3G units in two parallel tracks. The design was approved by the California Regional Water Quality Control Board and city of Malibu, and construction of the new plant was completed in April 2012.

**Result:** The system immediately produced high-quality effluent, which met the stringent disinfection requirement of California Title 22. Results have been consistent since operation began. Effluent total coliform count has been nondetectable, and the dissolved oxygen concentration has averaged 6 mg/L. The discharge has reduced coliform levels in the groundwater lens under the site and adjacent beach from more than 1,600 MPN to less than 2 MPN. The treatment plant and the Salcor UV units have now been operating over eight years, and have continued to produce high quality effluent that meets California Title 22. 760-731-0745; [www.salcor.world](http://www.salcor.world).

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