

December

2009

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Attention to detail and quality results help an Ohio installer build a loyal following

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Another View on Regional Codes

To the editor:

I truly accept the author of a recent letter to the editor in *Onsite Installer* writes what is true for him ("Regional Codes Have Merit," October 2009). And indeed, I find much merit in the tack he takes, suggesting the viability of "regional septic codes."

And, within selected parameters, I would make the argument for national standards in selected areas, such as a mandate for installation of watertight containment vessels into which any form of sewage flows.

Additionally, I would support a national mandate that all septic tanks as well as all containment vessels into which any form of sewage flows irrespective of type (fiberglass, concrete, polyethylene) must be field water-tested and verified by a third party. Spare me the argument about the cost of hauling water for such tests, as I would ask simply which is more important: this meager fee versus assuring the viability of these vessels in terms of protecting sources of water?

On the other hand, my own state of Arizona has both of these stipulations incorporated into our state statute. But, guess what: For the most part, more than 90 percent of all new septic installations in Arizona do not ever bother conforming with these statutes. Why? Simply because neither the Arizona Department of Environmental Quality nor the 15 county environmental health departments to whom they delegated this responsibility take the trouble to enforce them.

The point being: regional septic codes, unless coupled with honest implementation and rigorous enforcement, are nothing more than feel-good.

The author referred to other codes, such as the Uniform Plumbing Code (UPC) and Uniform Building Code (UBC). To the best of my knowledge, all have provisions in them allowing for the municipalities that adopt them to modify them to meet local conditions. There are, to the best of my knowledge, certain minimums that are unalterable, though I do not profess to be an expert.

Consumers today are looking for designers, contractors, O&M providers, septic pumpers, and other practitioners who will, to the very best of their ability, provide them with service in a professional manner and who are accountable and responsible for the work they perform.

Feel-good codes, whether local or regional, do not guarantee consumers that we (the onsite industry) will be accountable and responsible for the work we perform. As an industry, we either choose an ethical path or we choose a path to pad our bank account and to hell with the one environment we all share.

Paul F. Miller
Phoenix, Ariz.



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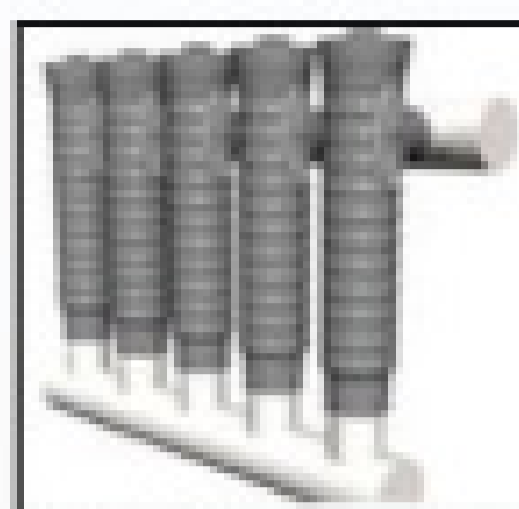
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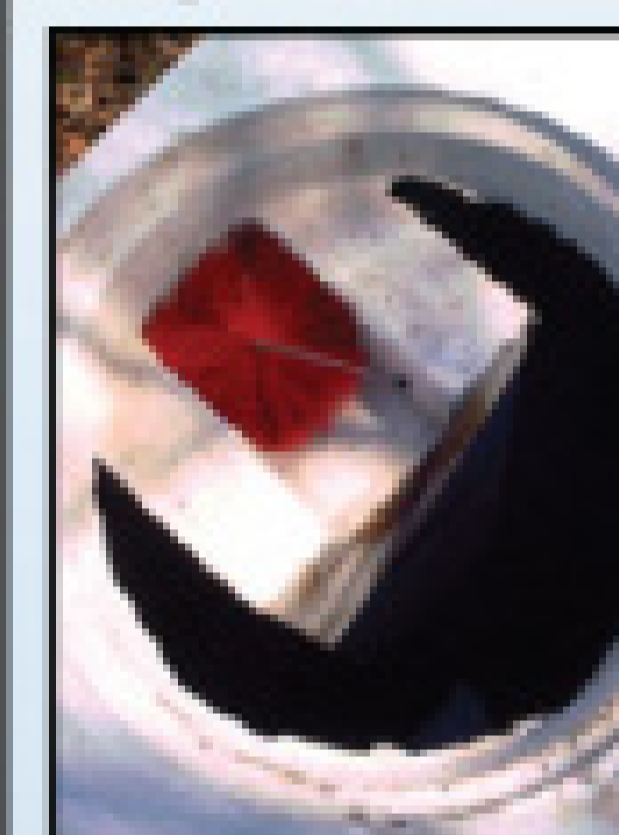
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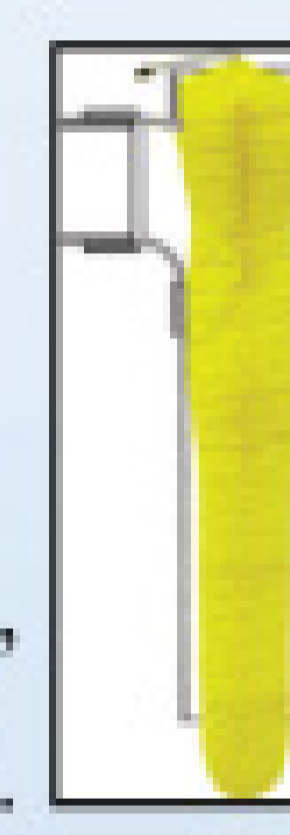


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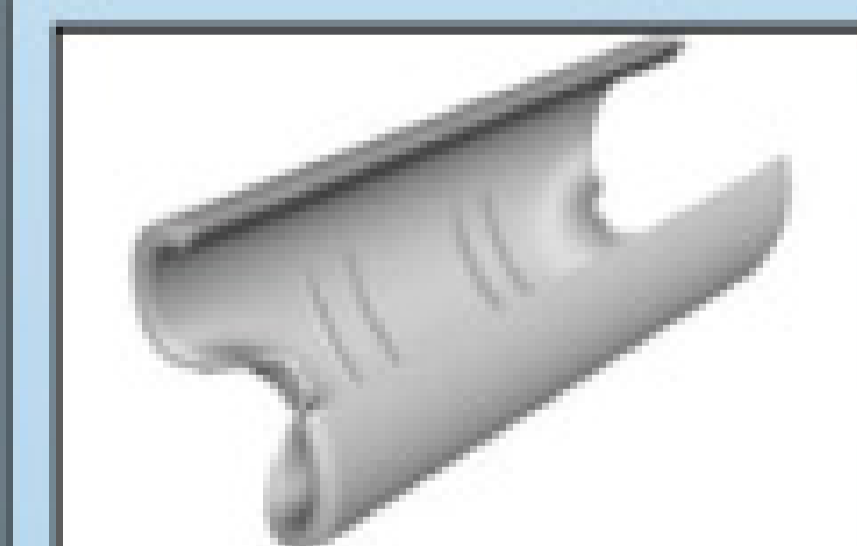
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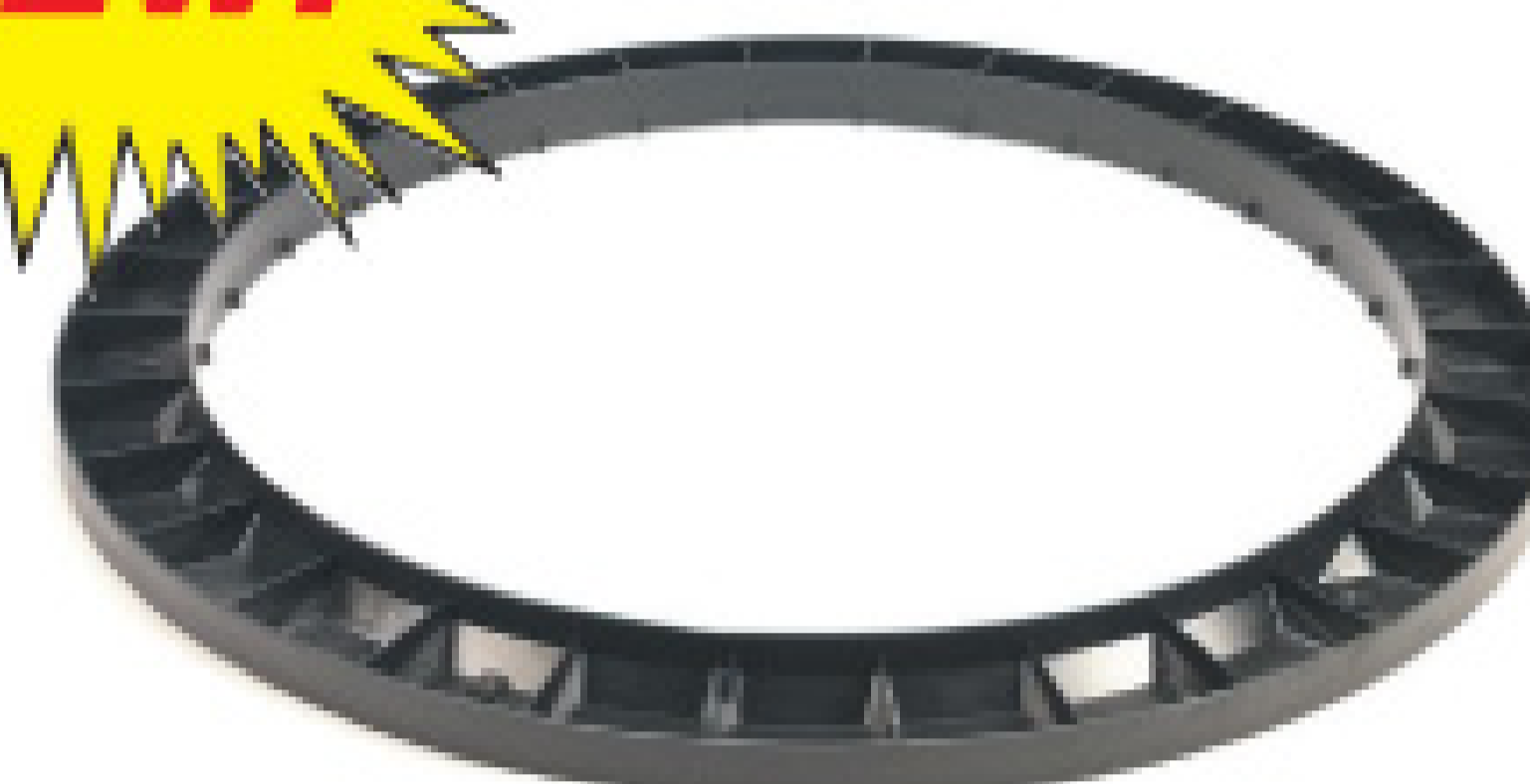
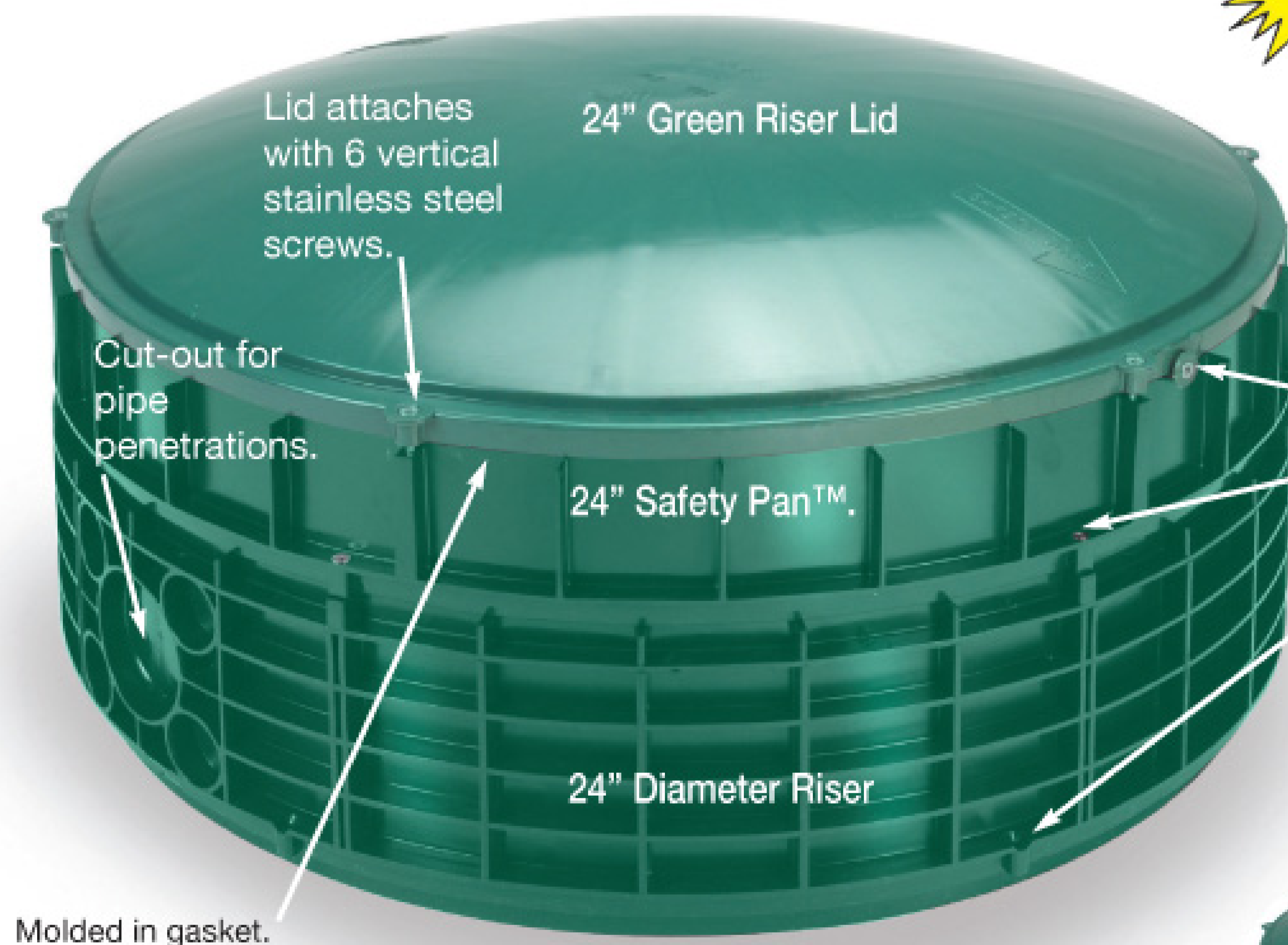
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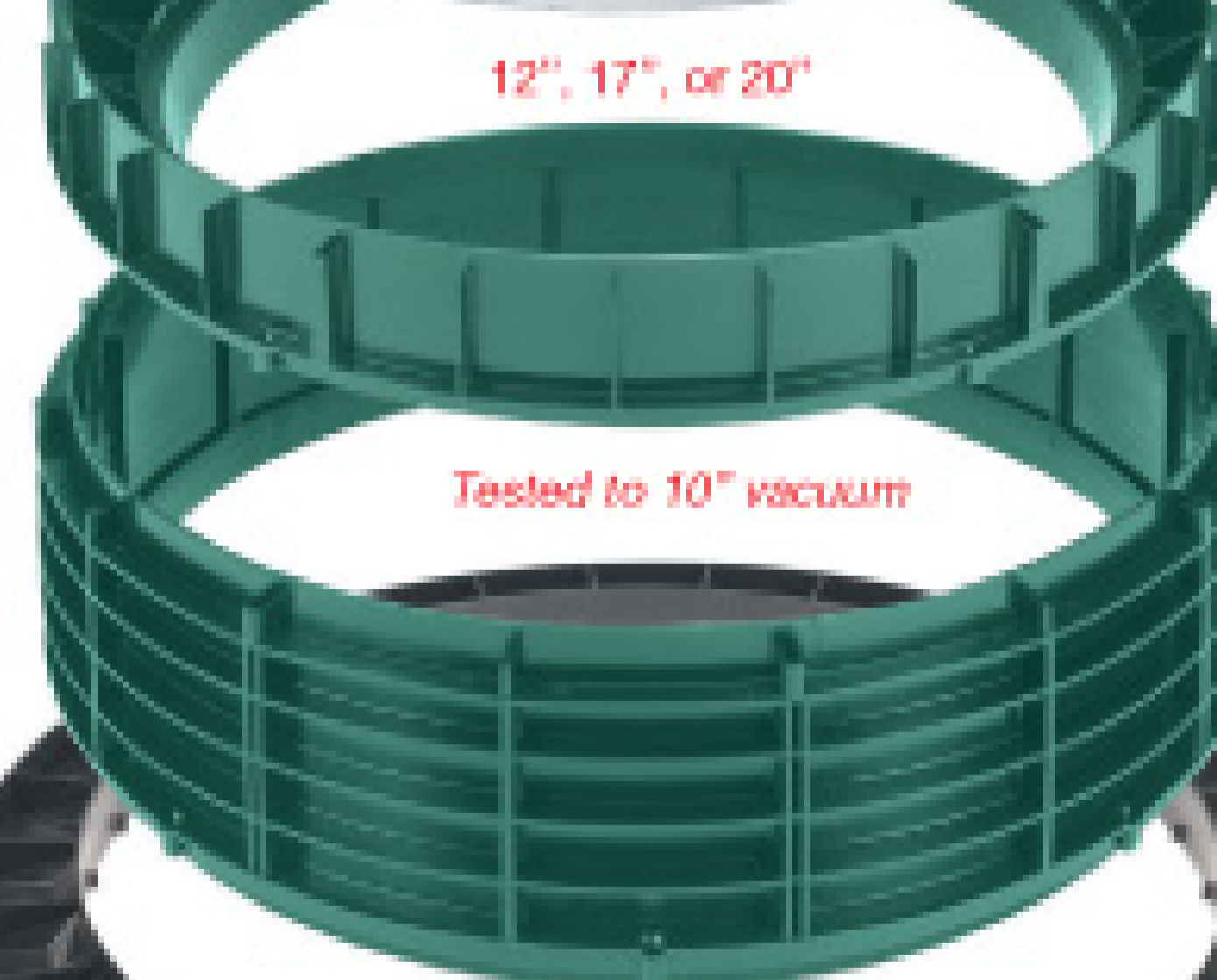
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Who Cuts the Corners?

When it comes to “cheap Charlie” systems, who’s responsible? Customers who ask for them? Installers who agree to build them? Or regulators who let it happen?

By Ted J. Rulseh, editor

A recent column by Missouri Smallflows president Janet Murray, in her organization’s newsletter, started me thinking.

Who cuts the corners? When an onsite system is shoddily installed, when a conventional system is put where it clearly doesn’t belong, when a system is undersized for the property and becomes a time bomb, where should the blame fall?

Murray (also environmental health supervisor for the Randolph County Department of Health) found out that a local family was building a new house on the same land as their old one, but using the same driveway. The owners decided they didn’t need a permit for a new onsite system and got “an unregistered person” to put in a septic tank, wrote Murray, who saw the tank while driving by.

To make matters worse, the owners were trying to install a tank and leachfield on a site with soils not suited to such a system. To make a long story short, Murray and the county had to battle the owners until they decided to go with a lagoon and got a permit.

Getting to the root

The question I ultimately asked was: How and why does something like this happen? And when it does, who’s really responsible?

First, the whole mess wouldn’t have started if the homeowners hadn’t thought they might get away with something. Second, it wouldn’t have gone far if no installer had

seen fit to take the project. And third ... well, in this case, the regulators ended up doing their job. But what if they hadn’t? (And there are times and places when they don’t.)

As I’ve said before, onsite is one of those industries where a trace of frontier mentality prevails. Rules? Regulations? What the heck, just put the box in the ground, dig the ditches, lay the pipe, cover it all up, and let’s go. Doesn’t matter. Bunch of red tape.

The facts are that homeowners’ wishes would never turn into bad systems if no one were there to build them. And if no bad systems were built, regulators wouldn’t have to worry about them. In a nutshell, no bad system can exist if no installer will build it.

The odd thing is, homeowners who think that way (or just don’t know the rules) can often find someone to do what they want. Owners who are less brazen — who know the rules but want only the dirt-cheapest system they can get, and don’t know the difference between adequate and substandard — almost always find a compliant installer.

The industry’s job

So who’s best equipped to stop it? I’m going to say for the sake of argument that the installer is the critical link in this chain.

Industry members can educate until they’re blue in the face and never get the message through to

every person who wants to build a country home. Regulators should be vigilant, of course, and many if not most do their level best, but are we likely to see a time when they have the qualified staff and the resources to be as effective as they might like to be? Not anytime soon.

The facts are that homeowners’ wishes would never turn into bad systems if no one were there to build them. And if no bad systems were built, regulators wouldn’t

have to worry about them. In a nutshell, no bad system can exist if no installer will build it.

Of course, most installers who read this magazine are also the kind who attend trade shows and seminars, are active in their associations, and hold themselves to high standards of excellence. Clearly the blame for bad systems doesn’t land on them.

Except that maybe the quality installers don’t make enough noise about the ones who are not such good operators. It’s as true in onsite as in many other industries: The relatively few bad actors are tolerated, partly because no one likes to be a snitch, and partly on the old theory of: “Give them enough rope and

they’ll hang themselves.”

Maybe in time they do get found out and go out of business (or are forced out), but in the meantime they do damage to their customers and the environment, and they sully the industry’s reputation.

20 letters of wisdom

Am I saying installers are the only ones to blame when systems are built improperly or illegally? No, but they’re a critical line of defense, and arguably the most critical. Preventing bad installations first of all means having unshakable ethics of one’s own, but it also means having zero tolerance for those who are ethically challenged.

Responsible installers, individually or collectively, can’t change the attitudes of irresponsible homeowners or weed out all the disreputable, corner-cutting contractors. But the first step in that direction is to heed a 10-word, 20-letter bit of wisdom I learned once in a leadership class: If it is to be, it is up to me.

All change, all progress, starts with committed individuals. To stop the corner cutting, resolve not to cut any corners yourself, and to take appropriate measures against anyone who does. At any rate, that’s how I see it. What do you think? If you’d like to weigh in, send me a note to editor@onsiteinstaller.com. We’ll gladly publish a selection of comments. ■

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James Martin, owner of Sweet Breeze Farms & Excavating, gets ready to unload a Norweco Singulair 960 Aerator from Norwalk Concrete Industries. The company made a transition into excavating and onsite installations starting in 1999. (Photography by Jodi Raber)

Work Follows Work

A willingness to embrace change and a dedication to doing the job right provide a success formula for an installer serving five Ohio counties

By Gil Longwell

Sweet Breeze Farms & Excavating, Shreve, Ohio

OWNER: James "Skeeter" and Pat Martin

YEARS IN BUSINESS: 27

MARKET AREA: 45-mile radius

EMPLOYEES: 6

AFFILIATIONS: NOWRA, Ohio Onsite Wastewater Association



Growth has been natural for Sweet Breeze Farms and Excavating in Shreve, Ohio. Owners James "Skeeter" Martin and wife Pat have learned that one good job often leads to another. That has been a key to their approach in building a thriving onsite business on what started as a farming and excavation business.

The farming began in 1981. Soon, Martin was using his farm equipment to install subsurface tile drainage lines and surface diversions. Neighbors saw his skill and success and asked him to do similar work for them. In 1999, the business formally expanded to include excavation services.

"The transition was a natural one," says Martin. "Our business is always growing." When a contractor called about a basement and an onsite system, Martin went to installer classes so he could "do it right." Seeking out training got him greater prominence in the contrac-

tor community, and calls for his services increased.

Martin attributes the "work following work" experience to his attention to detail and a commitment to doing the job right just once. "We always do our best," says Martin. "First, it is the only way we operate, and second, you never know what other jobs will emerge from a job well done. Pricing a job fairly also brings repeat business."

Rules and opportunities

Today, from their base in Shreve, about halfway between Mansfield and Canton, Sweet Breeze serves customers within a 45-mile radius. The business mix includes roughly 30 percent advanced system installations, 15 percent repairs, 20 percent service, 30 percent general excavation, and 5 percent real estate transfer inspections.

The office is near the convergence of five counties, and the company works in all of them. Each

"We always do our best. First, it is the only way we operate, and second, you never know what other jobs will emerge from a job well done."

James "Skeeter" Martin

county has its own take on site suitability and installation.

Martin finds that regulations can bring opportunities. "Some counties are more forward looking, some are less so," he says. His business has embraced most changes with an expanding service menu. "We present customers with a broad range of solutions, offering technologies that can address almost every site challenge," he says. This is far different from the one-size-fits-all model some regulators and installers present.

Similarly, Martin recognizes that some sites can't support any onsite

system, regardless of the technology. He believes that putting in the wrong system is not finding a solution — it is creating a problem. “Helping a landowner understand the value of not building may be the most positive thing I can do for that person,” Martin says.

Ohio’s efforts to write new regulations have not always been smooth, and the installer community hopes the roughest part is behind them. While the new regulations set minimum treatment and absorption area requirements for various soil characteristics, Martin knows that not every house can be successfully served by a system that meets only the minimum requirements. “When lifestyle, family size or other unusual conditions are



Equipment operator Brent Sheldon is one of half a dozen Sweet Breeze employees.

present, we encourage up-sizing the system to match the atypical demand,” he says.

Martin has seen systems fail to reach their life expectancy when they receive flows typical for the owners’ lifestyle, but well above regulatory minimums. “This is an experience I don’t want,” he says.

Broad menu

Martin has installed traditional box-and-rocks systems using septic tanks, aggregate, and large-diameter perforated pipes. Some are entirely gravity distributed, while others are split, with the treatment tank downslope from the home and the absorption area upslope. In those systems, a lift pump moves septic tank effluent to a small receiving tank, from which gravity takes over.

Martin has installed advanced treatment systems from Norweco Inc. and Jet Inc., two other Ohio businesses that have provided installation and maintenance training. He also installs sand filters.

The company has enjoyed success using the EZflow aggregate from Infiltrator Systems Inc. The product combines perforated distribution pipe and expanded polystyrene geosynthetic aggregate. Martin finds it is easier and faster to install than rock aggregate. “Savings from faster installations can translate into lower installation prices,” he says. “This product is especially suited for constrained or steep sites.”

Martin is intrigued with pressure distribution systems. Having installed both demand- and time-dosed systems, he sees advantages to time-dosing and feels it may be a means to reduce absorption area square footage. As new technologies gain regulatory approval, Sweet Breeze will continue to grow its knowledge, skills and resources.

Embracing change

While regulators and foresighted installers are embracing the change, homeowners are dragging their feet, Martin observes. Whether it is fear of the unknown, the higher cost of advanced systems, or stubbornness, the effect is the same.

Martin must spend time educating landowners with reluctance rooted in uncertainty. Where none of the traditional systems are



James and Pat Martin (owners) with Erika Schuch, their daughter and the company’s office manager.

Striking a Balance

James “Skeeter” Martin of Sweet Breeze Farms and Excavation feels the Ohio Department of Health is trying to balance landowner costs and regulatory requirements in its new onsite regulations. He feels a mandatory performance bond displays that balance.

A bond gives homeowners increased comfort and protection: If the system has a problem, the owner is not left alone to resolve it. Ultimately, installers with poor track records will find it difficult to secure either bonds or customers. Better systems and better installations should result, Martin believes.

Although not a warranty, a performance bond provides warranty-like protection for new system owners. Bonds (most have two-year terms) create a formal relationship between installer and owner. If there are no problems with the system,

nothing needs to be done. When the bond expires, a new door opens for discussions about and marketing ongoing management services.

Another indicator of regulatory balance applies to repairs of systems on problem sites. It starts with landowner education about the site’s limitations, addresses the possibility that the repair will be unsuccessful, and raises inescapable need for the landowner, health department and installer to collaborate on a mitigation strategy.

It is clear to Martin that statewide regulations and education are change agents. He sees them as positive influences that will make systems more reliable, return cleaner water to the environment, and require more skilled system installers and managers.

Truck driver Dave Hawkins and equipment operator Brent Sheldon install risers for an onsite system.



allowed, there now may be one or more technologies that can make a lot buildable. Not surprisingly, those owners quickly become converts to new technology.

Even when a technology may be feasible, the cost to overcome unfavorable site conditions may make development unaffordable. However, it is not always the cost of installation that can stop a project. The ongoing operation, maintenance and manage-

ment costs can be the deal breaker.

"Education is essential," says Martin. For his own education, he relies on NOWRA and the Ohio Onsite Wastewater Association, and on manufacturers for technology or brand-specific training. Martin finds that every jobsite can bring learning opportunities for him and his crew. Similarly, each site presents opportunities to educate future system owners about the single most

essential operating system on their property. In Martin's experience, better-educated homeowners are better customers.

The long haul

Emerging regulations that call for continuing operation, management and maintenance programs require long-term relationships between homeowners and service providers. To offer management services in the five counties where Sweet Breeze operates, the company needs someone on staff who holds a Class 1 operator's license. Martin holds such a license.

There are more than 3,300 aerobic systems in Homes County, where the Sweet Breeze is located, and most are not covered by a service agreement. Martin has about 200 systems under contract, and he

ages the farming and excavation services sides. Another son-in-law, Brent Sheldon, is an equipment operator for system installations. Two other employees, Dave Hawkins and Norman Tipton, keep the equipment running when not operating it themselves.

"For onsite installations we try to work exclusively on tracked equipment," Martin says. That minimizes soil compaction and lessens negative impacts on a site. The equipment roster includes a 2000 CAT 315 trackhoe, a 2006 Yanmar 35 mini-excavator, a 2006 John Deere 328 tracked skid loader, and a 1995 CAT D-4H dozer. Assorted trucks and trailers are ready to move equipment from site to site. Two Ford F-250 pickups support the general excavation, system installation and service work.

"We want to present customers with a broad range of solutions, offering technologies that can address almost every site challenge."

James "Skeeter" Martin

expects those contracts to grow by about 12 percent per year. If there is a shortage of qualified service providers, the company's service business could grow even faster.

"We have seen companies and 'man-with-a-backhoe-and-dump-truck' operations move into and quickly out of the installation and maintenance businesses," Martin says. He suspects many such owners get out because they lack knowledge and find the learning curve too steep. Others simply price themselves out of the market. Sweet Breeze, meanwhile, has identified opportunities and moved toward them by expanding its comfort and competence zones.

The inspection component of a management program will also drive minor repair work and system upgrades. Sweet Breeze welcomes these projects because they open the door for long-term relationships.

The family way

Such relationships fit well with the family approach Sweet Breeze takes to the business. Daughter Erika is the office and accounting manager. Her husband, Jason, man-

Martin is rightfully protective of his reputation. If he feels that a system cannot meet its design goals, he will not install it. "I have walked away from some jobs for just that reason," he says.

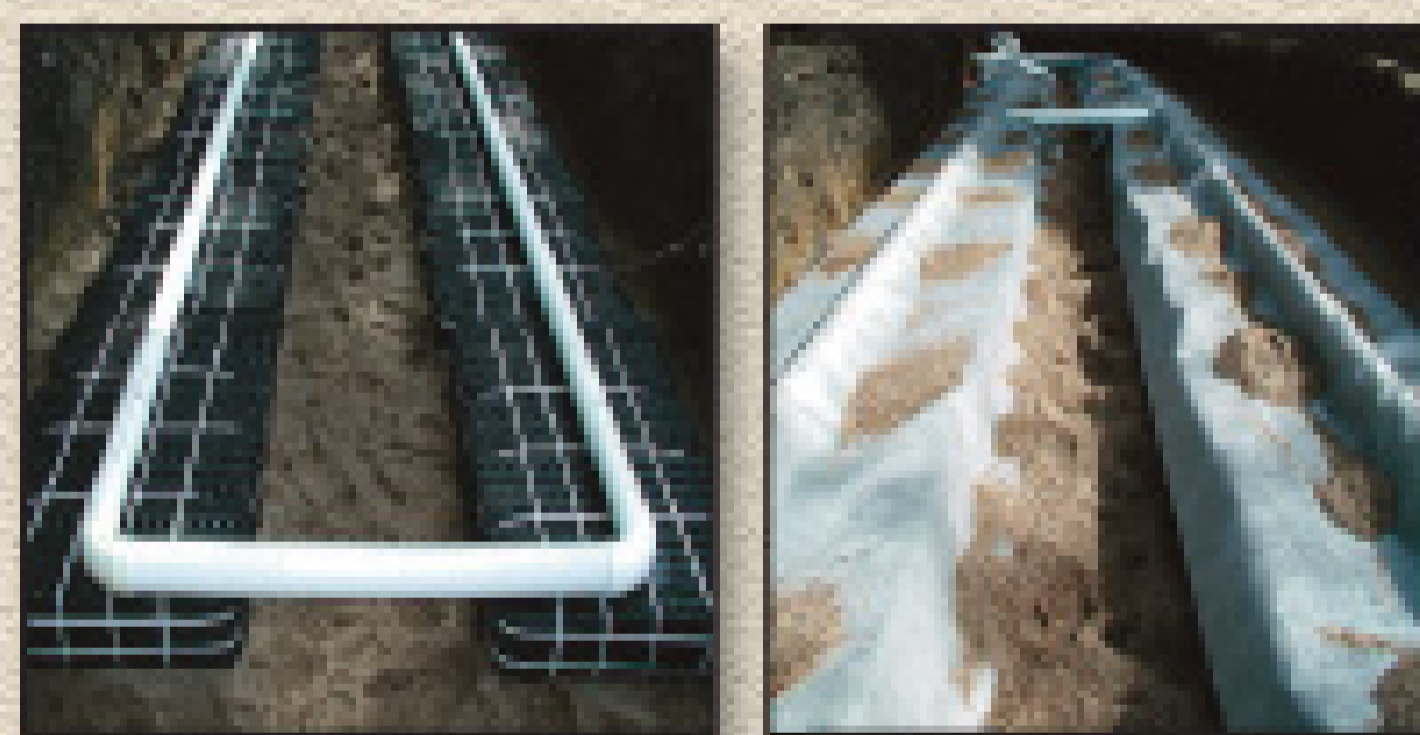
Active with FFA and 4-H, he provides educational opportunities for young people. He also supports the local soil and water conservation district's work. All these activities make him visible in the community. Advertising is solely by word-of-mouth. "We have and expect to continue growing every year," Martin says. "Our success is a gift from our community." ■

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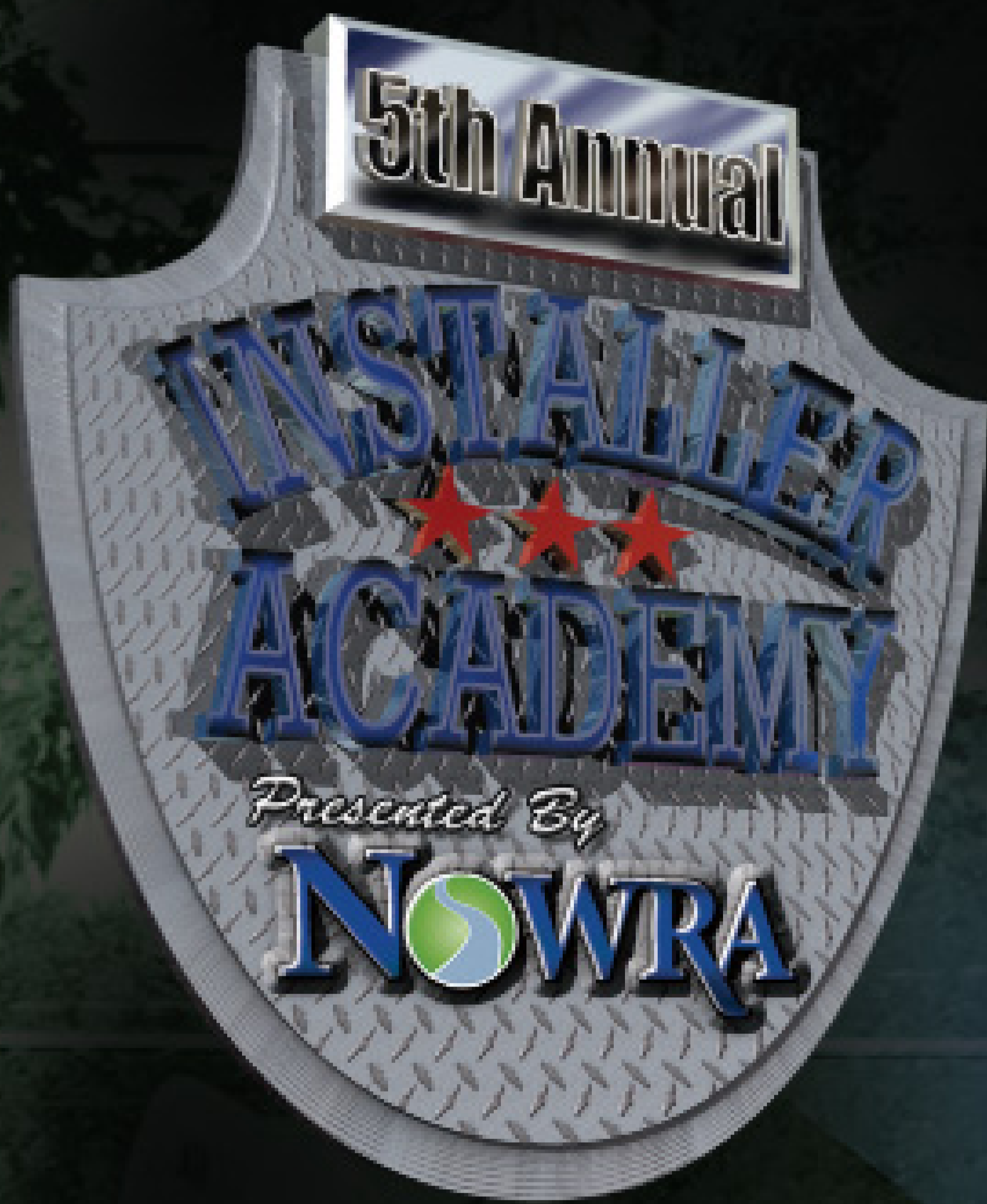
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Jim Anderson and David Gustafson are connected with the University of Minnesota onsite wastewater treatment education program. David is extension onsite sewage treatment educator. Jim is former director of the university's Water Resources Center and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

Understanding Structure

The way soil particles aggregate into clusters has a great deal to do with how well the soil transmits water and how well it accepts wastewater

By Jim Anderson, Ph.D., and David Gustafson, P.E.

Soil structure is an important soil property because many states use it as one of the soil attributes that determine the soil sizing factor for onsite systems. We're including an example of a soil sizing table based on a relationship between structure and texture.

Soil structure refers to the aggregation of the soil separates (sand, silt and clay particles) into clusters, called peds. Structure describes how the soil is glued together.

The peds are separated by surfaces of weakness. In some soil horizons, simple structures occur where each ped is a single entity without small peds inside. In many horizons, one or more sets of peds are held together to form discrete bodies recognized as larger peds.

Knowing the units

Since structure can significantly alter water transmission in soils, it is important to recognize the different units and to have a more detailed description of structure. Field terminology for

soil structure consists of separate sets of terms designating each of four properties. The four terms are combined in this order:

- Grade
- Size
- Shape
- Consistence

Grade describes the distinctness of the peds. It is a field determination of the ease with which the soil separates into discrete peds. Grade is designated as weak, moderate or strong.

Size is split into five size classes: very fine, fine, medium, coarse and very coarse.

Shape is described by four distinct types: granular, platy, blocky, and prismatic (or columnar). There is also a single-grain designation, which is the structure found in sandy soils where the particles are not held together.

Consistence refers to the resistance of the structure to deformation or rupture. Consistence depends heavily on the soil-water state. Therefore, moist samples should be used to assess this char-

Soil Grade Descriptions

Massive (no structure)

No observable aggregation, or no orderly arrangement of natural lines of weakness.

Weak

Poorly formed, indistinct peds, barely observable in place

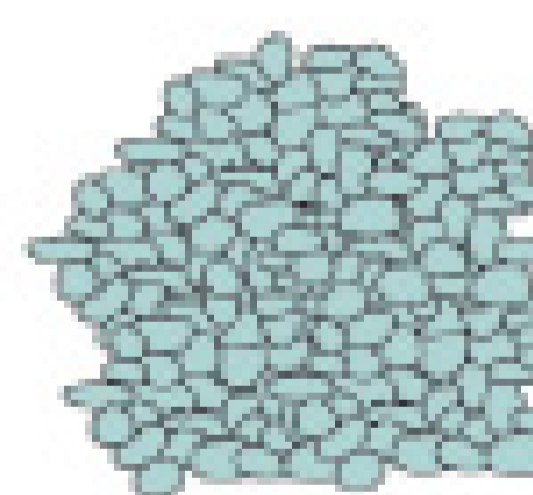
Moderate

Well formed, distinct peds, moderately durable and evident, but not distinct in undisturbed soil.

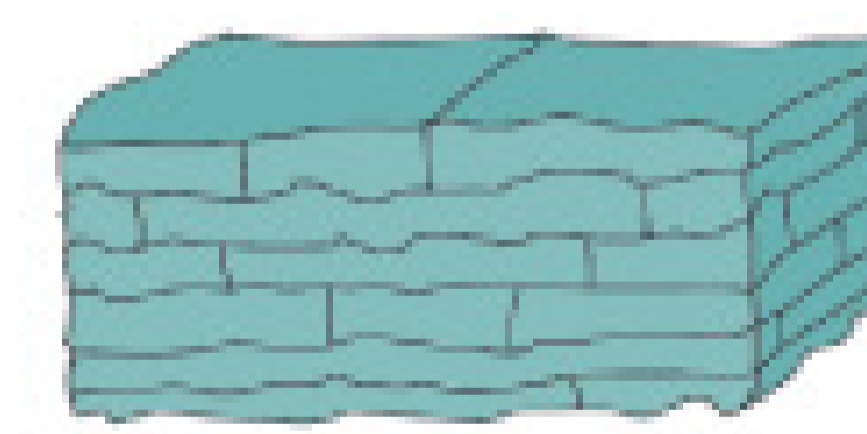
Strong

Durable peds that are quite evident in undisplaced soil, adhere weakly to one another, withstand displacement, and become separated when soil is disturbed.

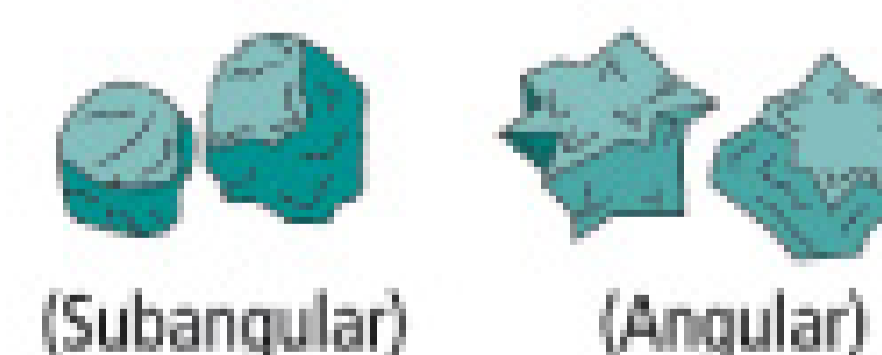
Soil Ped Classifications by Shape



Granular



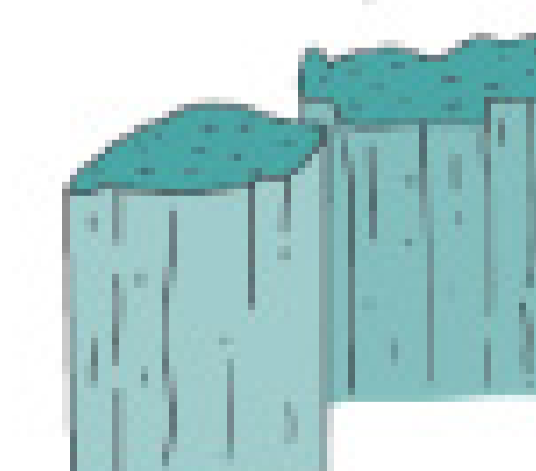
Platy



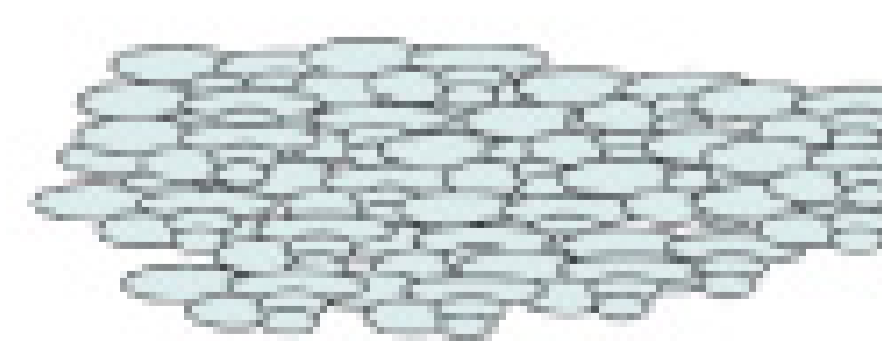
(Subangular)

(Angular)

Blocky



Prismatic



Single grain



Massive

Soil Structure Size Classes

Size Class	Size of Structure (millimeters)			
	Shape			
	Platy	Prismatic or Columnar	Blocky	Granular
Very Fine	<1	<10	<5	<1
Fine	1-2	10-20	5-10	1-2
Medium	2-5	20-50	10-20	2-5
Coarse	5-10	50-100	20-50	5-10
Very Coarse	>10	>100	>50	>10

Subset of Soil Loading Rates Table

Texture	Texture group	Structure	Grade	Consistence	Soil loading rate (gpd/ft ²)	Mound absorption ratio
Loam	8	pris, blk, gr	weak	v. friable, friable	0.45	2.6
		pris, blk, gr	weak	firm	0.24	5.0
		pris, blk, gr	mod or strong	v. friable, friable	0.60	2.0
		pris, blk, gr	mod or strong	firm	0.24	5.0
		platy	weak	v. friable, friable	0.24	5.0
		platy	weak	firm	0.00	0.0
		platy	mod or strong	v. friable, friable	0.00	0.0
		platy	mod or strong	firm	0.00	0.0
		massive		v. friable, friable	0.24	5.0
		massive		firm	0.00	0.0

Rupture Resistance Classes

moist consistence class	specimen fails under
loose	(Intact specimen not available.)
very friable	very slight force between fingers
friable	slight force between fingers
firm	moderate force between fingers
extremely firm	moderate force between hands or slight foot pressure
rigid	foot pressure

acteristic. To determine consistence, place a one-inch block-like sample between the thumb and forefinger and apply stress for one second. Moist consistence classes are:

- **Loose:** No intact sample can be obtained.
- **Friable:** Structure breaks down with slight force between the fingers.
- **Firm:** Structure breaks down with moderate force between the fingers.
- **Extremely firm:** Structure breaks down with moderate force between the hands or slight foot pressure.
- **Rigid:** Structure breaks down only with foot pressure.

Between the peds

Between soil peds are voids, or pores. Pores between peds are often relatively large and continuous when compared with the spaces between individual sand, silt and clay particles. The type of structure determines the dominant direction of the pores and hence determines water movement in the soil.

Soils with strong structure have distinct pores between peds. Well-structured soils with

large voids between peds will transmit water more rapidly than structureless soils of the same texture, especially if the soil has become dry before water is added. Small structural units create more pores in the soil than large structural units, but fine-textured, massive soils (soils with little structure) have very slow percolation rates.

You can expect faster percolation where soil structure is well developed. Strong structure can compensate for high clay content and produce suitable permeability. It also resists mechanical damage when an onsite treatment system is installed.

Small peds and single-grained structures have rapid percolation rates. Soils with granular, blocky, prismatic or columnar structures enhance flow both horizontally and vertically. Platy

structures restrict downward movement of water because the ped faces are oriented horizontally, against the flow. Platy structures are often associated with lateral movement of water.

Easy to change

Structure is one soil characteristic that is easily altered or destroyed. When you avoid compaction by working when the soil is dry and working to keep the soil in its natural condition, you maintain the soil's capacity to accept sewage effluent.

Structure is very dynamic and changes in response to moisture content, chemical composition of the soil solution, biological activity, and management practices. Soils that contain clay minerals that shrink and swell can show dramatic changes in permeability.

Structure is one soil characteristic that is easily altered or destroyed. When you avoid compaction by working when the soil is dry and working to keep the soil in its natural condition, you maintain the soil's capacity to accept sewage effluent.

When soil peds swell, the pores become smaller, and water movement is reduced. This is why where perc rates are still used for sizing systems, there is a required time to wait to run the test so that the soil can swell and imitate the moisture conditions that will exist when sewage effluent is added to the soil.

We hope that now you see that by recognizing soil structure, you can anticipate how the soil will perform in accepting sewage effluent. To learn more about structure, texture and color, take a soils class. A good course will give you some hands-on experience identifying these properties. The time you spend pays dividends to your business down the road. ■



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Worth Celebrating

The exhibit hall at the 2009 Pumper & Cleaner Environmental Expo International in Louisville, Ky.

30th Pumper & Cleaner Environmental Expo International adds a new-product display, interactive floor plan, and Women in the Industry seminar to its proven mix of exhibits and education

By Ted J. Rulseh

The 2010 Pumper & Cleaner Environmental Expo International sticks to a proven formula: Exhibits, education, networking, fun.

But this 30th annual show also breaks ground with new features, including a Women in the Industry seminar, a special display area for new products, and an interactive floor plan.

"We're staying with what has always worked, while adding new attractions that respond to ideas from our exhibitors and attendees," says Julie Gensler, trade show coordinator for COLE Inc., the show sponsor.

Industry's biggest

The Expo, at the Kentucky Exposition Center in Louisville for the third straight year, starts with Education Day on Wednesday, Feb. 24. Exhibits are open Thursday through Saturday, Feb. 25-27.

As the largest annual show in the industry, the Expo offers more

than 500 exhibits of new and proven equipment and technology, plus a total of 70 seminars. Ample space for networking is provided in the COLE Pub food court and cocktail area outside the exhibit hall. Here's a look at a few of the new features at the 30th Annual Expo:

Women in the Industry seminar. Women play a huge role in service companies — some as sole owners, others as partners with their spouses, still others as support systems, taking care of the home front. All play vital roles. "Here's a chance for women from all sides of the industry to come together, learn about issues they have in common, share ideas, and get acquainted," Gensler says.

Guest speaker Ann Fry will talk about, "The Regeneration Process: How to Re-energize, Re-purpose, Re-invent and Handle Everything!" Fry is an author, professional speaker, executive coach and corporate culture consultant who helps people connect to their passions

"We're staying with what has always worked, while adding new attractions that respond to ideas from our exhibitors and attendees."

— Julie Gensler

and dreams. This Thursday event (9 a.m. to noon) will be followed by a wine and cheese tasting.

New-product display. There is so much to see on the exhibit floor that it can be hard for attendees to find what is new. This year, a sampling of products never seen at the Expo before will be displayed in a dedicated area. This display will be during Education Day (Wednesday) before the exhibits officially open, as well as during regular exhibit hours. "Here's a way to get a sneak preview of some of the newest and most innovative tools and technologies," Gensler says.

Interactive floor plan. A virtual floor plan available at www.pumpershow.com will help attendees

quickly and easily find exhibits and products of interest. A simple graphic show layout shows where companies will exhibit. A click on an exhibit space brings up detailed information about the company, a list of product categories offered, and a panel highlighting the company's featured Expo offering.

Visitors can also search the show by product category: Search results highlight all exhibits on the floor plan that include the chosen category. An agenda planner lets attendees select exhibitors and seminars of interest and create a complete show itinerary, which they can print out and bring to the show to help maximize their time in Louisville.

Quality education

The Education Day program again includes tracks of seminars given by leading industry associations. Those participating are:

- Southern Section Collection Systems Committee (SSCSC)
- National Environmental Health Association (NEHA)
- National Association of Wastewater Transporters (NAWT)
- National Association of Sewer Service Companies (NASSCO)
- WaterJet Technology Association (WJTA)
- Portable Sanitation Association International (PSAI)
- Leaders Resource Network (LRN)
- National Onsite Wastewater Recycling Association (NOWRA)

Thursday and Friday seminars include tracks covering general business-building topics, sewer and drain cleaning, liquid waste man-

agement, portable sanitation, and municipal maintenance and repair. In addition, the SSCSC will offer seminars in Spanish to accommodate the growing number of Expo visitors from Mexico, Central America, and South America.

Top entertainment

As always, the Expo includes two popular social events. The annual Industry Appreciation Party on Thursday evening features tap beers for 25 cents.

The Saturday Evening Jam Revisited brings back two of the most popular acts in Expo History: Sawyer Brown (who performed in 2003 and 2004), and Phil Vassar (2005). The show begins at 5 p.m.

In honor of the Expo's 30th Anniversary, early registration costs just \$30 per person (until Jan. 22). At-the-door registration is \$60 for the full program. **To find out more, visit www.pumpershow.com or call 800/257-7222.** ■

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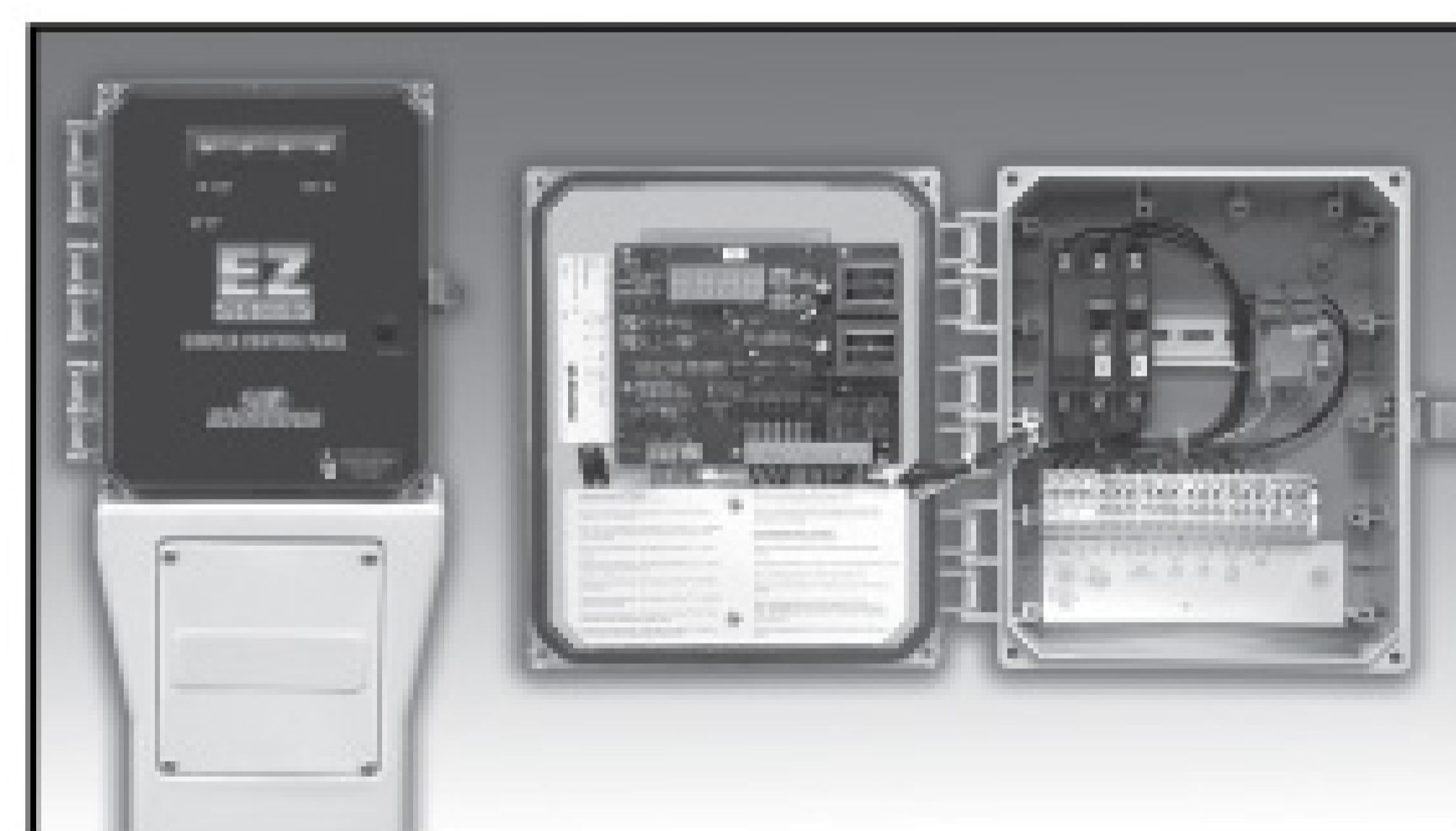
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EDUCATION DAY

Wednesday, February 24th, 2010

SOUTHERN SECTION COLLECTION SYSTEMS COMMITTEE

ROOM C204-C205 - SSCSC

- 8:00 - 9:00 Manhole Inspections 'The Need'
- 9:30 - 10:30 Combination Truck Maintenance and Safety, Sewer Hose Maintenance and Nozzle Technology
- 11:00 - 12:00 Jetting Nozzles - Their Design, Technology and Effective Usage
- 12:00 - 1:00 **LUNCH BREAK**
- 1:00 - 2:00 Elevating the Quality of Your CCTV Inspection Program
- 2:30 - 3:30 Critical Steps in Prioritizing Sewer Rehabilitation
- 4:00 - 5:00 Traffic Control - The Critical Factor in Pipeline Inspection

NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION

ROOM C105-C108 - NEHA

- 8:00 - 9:00 Decentralized Systems - The Next Wave in Our Industry
- 9:30 - 10:30 Septic Tanks: A Gift That Keeps on Giving
- 11:00 - 12:00 Selling CIOWTS Certification to Installers and Regulators
- 12:00 - 1:00 **LUNCH BREAK**
- 1:00 - 2:00 Softeners and Onsite Systems
- 2:30 - 3:30 Advanced Wastewater Treatment Systems
- 4:00 - 5:00 Maximize Efficiency by Working Closely with Regulators and Within the Regulatory System

NATIONAL ASSOCIATION OF WASTEWATER TRANSPORTERS

ROOM B101-B102 - NAWT

- 8:00 - 9:00 Sampling Protocols and Methods for Alternative Technologies
- 9:30 - 10:30 Dealing with Restaurant or High-Strength Waste
- 11:00 - 12:00 O & M for ATUs
- 12:00 - 1:00 **LUNCH BREAK**
- 1:00 - 2:00 O & M for Drip Irrigation
- 2:30 - 3:30 What to Expect When the EPA Comes A-Callin'
- 4:00 - 5:00 A Template for Keeping Your Employees Trained

NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES

ROOM C101-C104 - NASSCO

- 8:00 - 9:00 Pipe Inspections without an Operator?
- 9:30 - 10:30 Ways to Increase Your Daily Sewer Cleaning Production Rates without Increasing Your Costs
- 11:00 - 12:00 Proper Preparation of the Substrate Results in Coating Longevity
- 12:00 - 1:00 **LUNCH BREAK**
- 1:00 - 2:00 Collection System Asset Management - Getting from Reactive to Proactive
- 2:30 - 3:30 Trenchless Lateral Renewal Technologies - Lessons to be Learned
- 4:00 - 5:00 Zoom Camera Technologies: The Next Level of Infrastructure Inspection

WATERJET TECHNOLOGY ASSOCIATION

ROOM C203 - WJTA

- 8:00 - 9:00 The Impact of OSHA's Combustible Dust National Emphasis Program on Industrial Vacuuming
- 9:30 - 10:30 Waterblast Safety
- 11:00 - 12:00 Waterjet Applications and Business and Financial Considerations

PORTABLE SANITATION ASSOCIATION INTERNATIONAL

ROOM C203 - PSAI

- 1:00 - 2:00 Understanding Your True Cost Analysis to Ensure Profitability - Part 1
- 2:30 - 3:30 Understanding Your True Cost Analysis to Ensure Profitability - Part 2

LEADERS RESOURCE NETWORK

ROOM C201-C202 - LRN

- 8:00 - 9:00 Creating Your Vision for Success
- 9:30 - 10:30 Getting Your Team On Board
- 11:00 - 12:00 Working Effectively in a Family Business Culture
- 12:00 - 1:00 **LUNCH BREAK**
- 1:00 - 2:00 Creating Your Own Competitive Edge
- 2:30 - 3:30 Winning More Sales
- 4:00 - 5:00 Women in Business: Panel Discussion

NATIONAL ONSITE WASTEWATER RECYCLING ASSOCIATION

ROOM B103-B104 - NOWRA

- 8:00 - 9:00 Wastewater Characteristics
- 9:30 - 10:30 Soils and Site Evaluation Overview
- 11:00 - 12:00 Septic Tank Overview: Function, Design, Construction, Inspection and Troubleshooting
- 12:00 - 1:00 **LUNCH BREAK**
- 1:00 - 2:00 Seminar on Aerobic Treatment Units
- 2:30 - 3:30 Seminar on Media Filters
- 4:00 - 5:00 Seminar on Pumps and Controls

SCOTT HUNTER

ROOM C109-C112

- 9:30 - 10:30 Relationship is the Key!
- 11:00 - 12:00 The Art of Customer Service
- 12:00 - 1:00 **LUNCH BREAK/BOOK SALES**
- 2:30 - 3:30 Creating an Outrageously Successful Company - Part 1
- 4:00 - 5:00 Creating an Outrageously Successful Company - Part 2



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THURSDAY

February 25th, 2010

BUSINESS TRACK ROOM C101-C104

- 8:00 - 9:00 New 4 P's of Marketing
Jerard Nighorn/Lenzyme Trap-Clear Inc.
- 9:30 - 10:30 Quit Learning and Start Doing
Bill Raymond/Nexstar Network
- 11:00 - 12:00 5 Secrets of Winners
Kenny Chapman/Nexstar Network

INSTALLER TRACK ROOM B102

- 8:00 - 9:00 Risk Assessment for Determining SVC Frequency
Colin Bishop/Bord na Mona
- 9:30 - 10:30 From Theory to Reality
Roger Lacasse/Premier Tech
- 11:00 - 12:00 Timed Dosing and Controls
Mark Gross/Orenco

LIQUID WASTE TRACK ROOM B103

- 8:00 - 9:00 Understanding the Biology and Function of an ATU
Doug Dent/Ecological Laboratories
- 9:30 - 10:30 Permit Required Confined Space
Ed Fitzgerald/Jack Doheny Co.
- 11:00 - 12:00 T.B.D.

PORTABLE TOILET TRACK ROOM B104

- 8:00 - 9:00 Up-Selling: How to Thrive During a Recession
Ray Luden Jr./PolyJohn
- 9:30 - 10:30 Portable Sanitation Business Overview
Deric Boggs, Phil LaRoche/Satellite
- 11:00 - 12:00 T.B.D.

MUNICIPAL TRACK ROOM C105-C108

- 8:00 - 9:00 Pipe Cleaning Tools
Dana Hicks/ENZ USA Inc.
- 9:30 - 10:30 Increase Revenues through Pipeline Laser & Sonar
Doc Bennet/CUES
- 11:00 - 12:00 How to Prevent I/I in the Manhole Chimney Area
William Goff/Sealing Systems Inc.

SPANISH TRACK ROOM C109-C112

- 8:00 - 9:00 Limpieza de Drenajes y Tuberías y la Elección de Boquillas
Jim Aanderud/SSCSC
- 9:30 - 10:30 Formando un Programa Eficaz de Inspecciones CCTV
Jim Aanderud/SSCSC

WOMEN IN THE INDUSTRY ROOM C203

- 9:00 - 12:00 The Regeneration Process: How to Re-energize, Re-purpose, Re-invent and Handle Everything!
Ann Fry

FRIDAY

February 26th, 2010

MUNICIPAL TRACK ROOM C105-C108

- 8:00 - 9:00 Identifying Manhole I/I Sources and Cost-Effective Repair Methods
Lee Haessig/Cretex Specialty Products
- 9:30 - 10:30 Jet Up! Taking Science to the Sewer
Scott Paquet/NozzTeq Inc.
- 11:00 - 12:00 Cured in Place Pipe vs. Digging and Replacing
Travis Bohm/Perma-Liner

BUSINESS TRACK ROOM C101-C104

- 8:00 - 9:00 Quality and the True Cost of Ownership
Matt Sutton/Rapid View
- 9:30 - 10:30 Vision and Direction: Leading your Service Company to Prosperity
Victoria Finley/One Biotechnology
- 11:00 - 12:00 How to Shop Your Insurance Effectively
Mark Herring/Heffernan Insurance

INSTALLER TRACK ROOM C109-C112

- 8:00 - 9:00 Safety in Excavation
Gary Hooks/Safety Corporation of America
- 9:30 - 10:30 Comprehensive Control Panel Training
Joe Zimmerman, Scott Rietsema/SJE Rhombus
- 11:00 - 12:00 Onsite Wastewater Effluent Disinfection
Jim Cruver/Salcor

LIQUID WASTE TRACK ROOM B103

- 8:00 - 9:00 Dewatering Alternatives
Kelly Brown/BDP Industries
- 9:30 - 10:30 Convert a Liability to an Asset
Emily Landsburg/Black Gold Biofuels
- 11:00 - 12:00 The Role of Bacteria and Bioaugmentation in Grease Traps and Septic Systems
Dr. Clarence Baugh/Custom Biologicals

SEWER & DRAIN TRACK ROOM B102

- 8:00 - 9:00 Drain Cable Technology and Their Real World Applications
Keith Nesky/Spartan Tool
- 9:30 - 10:30 OSHA Procedures Regarding Confined Space
Chris Cira/M Tech
- 11:00 - 12:00 Sonde and Utility Line Locating Techniques
Rob Trefz/RIDGID



ONSITE INSTALLER COURSE ROOM B101

COLE Publishing's Onsite Installer™ Course
ALL DAY THURSDAY
8 a.m. - 5 p.m.
Jim Anderson and Dave Gustafson



For detailed seminar information please visit www.pumpershow.com

▶ Many of these seminars count toward continuing education credits. Check with your local representatives to see which seminars apply.

Machine Matters is designed to help readers get the most from excavators, backhoes, skid-steers and other mechanical equipment through proper maintenance, operation and financial practices. Readers are welcome to submit ideas for this column and can send them to Ted J. Rulseh, editor, by calling 800/257-7222 or e-mailing editor@onsiteinstaller.com.

Winter Work

When it comes to maintaining your hardworking backhoe loader, the best policy is to fix every nagging problem long before the new season begins

By Jim Kneiszel

Not long ago, you probably turned that last pile of earth for the season with your trusty backhoe tractor loader. As Mother Nature transformed the ground to concrete, you parked the machine in the yard or shed to let it hibernate until it's time to fire it up again in spring.

The temptation might have been to half-heartedly wash it down and forget about it. But the guys who maintain these machines on a regular basis have a different take on preparing your backhoe for winter slumber. They say you should give it a thorough once-over, then

Brian Serrahn, shop foreman at FABCO Equipment Inc. in Green Bay, Wis., demonstrates several important steps in fall maintenance on a Cat 420E backhoe loader.



Inspect, clean and refresh all pivot points, bushings and bearings for smooth operation.

fix every problem you can find before you put it in mothballs.

"We recommend you do machine inspection in the fall so you can determine what sort of repairs can be done during scheduled downtime in the winter," says Bill Linssen, a product support manager for FABCO Equipment Inc., the Caterpillar dealer in Green Bay, Wis. "With the small window of opportunity you have for a work season in Wisconsin, any day lost is lost for good. If a machine is down in the summer, you never gain that production time back."

Manufacturers produce detailed maintenance schedules for all equipment. By following those guidelines, you can successfully address before-failure repairs. "What contractors have to remember is that they're protecting their investment," Linssen says. "A few steps taken in good safety and storage



Replenish grease with a grease gun.



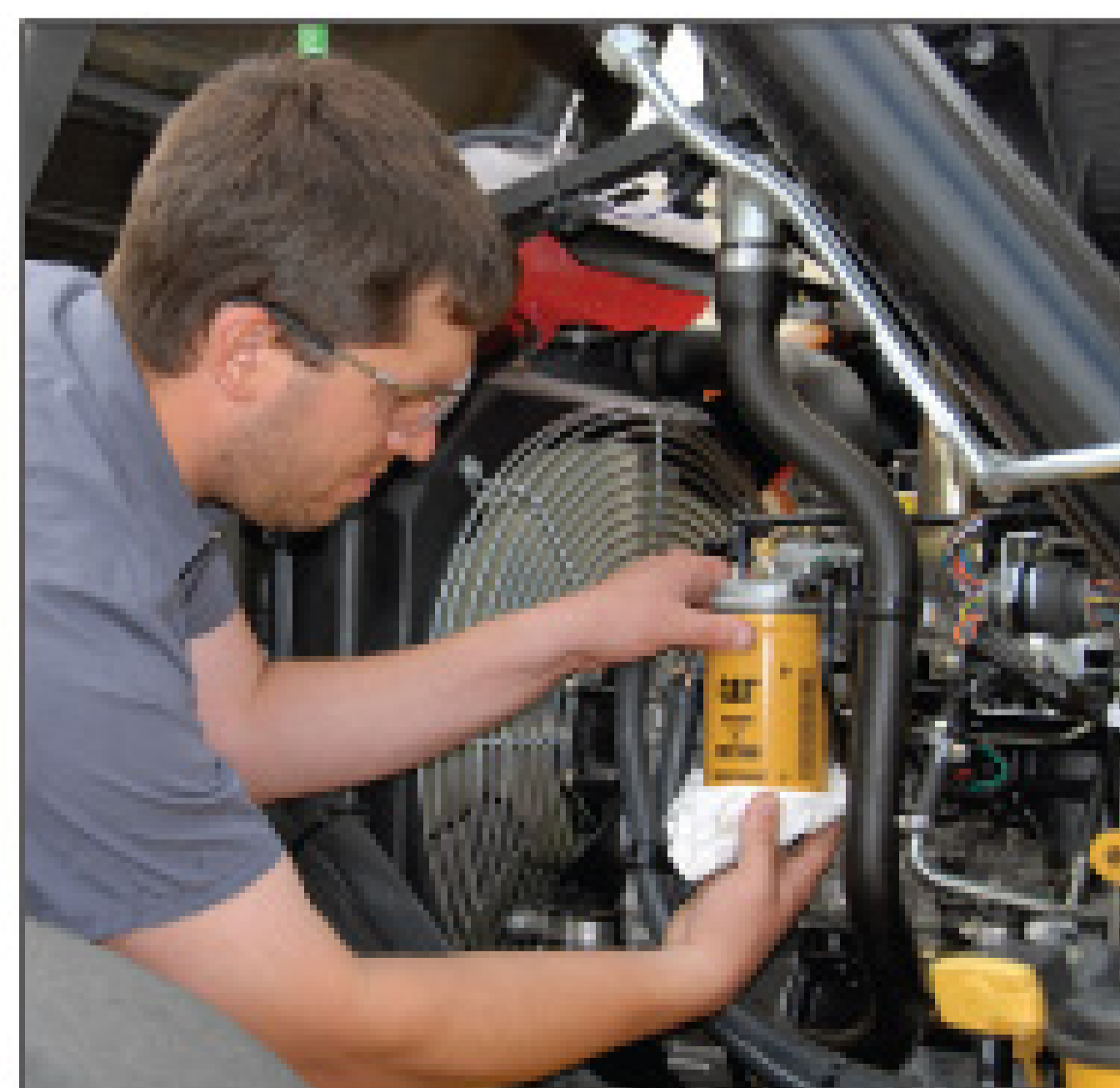
A thorough power washing will reveal issues you might need to address, says Dale Schraufnagel, of Schraufnagel Implement Inc., in Lomira, Wis. The photo shows a Cat 420E at FABCO Equipment Inc. in Green Bay, Wis. (Photography by Jim Kneiszel)

procedures protect their investment and their livelihood."

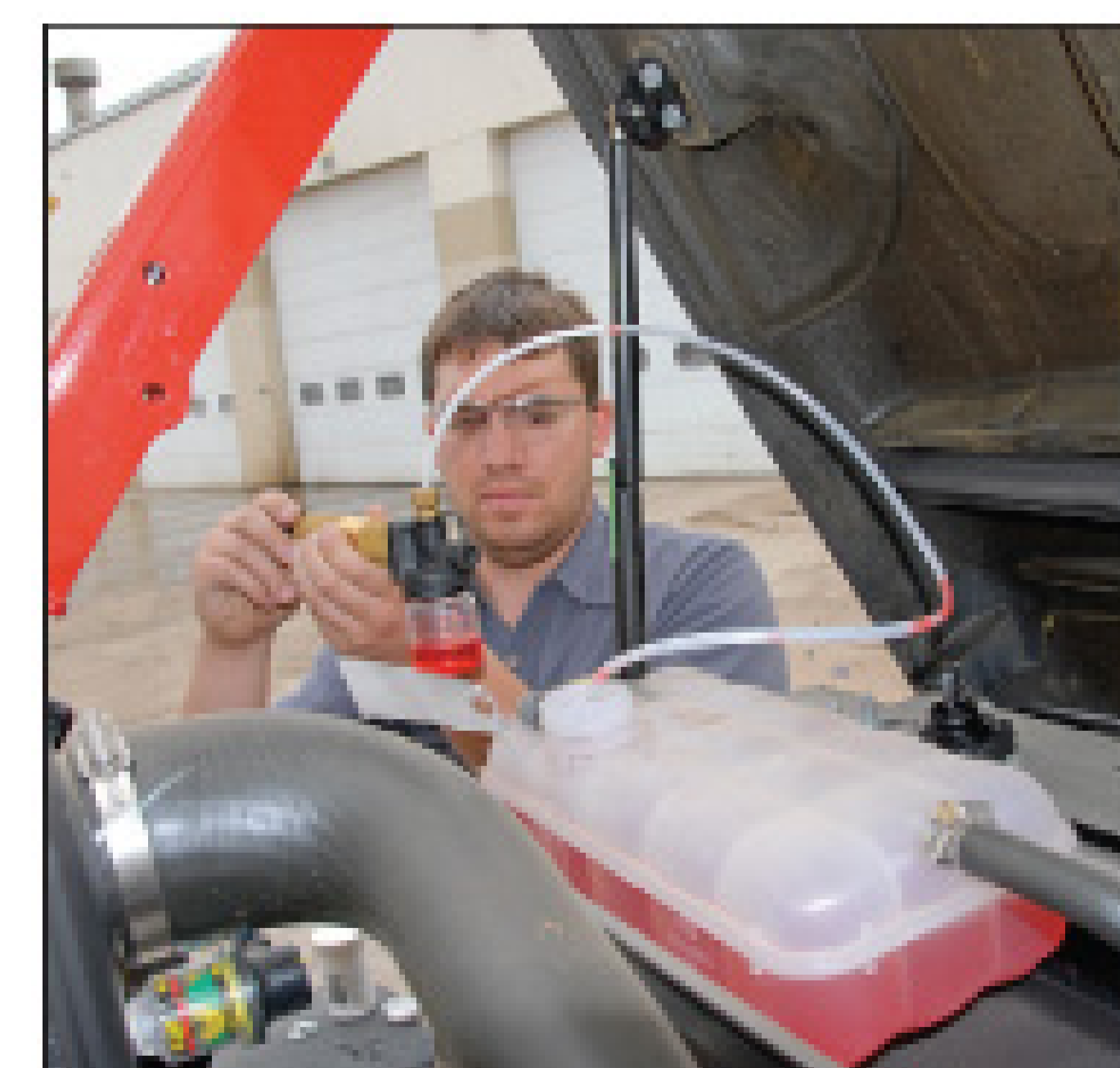
Clean the machine

The first order of business is to give your backhoe a thorough cleaning, inside and out. A good

power washing of the implement and loader will reveal issues you might need to address, says Dale Schraufnagel, of Schraufnagel Implement Inc., in Lomira, Wis. Clean in every crevice, nook and cranny to rid the backhoe of a season's dirt



Examine and change fuel filters as necessary.



Pull a coolant/antifreeze sample for analysis.

and grime. Then turn to the cab. Use appropriate cleaners to restore the seat and other vinyl surfaces, and dejunk the space. Give it a good vacuum cleaning and window washing.

Cleaning doesn't just preserve cosmetics. Linssen says a buildup of dirt can trap moisture and cause corrosion to chrome items. Debris can also damage the hydraulic system when it wedges into pins and loader and bucket linkages. It can also inhibit pedal movement in the cab.

Check wear points

You can expect that wear parts in the system will need replacing. Inspect, clean and refresh pivot points, bucket points, and anywhere you have grease fittings. Check bushings and bearings and make sure the moving parts operate smoothly.

Slate for overhaul

A great reason for end-of-season maintenance is that it helps you identify major problems that require a winter overhaul, says Schraufnagel. In a thorough inspection, you can track nagging oil leaks or other problems to their source. A slow period is when you want to diagnose a major problem with the engine, transmission or differential. As you put the equipment away, order necessary parts for a major job, and you'll have everything you need to rehabilitate your ailing backhoe in January.

Winterize the fuel system

Add the appropriate amount of fuel stabilizer and fill the tank with fuel. If the tank isn't full, condensation can form inside, degrading the fuel and promoting corrosion in the tank. Run the backhoe until it reaches operating temperature to distribute the treated fuel throughout the engine. Linssen recommends adding a diesel fuel biocide to halt growth of microorganisms that cloud the fuel. New emission-reducing engines have lower tolerances, making it more important to remove traces of water from the system that might reduce the lubricating qualities in the fuel.

Check fluids

You should track engine and

hydraulic oil levels and quality during daily checks throughout the season. The same goes for routine checks of the coolant/antifreeze. Pull your maintenance records and see if you're due for a radiator flush, and if it's close, err on the side of prevention and replace the antifreeze.

Linssen recommends replacing the engine oil just before storage.

"What contractors have to remember is they're protecting their investment. A few steps taken in the fall of the year in good safety and storage procedures protects their investment and their livelihood."

Bill Linssen

Dirty oil can cause corrosion in vital engine parts over the winter. He also promotes a few more steps. First, he recommends having engine oil samples analyzed regularly to track engine wear. For winter storage, he also recommends coating the inside of the engine with volatile corrosive inhibitor (VCI) oil.

Check rubber parts

According to the Deere & Co. backhoe storage procedures, you should check all belts and hoses for wear and replace them as necessary. This includes all clamps and connectors on the hoses. Look for weather checking and cracking as signs that items should be replaced. If you find one overly worn hose or belt, it's a sign that others may need to be replaced as well. If you're not sure if a belt or hose is at the end of its useful life, change it anyway. It's better to address these stress points now than when a part breaks in the field during the busy season.

Assess tire condition

Check how old your tires are and determine if you will need new tires next season. If so, consider replacing them now if your budget allows. Ensure that tires are at full pressure when you store them.

Charge the battery

Check the age of the battery and make a note if you'll need to replace it in spring. If so, you can remove the battery when you store

the equipment, then add a fresh battery in the spring. If the battery still has life, Linssen suggests storing it in a cool, dry place. Don't allow it to freeze. Batteries near the end of their life can freeze if left in the elements. When storing batteries, cover the terminals to prevent corrosion and accidental damage in case something should fall and contact both terminals.

erly and that hydraulic fluids circulate. Then park the backhoe on a hard, dry surface, in as clean an area as possible.

If you're storing the machine in the yard, park it on a gravel area as flat as possible, Linssen says. When you lower implements, rest the buckets on wooden blocks — not on the ground — and tip the buckets forward so that water will run out. Make sure you keep ground-engaging tools, tips, hinge points and pins out of water. Cover the tires with thick canvas or black plastic to protect them from damaging UV light exposure.

Tag it

Finally, Linssen recommends tying a tag to the steering wheel or controls that notes all small maintenance that needs to be done in spring. Include crucial start-up instructions as a reminder for experienced operators and a precaution for new operators. ■

Park it properly

According to Deere, you should start the machine and run until it reaches operating temperature, then continue to run it for five minutes at half speed, avoiding running it fast or at idle. Operate all functions and adjustable parts one last time to make sure they work prop-

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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.

Maryland Acts to Protect Chesapeake Bay

By **Scottie Dayton**

A law passed at the end of the legislative session requires homes within 1,000 feet of Chesapeake Bay and its tidal rivers to use nitrogen-reducing technology when existing septic systems fail or when new homes are built. An estimated 50,000 systems are affected. According to the Department of the Environment, while seven percent of nitrogen pollution comes from onsite systems in the state that increases to 25 to 30 percent for bay tributaries. The state's Bay Restoration Fund, supported by a flush

tax, gives grants to homeowners upgrading or replacing their systems.

Minnesota

Changes to the state's septic system rules require counties to implement their own ordinances by February 2010. Otter Tail County is one of the first to issue rules, which cover systems treating up to 5,000 gpd. The changes include new inspection criteria for existing systems, increased tank size for new systems, and 15 percent larger tanks for households with garbage

disposals and dishwashers.

The ordinance also says new septic tanks must be marked with their capacities and insulated if less than two feet below grade. Covers must weigh at least 95 pounds or be locked and bolted.

Ohio

The new budget bill signed into law includes a provision that extends the moratorium on the 2007 onsite wastewater rules until Jan. 1, 2010.

Texas

The Texas Onsite Wastewater Association stopped a bill that would require all licensed onsite system contractors to carry \$1 million of liability insurance.

Washington

Cowlitz County commissioners proposed septic system rules to clarify what is allowed during design and construction and make inspection criteria consistent. The rules would let owners service and inspect their systems, as advanced treatment technologies are rare in the county.

The ordinance also allows owners to install their own systems and does not include an age limit or pumping schedule, as long as the systems function correctly. The county is offering a two-hour class to instruct homeowners on septic care and inspection.

Delaware

A study states that new onsite regulations could create a need for \$23.8 million in aid between 2010 and 2014 to help low- and moderate-income families in southeastern Sussex County. The Department of Natural Resources and Environmental Control set new inspection and pump-out rules for the Inland Bays watershed in 2007 and mandated that septic systems meet higher standards by 2015.

The new standards could require upgrades or replacements, along with annual upkeep contracts averaging \$350 a year. As much as \$2 million yearly could be needed after 2015 to support ongoing replacements. ■

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Marriage of Opportunity

Technology integrating the activated sludge process with ceramic membrane filtration remediates a failed drainfield in a Minnesota lakeshore community

By **Scottie Dayton**

Residents of Ravenswood Beach noticed ponding in their two-tiered drainfield in spring 2005. The 30-year-old cluster system serves 36 homes on Lake Melissa, south of Detroit Lakes, Minn. The homeowners chose to address the problem.

The only apparent solution was to replace the clogged gravel beds and lateral pipes with a new drainfield using chambers, but the price was steep, and no space was available for a drainfield upgrade and expansion. The homeowner association contacted Eugene Hansen, the private civil engineer who had designed the original 8,000-gpd system.

Hansen knew that Mike Metelak, marketing director for SJE-Rhombus Controls in Detroit Lakes, was

seeking a site with residential wastewater to evaluate an innovative flat-sheet ceramic membrane bioreactor (MBR) from ItN Nanovation AG in Germany.

"The daily flow was ideal for a test site, and the residents had to resolve their drainfield problem," says Metelak. "It was the ideal dream marriage." In a cooperative venture, SJE-Rhombus installed the components and operates the cluster system at no cost while it logs data. This is the first installation using ceramic flat-sheet membranes in North America.

Site conditions

The local soils are sandy with excellent drainage. The drainfield is located on a hill 30 feet above the beach.



Ed Gades of Ivanhoe Environmental, Jim Lockrem of SJE-Rhombus, Christof Gränitz of ItN Nanovation, and Dave Long of SJE-Rhombus prepare the 600-pound ceramic membrane tower for its descent into the filtration tank. (Photos courtesy of SJE-Rhombus Controls)

System components

Jim Lockrem, electrical engineer from SJE-Rhombus and the project's technical director, designed the upgraded system to handle 8,000 gpd. Its major components are:

- Existing 2,000-gallon concrete lift station with duplex 3-hp pumps
- Existing 8,500-gallon concrete septic tank with 6,000-gallon settling compartment and 2,500-gallon effluent equalization compartment
- 1/2-hp dosing pump in a screened effluent vault
- 1,800-gallon fiberglass anoxic (denitrification) reactor tank

with 1/2-hp submerged vertical mixer and 1/3-hp sludge pump. Fiberglass tanks made by AK Basin (AK Industries Inc.), Plymouth, Ind., purchased through Rep-Rite-Burk, Mendota Heights, Minn.

- 1,800-gallon fiberglass aerobic reactor tank with two 1/3-hp recirculation pumps.
- 1,600-gallon, two-compartment concrete filtration tank with one tower of eight ceramic membrane modules in the first chamber. Modules from ItN Nanovation AG.
- C-MBR Web-based control platform from SJE-Rhombus.

System Profile

Location:	Detroit Lakes, Minn.
Facility served:	36 lake cottages
Designer:	Jim Lockrem, BSEE; SJE-Rhombus, Detroit Lakes, Minn.
Installers:	Vareberg Backhoe Service and Septic, Detroit Lakes; SJE-Rhombus
Site conditions:	Sandy
Type of system:	Ceramic membrane bioreactor
Hydraulic capacity:	8,000 gpd

System operation

Wastewater from six year-round and 30 seasonal homes gravity flows from each home to a collection line running alongside the public road into a lift station. It is then pumped 200 yards uphill to the septic tank and cluster treatment site. Two-inch PVC pipes handle pressurized flows; 4-inch PVC pipes handle gravity flows.

In summer, the pump in the septic tank equalization chamber operates on a timed dose sequence, providing about 40 doses per day of about 150 gallons to the anoxic tank. In winter when daily flows are lower, dosing is reduced to about 20 per day at 50 gallons per dose.

The activated sludge process in the aerobic reactor tank reduces BOD and begins converting ammonia to nitrate. A slow-moving vertical mixer in the anoxic tank maintains volatile solids in suspension, while fine-bubble aeration diffusers in the aerobic reactor tank provide oxygen and keep the liquid well mixed.

"Conventional aerobic treatment systems, or extended aeration systems, have an activated sludge

concentration of about 2,500 mg/l," says Metelak. "Membrane bioreactors have 8,000 to 15,000 mg/l. When the concentration exceeds 15,000 mg/l, we manually activate the pump in the anoxic tank and send some waste sludge back to the primary settling compartment to maintain the proper concentration of activated sludge."

Effluent in the anoxic tank gravity flows to the aerobic tank. About five times per day the daily flow is recirculated between the aerobic tank and anoxic tank for further denitrification. On demand, the second pump in the aerobic tank

the treatment process."

The filtration tank has two 800-gallon chambers. One holds a tower of eight ceramic membrane modules; the other is a spare. The activated sludge is filtered on a 10-minute cycle. For 9.5 minutes, a 1.5-hp vacuum pump draws permeate water from the activated sludge through the membrane modules, with columns of flat-sheet ceramic plates stacked 6 feet high. The membranes have 344 square feet of surface area with a durable nanotechnology coating used as the filtration layer, providing a 0.20-micron pore opening.

"The aerobic tank is the hub of the system. Recirculating both ways, from aerobic to anoxic and from aerobic to filtration, really simplifies and stabilizes the treatment process."

Mike Metelak

sends the activated sludge to the filtration tank, which recirculates by gravity flow back to the aerobic tank to avoid a high concentration of activated sludge in the filtration tank.

"The aerobic tank is the hub of the system," says Metelak. "Recirculating both ways, from aerobic to anoxic and from aerobic to filtration, really simplifies and stabilizes

Left, SJE-Rhombus engineer Dave Long, supervises the lowering of the 600-pound ceramic membrane tower into the first 800-gallon filtration chamber. The permeate is collected in the center pipe with union quick-connect. Below, workers begin to plumb the dual-chamber filtration tank.



chlorine bleach. The preprogrammed sequence backflushes the modules, rests for four to five minutes, then repeats the cycle eight to 10 times.

While any membrane with a similar pore size will provide the same kind of treatment, the difference is the material. "The significant advantage of ceramic membranes is that you have additional



The failure of the original system was evident as ponding effluent melted the snow in the lower-level drainfield.

cleaning options that will not damage the ceramic membrane, but may otherwise damage a polymeric membrane," says Metelak.

"Because they are durable, ceramic membranes can be backflushed more frequently and at higher pressure and are unaffected by chlorine. They can be power sprayed and it won't damage the membrane surface." In extreme cleaning situations, such as fouling from grease or an unusual chemical event, the permeate can be heated to 176 degrees F or steam-cleaned.

Installation

SJE-Rhombus hired Richard Vareberg of Vareberg Backhoe Service and Septic in Detroit Lakes to excavate the tank holes. A subcontractor poured the filtration tank. The tanks were buried six feet deep and extend four feet above ground. The SJE-Rhombus team did the plumbing and hookups.

A 10- by 15-foot metal service building houses the control panel, air compressor and scouring blower, permeate pump, flow meters, and monitoring devices. A slanted roof on the back of the building overhangs the filtration tank. The air compressor helps heat the building

"The *E. coli* bacteria are about 35 times larger than the pore size and can't pass through the pore opening," says Metelak. "The pressure differential on the membranes is 150 to 450 mBar, and the flux rate averages 18 gpd per square foot of membrane surface area." The biology held back by the membranes gravity flows to the aerobic tank. All three secondary tanks have the same concentration of activated sludge.

During filtration, some permeate is sent to a 35-gallon storage tank and is used to backflush the membranes from the inside out for 30 seconds to complete the 10-minute cycle. The remaining permeate gravity flows from the filtration tank to the distribution box, then to two 75- by 100-foot-long drainfields.

The permeate averages less than 2-mg/l TSS and BOD and less than 10-mg/l total nitrogen, and has 99.9 percent fecal coliform reduction with no pathogens. Besides permeate backflushing, a 2-hp rotary air compressor continually sends coarse air bubbles up from the bottom of the tower and between the plates to scour any buildup on the membrane surface.

Two to four times per month, the membranes receive a 60-minute chemical cleaning with 500-ppm

in winter in addition to a small electric baseboard heater.

"The installation was straightforward," says Metelak. "What is important to note is the huge footprint reduction. Conventional aerobic treatment units have a 24-hour retention time. With the heavy concentration of activated sludge biology in MBRs, the retention time drops to six to eight hours. So, installers don't need one gallon of tank size for every gallon of flow. The tanks can be one-third the size.

"The other space-saver is using filtration tanks, instead of the clarifiers used in an ATU or extended aeration plants. The membranes dewater the mixed liquor and retain all the activated sludge biology in the tank. So contractors also have a footprint savings in reduced biological and clarification tankage."

As a result of the higher level of treatment, ponding in the drainfields disappeared in less than two months, and the biomass within a year. Today, they are completely rehabilitated.

Maintenance

SJE-Rhombus is the service provider. Once a month, staff sample the permeate, check the equipment, and run a TSS test on the activated sludge concentration. If the level is above 15,000 mg/l, they waste some to the primary settling tank. The entire operating process is automated and can be monitored and controlled remotely via a Web-based control platform designed for the application by SJE-Rhombus. ■

MORE INFO:

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Advanced Drainage Systems Adds Flowtech System

Advanced Drainage Systems Inc. has added Flowtech septic and drainage systems to its line of onsite products. The Flowtech subsurface drainfield system replaces the need for a barrier cover such as gravel and prevents sand or fine soils from entering the drainfield.

Zoeller Receives International Trade Excellence Award

Zoeller Co., Louisville, Ky., received the Governor's Award for International Trade Excellence at the Kentucky World Trade Day luncheon in September. The award recognizes Kentucky businesses that show trade success through performance, management, commitment to international trade, unique strategy and creativity and overall contribution to the local community or the cause of world trade.

SJE-Rhombus Names McDonald Sales Director

Greg McDonald has joined SJE-Rhombus as the company's international sales director. He has served as the Asian Pacific region director of sales for a thermal management materials manufacturer and with OEMs. McDonald is a graduate of Minnesota State University-Moorhead. ■



Greg McDonald

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Softeners and Concrete

Installers discuss the reasons for concrete erosion in septic tanks that receive brine discharges from water conditioning systems

Question:

Does anyone have ideas on why septic tank concrete can break down above the liquid level at homes with water softener discharges when the salt brine is not in direct contact with the affected area?

Answers:

➔ The final answer is: bacteria. Some species of bacteria oxidize

sulfur into sulfuric acid, which attacks concrete in septic tanks and wastewater pipes. Fortunately, these bacteria are slow growers, but given the right environment, they can make a mess of concrete within a fairly short time span. Now, this may not be the only cause but it is a major one. And just because someone will ask: No, these bacteria are not the ones you would find in your typical septic or drain treatment.

Anaerobic bacteria in the septic

tank produce sulfides. If the sulfides react with metals, mostly iron, from the water and waste, then they form the black sludge in the tank. If the pH is too low, then the sulfides can form hydrogen sulfide gas, the rotten egg smell. Since you can smell it, some of the hydrogen sulfide gas is in the vapor phase. In the vapor phase, this acid can attack the concrete and corrode it the same as any other acid. Look to the pH in the tank as the basic issue. I might also add that hydrogen sulfide gas is one of the most deadly gases known. We are lucky that we can smell it at concentrations far below the lethal level.

➔ I don't know for sure, but there may be sodium ions in the vapor above the water level. Since sodium is much more reactive than calcium, it will replace the calcium in the concrete (the calcium silicates from the Portland cement form calcium hydroxide and a gel-like calcium silicate hydrate when water is added). This is why brine is used to recharge the media in the water softener: The sodium in the

salt replaces the calcium from the hard water.

I have no data on what is present in the vadose portion of the tank, but I assume there could be sodium ions similar to sea spray in addition to the acid gasses (hydrogen sulfide) that are present in all functioning tanks.

➔ There are no sodium ions in the vapor above a solution of salt (sodium chloride). Ions only exist in solution. Ions in the vapor phase require special circumstances such as very high temperatures, several thousand degrees, and high vacuum. The corrosion caused by salt water on concrete is not so much on the concrete as on any rebar or iron reinforcing rods in the concrete. Several references to this can be found by searching under "salt water corrosion of concrete."

Again, the main culprit is the hydrogen sulfide gas formed in the septic tank. The acid is the problem. As we know, concrete is washed with hydrochloric acid to clean it, and excess will actually dissolve the concrete. ■

AL & RON

Twas the night before Christmas, and all through the house, not a toilet was flushing, not even a mouse's.

The sewers were flooding and Brand X didn't care, they teamed up with the Grinch to flood toilets this year.

I don't need this mess during Christmas!

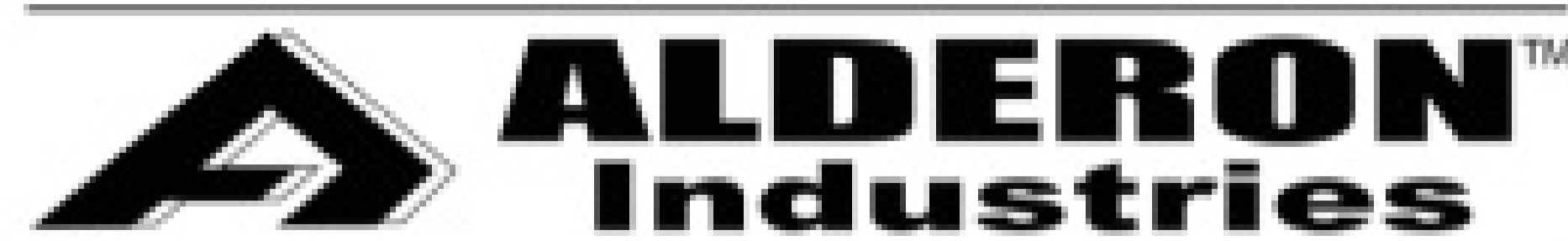
The home owners, contractors and distributors were snug in their beds, when nightmares of Brand X flooded their heads.

Good thing their stockings were hung by the chimney with care, I packed them with Versa'alarm's, floats, Check It panels and beer.

When they woke up, they installed their new gifts. Alderon stopped the flood and Brand X hit the ditch. (the Grinch is a bad driver.)

Automatic Christmas ruler by Brand X and the Grinch.

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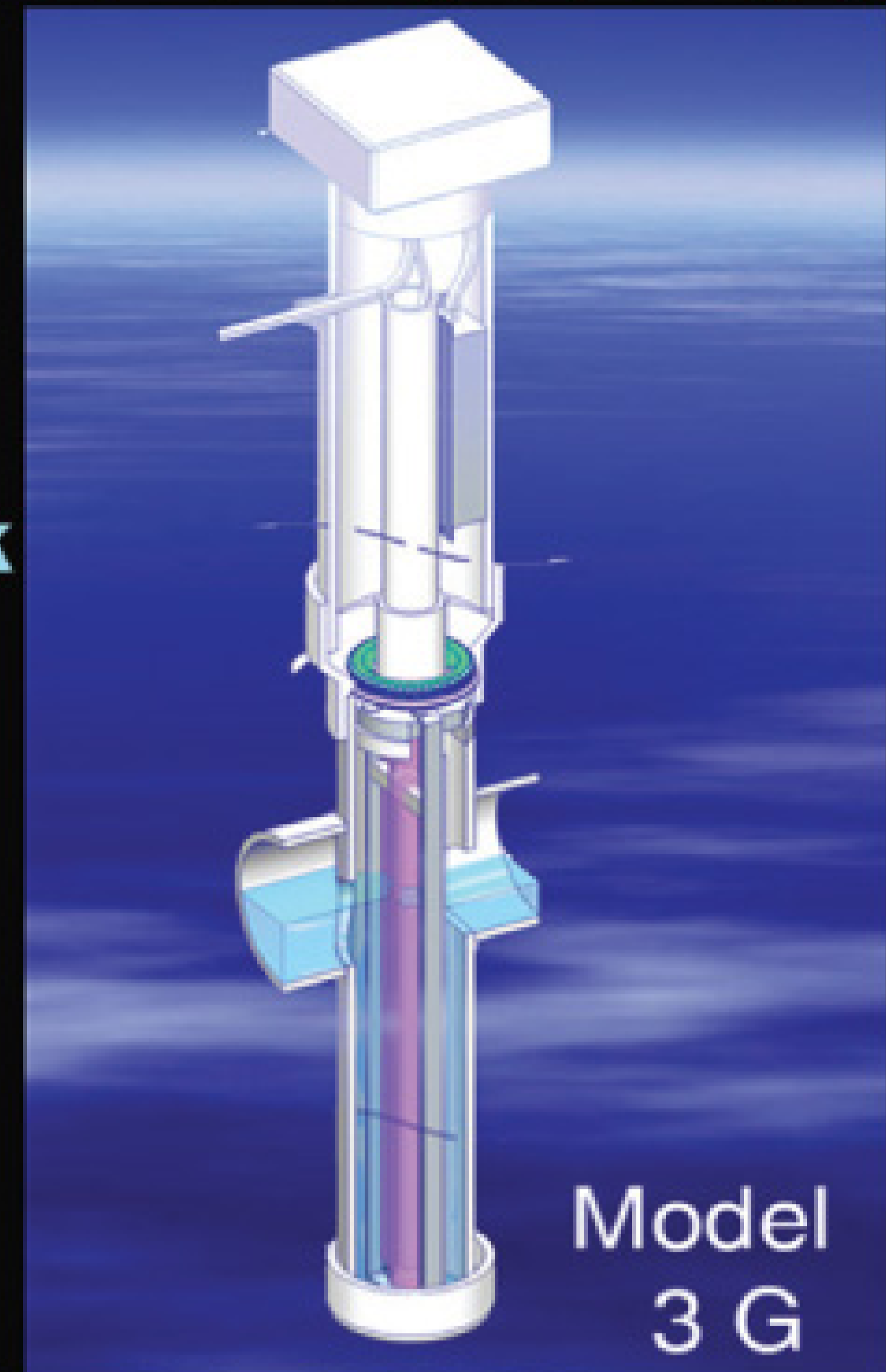
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Onsite Installer invites your state association to post notices and news items in this column. Send contributions to editor@onsiteinstaller.com.

Reimbursement Benefit

Licensed septage haulers in Michigan may be entitled to reimbursement of their continuing education fees. A septage waste contingency fund, established to defray the costs of such courses, has more than \$73,000 still available.

The Department of Environmental Quality indicated that one hauler per firm could receive reimbursement for the January membership conference registration fee. MDEQ-approved CEU classes, the National Association of Waste Transporters Inc. vacuum truck training on the Tuesday before the main conference, and the Pumper & Cleaner Environmental Expo could also qualify for reimbursement.

Log on to www.michigan.gov/deqseptage. Under Downloads, click Continuing Septage Education, then CSE Course Reimbursement Information, and CSE Reimbursement Form EQP5918.

Certified plants

The National Precast Concrete Association awarded Wieser Concrete Products Inc., Maiden Rock, Wis., NPCA-Certified Plant status for the 20th consecutive year and Wieser Concrete Products Inc., Portage, Wis., NPCA-Certified Plant status for the 14th consecutive year. Plants maintain certification by passing annual, unannounced on-site inspections conducted by an independent engineering firm.

CALENDAR OF EVENTS

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Wisconsin Precast Concrete Association Winter Convention, Holiday Inn and Suites, Madison. Call 608/256-7701.

Jan. 12-15

Michigan Onsite Wastewater Conference, Kellogg Hotel and Conference Center, East Lansing. Call Chanin Frank at 989/773-6985 ext. 258 or visit www.mowra.org.

Jan. 13-14

Iowa Onsite Waste Water Asso-

ciation Conference, Polk County Convention Complex, Des Moines. Call Alice Vinsand at 515/225-1051 or visit www.iowwa.com.

Jan. 14-15

Ohio Onsite Wastewater Association Conference and Trade Show, Ramada Plaza Hotel and Conference Center, Columbus. Call 866/843-4429 or visit www.ohioonsite.org.

Jan. 19-20

Missouri Smallflows Organization Conference and Exhibition, Holiday Inn Select, Columbia. Call 417/739-4100 or visit www.mosmallflows.org.

Jan. 24-26

Pennsylvania Decentralized Wastewater Conference and Trade Show, Lancaster County Convention Center, Lancaster. Call PSMA at 717/763-7762 or visit www.pdma.net.

Jan. 25-26

Indiana Onsite Wastewater Professional Association Annual Convention, Indianapolis. Call 317/889-2382 or visit www.iowpa.org.

Jan. 27-28

Arizona County Directors of Environmental Health Services Association Inc. Southwest Onsite Wastewater Conference, Riverside Hotel and Casino, Laughlin, Nev. Visit www.wastewater2010.wordpress.com.

Jan. 27-29

Kansas Small Flows Association Conference and Trade Show, Prairie Band Casino and Resort, Topeka. Call Dale Hayse at 620/548-2369 or visit www.ksfa.org.

Jan. 28-29

Colorado Professionals in Onsite Wastewater Conference and Roe-d-Hoe, PPA Event Center, Denver. Call Becky Roland at 303/551-3266 or visit www.epow.net.

Jan. 28-30

Wisconsin Liquid Waste Carriers Association/Wisconsin Onsite Water

Recycling Association Joint Convention, Holiday Inn Hotel and Conference Center, Stevens Point. Call 608/255-2770 or 608/256-7757.

Jan. 29-30

Washington Onsite Sewage Association Conference, Yakima. Call 253/770-6594 or visit www.wossa.org.

TRAINING & EDUCATION

NAWT

The National Association of Wastewater Transporters has these sessions:

- Jan. 12 – Vacuum Truck Technician, East Lansing, Mich.
- Jan. 26-27 – Onsite Inspector Training, Laughlin, Nev.
- Feb. 13-14 – Onsite Inspector Training, Georgetown, Del.
- Feb. 13-14 – Operation and Maintenance Training, Georgetown, Del.

Call NAWT at 800/236-6298 or visit www.nawt.org. For California classes, call the California Onsite Wastewater Association at 530/321-2207. For Michigan classes, call Mark Scott at 989/275-5011. For Nevada classes, call Kitt Farrell-Poe at 928/782-3836. For Delaware courses, call Jerry Williams at 302/855-5904.

Minnesota

The University of Minnesota Extension has these classes:

- Jan. 4-6 – Introduction to Onsite Systems, Hinckley
 - Jan. 7-8 – Installing Onsite Systems, Hinckley
 - Jan. 11-12 – Maintainer CE, Brainerd
 - Jan. 13-14 – Installer Continuing Education, St. Cloud
 - Jan. 14 – Pipelayer Certification, Rochester
 - Feb. 9-11 – Maintaining Onsite Systems, Hinckley
 - Feb. 16-17 – General Continuing Education, Hinckley
- Call Nick Haig at 800/322-8642

(612/625-9797) or visit <http://septic.umn.edu>.

New York

The New York Onsite Wastewater Treatment Training Network Inc. is offering certified courses at the Columbia County Health Department in Hudson.

- Feb. 24 – Fundamentals and Soil Analysis for Onsite Wastewater Treatment Systems
 - Feb. 25 – Soil Analysis
- Call SUNY Delhi at 800/963-3544 or visit www.delhi.edu/bcs/otn_wastewater.

Washington State

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

- Jan. 6 – Maintaining Onsite Systems
 - Jan. 7 – Proprietary Systems
 - Feb. 11 – Pump Review for Designers
 - Feb. 16-17 – Wiring Electrical Panels
 - Feb. 24 – Soils, Moses Lake
- Call WOSSA at 253/770-6594 or visit www.wossa.org. ■

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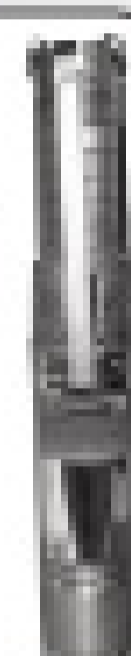


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PRODUCT NEWS

December 2009

Polylok Introduces Carbon-Activated Riser Covers

Carbon-activated riser covers from Polylok are designed to eliminate offensive odors caused by septic system effluent. The covers feature two pounds of activated carbon. The 20-inch cover will fit 20- and 24-inch Polylok risers and the 24-inch cover will fit corrugated pipe and Polylok's 24-inch risers. 877/701-3942; www.polylok.com.



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TERRALIFT 2000: 2002 model year, 228 hours, excellent condition. \$22,500. 574-256-1465 or 574-532-3559. (P01)

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