February 2019

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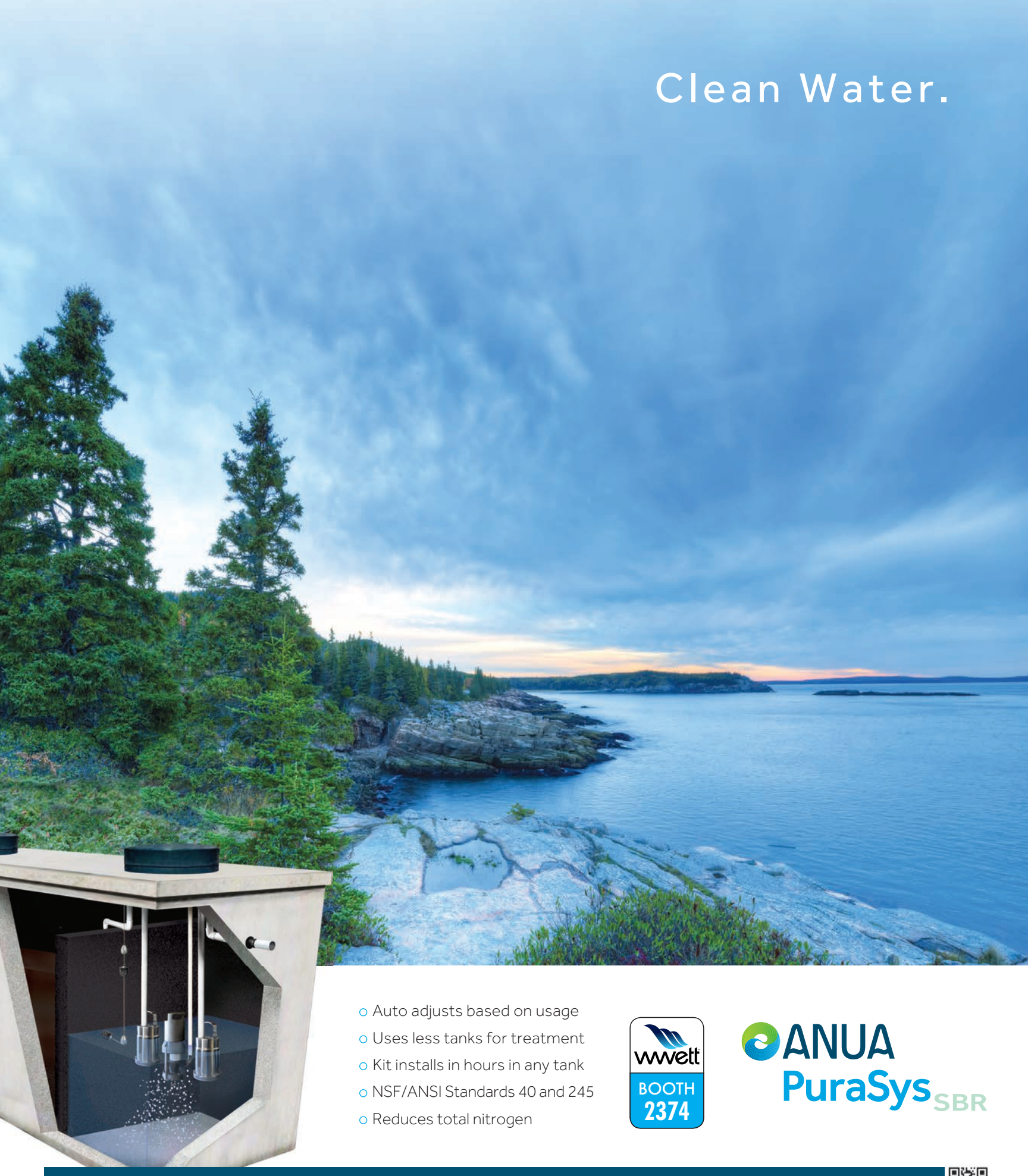
SHOW ISSUE

Clean Water.



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A Trainer's Touch By Ted J. Rulseh

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Dave Gustafson is a key national wastewater industry educator from the University of Minnesota Onsite Sewage Treatment Program. He is shown on location assessing issues with a septic system in Stillwater, Minnesota. (Photo by Brad Stauffer)

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Published monthly by
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ADVERTISER INDEX

February 2019

Jim Kneiszel

Come and Get Your Learner's Permit at the WWETT Show

Take in as many of this baker's dozen of onsite-related education seminars as possible to enhance the value of your visit to the greatest wastewater show on earth

The Water & Wastewater Equipment, Treatment & Transport (WWETT) Show, known as the Pumper & Cleaner Environmental Expo for many years, has a rich history of focusing on education for wastewater industry professionals.

Sure, the greatest wastewater show on earth, Feb. 20-23 in Indianapolis, has at its foundation in exhibits of the latest and best tools to serve contractors. If you need it as an installer, you will find it at the Indiana Convention Center. There is indeed no shortage of bright, shiny objects to capture your imagination as you think about better ways to serve your customers.

But at the bedrock of the WWETT Show is also an emphasis on preparing you and your installing crews to utilize the newest technology and follow best practices in the field. If you have newbies in your company, this is the place where they can become immersed in the learning process that will lead them through a successful career start as a wastewater professional. If you need to brush up on new advanced systems, system inspection procedures or safety techniques, you can do all of that here.

The first day of the WWETT Show has always been considered Education Day. On Wednesday, Feb. 20, before the exhibit hall opens, there are nearly 50 seminars to choose from, spanning a broad array of wastewater topics. And a heavy classroom schedule continues on Thursday and Friday, Feb. 21 and 22. In all, there are nearly 100 seminars.

How do you choose where to spend your time? You can look over the entire schedule before you arrive in Indy by visiting www.wwettshow.com. Or when you arrive to register at the convention center, pick up a program and take some time to carefully review the courses and plan your days. To get you started, I'm highlighting a baker's dozen seminars aimed at installers.

Take a look. Compare my list to the full schedule. I couldn't cover all of the valuable WWETT Show education resources in one short column.

Don't forget to bring a pen and notepad, and I'll see you at the show!

WEDNESDAY

The Driving Forces of Septic Failures.

Presenter: Jason Ravenscroft, manager of the Marion (Indiana) County Public Health Department and adjunct professor at the Fairbanks School of Public Health at Indiana University

Ravenscroft will summarize a Marion County Health Department survey of septic system users in an urban area where many systems are 50 years old and replacement would be challenged by limited lot space, flood plains, potential for sewer expansion and threats to local waterways. He will define and identify methods to reduce septic failures.

What's Going Down the Drain Matters.

Presenter: Sara Heger, engineer, researcher and instructor in the Onsite Sewage Treatment Program in the Water Resource Center at the University of Minnesota, as well as a board member and education chair of the National Onsite Wastewater Recycling Association

Heger will address the varying quantity and quality of wastewater in public facilities and private homes and suggest design scenarios for a broad spectrum of settings. Topics include the difference between hydraulic and organic loading, identifying challenging water streams from commercial properties and the impact of chemicals entering the wastewater stream.

Compaction – The Enemy of Septic System Longevity.

Presenter: Sara Heger

Heger will discuss causes of soil compaction — including wet soils, material handling and the weight of vehicles, equipment, pedestrians, and animals — and best techniques to avoid issues. She will explain how a variety of distribution methods affect biomat formation.

Point of Sale or Time of Transfer: Navigating the Politics.

Presenter: Dendra Best, executive director of WasteWater Education, Traverse City, Michigan, past member of the Water Environment Federation, member of Michigan League for Public Policy and the National Environmental Health Association

Best will discuss how point-of-sale or time-of-transfer regulations differ by jurisdiction and help installers determine if ordinances are in effect, the pros and cons of such inspections and the political implications of these rules. She will also discuss the details of filing inspection reports.

Checklists, Inspections, Evaluations and Disclosures.

Presenter: Dendra Best

Best will look at creating sound policies and procedures to avoid legal issues when performing system inspections or evaluations. Topics will include disclosure statements, service checklists, recording findings, dealing with lenders and Realtors and creating a database of services performed.

Troubleshooting Pumps and Controls.

Presenter: John R. Buchanan, associate professor in the Biosystems Engineering and Soil Science Department at the University of Tennessee and a member of the Water Environment Federation, Soil and Water Conservation Society, NOWRA and the American Society of Agricultural and Biological Engineers

Buchanan will focus on the issues faced when service providers are called to inspect a failed pump system. He will explain common pump failure modes and evaluate when it makes sense to rebuild or replace the pump. Topics will include tracing electrical failures, reviewing necessary repair tools, identifying types of controls used and determining voltage amperage and resistance within electrical controls.

Troubleshooting Drip Distribution.

Presenter: John R. Buchanan

Buchanan will look at methods for identifying and repairing problems in drip distribution systems. He will start with a refresher on how drip systems work, then explore topics including the impact that filters, air/vacuum relief valves, and pumps may have on system performance. He will also discuss simple fixes, when and how chemical treatment would be utilized on emitters and calculating and measuring the flow rate from a drip system.

What to Do With Water and Solids.

Presenter: Dave Gustafson, engineer and trainer with the Water Resource Center at the University of Minnesota

Gustafson will discuss separation of liquids and solids in onsite systems and options and considerations for disposal of both waste streams. He will address U.S. Environmental Protection Agency 503 requirements and land application loading rates for wastewater.

Troubleshooting Floats and Onsite Septic Controls.

Presenter: Mark McCollum, regional sales manager for SJE-Rhombus and a member of the Oregon Onsite Wastewater Association

McCollum will discuss control panel components and their functions, how to use a digital multimeter, proper ways to troubleshoot a float and timesaving methods to begin assessing problems at the control panel. His intent is to provide basic theory of operation for residential onsite control panels, how to read schematics and demonstrate basic knowledge of electricity use in residential onsite controls.

Online Tools for In-Depth Review of Soils, Hydrology and Geology.

Presenters: Paul R. Finnell Sr., owner of Prairie Hills Soils Consulting, and Dena Anderson, a resource soil scientist at the U.S. Department of Agriculture Soil Conservation Service and Natural Resource Conservation Service

Finnell and Anderson will focus on web-based tools for preliminary soil evaluation for onsite system locations, including Web Soil Survey, SoilWeb and Google Earth Pro, and talk about information available on the National Soil Survey Database.

THURSDAY

Soil Evaluation – Soil Properties.

Presenters: Paul R. Finnell Sr. and Dena Anderson

Finnell and Anderson will use many demonstrations and give an introduction to soils treatment capacity depending on composition such as description forms (site, profile, limitations), soil texture, color, structure, depth and restrictive layers.

NOWRA Land Surveying Workshop for Septic System Installation and Location.

Presenters: John R. Buchanan; Kevin Sherman, technical specialist at Presby Environmental Inc. (PEI); Sara Heger

The speakers will focus on tools and techniques of measuring elevation and distances during onsite system installations and for locating the components of existing systems during service or maintenance calls. They will also discuss system mapping and teach proper operation of surveying instruments.

FRIDAY

NAWT O&M – Professional System Technician.

Presenter: Dave Gustafson

Gustafson will introduce the basics of operations and maintenance services for onsite systems, provide an overview of necessary skills for technicians, explain the importance of developing files and communications, and recognize wastewater flows and their impacts on systems.

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AFTER THE FLOOD

Sewer Backup Cleaning

The first priority when dealing with the aftermath of flooding or a large sewage backup is your customer's safety. Cleanup should begin as soon as possible to reduce the risk of exposure to sewage. The following tips compose a guide you can give to your customers to help with proper spill cleanup. onsiteinstaller.com/featured

DESIGN SKILLS

Intro to ATUs

There are many reasons to use an aerobic treatment unit when selecting an onsite system design, including poor soils, shallow vertical separation distances to limiting conditions, tight lots and high-strength wastewater. This online series is a good introduction to these systems and how to design them. onsiteinstaller.com/featured

Overheard Online

"Don't be afraid to contact a longtime supplier and let them know you are considering your options; ask them if they can offer even a small discount to help maintain your business."

– Lower Your Operating Costs in 2019

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STAY HEALTHY

Protect Yourself from Pathogens

Pathogens are present in wastewater and can be found anywhere and on anything that is in contact with wastewater. This means they will be found in the septic tank, distribution pipes, and effluent treatment components such as a drainfield, mound, recirculating sand filter, etc. — basically in all parts of the systems you're working on. You should assume anything being exposed to wastewater is contaminated, but following these best practices will keep you healthy on the job. onsiteinstaller.com/featured

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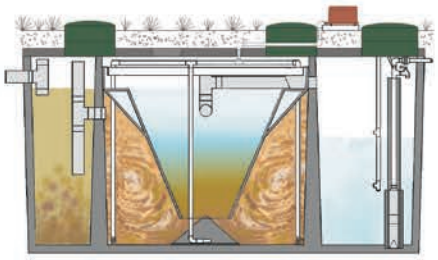

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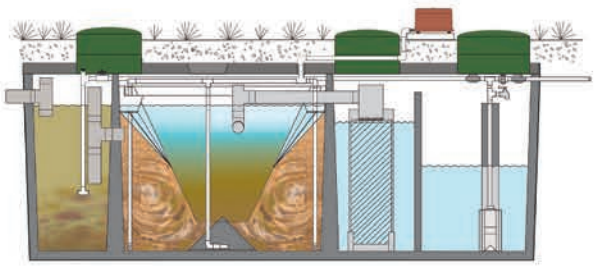

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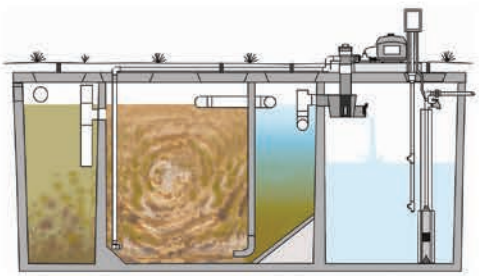
LA - Hoot



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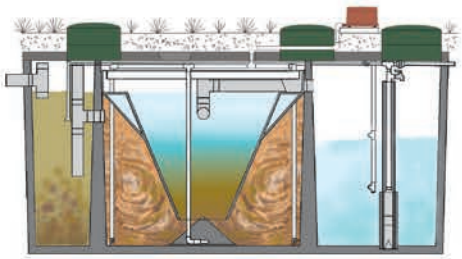
Hoot - NR (Coming Soon)



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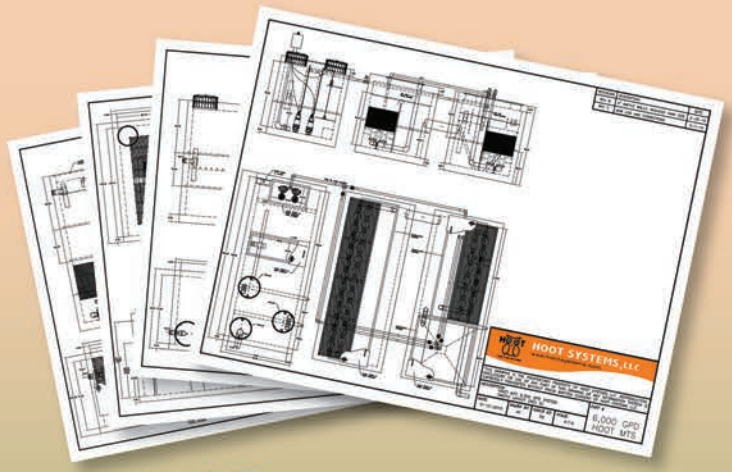

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Dave Gustafson meets with Stillwater, Minnesota, restaurant owner Chris Cosgrove to consult about issues with the septic system operation at the sports bar Cozzie's. (Photos by Brad Stauffer)

A TRAINER'S TOUCH

Dave Gustafson instructs thousands of onsite professionals each year, bringing a solid technical approach liberally seasoned with humor

By Ted J. Rulseh

In Dave Gustafson's onsite treatment training classes, you can count on at least three things.

You'll get a quality education in building and maintaining systems that treat wastewater effectively for the long term. You'll get it with a generous dose of humor. And you'll have no trouble hearing him from a seat in the back row.

As a member of the University of Minnesota's Onsite Sewage Treatment Program team, Gustafson, P.E., trains thousands of onsite professionals every year. He brings his enthusiastic teaching style to seminars covering soils, installation, operation and maintenance, and inspection, visiting some 40 states over a career that spans three decades.

Along the way, he has helped develop training materials now used nationwide for certifications, helped small Minnesota communities

cost-effectively solve wastewater treatment problems, advocated for the role of technology in onsite treatment and fostered communication between onsite professionals and state and local regulators. For these and other accomplishments, he received the 2018 Ralph Macchio Lifetime Achievement Award during a Water & Wastewater Equipment, Treatment & Transport (WWETT) Show meeting of the National Association of Wastewater Technicians.

"This is a really great industry to work in," Gustafson says. "Every day is a little different. You really can't get bored. Just when you think you've figured everything out, there's something new. I'm thankful for and proud of the relationships I've built with other professionals in the industry. They're an important part of who I am."

Dave Gustafson, P.E., University of Minnesota

Position: Member on Onsite Sewage Treatment Program team
Years in industry: 30
Certifications: Registered Professional Engineer
Education Civil engineering degree, University of Minnesota
Awards: Ralph Macchio Lifetime Achievement Award
Goals: Continue promoting knowledge of effective and affordable onsite treatment systems

SPLITTING TIME

Gustafson, a Twin Cities native, took a unique path through college. He played football for four years at Northwestern College (now called the University of Northwestern-St. Paul), at various times starting at all five positions on the offensive line and becoming team captain as a senior. After each fall semester, he transferred to the University of Minnesota for the spring session to study civil engineering.

After earning his degree in 1984, he joined the Minnesota Pollution Control Agency as an engineer working mainly on funding for small wastewater treatment plants. He later transferred to the Minnesota Pollution Control Agency wastewater operator training group and there got involved with onsite training. In that capacity, he worked with Roger Machmeier and Jim Anderson, architects of the University of Minnesota onsite training program.

After Machmeier retired in about 1990, Gustafson joined the university program as the Extension engineer handling onsite training. He also joined an onsite technical advisory committee, where he forged connections with contractors who helped him gain real-world experience with systems.

"I worked really hard at getting out and dealing with professionals in the field," he says. "It was a great way to learn about how systems actually functioned and how to solve problems."

In the mid-1990s he began taking his training session on the road, and in 1997 he teamed up with Anderson in a training partnership that lasted until Anderson retired in 2017. At present,

"I'm thankful for and proud of the relationships I've built with other professionals in the industry. **They're an important part of who I am."**

Dave Gustafson

Gustafson reviews the spacing of PVC pipes across a new drainage bed as it is installed by Kothrade Residential and Commercial Sewer, Septic and Excavating in Independence, Minnesota. Kothrade employee Gabe Bursch works in the background.

<< Gustafson discusses installation of a complex system with Glen Kothrade of Kothrade Residential and Commercial Sewer, Septic and Excavating. The company's technicians Terry Bursch and Gabe Bursch work in the foreground.

BRINGING REGULATORS ON BOARD

It's not just installers, service people and inspectors who need training in onsite wastewater treatment. Regulators from state agencies and county health departments do, too.

"When I look at that side of the industry, I see many younger professionals who don't have a lot of experience," says Dave Gustafson, P.E., of the University of Minnesota onsite program. "That is where education could be helpful.

"They come out of college excited about protecting the environment, and I think sometimes they feel protecting the environment means saying no. If both sides come together in training, they can gain some appreciation for each other. They can meet in a nonthreatening situation and talk through some of the issues both sides have."

Regulators are always invited to Gustafson's classes in Minnesota, and in fact, the state requires them to take the training. "I train regulators here and across the U.S.," Gustafson says. "I find it to be really helpful for them. Part of that is creating mutual respect so the installers appreciate that the regulators have a job to do and the regulators can understand how their job fits in with what the onsite professionals are doing.

"It's important for the respect to go both ways — that can help make the industry a better place. If the regulations and the work being done match effectively, that is also the best for our customers."

Gustafson's key colleagues in the Minnesota program are Sara Heger, researcher, and Dan Wheeler, soil scientist.

ON THE ROAD

The heavy roadwork for Gustafson and Anderson started with all-day, large-group seminars during the Pumper & Cleaner Environmental Expo (now called the WWETT Show). It was there Gustafson connected with members of the NAWT board of directors, including Tom Ferrero, Tim Frank and Ralph Macchio, who helped broaden his perspective.

"I really appreciate all the real-life experience they brought," Gustafson says. "A big part of my development was connecting with professionals like those in other parts of the country who were dealing with the same issues and coming up with different ways — sometimes better, sometimes not as good — for dealing with them.

"Those national connections, being able to cross-pollinate and learn from things that go well and don't go well in other locations, that's a benefit that people often don't recognize. You tend to get caught up in what's going on in your area, how you do it and what your rules say; and that can close off the box you're working in."

Apart from the WWETT Show, Gustafson and Anderson have been regular trainers in Arizona and Ohio and sporadically in other states. "I work in some states a little more regularly because I'm active in their certification programs," Gustafson says. "In other states, I come as an invited guest. I tend to bring different perspectives; that's one thing groups seem to appreciate."

He travels for training about 160 days per year. That means addressing about 2,000 people per year in Minnesota alone, up to 700 at the WWETT Show, and a total of 600 to 700 more at a dozen to 15 events scattered around the country.

PRACTICAL PRESENTATION

His approach to training emphasizes real-world examples and often contains a healthy dose of math: "I tend to force a little extra math because it helps bring home the science around how we make decisions about our systems. For nonscientists, sometimes the math helps them connect the dots a little better.

"The other big thing is that I try to make the step from the science to what professionals see — why things look the way they do and why some things are important even though they may not appear to be. I try to make the material really apply to what they are working on."

That includes emphasizing the critical importance of maintenance and reporting on the outcomes of maintenance: "Sometimes our industry misses opportunities to share successes. We work a day in the field and perform service at five houses. Four of the systems are working great and one of them isn't; we tend to focus on the one that's broken instead of the four successes."

Other points of emphasis include accurately setting floats in pump tanks so that systems are not under- or overloaded, measuring voltage to pumps to make sure they are operating properly, and measuring wastewater pH to help troubleshoot problems, such as where users may be overusing chemical cleaners. "It's useful to have a tool like that to identify homeowners who are creating problems for themselves and to connect with what is causing the issue," Gustafson says. "Those kinds of things make a big difference."

It's all presented in a serious, yet lighthearted manner. "The first comment I hear from attendees is that I'm loud; I project," Gustafson observes. "The second comment is that I tend to be a little unexpected and infuse some humor into the discussion. I find that if you're laughing a little bit, things tend to sink in a little bit more. I also want to be technically clear and accurate. So I try to walk a line: the technical applied with a taste of humor."

IT'S ABOUT TREATMENT

On the technical side, Gustafson emphasizes there's more to a successful system than making sure the toilet flushes and the sewage goes away: "We need to make sure our systems are actually going to

"I find that if you're laughing a little bit, things tend to sink in a little bit more. I also want to be technically clear and accurate. **So I try to walk a line: the technical applied with a taste of humor."**

Dave Gustafson

Gustafson is not afraid to get hands-on when visiting a job site. Here he helps out Jim Braegelmann, of Elmer J. Peterson Co., pump a vacuum tank.

treat the wastewater. That was the theme Machmeier started with in 1974, and here in Minnesota that's a big theme we continue to work through.

"An understanding of the relationship between site characteristics and sewage treatment allows professionals to make sure the systems they install are not going to create problems in the natural environment and are going to be part of the solution to developing those places where people want to live, such as the lakes in Minnesota and Wisconsin and the mountain vistas in the West.

"These places may not have the best soils for onsite systems, so we need to build some things into our systems that will enable proper treatment. That may mean pumping the effluent a little ways up the hill to where the soils are better or using pressure distribution to spread the sewage out. It's about understanding that we need to match the system to the site so that people can enjoy living there. The other thing is that all systems need to be taken care of, so we make sure our customers get the maximum life out of them."

APPLYING TECHNOLOGY

Technology plays a role in many systems, and here Gustafson sees a need to make selections with site characteristics in mind: "We've got an abundance of choices. Not every technology, be it aerobic tanks or recirculating filters, will be the right answer for every property. We need to evaluate properties and choose the technology that fits best.

"Part of the right choice is what's going to be the most affordable. Treatment is the first decision, and the second choice is what it costs to install the system and keep it working. That's the place where the industry is going to learn the most in the next 10 years: What is the real economy around these different technologies?"

> **"Education is a choice, and it's the top** people in the industry who make that choice."
>
> Dave Gustafson

Cost was a big factor about 10 years ago when Gustafson and colleagues worked with a few small Minnesota communities that faced numerous septic system failures but could not afford centralized wastewater collections and treatment systems. One of those communities, in the southern part of the state, took an innovative approach by using a mix of cluster and individual systems.

"It was a project where people went through and looked at the available technologies and made multiple choices that ultimately served the community better," Gustafson says. "It showed that with a little bit of upfront planning, it's possible to create an affordable, site-specific solution that allows the integration of multiple technologies."

PEOPLE BUSINESS

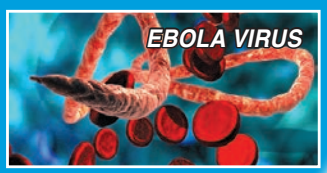
Behind the technology are people, and Gustafson is gratified to work with other industry experts, as well as the people he trains each year. He helped develop the Inspector Training Program for NAWT: "I still think that is a quality program, and it's an industry standard on proper point-of-sale inspections."

He also takes pride in his work with the Consortium of Institutes for Decentralized Wastewater Treatment, developing training materials for high-strength wastewater treatment and system operation and maintenance that are now used for certification by NAWT and by a number of states. He cites Bruce Lesikar of Texas A&M University, George Loomis of the University of Rhode Island and Bill Stuth of Nibbler as key collaborators. "It's people like that who motivate me to share knowledge that helps contractors in the field to be profitable and put in quality systems for their customers," he says.

His trainees themselves also inspire his respect: "Education is a choice, and it's the top people in the industry who make that choice. It's really difficult to run a small business in America. The people I'm training on the ins and outs of wastewater are really sharp. I meet people who are running really efficient, profitable businesses.

"The small-business owners and the equipment manufacturers appreciate what's going on in the industry, and they're working hard to give customers the best service they can. That keeps it exciting and fresh for me."

WHAT'S IN YOUR WATER?



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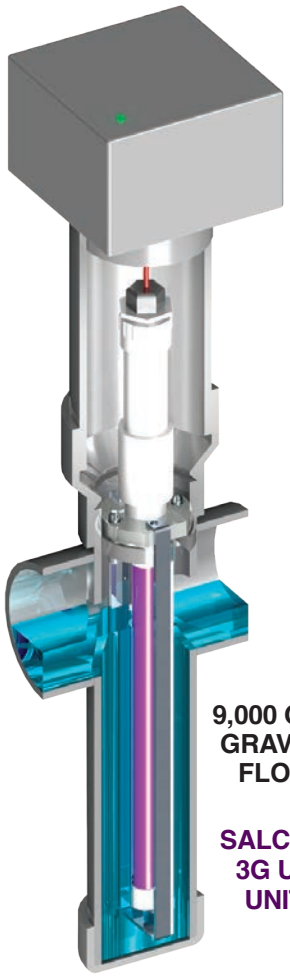

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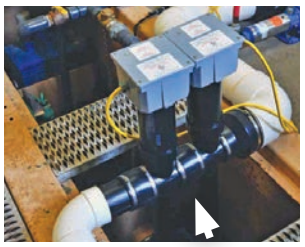

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Jim Anderson, Ph.D., and David Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. David is extension onsite sewage treatment educator. Jim is former director of the university's Water Resources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

Sometimes You Have to Go Big or Go Home

Follow these guidelines to determine flow characteristics for customers with larger systems. Then check your numbers carefully to ensure a successful installation.

By Jim Anderson and David Gustafson

Over the past few months, we have received questions about estimating flows for larger system designs. We thought it would be a good idea to explain in a general way some of the approaches to determining design flows for systems that serve multiple residences or establishments, defined as a cluster system.

The definition of "larger" system varies from state to state. In our Minnesota state code, large is defined as having flows between 5,000 and 10,000 gpd. A good case can be made that flows up to 5,000 gpd cover most single residence and small business flows. Flow levels are used to determine the qualification requirements for individuals or companies to design, install and maintain systems. As always, you need to know state code and how it addresses these issues.

The minimum time to measure flows is probably one week. Maximum capacity is used to make sure that the system is sized large enough to accept the larger flows. If the time period is longer, such as a month, it could include times of much lower use that would bring the average down, allowing a smaller system.

The upper end of flows is set by federal requirements. Flows exceeding 10,000 gpd require an NPDES (National Pollutant Discharge Elimination System) permit. These systems must be designed by a professional engineer. Federal rules can also impact the midsized and smaller systems since any system serving two or more residences or other establishments serving more than 20 people are covered under Class V injection well standards. There are specific reporting and inventory requirements for these systems. Each state deals with these requirements a little differently.

A BIGGER CHALLENGE

Estimating flows for larger systems is more challenging than single-family residences, but the general methods are the same. Flow estimates for residences are based on the number of bedrooms, residence size in square feet and/or water-using devices.

In Minnesota, it was recognized that there are differences between groups of established residences and new housing developments. Part of this recognition was due to high numbers of formerly seasonal dwellings converted to full-time residences on lakeshores. Resort cabins were sold off individually on small lots. At conversion time, if there was not already a collections system to a shared treatment system, there needed to be following conversion.

Design flow in this case is determined by taking the total flow from the 10 highest dwellings plus total flow from the remaining dwellings, then multiplying that number by 0.45. This recognizes that all dwellings in these situations will not have the same level of usage. New housing development flows are based on determining the total number of bedrooms in the development and multiplying by 110 gallons per bedroom. This is less than the standard 150 gallons per day per bedroom estimation and reflects the fact that when there are multiple residences involved, there is variation in use and occupancy.

For establishments other than residences, tables provided by U.S. Environmental Protection Agency or the state regulatory authority are often used. An important consideration when using estimates from tables is they reflect maximum flows; as a service provider if you see average daily flows over 70 percent of the estimated values for extended periods, you should be concerned. Soil treatment units will not accept those levels of use over the long term.

Another option if the facility is already in place is to measure flow, ideally during a time of maximum capacity or use. The minimum time to measure flows is probably one week. Maximum capacity is used to make sure that the system is sized large enough to accept the larger flows. If the time period is longer, such as a month, it could include times of much lower use that would bring the average down, allowing a smaller system. But it would not be large enough during busy periods. Where we live, this is a common occurrence for bars and restaurants — very busy during peak tourist times, not so much when it is just locals.

Ideally, during the week when flows are measured, times and levels of peak flows throughout the week can be determined. Peak flows can be used to determine whether to increase the size of the soil treatment area and whether using flow equalization is a good design option. Bars and restaurants often have variations in patronage during the week. Generally,

more flow occurs on weekends or special events during the week, such as "Taco Tuesday."

DON'T FORGET STRENGTH OF WASTE

Using the average daily flow, along with knowledge of peak weekly flow events, can help with sizing soil treatment areas and determining storage needed to provide flow equalization. It can also help establish a management and maintenance routine for the system. Management may involve splitting the soil treatment area into sections, storing effluent and establishing dosing sequences run by timers to distribute the effluent more evenly through the week.

The only aspect we have dealt with is flow volume; the designer and installer should recognize that waste strength is also an important component of flow estimation and design parameters. We have used restaurants and bars as examples in the estimation process. These typically have sewage that is considered high-strength waste. The waste is higher in biochemical oxygen demand (BOD), total suspended solids (TSS), and fats, oils and grease (FOG). System design must account for this and incorporate components to reduce these levels before discharge to the soil treatment area.

A final area of consideration that we do not usually worry about for individual residences — but can be important for cluster systems — is the potential for infiltration in the sewer collections system. The longer the collections sewer and the more tanks and treatment devices involved, the higher the probability of infiltration in the system. This should be estimated and incorporated into sizing the final treatment area. Each state will view this somewhat differently, so know your numbers.

SYSTEM PROFILE

Ice Road Installers

A daily half-mile trek over a frozen Minnesota lake kept this island ATU project interesting for the crew at Septic Check

By David Steinkraus

Although most installation work shuts down when winter comes to the north, one crew in Minnesota was waiting for the snow and ice so they could get their job done. Winter was the best time to put in a new treatment system for a house on an island.

Minnesota has many lakes and many islands, but not all the lakes or all the islands are easy to reach, says Travis Johnson, production manager for Septic Check in Milaca, Minnesota. Johnson handles the design, inspection and installation division of the multiservice company. On large lakes — such as Minnetonka, which is about 4 miles long by 3 miles wide and is near the Twin Cities — you can expect to find a barge company to tote materials to island construction sites, he says. On smaller lakes that's not the case, which means an installer either pays for someone to haul a barge to the lake or finds another way to move equipment and components. The Septic Check crew chose a different solution: driving across the ice.

Farm Island is about 1,200 feet long by 1,200 feet wide and sits near the southern end of Farm Island Lake near Aitkin. The lake is about 120 miles north of Minneapolis. There are other homes on the island, but the job for Septic Check was to install a new onsite system for a year-round recreational dwelling of about 1,400 square feet.

Minnesota regulations require a minimum separation of 3 feet between the drainfield of a conventional system and the water table. A mound system would have met that requirement, but hauling aggregate to the island would have been a problem. You either move three-quarters of a yard at a time in a skid-steer, Johnson says, or you drive a dump truck and risk the life of the driver and the loss of the truck if it falls through the ice. "And we would not carry that risk," he says.

<< The road to Farm Island was safe. Extra weight from a snowfall squeezed water on top of the ice where it froze at night. During the day, and under the weight of trucks, it shattered and floated, but there was solid ice below. Travis Johnson (left), Kyle Wade (middle) and Brandon Ligneel from Septic Check check the condition of the road. (Photos courtesy of Travis Johnson)

^ Josh Holm from Septic Check looks over the Infiltrator Water Technologies tanks that will be used for the onsite system at the year-round recreational dwelling (background) still under construction on Farm Island in Minnesota.

>> Kyle Wade of Septic Check helps set one of the Infiltrator Water Technologies IM-1060 tanks that formed the primary treatment chain for the system on Farm Island in Minnesota.

"Anytime you work on an island, you double-check everything. You make sure you have all the little stuff that otherwise you would run to the store to get. **Island work is just more planning."**

Travis Johnson

The designer instead chose to use an aerobic treatment unit. This option reduced the required separation, and the inclusion of a UV lamp dropped it to 1 foot.

The system

From the house, wastewater exits in a 4-inch Schedule 40 PVC pipe running about 12 feet to the first of three Infiltrator Water Technologies IM-1060 1,000-gallon tanks. This first tank is for settling and anaerobic treatment.

From there, water flows by gravity into the second tank where an ECOPOD E50 unit from Delta Treatment Systems provides aerobic processing. Water leaves the ECOPOD and flows by gravity through a SALCOR UV light and then to the last Infiltrator Water Technologies tank, where a Goulds Water Technology, a Xylem brand, PE51 pump sends it 65 feet through a 2-inch pipe to the absorption field.

The field is 585 square feet and uses 200 linear feet of EZflow by Infiltrator divided into three beds fed by a manifold of 2-inch pipe. The beds are of varying sizes to make maximum use of a small patch of good soil on the 1-acre lot. The system sits behind the house, at the northwestern corner of the property and about 250 feet from the lakeshore.

The system is controlled by a Delta Treatment Systems CPR52RCT15SUV control panel.

System Profile

Location:	Farm Island on Farm Island Lake, Aitkin, Minnesota
Facility served:	Private home
Designer:	Martin Joyce, Brainerd
Installer:	Septic Check, Milaca, Minnesota
Type of system:	ECOPOD aerobic treatment unit
Site conditions:	Sandy soils with high water table
Hydraulic capacity:	450 gpd

Risers were cut from a large piece of Ultra-Rib pipe (IPEX USA) and were secured with Infiltrator Water Technologies lids.

Ice and snow

Installation happened in early March 2018, but preparation began in fall 2017. That's when the building contractor covered the installation site with frost blankets. These are insulating covers that trap heat from the soil and prevent it from freezing. In February, Johnson went to the island

With the tank in the ground, the crew from Septic Check begins putting the soil back. Frost blankets placed over the site in the fall kept the ground soft enough for digging. Pictured, from left, are Brandon Ligneel, Josh Holm and Kyle Wade ran the mini-excavator.

and looked under the frost blankets. The soil was unfrozen, and with final approval from the county, the job was on.

The Septic Check crew brought over a truck with a snowplow and made a road across 3,400 feet of ice to reach the island.

"By the time the job started, we were dealing with 26 to 34 inches of ice on the lake, plenty for smaller trucks," Johnson says.

Equipment and supplies went across on a trailer pulled by a single-axle flatbed truck. During the five days of construction, the technicians commuted by snowmobile, and every morning they had to make sure there was enough fuel for the snowmobiles. Equipment stayed on the island overnight, and because there was power, the crew could plug in block heaters to make morning starts easier.

That does not mean working across ice was easy.

A large snowfall hit just before the job started. That extra foot of snow put added weight on the ice. Water is squeezed to the top of the ice, and

> "By the time the job started, we were **dealing with 26 to 34 inches of ice on the lake, plenty for smaller trucks."**
>
> Travis Johnson

at night it froze. In the morning, drivers face an inch of ice on top of 6 inches of water on top of 36 inches of ice base. It made driving interesting, Johnson says.

"Fortunately we all grew up in Minnesota so we were used to seeing that," he says.

Everyone watched the weather forecast closely. As spring comes to the north, ice goes through a freeze and thaw cycle. Snowmelt from the shore runs onto lakes and deteriorates the ice until it resembles a honeycomb, and that's when it's dangerous to cross, Johnson says. There was no extended period of warming during the project, yet the crew used an

continued >>

Equipment and supplies for the Farm Island job near Aitkin, Minnesota, go on the trailer so they can be moved more than half a mile across ice to the job site.

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auger to bore holes regularly and check the thickness and quality of the ice. It stayed safe through the project.

To do the job, the crew used a 2008 Cat 304 mini-excavator and a 2014 Cat 279D skid-steer.

Island work

"Anytime you work on an island, you double-check everything," Johnson says. You build the job on paper a few more times than usual, you check the parts list four or five times, and you bring extra pipe, fittings and so on. For this winter job, he made sure there were extension cords to plug in block heaters at night and extra fuel filters for the diesel engines because fuel tends to gel in extreme cold.

"You make sure you have all the little stuff that otherwise you would run to the store to get. Island work is just more planning," he says.

Once on the island, the job went smoothly. The hardest part was the need to clear all piles of dirt in the course of a day because they would freeze if they sat overnight. It added another item to the scheduling.

Planning for an island job also requires allowing time for the noninstallation work. People will ask, could you move this rock or dig a trench here — and you can't blame them because heavy machinery doesn't show up on islands very often so they want to take advantage of it, Johnson says.

And the result of this job for Septic Check was — more work.

"I have three island jobs that I'm working on right now," he says.

As he begins his planning, the first challenge is the same one he faced on Farm Island: How does he get equipment to the next jobs? ◻

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'My Guys Hunger to Learn; They're Good With People'

Wastewater pros in British Columbia work hard, adapt to changing regulations and strive to be at their professional best

Compiled by Betty Dageforde

In States Snapshot, we visit with a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we learn about a member of the Western Canada Onsite Wastewater Management Association of British Columbia.

Garth Millan
co-owner with wife, Frances Millan

Business: JAB Site & Wastewater Solutions, Hornby Island, British Columbia
Age: 66
Years in the industry: I've been in the industry about 13 years and became certified as a Registered Onsite Wastewater Practitioner, or ROWP, in 2006. I'd been involved in related work before that — home maintenance, water systems. We live in a rural community where everybody has wells or water storage so there was a lot of work with water, septic and small repairs.

Association involvement:

I'm currently president of the Western Canada Onsite Wastewater Management Association of British Columbia, serving my second two-year term. I joined the association nine years ago. I have served on the board of directors for seven years — two as secretary-treasurer, one as vice president and now president. Despite the industry challenges, I enjoy working with our membership and sharing skills and experience I have gained over the years.

Benefits of belonging to the association:

We advocate for our members to other industry stakeholders — the registration body, the Ministry of Health — and we offer training in all ROWP categories. We hold annual conferences, usually three days, where we bring in suppliers, manufacturers and distributors and have training seminars. If the weather is fine, we'll do some practical training in the field or we may hold a day seminar for an important aspect of training.

Biggest issue facing your association right now:

The industry in British Columbia is suffering some huge growing pains. New sewage system regulations came into effect in 2005, the biggest change being that our ROWPs, engineers and hydrogeologists sign and stamp their designs, installs, maintenance and inspection reports — in other words, policing ourselves. A strong element of distrust has developed in the industry. The accrediting body wants new people to be highly trained before offering accreditation. But in a small onsite industry, it's hard for potential ROWPs to find work with a company in order to get training, especially in maintenance or inspections. So our biggest challenge is developing a stronger trust and better relationships with the accreditation organization. The Western Canada Onsite Wastewater Management Association of British Columbia will provide good training and will continue to upgrade people's skills to meet whatever the expectation is.

Our crew includes:

My excavator/gravel truck operator is Bob Nixon. And I have one part-time maintenance provider, Bikram Singh Gill. I hire contractors or different equipment for special needs.

Typical day on the job:

For the last couple years, most of my time is spent doing what I call triage. With the challenge of poor soils on the Gulf Islands and setbacks from the ocean or streams, the industry was forced into advanced treatment systems as early as 30 years ago. Some were partially maintained but most systems lacked full routine maintenance. So there's a lot of emergencies — sewage backing up into bathtubs in the basement, alarms, wet spots in the yard. This is good and bad. Now I see a significant change in the homeowner's attitude. What used to be, "I don't have any problems: The toilet is still flushing," to nowadays saying, "We want you to make sure this thing is going to keep on ticking because we don't want to pay for a new system."

continued >>

Helping hands – Indispensable crew member:

Everyone is just so important. My guys like what they're doing, and they hunger to learn; they're good with people and have very good personalities. I've been lucky through the years that the people who've worked for me have been positive, listen to customers and don't get angry. And they're very good at saying, "I don't know what to do here. I'll have to check into this." To me, that's important. They don't have that ego or arrogance and end up making poor decisions.

The job I'll never forget:

This installation had all the classic examples of what not to do. In 2007, a Type 3 treatment system was installed at a small restaurant/bakery. The alarms started going off. I received the call in January, during heavy rains and high water table. There was severe flooding of the tank, the treatment plant and the dispersal field, which was a mound built between the restaurant and the parking area. The owner was incensed because it was only 1 1/2 years old and had cost them close to $60,000. I played the advocate — I couldn't slam dunk the installers or the designer because fault was shared by all parties.

The designer and one installer responded immediately and we devised a game plan. The repair was phased in over two years. The treatment plant vent caused the flooding of the tanks so we repaired it immediately. The dispersal was completely saturated and groundwater mounding was an issue. We rerouted the vent from the treatment plant to introduce warm air into the gravelless chambers, which were a higher elevation than the tanks. This helped the field to dry out and oxygenate. Due to prolonged flooding of the tanks, the treatment system became invaded with little critters, which were determined to be *Cyclops* (water fleas). In the ideal environment of warmth, plenty of food and no predators, the *Cyclops* multiplied, clogging tanks, filters, the UV, the pump chamber and dispersal laterals.

We had to completely pump the whole system — four tanks — and bleach and clean everything. Then it was a slow process for the system to rebuild bacteria and get back to normal. Just as the system returned to normal, we had the 100-year storm. The building and the system flooded; the blowers became submerged. Fortunately, the pumps continued to move water to the dispersal. No insurance, so we rebuilt the damaged equipment.

My favorite piece of equipment:

My 1981 single-axle Mack gravel truck. It has a 10-yard aluminum gravel box. It's a workhorse, just never gives up. It's small enough to get into the smallest yards and large enough to carry 10 yards of light material or five or six of heavier materials. It's known throughout the region. Everybody says, "Oh, you're the one with the little red Mack."

Most challenging site I've worked on:

We had a repair to a system on a small waterfront lot that had a 7-foot concrete fence around it and no equipment access. The option was to either tear down a large section of the fence and hopefully rebuild it or do everything by hand. We chose the latter. The field had failed. I hired Steve Carballeira, hydrologist from H2O Environmental Ltd. Carballeira's plan was to install a pump chamber after the treatment plant and a small seepage bed. All the materials were placed by hand with wheelbarrows. The hole for the tank was hand-dug in almost sandstone-type soil. I just said to the gang, "We've got to do this. I can hire some young bucks or I'll just give you $1,000 and you dig that hole. If you do it in 10 hours, you just made yourself $100 an hour." Being in a remote area with two ferries, it's very expensive to bring a (Stone Slinger truck from www.stoneslinger.com) in. We planned a day for a Slinger — we had all our piping cut, drilled and glued just ready to lift over on top of the drain rock and quickly get it glued to the headers. It was a very challenging, exhausting process, but at the end of it all, it was like "Wow, we did it!" Everybody had big grins on their faces.

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

In the early years, I would have had many answers for this, but in the past 15 years, I've learned no question is crazy. If you really listen and ask for more information, you will learn the client's depth of understanding. What seemed like a ridiculous question was purely the client's lack of knowledge. It reminds me that before I attended formal training, I only thought I knew what made septic systems operate. It takes years of making your own mistakes to gain knowledge. So I do not judge clients for asking questions, I encourage it. Many homeowners have stated they learned more about their septic system in the hour and a half I spent with them than in all their years of ownership. That is when I know I am doing my job properly.

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

The current regulations need a provision for inspection of septic systems. Requirements have not been outlined. The result is the Ministry of Health and regulatory body have taken the approach that inspection and maintenance are the same thing — but they are not. Maintenance is making sure the system works as the designer intended (performance more than compliance), while inspection is doing an in-depth look, including digging up the dispersal area and seeing what it looks like, to ensure the system fully complies with guidelines and is operating properly (compliance and performance).

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

Don't undercut yourself or try to beat everybody's price. Respect the value of your service and the fact that you're a professional and don't gouge but charge accordingly. Keep always in the forefront of your mind that you are a professional and working in hazardous conditions. My wife was a very strong proponent of that — you're doing an important job and you're worth it.

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

I'd want to be retired. But I like this industry. I don't think there's really anything else I'd want to do. And I love training. I feel the adrenaline surge when challenged at sites. I love the opportunity to troubleshoot and find solutions. I like to motivate students.

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

I think the industry in British Columbia is heading in the right direction. But it's been tough trying to build the trust between the Western Canada Onsite Wastewater Management Association of British Columbia, Ministry of Health and accreditation body — trusting that everybody is trying to do a good job, that all of our intentions are honorable. That is my goal, and I will stick to it until they retire me. ☐

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New York City Mulls Changes to Onsite Wastewater Rules

By David Steinkraus

New York City is about to revise its watershed rules, and that includes how onsite systems are handled. Changes also include how the city Department of Environmental Protection will handle portable restrooms and holding tanks. The department will not approve them, but the new rule adopts standards consistent with state standards.

Among the changes proposed for onsite systems:

1. Approvals from the department will expire unless construction is substantially complete and a system is functioning as designed within five years for subdivision systems and two years for all other onsite systems.
2. Systems out of operation for five or more years can be returned to operation if they are brought into compliance with current rules.
3. If required modifications to an onsite system are not done within two years, the department's approval expires.
4. Drip and low-profile dispersal systems for intermediate-size onsite systems will be prohibited in the watershed.
5. The department must be notified at least two business days before construction of an onsite system begins and must be notified at least a day before any component is buried. If construction stops for more than seven days, the permit applicant must make a best effort to notify the department at least two business days in advance of the restart of construction.

A copy of the rules and a link to post comments can be found here: rules.cityofnewyork.us/content/amendment-watershed-regulations.

* * *

The town of Queensbury, located on the southern end of Lake George, last fall ended three years' discussion by approving a rule for onsite systems near lakes and rivers. If a property-zoned waterfront residential is sold, the town will inspect the onsite system. Only if the system has passed an inspection in the previous three years will it be exempt. The new rules took effect in January.

A number of people wanted an exemption for properties transferred through inheritance, but the town board refused. Officials continually say leaking systems must be fixed and that a sale is the time to do that because owners can use some of the sale proceeds to fix wastewater system problems, according to *The Post-Star* of Glens Falls.

Massachusetts

Citizens at a town meeting in Billerica voted down a penalty for people who refuse to connect to the municipal sewer system. The proposal would have charged people who did not connect about $240 annually. For 44 years, a town rule has required people to connect to municipal sewer within a year after it becomes available, but there has never been a penalty.

John Curran, town manager, says about 630 people have refused to connect, which amounts to $200,000 in lost revenue every year, according to the *Lowell Sun* newspaper. That costs other ratepayers about $15 annually to help pay for sewer service expansion. People at the meeting say citizens spent thousands of dollars to upgrade their onsite systems to meet state standards because municipal sewer service was not available, and now they may be forced to pay again to make sewer connections.

Washington

Public health officials in Clark County, immediately north of Portland, Oregon, warned residents about a company making false statements to sell products. Officials say the company calls people and tells them there was an alert about failing onsite systems. Then the company representative offers to sell the person an additive to clean their septic system, reports *KPTV* in Beaverton, Oregon.

There was no alert about failing systems. Health officials say not all additives work, and some may contaminate groundwater. The state Health Department maintains a list of approved additives at its website: www.doh.wa.gov/Portals/1/Documents/Pubs/337-025.pdf.

South Dakota

The long fight of one county official opposed to onsite system regulations has overflowed onto a regional water district that backed his cause with public money.

Last fall the West Dakota Water Development District board approved up to $7,500 for a lawyer to join George Ferebee at a meeting of the South Dakota Water Management Board. The district wants the state board to say cities and counties cannot regulate septic systems, or at least not those in existence before a 1975 change in state law. That is Ferebee's latest argument in his years-long opposition to wastewater regulations.

The county is about 100 miles long and includes Badlands National Park in its eastern end. The western end includes part of the Black Hills National Forest, and near the center is Rapid City. Ferebee lives in rural Hill City, in the Black Hills.

Onsite regulations led to Ferebee's own legal troubles. In October 2017 he was convicted of operating an onsite system without a permit. The county zoning rules he violated require systems to be regularly pumped and inspected.

The meeting was not to be Ferebee's first appearance before the state water board. In 2016 he challenged the authority of counties and cities to regulate pit privies and cesspools. In that case, he also wanted the state board to issue a ruling against Pennington County and Rapid City. Without discussion, the board voted 6-0 to dismiss his petition.

One member of Rapid City's Public Works Committee put the wastewater issue in broader terms. "We as Rapid City have a responsibility to protect that water downstream from us," says Jason Salamun, City Council member. "That's called being a good neighbor. That's what we are in South Dakota — good neighbors. That means taking care of the water supply we all share."

Keep Communication Lines Open to Resolve OSHA Safety Violations

Nobody wants to blow the whistle on a dangerous workplace situation. But when it happens, work to get into compliance rather than punish the reporting employee.

By Jared Raney

At some point, you may have heard a horror story about someone getting fired or demoted for reporting a safety violation.

In fact, OSHA's whistleblower department investigates approximately 3,000 such cases a year. Reporting a safety violation is rarely easy. Employees don't want to get their company in trouble and may be afraid of bringing the issue to superiors.

When employees notice a safety concern, it's not uncommon that the fear of blowback results in a reluctance to bring it to the attention of their supervisors. But repressive atmospheres that discourage employees from reporting can lead to much bigger problems for employers and their employees.

If an employer takes what could be considered a retaliatory action against an employee for protected activity like reporting safety issues, the best-case scenario is months of investigation, most likely legal fees and headaches, without even taking into account the potential penalties if an employer is found to be at fault. This can also result in decreased worker productivity.

That's why the Occupational Safety and Health Administration requires an anti-retaliation culture among employers. The agency recently issued recommended practices to help employers establish anti-retaliation programs in their workplaces.

"The idea is that if we educate an employer about its responsibilities under the law and the benefits of having an effective program that allows employees to raise concerns without fear of retaliation, there's less likelihood of having to hire an attorney or legal team to defend against an allegation of retaliation or an unreported hazard that causes a serious injury or death," says Anthony Rosa, deputy director of OSHA's Directorate of Whistleblower Protection Programs.

Though employers often feel compelled to do everything they can to suppress reports of safety violations, creating an atmosphere that supports employees in raising those concerns can make them feel more comfortable to deal with the problem in-house, potentially avoiding OSHA involvement altogether. Moreover, it allows the employer to address the safety or health concern before an incident occurs, which could result in greater loss to the company.

The most important component for developing a safety-first culture is making sure employees understand their right to a safe workplace and their right to report any violations without repercussions.

SAFETY AND HEALTH VS. WHISTLEBLOWING

Two relevant offices within OSHA come into play in these circumstances.

The safety and health program is actually separate from the whistleblower protection program. If an employee notices a safety issue on a work site that their employer cannot or will not resolve, they have an absolute right to report that violation. In that instance, you would call the nearest OSHA area office.

If, after reporting that violation, an employer or superior within the company finds out that a particular employee was involved and takes retaliatory action against them, the whistleblower protection program in the nearest OSHA regional office gets the call.

When OSHA's Whistleblower Protection Program receives a report of retaliation, an initial review decides whether the case meets the minimum investigative requirements to proceed through the system. This is known as a prima-facie allegation.

Over half of the complaints are administratively closed without investigation based on the initial evaluation, such as being filed late, lack of jurisdiction, or lack of a prima-facie case. About 7,000 reports are filed with the whistleblower protection program each year, and only 3,000 are docketed for investigation.

"One of the things I ask employees, and it's probably the hardest thing, is to have patience with us," Rosa says. "I have a lot of empathy for people that bravely come forward, because they're going through some strife, they're going through economic hardship, and our investigations can take a long time."

Patience and cooperation are important, as many cases are dropped simply because the employee gives up or doesn't respond by the time OSHA is able to reach out to them.

"In many instances, we end up dismissing the case because the employee never got back to the investigator, and there's a missed opportunity there," Rosa says.

MANY TECHNICALITIES

First and foremost, all workers have a right to contact OSHA at any time to report a safety violation without being subjected to retaliation from their employer.

OSHA has many resources available on the website, by contacting an OSHA office, or by calling OSHA at 800-321-6742. If you are unsure whether there is a safety issue or have questions about your rights or about the limits on the reporting process, it's always best to check.

continued >>

"If we educate an employer about its responsibilities under the law and the benefits of having an effective program that allows employees to raise concerns **without fear of retaliation, there's less likelihood of having to hire an attorney."**
Anthony Rosa

Timing can be a factor. For example, with environmental complaints, there is a 30-day window to file a report with the whistleblower protection program after the retaliation.

Employees should also be aware that the circumstances around suspected retaliation can have an impact.

Say an employee notices an unshored trench on a work site. If they simply walk off the job site and are fired, that will most likely not be considered a protected work refusal. There are precipitating factors that OSHA looks for in determining valid work refusals.

Work refusal requirements:

- **Imminent Danger:** In order for OSHA to consider a protected work refusal, the urgency of the situation must be so unsafe that serious injury or death could occur and there is not enough time to call OSHA.
- **Notify Employer:** The field supervisor or other relevant management must be aware of the danger before work can be refused. Where possible, the employee must have sought the employer but have been unable to obtain correction of the dangerous condition.
- **Good Faith:** Refusals must be made in good faith, which OSHA defines as "a reasonable person would agree that there was imminent danger."
- **Alternative Work:** Employees who believe a situation is too unsafe to proceed should ask the employer if there is another job or work duty they could perform while the issue is addressed.

When all of these boxes are checked, the employee should still not leave the work site until directed to by his or her employer. If that is the case, it is possible that OSHA will find merit to the complaint, especially if the employee is subsequently disciplined or fired after the work refusal.

POST-INVESTIGATION

After the whistleblower protection program investigates a complaint and finds it has merit, they will forward it to the court system for litigation or issue a merit determination, depending on the whistleblower statute. Most merit cases are settled, but if not, then the court or the Secretary's Findings can order a number of compensatory and punitive damages, again depending on the whistleblower statute.

In the case of an investigation, it is important for both employer and employee to keep records, as these are crucial pieces of evidence in OSHA's evaluation and determination.

"Our job is to investigate whether the allegations hold water. If the parties want to get together and settle, we absolutely entertain the settlement. In fact, we have an Alternative Dispute Resolution program that actually can halt the investigation while the parties try to settle the case," Rosa says. "That's our goal — that we always look for opportunities to settle the case."

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Alabama Onsite Wastewater Association; www.aowainfo.org; 334-396-3434

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Arizona Onsite Wastewater Recycling Association; www.azowra.org; 928-443-0333

ARKANSAS

Arkansas Onsite Wastewater Association; www.arkowa.com

CALIFORNIA

California Onsite Wastewater Association; www.cowa.org; 530-513-6658

COLORADO

Colorado Professionals in Onsite Wastewater; www.cpow.net; 720-626-8989

CONNECTICUT

Connecticut Onsite Wastewater Recycling Association; www.cowra-online.org; 860-267-1057

DELAWARE

Delaware On-Site Wastewater Recycling Association; www.dowra.org

FLORIDA

Florida Onsite Wastewater Association; www.fowaonsite.com; 321-363-1590

GEORGIA

Georgia Onsite Wastewater Association; www.onsitewastewater.org; 706-407-2552

Georgia F.O.G. Alliance; www.georgiafog.com

IDAHO

Onsite Wastewater Association of Idaho; www.owaidaho.org; 208-664-2133

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Onsite Wastewater Professionals of Illinois; www.owpi.org

INDIANA

Indiana Onsite Waste Water Professionals Association; www.iowpa.org; 317-889-2382

IOWA

Iowa Onsite Waste Water Association; www.iowwa.com; 515-225-1051

KANSAS

Kansas Small Flows Association; www.ksfa.org; 913-594-1472

KENTUCKY

Kentucky Onsite Wastewater Association; www.kentuckyonsite.org; 855-818-5692

MAINE

Maine Association of Site Evaluators; www.mainese.com

Maine Association of Professional Soil Scientists; www.mapss.org

MARYLAND

Maryland Onsite Wastewater Professionals Association; www.mowpa.org; 443-570-2029

MASSACHUSETTS

Yankee Onsite Wastewater Association; www.maowp.org; 781-939-5710

MICHIGAN

Michigan Onsite Wastewater Recycling Association; www.mowra.org

Michigan Septic Tank Association; www.msta.biz; 989-808-8648

MINNESOTA

Minnesota Onsite Wastewater Association; www.mowa-mn.com; 888-810-4178

MISSISSIPPI

Mississippi Pumpers Association; www.mspumpersassociation.com, 601-249-2066

MISSOURI

Missouri Smallflows Organization; www.mosmallflows.org; 417-631-4027

NEBRASKA

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

NEW HAMPSHIRE

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

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

NEW MEXICO

Professional Onsite Wastewater Reuse Association of New Mexico; www.powranm.org; 505-989-7676

NEW YORK

Long Island Liquid Waste Association, Inc.; www.lilwa.org; 631-585-0448

NORTH CAROLINA

North Carolina Septic Tank Association; www.ncsta.net; 336-416-3564

North Carolina Portable Toilet Group; www.ncportabletoiletgroup.org; 252-249-1097

North Carolina Pumper Group; www.ncpumpergroup.org; 252-249-1097

OHIO

Ohio Onsite Wastewater Association; www.ohioonsite.org; 888-294-0084

OREGON

Oregon Onsite Wastewater Association; www.o2wa.org; 541-389-6692

PENNSYLVANIA

Pennsylvania Association of Sewage Enforcement Officers; www.pa-seo.org; 717-761-8648

Pennsylvania Onsite Wastewater Recycling Association; www.powra.org

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

TENNESSEE

Tennessee Onsite Wastewater Association; www.tnonsite.org

TEXAS

Texas On-Site Wastewater Association; www.txowa.org; 409-718-0645

Education 4 Onsite Wastewater Management; www.e4owm.com; 713-774-6694

VIRGINIA

Virginia Onsite Wastewater Recycling Association; www.vowra.org; 540-377-9830

WASHINGTON

Washington On-Site Sewage Association; www.wossa.org; 253-770-6594

WISCONSIN

Wisconsin Onsite Water Recycling Association; www.wowra.com; 888-782-6815

Wisconsin Liquid Waste Carriers Association; www.wlwca.com; 888-782-6815

NATIONAL

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

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

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

CANADA

ALBERTA

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

BRITISH COLUMBIA

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

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

MANITOBA

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

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

NEW BRUNSWICK

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

NOVA SCOTIA

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

ONTARIO

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

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

SASKATCHEWAN

Saskatchewan Onsite Wastewater Management Association; www.sowma.ca; 877-489-7471

CANADIAN REGIONAL

Western Canada Onsite Wastewater Management Association; www.wcowma.com; 877-489-7471

INDUSTRY NEWS

Tank Holding acquires Bushman Water tank line

Tank Holding acquired Bushman USA's water tank product line, and all the related assets, from Channell Commercial of Temecula, California. Channell launched the Bushman product line in 2009, and its market focus is primarily rainwater harvesting solutions for residential, commercial and municipal applications. Tank Holding, which includes the brands of Norwesco, Snyder Industries, Bonar Plastics and Stratis Pallets, is owned by Leonard Green & Partners and the management team and currently operates 22 manufacturing plants employing approximately 650 people throughout North America.

Norweco's Gregory Graves honored with industry award

The National Onsite Wastewater Recycling Association announced the 2018 recipient of the Richard J. Otis Industry Achievement Award. Gregory Graves, president of Norweco and past president of NOWRA, received the award during the NOWRA Mega-Conference held in Minneapolis last October.

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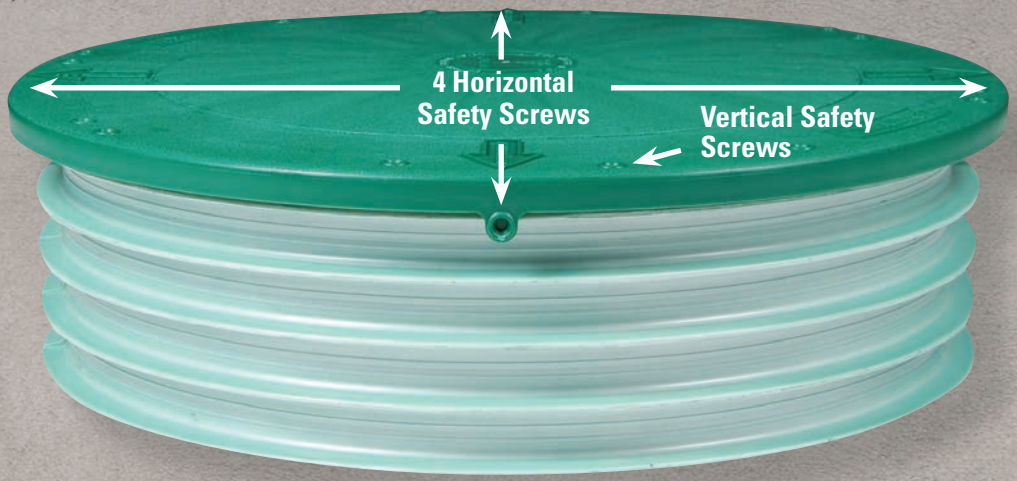

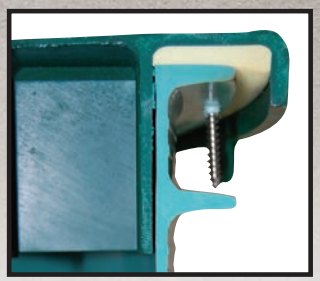

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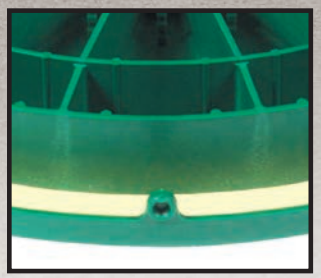

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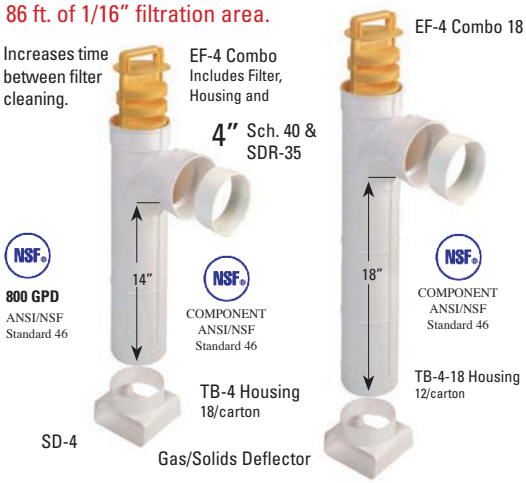

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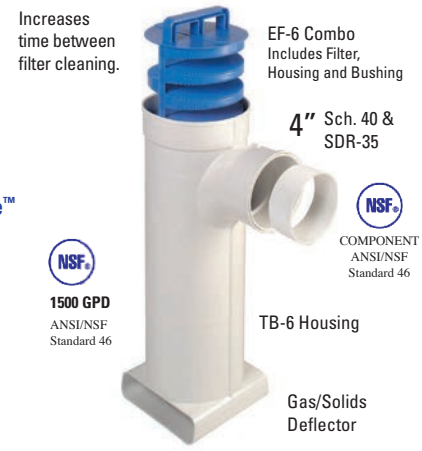

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