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Indiana installer Brian Baker adapts to new technologies as they are approved, ensuring his place on the leading edge of the onsite industry PAGE 12

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- Cover story: Company in the heartland of Indiana focuses on the future
- State of the State: North to Alaska

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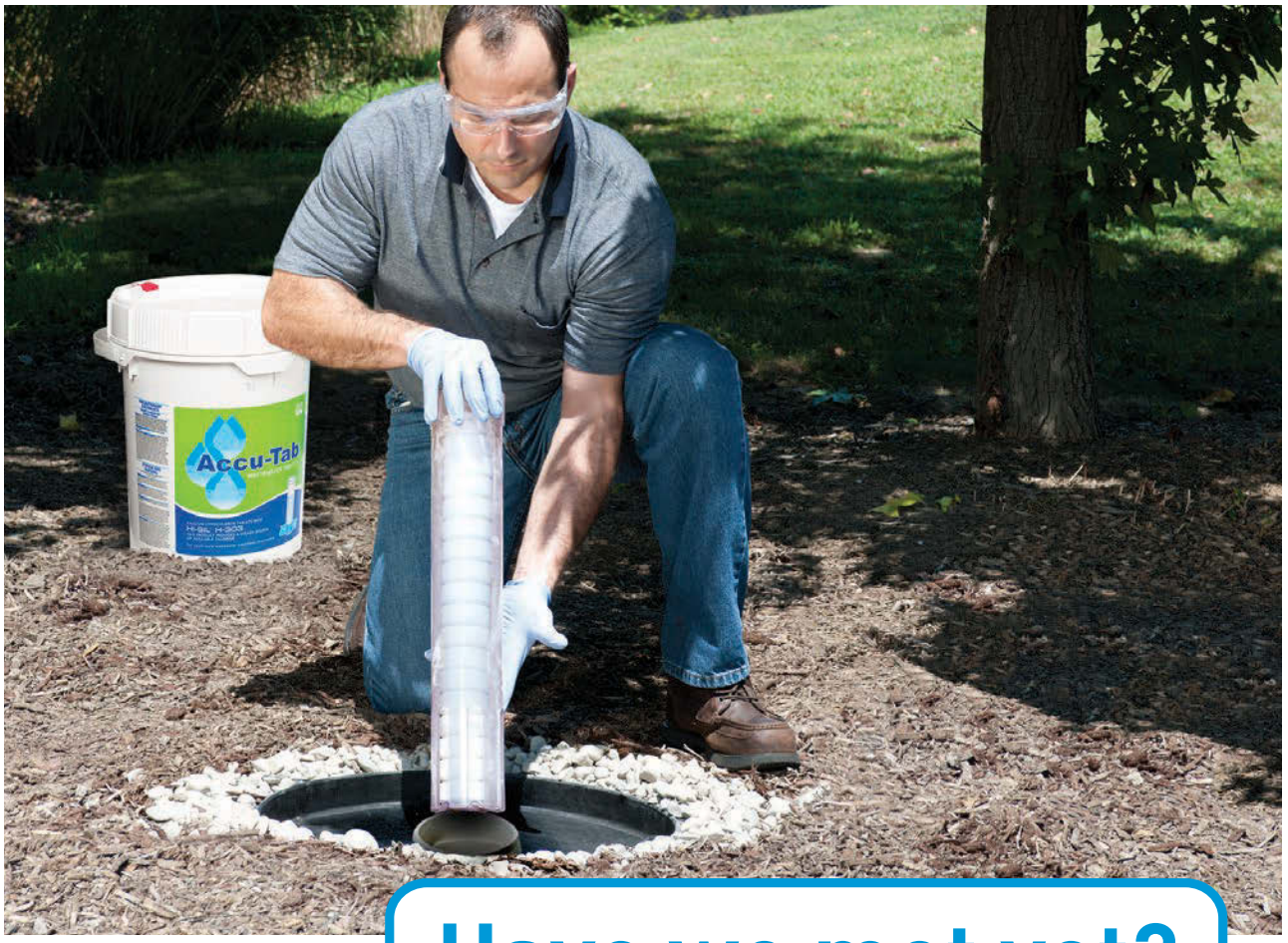

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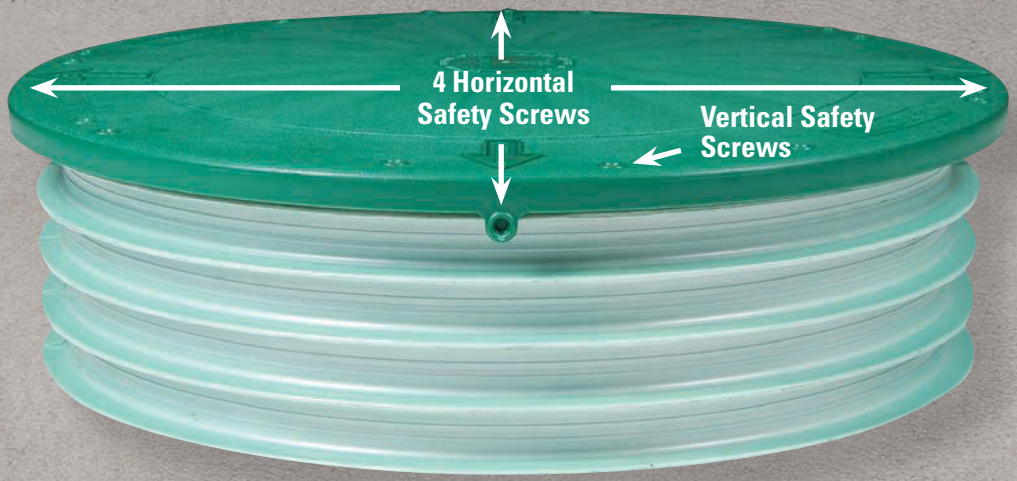

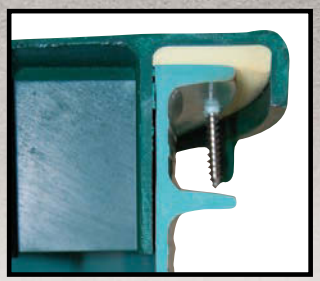

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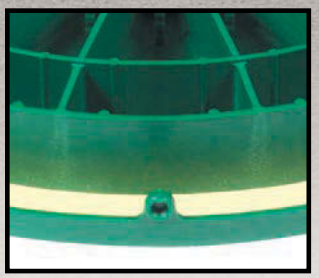

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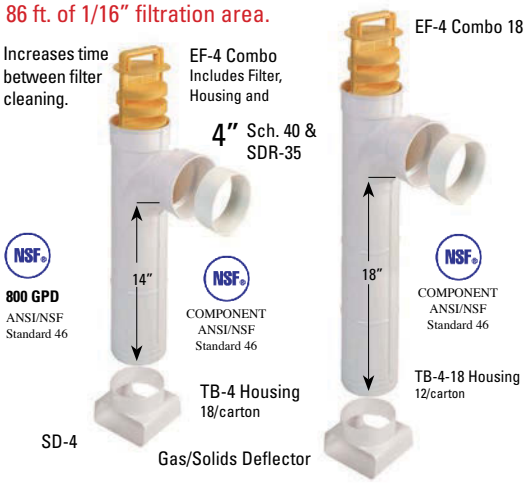

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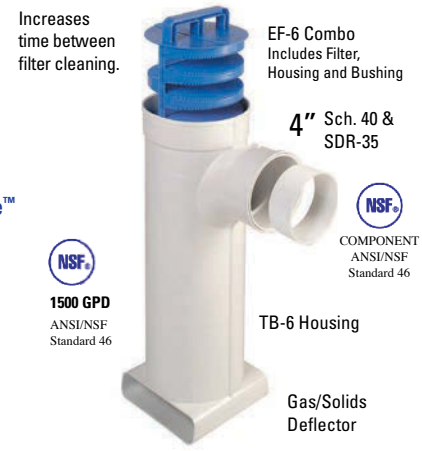

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Keep On Truckin'

After 53 years and 5,000 septic tank installations, Texas onsite worker Al Pavlicek insists he'll keep busy and enjoy family in his retirement

By Jim Kneiszel

Were they really the *good old days*?

If you talk to Alfonzo "Al" Pavlicek about his long career installing septic systems, you might wonder why so many people look back fondly at the way things used to be.

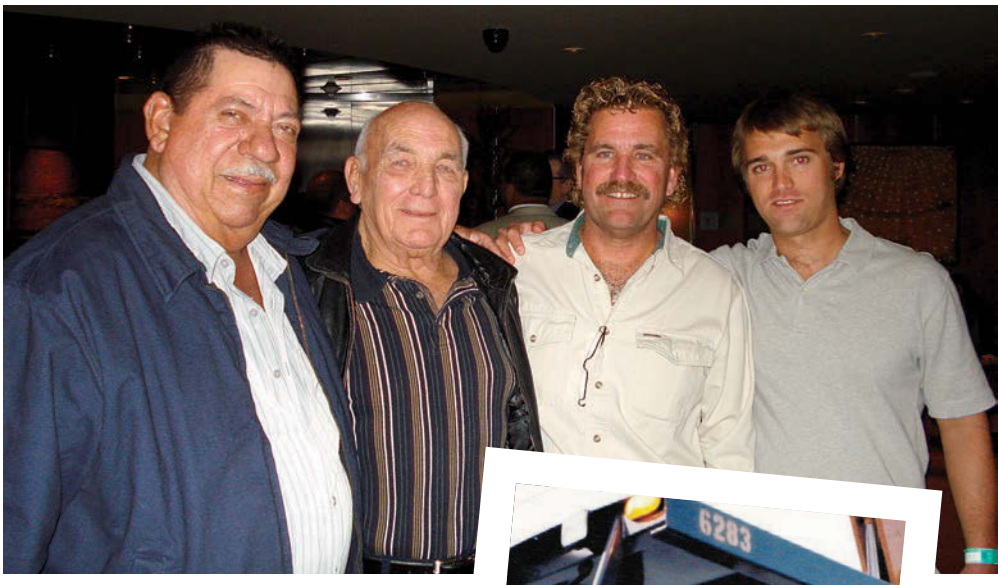
When Pavlicek first grabbed the pick and shovel for Van Delden Wastewater Systems in San Antonio, Texas, the crews had a daily quota: 150 feet of trench, 18 inches deep and 2 feet wide. It was 1960 and much of the dirt work was done by hand.

"I've still got calluses from I don't know how many years back," recalls Pavlicek, 73, whose bosses estimated he'd installed 5,000 septic tanks after 50 years. "Sometimes you would think, 'I can't do this.' But you can, especially if you're young. The shovel was there and the pick was there … pain and sweat, that's about all it is."

When Pavlicek reflects on a lifetime working in the industry, he sees equipment advances that have made the job faster and easier, and onsite system options for customers that work better and are incredibly reliable.

But still, at its heart installing septic systems remains difficult, challenging work that only a small percentage of the American workforce feels called to do, he says. And Pavlicek congratulates anyone who's tough enough and determined to make installing a career.

"It's a good, hard job and you make a lot of people happy," says the installer who retired recently.



ABOVE: On his 50th anniversary on the job, Al Pavlicek, left, is shown with three generations of company leaders, left to right, Gary, Garrett and Chad Van Delden. RIGHT: Al Pavlicek at the controls of his trusty Case backhoe installing a septic system in 1999. The equipment today beats working all day with a shovel and a pick like he did in 1960, Pavlicek says. (Photos courtesy of Van Delden Wastewater Systems)

A LOYAL WORKER

Pavlicek worked for three generations of Van Deldens: Gary, Garrett, and now brother and sister Chad and Courtney Van Delden. He started making 75 cents an hour, but recalls how the company boosted his wage to $1 a few weeks after he started on an installing crew. His hard work and loyalty over the years was answered by loyalty from his bosses. That's one reason he put in so many years for the company.

"If you have people who, whatever you need, they're there to help you, it's kind of hard to leave them," he says. "Mr. Van Delden would always loan me money if I needed to take the kids or my wife to the doctor. How can you leave someone who would take the shirt off his back to help you? I had to repay him by working my butt off and doing the best job I could."

Another reason Pavlicek stayed in the industry all these years was that he genuinely enjoyed the work, no matter how many days the summer heat rose past 100.

"I really liked to work outdoors; I don't care for an inside job," says Pavlicek, echoing a sentiment I hear frequently from installing pros. "Another thing I loved about it was that every three days I was working at a new location. We put in septic tanks all over this side of Texas, 150 miles either way from San Antonio."

BETTER SYSTEMS

New locations every week meant new challenges in topography, soils and other site considerations, requiring the installing crews to come up with fresh solutions for wastewater treatment. During Pavlicek's tenure, the earth moving machinery and system components improved dramatically, meaning his crews could get things done more efficiently and with less effort, and deliver systems that worked better and will last longer. That's the biggest reward for the onsite installer, he says.

"Every year they made a new machine and they just kept improving them. Nowadays you can hardly wear a machine out. They're too durable. Throughout the years they would fix what was weak about a machine, so now when you buy a new machine, all you have to do is maintain it."

Al Pavlicek

In the early days, systems consisted of a septic tank and concrete drain tile running out in the backyard, and with little or no government regulation of the industry, corners could be cut by competitors, he says. But as the industry has grown up, systems are better built, strictly regulated and have the potential to last a lot longer.

"It's good for the homeowner. He gets a better quality job for what he's paid for," he says. "The way the old systems were designed, you were lucky if you could get 22 years out of them. Now you can get more than that, not just because of the variety of systems out there, but because you are required to have more maintenance, too."

The machines used to install the system components are vastly improved, too, according to Pavlicek, who was often at the controls of a Case backhoe over the decades.

"I noticed every year they made a new machine and they just kept improving them. Nowadays you can hardly wear a machine out. They're too durable," he says. "Throughout the years they would fix what was weak about a machine, so now when you buy a new machine, all you have to do is maintain it."

FIND A GOOD EMPLOYER

Pavlicek worked through many Texas booms and busts, and he and wife Martha raised four children and have seven grandchildren. Retirement comes as his knees and lower back are giving him some trouble. "I feel like a half-wore-out horse. Even though I'm not pulling the plow, I still feel it," he says. He hopes to do more fishing and hunting with family. "I've got to keep on truckin' somehow."

Pavlicek's not sure whether there will be enough people ready to take on the hard work and challenge of installing septic systems in the future. For young people who want to work outside and pursue a career in the industry, he offers a simple bit of advice.

"In this business, there's lots of competition and a lot of work out there. Find somebody good to work for," he says. "I was lucky enough to work with people who appreciated everything I did for them. It's hard to find somebody who will take care of you for so many years."

Good luck, Al, and enjoy a well-deserved retirement!

Be sure to check out the exclusive online content at Onsiteinstaller.com

By Jim Kneiszel

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

EDITOR'S BLOG: THEY PROMOTE THE ONSITE INDUSTRY

Through its new website blog, Ace Acme Septic Services is showing that individual service companies can become strong advocates for the decentralized wastewater industry. Todd and Kelly Summers are sharing their thoughts about a variety of septic system maintenance topics, hoping to educate homeowners around their Arlington, Wash., home base. As an example, take a look at their recent blog, entitled "What Are the Advantages of Using Septic Sewage Systems?" The company lays out its arguments for communities choosing decentralized treatment systems over hooking more homes to the big pipe. Link to their entertaining posts through my editor's blog.

HOW TO COMBAT THE SKILLED TALENT SHORTAGE

Business-building writer David J. Baker says small businesses are at the beginning of a talent war: "As we begin the rapid rise out of one of the worst recessions on record, businesses in the onsite septic industry are seeing opportunities for growth. The stock market is setting records, almost weekly, housing is rebounding and mortgage rates are starting to bounce back. But there's a great conundrum. Unemployment rates are still unusually high — still over 7 percent nationally. The problem is a current workforce that lacks the necessary skills required to perform the hundreds of jobs that growing companies are trying to fill." Baker passes along information that drivers, technicians and skilled trades workers will be the most difficult to recruit moving forward. He shares tips on how your business can attract the very best.

PROPERLY PRICING YOUR ONSITE SYSTEM SERVICES

Onsite system expert Jim Anderson writes about how installers can price their projects accurately to ensure a profit. He presents a primer for contractors on writing a solid *scope of services* document that will help customers understand project invoices. "The price you present for the work has to reflect your actual costs, plus a reasonable profit for your efforts. This means you need to track equipment and machinery costs. Consider equipment rentals, fuel and labor costs if other workers are needed. All of these are important to running a successful and profitable business," Anderson says. "This was brought home to me a long time ago when an installer I worked with frequently talked about bringing his son into the business and that his son was quick to accept jobs that were outside their normal working area." The contractor was sometimes losing money on these jobs that looked lucrative at the start.

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

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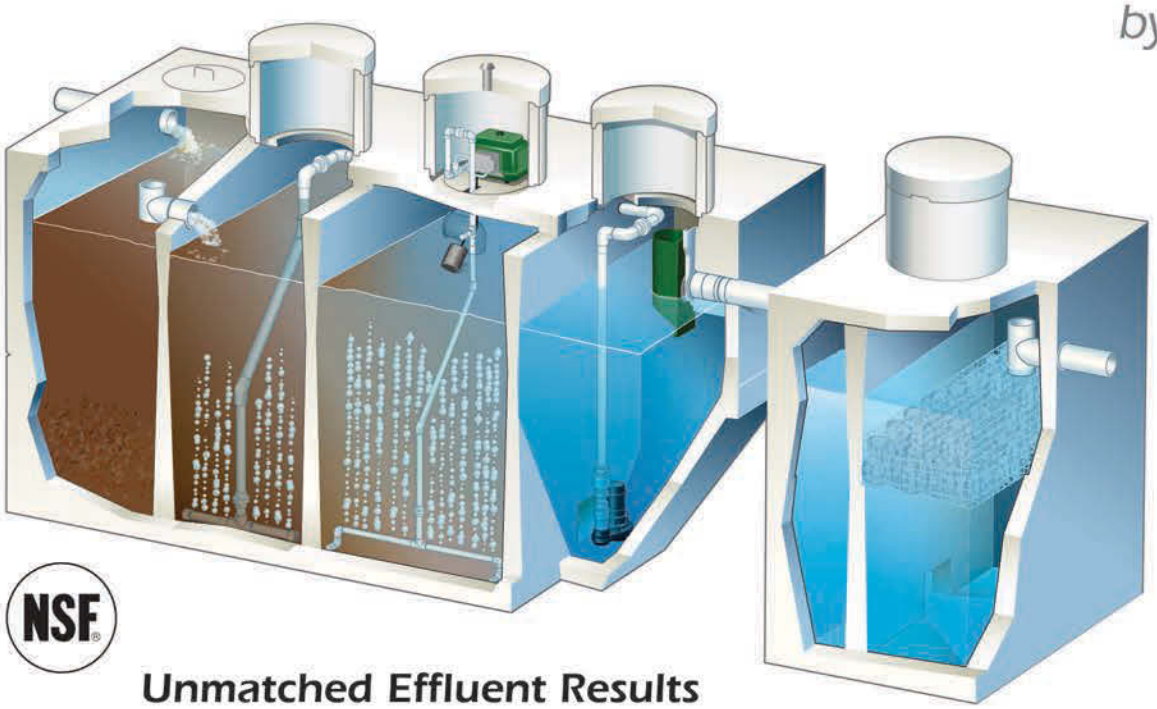

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Brian Baker, at the controls of the Case backhoe, excavates for the installation of a dosing tank as Alberto Mendoza checks for proper depth using a laser level. (Photos by Gary Brockman)

KNOWLEDGE IS POWER

Indiana installer Brian Baker adapts to new technologies as they are approved, ensuring his place on the leading edge of the onsite industry

By Scottie Dayton

What advice would Brian Baker, of B. Baker Construction in Noblesville, Ind., give to contractors about persevering during lean times, such as after the housing bubble burst several years ago?

"Stay in your comfort zone and resist the temptation to overextend during the good times," says Baker, whose company – started in 1986 – found ways to prosper into a solid position and look forward to better days ahead.

B. Baker Construction, Noblesville, Ind.

OWNER:	Brian Baker
YEARS IN BUSINESS:	27
EMPLOYEES:	Four
MARKET AREA:	100-mile radius
SPECIALTY:	Installing and repairing residential and commercial systems
AFFILIATIONS:	Indiana Onsite Waste Water Professionals Association
WEBSITE:	http://bbakerconstruction.bmbnow.com

Trained as an automotive mechanic, Baker was soon swept off course, finding his life's passion in onsite systems. "I wanted to know the answer to any septic question, so I studied the regulations for each county in which I worked," he says. "Helping people was how I grew my niche in the industry."

HOMEWORK PAYS OFF

Today, the company is licensed in Hamilton, Madison, Marion, Boone, Johnson, Hendricks and Tipton Counties. While the main focus is on installing or repairing residential and commercial onsite systems, other services include septic tank pumping, sewer and driveway installations, pond construction, and decorative concrete and crawl space footings.

Running an auto repair business at night while working for a car dealership during the day introduced Baker to self-employment. A stint doing everything but the billing for an excavation contractor laid the groundwork for a great leap of faith. When the owner wanted to sell a used J.I. Case backhoe, Baker bought it.

"I'd been purchasing the smaller stuff I'd need to start my business – a truck and trailer, pumps, compactors, cutoff saws – everything I could afford, while working for somebody else," says Baker. "When the bank lent me $100,000, I was scared to death and couldn't sleep that night. The monthly payments were more than a thousand dollars. In the 1980s, that

BELOW: Albert Mendoza, assisted by William Horgus (right) checks for level between the septic and dosing tanks in a new system going in the ground. RIGHT: John Frye checks for the proper drainfield grade using a Leica Rugby 100 Pro laser level.

much money was a house payment for many people." Baker, 25 at the time, also had house payments and a new wife.

The one job Baker had on the board when he bought the backhoe turned into another before he finished digging the hole. He went anywhere and did anything for anybody, but mostly he excavated for sewer or water mains with an occasional septic system in the mix. Work snowballed and he hired his first employee within two years.

"Everyone was buying backhoes and calling themselves contractors. There was so much new construction that even contractors with bad reputations could stay in business. When the work went away, so did they, and customers benefited from it."

Brian Baker

In 1991, Indiana updated its septic code. Counties took the minimum mandates and enacted them as they saw fit. Studying their different regulations became a passion for Baker. The most radical change required drainfields larger than 1,500 square feet to be flood dosed (one dose equals the designed capacity of the system). At the time, installing basic gravity systems was easy, and half the farmers with backhoes did it to earn extra income.

However, the new code required installers and service providers to be licensed, and Baker was one of the first. He retains his certification through the Indiana Onsite Waste Water Professionals Association and attends as many onsite wastewater conferences as possible.

SEPTIC IS BREAD AND BUTTER

To help clients find him, Baker bought a medium-sized display ad in the phone book. "It was expensive, but it opened doors," he says. "I got a lot more calls from many different directions, but mostly we became known for troubleshooting septic systems."

About 80 percent of the company's annual revenue came from the septic industry, and mainly through referrals. As workload grew, Baker's mind told him to buy more machines and hire more employees. He analyzed his financial situation and business prospects, then decided he would never owe more than $100,000.

"I found it really tough to stay in my zone, working with what I had and could afford," he says. "I always forced myself to pay off one machine before buying another, and each machine had to pay for itself."

Baker's mechanical ability enabled him to keep machines longer, but he always upgraded equipment before it lost trade-in value. He buys Case equipment for excavation work, and stores, repairs and paints everything in an 80- by 80-foot shop on 17 acres. His wife, Rachael, one of the company's four employees, runs the home office.

Baker purchased a John Deere bulldozer to complement his backhoe. Now he graded properties after installing systems and even offered to reseed as an extra service. "I restrained the company's growth until the funds were available to make my life and jobs easier," he says.

Baker oversees John Frye, who is dumping rock over Infiltrator Systems and Norwesco tanks placed in series during a new system install.

Two strikes, then an ATU

Replacing or repairing onsite systems is frequently a challenge, but Brian Baker of B. Baker Construction says determining which jobs have no chance of success can be even trickier.

"Many subdivisions have 30- or 40-year-old systems that already have a replacement system on top of them, and lots are often too small to put the drainfield in a different location," says Baker. "If I'm facing putting a third system on top of the first two, that's when I bring in an advanced treatment unit to stop and slow the biomat's development."

Where to put the ATU on these lots can be very challenging. Baker has replumbed components and even moved potable wells to met setbacks. "After the third failure, the cost of repairing the system will exceed the value of the house," he says. "I explain to customers that their chance of success is not good, no matter who they hire. There is no fix."

A recent state law requires homeowners with onsite systems to connect to a sewer if it is within 300 feet of the property line and the hookup doesn't cost 1.5 times the cost of the septic system. "I highly recommend it to all people in the above-mentioned situation," says Baker.

Another challenge was not accepting projects beyond the company's capabilities. Baker resisted the temptation because it wasn't right for him, and he didn't want to hire subcontractors. "I prefer to stay in my zone and keep the machines in my zone," he says. "However, every contractor must make that decision for himself."

NEW REVENUE STREAMS

Then a customer prompted Baker into commercial onsite system installation. A general contractor hired him to install a Wisconsin sand mound for a new fire station. As soon as the state approved the technology, Baker learned everything about it. County health departments liked mounds for commercial properties and Baker's expertise put him in position to build that specialty. He repeated this formula whenever the state approved another technology.

In 2000, employee Frank Powers gave Baker his notice with plans to start a pumping business, Powers Septic and Sewer in Noblesville. The move worked out well for both contractors.

"Now I could offer that service to my customers and Frank shared some of his service calls with me," says Baker. "I also call Frank to jet drainfield laterals and break up biomats as part of our service work, which includes

(continued)

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ABOVE: Baker lifts a 1,000-gallon Infiltrator Systems dosing tank during an install as Alberto Mendoza looks on. RIGHT: William Horgus sets up the Leica Rugby Pro 100 laser level to take a reading during a system install.

pumps, floats, electrical and replacing or rehabilitating absorption beds."

Baker provides five-year maintenance contracts on the advanced treatment systems his company installs, and he hired a technician to fulfill them and handle standard service calls. "The state mandates service contracts for the life of these systems," says Baker. "I chose five years to avoid renewing them every other year."

"I wanted to know the answer to any septic question, so I studied the regulations for each county in which I worked. Helping people was how I grew my niche in the industry."

Brian Baker

INSPECTION DEMAND

While the state does not require onsite inspections for real estate transfers, the abundance of homes in foreclosure created another business opportunity for Baker. Home inspectors evaluating these properties also include the onsite systems, passing or failing them based solely on a dye test. Baker gets a lot of calls to provide the service.

Besides the dye test, Baker's technicians use a Sludge Judge sampler from Cole-Parmer to measure settled solids. In 2010, Baker bought a RIDGID SeeSnake to help troubleshoot problems discovered during inspections. To help customers make informed decisions, he also offers a septic investigation. "I explain that a system dormant for four years could pass the test, but easily fail once a family moves into the home," says Baker.

A septic inspection for a 450-gpd system would involve dosing it three times with 150 gallons of water within 24 hours. Each phase includes measuring the scum layer, adding water, then the dye, measuring again and inspecting the absorption area for surfacing effluent. "Any time effluent leaves the tank or breaks out, the test is over and the system has failed," says Baker. "Noting how quickly the system recovers from phase one usually tells us if it will pass or fail."

THINNING THE HERD

While the housing bubble inflated, Hamilton County Health Department wrote 450 to 480 permits a year and Baker installed 30 to 40 of those systems. In 2009, the county issued 60 permits and Baker installed four systems. "When the bottom dropped out, I was in a stable position because I had not overextended myself when things were good," he says. "Hamilton isn't a big county and I knew all my competitors. Five of them have since closed their doors."

During a break in the action, the B. Baker crew poses for a shot. From left, they are John Frye, Alberto Mendoza, Brian Baker and William Horgus.

Baker said the construction slowdown weeded out marginal contracting companies. "Everyone was buying backhoes and calling themselves contractors," he says. "There was so much new construction that even contractors with bad reputations could stay in business. When the work went away, so did they, and customers benefited from it."

Today, referrals generate most of Baker's business or people find him through the company's website or the service provider rating site, Angie's List. While new installs are gradually returning – he did 17 in 2012 – drainfield repairs, drainage work, snow removal and salting keep everyone busy. "Last year's drought was a blessing for many onsite systems," says Baker. "Then spring rains and snowmelt made them show their ugly faces again. As soon as soils dried sufficiently, we were out there repairing them."

MORE INFO:

Bio-Microbics, Inc.
800/753-3278
www.biomicrobics.com
(See ad page 33)

Cole-Parmer
800/323-4340
www.coleparmer.com

Infiltrator Systems, Inc.
800/221-4436
www.infiltratorsystems.com
(See ad page 19)

Leica Geosystems GR LLC
800/367-9453
www.leica-geosystems.com

Norwesco, Inc.
800/328-3420
www.norwesco.com

RIDGID
800/769-7743
www.ridgid.com

CONTINUING EDUCATION

Repairs have migrated from replacing stone-and-pipe drainfields with recirculating gravel filters to installing Bio-Microbics FAST systems purchased from nearby Clear Water Environmental Solutions.

As new technologies enter the onsite arena, Baker intends to be at the forefront, learning all he can, sharing his knowledge and helping customers improve their chances of living with happy septic systems.

Matt's rolls out freeze protective septic blanket in Indy

By Ed Wodalski

Matt's Cold Weather Products literally rolled out its frost and freeze protection Sewer Blanket for septic tanks, sewer lines and drainfields at the 2013 Pumper & Cleaner Environmental Expo in Indianapolis. Primarily marketed in Minnesota and portions of Canada, the product reached a broader national and international audience at the Expo.

"I'm a pumper myself, and I've been selling them out of the truck for five years to my customers," says Mike Casey, sales and marketing manager for Matt's and owner of Bunes Septic Service in Grand Rapids, Minn. "In the last few years we've put them in the local stores and we're trying to expand that."

Using no electricity, the blanket is staked to the ground and can be used below grade, at grade or on mound systems. Waterproof, it sheds late fall rain and holds snow for added insulation.

"The product is pretty new, and it was more of an introductory mission," Casey says of his Expo experience. "We weren't expecting to sell a lot, and we actually didn't sell any while we were there but we received some good feedback and we have gotten some follow-up from the show. The other thing is it's seasonal, so we'll see how it does in the fall."

Among the Expo visitors who stopped by his booth, Casey says inspectors were most interested in the product.

"Surprisingly, we got a lot of feedback from regulatory people at the show," he says. "That was kind of unexpected – people that are knowledgeable in terms of rulemaking, inspectors and municipal-type people – they were very interested in the product."

Casey says regulators liked the idea of a simple way to solve widespread freezing problems in colder climates.

"Essentially, when a system freezes out, it's turned off, so the homeowner has a few choices to make, and sometimes they're environmentally poor choices, and I think the regulators are all too familiar with that," Casey says. "I've seen where people have disconnected their pump and run their line over land and off into the woods, or wherever. It solves the problem, but it's not the right way to solve the problem."

Mike Casey, sales and marketing manager for Matt's Cold Weather Products describes how the Sewer Blanket protects against septic system freezing.

Designed to replace straw in areas where freezing is a problem, the standard 6-feet by 20-feet cover is essentially a reusable insulated tarp that weighs approximately 10 pounds and can be rolled out in the fall and rolled up in the spring.

Casey also displayed pipe wrap made from the same fabric, as well as RV skirting. "It's a way to seal up a camper in cold weather," he says. "It was inspired by the oilfields – people living in campers in cold weather. We also have a survival bag. It's like a sleeping bag made out of this material that you can carry with you in the truck if you're stranded in the cold; you can climb in and stay warm. We also have a windshield cover that eliminates having to scrape your windshield in cold weather, and we're prototyping a heated portable shop as well." **218/689-1031; www.sewerblanket.com.**

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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.

Onsite system rules face upgrades in Idaho

By Doug Day and Scottie Dayton

Idaho

The Idaho Department of Environmental Quality is revising the Technical Guidance Manual for builders and septic system installers. The process started in spring with a public comment period. According to a department news release, the changes "address practices and policies of the Technical Guidance Committee, setbacks from drainfields to cutoff trenches, horizontal separation distances, permitting and design requirements for alternative public and private subsurface sewage disposal systems, and approval conditions and compost disposal requirements for composting toilet units." The proposed revisions are available for download on the DEQ website: http://www.deq.idaho.gov/news-archives/2013/may/water-tgm-revisions-comment-050613.aspx.

Illinois

After flooding in April, officials in Lake County waived and cut various fees temporarily. About 4,500 properties were damaged in the flooding. Fees for building permits were waived for repair and restoration work, including permits for interior alterations, electrical work, heating and air conditioning and water heaters. With many septic systems flooded, the county reduced the rate for disposal of septage at the Lake County Public Works Mill Creek Water Reclamation Facility. Haulers were given reduced disposal rates from May 14 to June 1 and agreed to pass the savings on to customers. The normal fee of up to $40 per 1,000 gallons was cut to $7.

New Hampshire

The state Senate passed SB 11, giving newly created water districts the authority to tax private wells and onsite systems of property owners within proposed water/sewer utility districts. The bill resulted from the town of Stratham, which has no public water or sewer, seeking an inter-municipal agreement with the Town of Exeter to help attract businesses to the Route 108 corridor and to help offset tax burdens for property taxpayers.

North Carolina

A ruling by the North Carolina Division of Coastal Management allows Nags Head property owners to replace onsite systems lost to storms provided they are 50 feet from the water at low tide. It also classifies the system as part of the house, which can be rebuilt if it has not lost 50 percent or more of its value to storm damage. Coastal Management is a division of the Department of Environment and Natural Resources.

Pennsylvania

The Upper Delaware Council and representatives from Pennsylvania's Wayne and Pike Counties believe the nitrate-restricting policy proposed by the Pennsylvania Department of Environmental Protection would make land adjacent to watersheds unusable for most purposes. The policy establishes setbacks for onsite systems at 150 feet from water and 30 feet from streams with exceptional value and high-quality waters. It also would require a system barrier preventing effluent from traveling underground. Water quality monitoring studies by three agencies prove current measures to protect the water quality in the river basin are successful, according to the Council.

Rhode Island

A compromise bill (Senate 672 Substitute A) would create a stakeholders group to study how best to promote economic development while protecting the environment. The group must make recommendations by Jan. 31, 2015. The bill was introduced to counteract proposed legislation that would prevent cities and towns from becoming tougher on construction-related wetland and onsite system issues.

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Refresher Course

Gravelless chamber drainfields at a college preparatory school in Connecticut provide effective treatment in a small footprint with high-water-table soils

By Scottie Dayton

A college preparatory school in South Kent, Conn., was expanding and needed a larger onsite system.

Officials hired Mark Lancor, P.E., principal engineer at DYMAR Corp. in Southbury, Conn., to design a conventional system that met the state Department of Energy and Environmental Protection discharge limits. Leggett, Brashears & Graham, a hydro-geological consultant in Shelton, Conn., used the MOD-Flow three-dimensional finite-difference groundwater model to calibrate hydrologic flow.

The project went out to bid based on components. Mark Green, manager of HLC Excavation and Tank Removal in Woodbury, Conn., won the contract to install the dose tank and drainfield. Unsuitable soils, logistics, high groundwater and bad weather stretched a two-month installation from September through early March.

SITE CONDITIONS

Soils are sand and gravel with 6- to 8-inch cobble and permeability rates of 2.5 to 28 feet per day. The water table is 8 to 9.5 feet below grade. The drainfield is sited by a pond, wetlands and a road.

SYSTEM PROFILE

Location:	South Kent, Conn.
Facility served:	College preparatory school
Designer:	Mark Lancor, P.E., DYMAR Corp., Southbury, Conn.
Installer:	Mark Green, HLC Excavation and Tank Removal, Woodbury, Conn.
Site conditions:	Sand and gravel with 6- to 8-inch cobble; permeability rates of 2.5 to 28 feet per day
Type of system:	Conventional
Hydraulic capacity:	27,476 gpd

A worker (left) and field supervisor Wayne Green of HLC Excavation and Tank Removal installed 300 feet of drainfield per day. Each trench had two rows of CULTEC chambers. (Photos courtesy of CULTEC)

BELOW: Senior DYMAR Corp. engineer Scott Lukowski, P.E., (left) and installer Mark Green of HLC Excavation and Tank Removal consult the drainfield's construction drawing. RIGHT: Field supervisor Wayne Green (left) and installer Mark Green check the 24-inch manhole frame on the splitter vault.

SYSTEM COMPONENTS

Lancor designed the system to handle 27,476 gpd. Major components are:

- 7,500-gallon dose tank with three 3-hp Barnes effluent pumps (Crane Pumps & Systems)
- 11- by 6-foot-wide concrete vault (Connecticut Precast Corp.) with 3-inch electromagnetic flowmeter (Badger Meter) and four 3-inch butterfly ball valves (Milwaukee Valve)
- 7-square-foot concrete splitter vault with 3-inch ball valves and check valves
- 1,164 Contactor 100 chambers (CULTEC) in a 59,400-square-foot drainfield
- Custom control panel from SPI – Septic Products

"We often had to over-excavate to extract the cobble, then go back two feet and re-establish the subgrade with finer material. We did that for 4,329 feet, which is a lot of digging for four people, but I had no room for a second crew."

Mark Green

Mark Green (left) and Tommy Dauti and workers from Dauti Masonry oversee installing the bottom section of the pump tank. (Courtesy of Mark Green)

SYSTEM OPERATION

Wastewater flows from numerous buildings and pretreatment septic tanks through 6- and 3-inch force mains to the dose tank. Alternating on-demand pumps run 15 minutes, sending 1,528 gallons at 46 feet total dynamic head to the metering vault. (During high flows, two pumps run simultaneously.) Two 3-inch force mains carry the metered flow to the splitter vault, which alternately doses each zone's distribution box with 5,000 gallons per cycle.

In the vault, flow A splits four ways: A 2-inch force main feeds paired drainfields 1-2, a 1.5-inch pipe feeds drainfields 3-4 and 5, and a 2-inch line feeds drainfields 6-7. Flow B splits three ways: A 1.5-inch force main feeds drainfield 8, a 2-inch pipe feeds drainfield 9 and a 2.5-inch line feeds drainfield 10.

The drainfield has eight zones of seven laterals, either 68.75, 75, or 87 feet long. Approximately 240 feet of additional chambers drain stormwater from the soccer field.

INSTALLATION

Green, two machine operators, and a laborer stripped and stockpiled 4,100 cubic yards of topsoil from the drainfield area, then brought in a

LEFT: The pump tank is wrapped in urethane sheets and inlets and outlets are sealed with waterproofing grout. The dewatering pumps are still active. (Courtesy of Mark Green) BELOW: James Harrison uses a Komatsu excavator to dig a 72-inch-wide trench, while field supervisor Wayne Green checks the elevation with a laser rod. They often had to over-excavate the trench to remove cobble.

screener and front-end loader to screen the material. "We had topsoil pushed into little mountains all over the east side of the site," says Green. "Then we had to find enough room to stockpile the screenings and tailings."

Using a Komatsu PC 128 excavator to dig 72-inch-wide trenches 2 to 4 feet deep, the crew quickly encountered an unending supply of cobble that they dug out, stockpiled and screened to an acceptable backfill material. The fact that the trenches required no bedding presented another challenge.

"It was tough to keep the trenches tight, find enough fine gravel for a level base and maintain elevations," says Green, who constantly checked grades with a laser rod and LL500 laser level (Spectra Precision). "We often had to over-excavate to extract the cobble, then go back two feet and re-establish the subgrade with finer material. We did that for 4,329 feet, which is a lot of digging for four people, but I had no room for a second crew."

Trenching advanced 300 feet per day. After the team installed two rows of 96- by 36- by 12.5-inch-high chambers, they covered them with No. 410 nonwoven filter fabric (CULTEC) and backfilled to the crowns with 1.25-inch stone. Then they returned with the screener to sift the excavated material, covered the stone with 6 inches of it, and finished with 6 inches or more of topsoil to grade. Tailings were deposited along stream banks or other areas needing fill.

To avoid trapping themselves in a corner, the crew installed one zone at a time working west to east, then used the completed zone as a platform to install its neighbor. The Komatsu excavator, rated up to 30,000 pounds, safely tracked over the H10-rated chambers. "It was like working on a jigsaw puzzle," says Green.

The excavation for the 14- by 20- by 10-feet-high pump tank was across a road from four residences, 5 feet from a heavily flowing stream on the other side and 10 feet below the water table. The crew quickly encountered severe water conditions. Green called groundwater specialists Dauti Masonry in Prospect, Conn., to help install a wet well and two 1/3-hp submersible pumps running continually to dewater the 40- by 40- by 14-feet-deep excavation.

"We benched and excavated more than 1,000 cubic yards of material by running an Hitachi EX200 excavator and dump truck 10 hours per day," says Green. "As fast as the material came out, we stabilized the banks with stone." The excavation required 85 tons of compacted 1.25-inch stone 6 to 8 inches deep.

A trucking company brought the tank in four sections, and A-Quick Pick Crane and Rigging set them. The bottom section alone weighed 18 tons. Once the joints were solvent-welded together, Green's crew wrapped the sides of the tank in urethane sheets and sealed them with propane torches. They sealed the inlets and outlets with waterproofing grout (Five Star Products), then tested the tank for watertightness.

Green also installed the splitter vault 700 feet from the metering vault, and used 50 psi hydraulic pressure to test the force mains going to the drainfield. The normal pressure is 37 psi.

Heavy rains stopped work in October, the soil froze two feet deep in December, a blizzard buried the site in January and the project finally resumed in mid-February. The system went operational in early March.

MAINTENANCE

Waste & Water Equipment of Cromwell, Conn., installed the control panel and maintains the system.

MORE INFO:

Badger Meter, Inc.
800/876-3837
www.badgermeter.com

Crane Pumps & Systems
937/615-3544
www.cranepumps.com

CULTEC, Inc.
800/428-5832
www.cultec.com

Five Star Products
800/243-2206
www.fivestarproducts.com

Spectra Precision/Trimble
800/874-6253
www.trimble.com
(See ad page 15)

SPI - Septic Products, Inc.
419/282-5933
www.septicproducts.com
(See ad page 34)

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

Sharpen Your Pencil

You're finishing another great onsite system installation. Take the time to create as-built drawings before covering components and seeding the lawn.

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

As-built drawings are a topic that comes up during any installer training we conduct. Clearly, if there is an engineer or designer involved other than the installer, the responsibility for accurate drawings of the final installation may vary.

However, we always point out having good, accurate drawings for your records is important. So either you should obtain a copy if it is someone else's responsibility or you should capture that information for your records. Some installers suggest that they always take their own measurements and record their install drawings to protect themselves from bad drawings or misinformation provided by others involved in the project.

We would probably agree, especially since we know who will be the first person called if there is a problem or question about the system. It's usually the installer! If there is a problem or question, the last thing the installer wants is to find out the information on the system is incorrect.

ABOVE: Having inspection ports installed assists in future system management. LEFT: Consult the as-built drawings as the installation proceeds.

There are other good reasons for having accurate as-built drawings. They allow easy component location by the installer or others in the future, whether for inspection or maintenance. They help with troubleshooting problems as they arise and provide information important to future system additions.

ACCURACY IS CRITICAL

These drawings should be to scale and as accurate as possible. This means using some type of graph paper where each square represents a certain number of feet. We always like to use graph paper that is 10 squares to the inch, which makes for easy conversion.

The drawings should provide accurate locations for each component of the system, including the septic tank, pump tank, drop or distribution boxes, trenches, pressure manifolds and inspection pipes. On sewage tanks, the manhole access points should be located. If system monitoring is required for the permit, monitoring access points should be located. Sizes of the septic and pump tanks should be provided.

Any benchmarks should be located. When there is a pump in the system, there should be information from the design about the pump capacity.

Installers often ask if they need to survey the lot. The answer usually is no. Even though surveying is the most accurate way of locating the system and components, it is also the most expensive and time consuming. Survey precision is not needed to locate the components in the future if the drawings are to scale and the measurements are accurate. If there is elevation, it's important to have the benchmarks located and information about those specific requirements so they can be measured in the future.

LOCATION, LOCATION, LOCATION

There are two other main ways to capture information for the as-built drawings. The first is to measure the distance to the center of each component from a set point on the face of the building; making sure there is a north arrow or indicator so direction is recorded. This is not as reliable as the second and preferred method: swing tie.

To measure the distances we recommend having a tape that is at least 100 feet long. Otherwise you will likely find your tape does not reach all the way with one measurement, complicating the process.

The swing tie method requires measuring two established points from the system component being located. Other significant features can be located, such as well location, large trees or small outbuildings. These points need to be on something that will be permanent, and can easily be located in the future. Usually this means using two points on the house or building, often the corners.

To measure the distances we recommend having a tape that is at least 100 feet long. Otherwise you will likely find your tape does not reach all the way with one measurement, complicating the process. The tape can be in inches or tenths; if it is inches the measurement should be accurate to the inch; if it is in tenths accurate to the one-tenth inch.

The tape should be held tight and the measurements taken in a straight line. It can be laid on the ground and does not need to be held horizontally to account for slope. Others who follow will be measuring with the same slopes, so it will be accurate enough. All necessary components should be located.

A handy way of recording the information on the drawing is to have a table showing the measurement from each point to the component being located. The component on the drawing can be indicated by a number. Remember the drawing is done to scale so that those points are accurately depicted in the drawing. This method is useful when two access points on a septic tank are located.

Measurements should be made and recorded from the first point and from the second point. The measurements should be taken before backfilling; a good time is while you're waiting for the inspector to arrive for the compliance inspection.

RIGHT: Marking proper locations to identify system components is important for future management of the system.

RETURN TRIP

We also suggest the installer revisit the site 20 to 30 days after completion of the system. This allows the installer to see if there are settling problems with the backfill and check in with the homeowner.

This is a good opportunity to offer other services your company may provide in terms of long-term maintenance. It is also a chance to give the homeowner information on the "care and feeding" of the system. Information provided can include a copy of the as-built drawing and information on the need to maintain the system. If the installer is also a service provider, it would be good to propose a maintenance program for the system.

Canadian Club

New Brunswick's onsite wastewater professional association is not even a year old, yet it is already influencing regulations that affect their livelihood

By Scottie Dayton

Since 1987, Mike Stairs of Mike Stairs General Contracting in Fredericton, New Brunswick, Canada, and two colleagues tried to form an association to raise professionalism among onsite installers. The New Brunswick Canadian Homebuilders Association offered to share office space and staff, but the provincial government refused to support a challenge to the status quo. The industry didn't appear to show an interest either.

All that changed in 2009 when the Department of Health revised septic regulations. Effective April 2010, the technical guidelines required new installers to be licensed through a course and exam. Contractors needed an application (permit) to install, construct, replace or repair onsite systems, and pay $150 per application.

Once-simple repairs became nightmares. Contractors first excavated to uncover the problem and made an application. Department inspectors had five business days to visit the site and approve the work. Upon completing it, contractors waited for the inspection, then returned to cover the repair. Repeat visits drove operating costs through the roof.

"Until the guidelines became effective, the only requirements for systems to pass inspection was an approved, two-compartment septic tank with effluent filter and a minimum of 240 feet of approved drainfield pipe with orifices pointing down. Provided installers met the industry's minimum standards, homeowners had no legal recourse."
Mike Stairs

Now seeking representation, the industry coalesced and formed the New Brunswick Association of Onsite Wastewater Professionals in March 2010. Stairs was elected its first president at the inaugural membership meeting in November 2012. As lawsuits escalated against the provincial government, contractors and sometimes the product manufacturers due to improper installations and inspections, the department welcomed and shepherded the association.

Installer: How did the DOH help the association?

Stairs: The department invited the province's 575 licensed installers to a meeting in Fredericton in March 2010. Of the 350 people attending, 95 percent wanted to form an association. A year later, we held another meeting and presented what the steering committee had done to the 100 attendees. Afterward, only 60 people paid the $75 membership fee.

The department also provided seed money, but start-up expenses ate most of it. This March, we met with officials and proposed attaching a $25 industry betterment fee to every application. They issue about 2,500 annually, which would generate enough money to hire a part-time executive director and provide an element of stable funding for ongoing expenses.

Mike Stairs may be reached at 506/455-5477 or mike.stairs@nbaowp.ca.

Installer: What happened to the early enthusiasm to form an association?

Stairs: Most are playing the wait-and-see game. We had 114 members before our first general membership meeting last November, but then only 76 renewed. We're also trying to bring pumpers into the association because some of them install.

We are making inroads, but membership is a hard sell. People must see value. One way we're doing that is through our website, www.nbaowp.ca, which was launched last year. It has a page for posting our accomplishments working with the DOH. Our biggest was when the Imported Soils Committee postponed a ruling that banned pit-run gravel and mandated only sand for raised beds and mound systems. That was huge, because pit-run gravel is an available, known quantity, but sand isn't readily available and remains an unknown quantity until tested for hydraulic conductivity. The more we accomplish, the more installers will see merit in joining.

Installer: **Besides establishing the association, what else does the DOH expect in exchange for the grant?**

Stairs: They asked us to eventually provide training to all members. We're working with training organizations to develop a mandatory three-day course. Graduates then work with a licensed contractor for a season before receiving their full license. Our first training session should roll out next spring or fall. Our next step is advocating continuing education as a license renewal requirement.

Although not an obligation, following the DOH request requires some background. The guidelines require 4 feet of imported soil to the invert of drainfield pipes in poor soils. Unscrupulous contractors haul in almost any material, build a 2-foot-high bed including cover, and know DOH inspectors will often approve it because they don't shoot elevations. The department tried pulling installers' licenses, but they complained to their legislative representatives about being put out of business. Very shortly, the politicians had restored their licenses.

To potentially end that situation, the DOH may wish to implement mandatory installer membership in the association in 18 to 24 months. Once that happens, the department suggested we establish a confidential ad hoc committee to review substantiated complaints about members conducting themselves unprofessionally, and provide the mechanism to terminate their memberships, which will affect their licenses.

We already launched a website where homeowners can file complaints. In every situation to date, we found that negligence seems to be shared equally with installers and inspectors. Installers will likely have 60 days to correct the problems. If they don't, they may be allowed three miscues before we pull their membership. Consequently, inspectors are becoming more receptive to taking licenses, but we're just entering that stage. It's happened only a few times.

Installer: **What prompted homeowners to sue installers and the health department?**

Stairs: Until the guidelines became effective, the only requirements for systems to pass inspection was an approved, two-compartment septic tank with effluent filter and a minimum of 240 feet of approved drainfield pipe with orifices pointing down. Provided installers met the industry's minimum standards, homeowners had no legal recourse.

Installer: **How have the guidelines and lawsuits affected inspectors?**

Stairs: They used to inspect every system twice. To help circumvent legal claims, the department switched to random audits. Now, every fifth or sixth system I install is inspected. On the first visit, they look at the test hole and evaluate my soil analysis. On the second visit, they inspect the finished system before I cover it up. That's the only monitoring we have and it could become worse. If provincial cutbacks continue and DOH loses inspectors, the department may ask us to police our own members.

Installer: **What legislative headway has been made by the association?**

Stairs: In January, we changed the rules to require contractors to hold a conventional license before applying for a nonconventional license. We recommended that all tanks have risers to within 6 inches of grade, and that any work done within 10 feet of systems be supervised or completed by licensed installers. The latter prevents landscape contractors from maneuvering equipment over the system. We changed the fine for installing septic tanks without a license from a flat $50 to $350 per day from the day of the offense.

Installer: **What is on the association's agenda this year?**

Stairs: We're trying to enhance and encapsulate membership before the DOH mandates it. One benefit we've arranged is for members to receive 5 to 10 percent discounts on merchandise from participating vendors.

Although the DOH supports and promotes us, inspectors seem indifferent to the association and its mandate. When installers ask them about the association, they're told that membership isn't mandatory and not to worry about it. We need their endorsement, because it has meaning.

Regarding education, we partnered with the DOH to present a course on contour trenches. They're the lead system in Nova Scotia, and are far more affordable than raised beds and mound systems. Once installers are licensed to install contour trenches, the issue over imported fill material basically goes away because contour systems require 10 to 12 loads of specific material and raised beds require 40 to 50 loads.

Installer: **How big a voice will the association have in writing legislative code?**

Stairs: The DOH is turning to us for advice as they address more stringent regulations. We were invited to attend the Technical Guideline Committee meetings and discuss changes before they become effective 60 days later. Officials now accept that we are serious about advancing professionalism in the industry.

Distribution Equipment and Systems

By Craig Mandli

Effluent distribution is essential to the success of every onsite system. Here are components – including distribution boxes, pumps, piping and drainfield media – that can play a pivotal role in designing and installing an efficient onsite system.

PUMPS

Continuous-duty effluent pump

Heavy-duty effluent pumps from **Ashland Pump** feature continuous duty-rated PSC motors. The oil-filled pumps feature an upper and lower ball-bearing design and handle up to 1-inch solids. The line is available in different horsepower models. All feature a cast iron volute and impeller, and are available with a piggyback switch or in manual configuration. They have a standard three-year warranty. 855/281-6830; **www.ashlandpump.com**.

Pump backup system

Designed to deliver all the benefits of sound-attenuated silent pumps, the **ReliaPrime** emergency bypass station from **Gorman-Rupp Company** operates on natural gas, making it a quiet, efficient and environmentally friendly option. It features a 6-inch Super T Series pump capable of passing a 3-inch spherical solid, and offers a soundproof, lightweight aluminum enclosure with lockable, removable door panels. It is a complete backup package, ready for use in emergencies and power outages, primary pump repair and to provide additional pumping capacity. 419/755-1011; **www.grpumps.com**.

Grinder pump retrofit kit

The **Grinder Pump Retrofit Kit** from **Goulds Water Technology – a Xylem Brand**, is designed as a more economical option than replacing a residential grinder pump system. The kit allows for continuous operation, and can be retrofitted with other grinder pumps as well as progressive cavity pumps. The kit includes a single-phase, 2-hp motor with 60 Hz, 3450 RPM, 230 V and a capacitor start with winding thermal protector. It also includes piping and electrical connections for retrofitting to other pump systems. Capacity is up to 41 gpm with heads to 95 feet and discharge of 1 1/4 NPT. 866/325-4210; **www.gouldswatertechnology.com**.

Sewage pump

S Pumps from **Grundfos Pumps** can be used for transferring unscreened raw sewage or water, pumping water containing sludge or pumping industrial effluent. They feature a SmartTrim impeller clearance adjustment system and SmartSeal for leakage prevention. The SmartTrim system makes it easy to adjust the factory-set impeller clearance to maintain efficiency. The SmartSeal auto-coupling gasket provides a leak-proof connection between the pump and the base unit of the auto-coupling system. The shaft seal is capable of rotating in either direction. When installed with separate pipework, sludge sedimentation can be avoided by back-flushing at regular intervals. 800/921-7867; **www.grundfos.us**.

Simplex/duplex grinder packaged system

Simplex and duplex systems from **Franklin Electric/Little Giant Pump** come with GP Series grinder pumps, check valves, a control panel with three switch floats that sense normal, high and alarm effluent levels, a large fiberglass basin with inlet hub, gas-tight covers with vent and discharge flanges, core seals, gaskets and hardware. The pump's cutter design features anti-roping, self-aligning, self-sharpening cutters engineered with close clearances between the two notched rotary and stationary cutters for ideal grinding performance. 800/701-7894; **www.franklin-electric.com**.

Dual-discharge effluent pump

FL effluent pumps from **Liberty Pumps** are available in 1-, 1.5- and 2-hp models. They feature maximum head capabilities of over 130 feet and flows to 130 gpm. They are designed for STEP systems, mound systems, liquid waste transfer and higher head de-watering applications. A dual-sized discharge features a 1 1/2-inch removable flange with a 2-inch threaded port for connection to either pipe size. They also feature a standard 25-foot quick-disconnect power cord and dual shaft seals. They are built of heavy cast iron with an epoxy powder-coat finish and stainless steel fasteners. 800/543-2550; **www.libertypumps.com**.

Efficient solids-handling pump

The **Hydromatic HPE** premium-efficient solids-handling pump from

Pentair / Myers is available up to 200 hp, and is engineered for lower life cycle costs and increased serviceability and pump life. It uses a premium-efficient, oil-filled motor that allows for not only less power consumption but also decreased operating temperatures and permanently lubricated bearings for extended pump life. Features include switchable seal design, optional quick-disconnect cord, optional shaft-grounding ring for use with VFDs, a bronze sleeve bearing and a seal-leak detector that alerts prior to water entry into the motor. **888/416-9513; www.hydromatichpe.com.**

Linear air pump

Whirlwind STA Series linear air pumps from **Septic Services** are available in four models. The STA60N produces 2.4 cfm airflow at 2.18 psi and is used for tanks up to 500 gpd, 60 liters/minute. The STA80N produces 3.0 cfm airflow at 2.18 psi for tanks up to 750 gpd, 80 liters/minute. Both models come with an integrated hose bib and 3/16-inch male threaded pipefitting for a low-pressure alarm (available separately). The STA-Series is also available in the STA100 model, which produces 7.0 cfm airflow at 6.9 psi for tanks up to 1,000 gpd, 100 liters/minute. The STA80AL has integrated audible alarm and warning light to monitor pump performance, warning of low pressures requiring diaphragm replacement. The alarm activates when air pressure drops below functional level. They require no lubrication and feature a 6-foot power cord, inside threaded outlet port and an easy-access lid requiring no tools to access included filter. **800/536-5564; www.septicserv.com/store.**

Bypass/wastewater pump

The **Enviroprime System** pump series from **Thompson Pump** provides reliable, automatic priming with the environmental advantage of not spilling pump fluids during initial priming and continued priming throughout operation. They are ideal for sewer bypasses and wastewater, and are available in sizes 2 to 18 inches with capacities up to 11,000 gpm, heads to 430 feet and can handle solids up to 4 inches. **800/767-7310; www.thompsonpump.com.**

Turbine effluent pump

WTE Turbine Effluent pumps from **Weber Industries - Webtrol Pumps** are designed to handle demanding wastewater applications. They are constructed from 304 stainless steel as well as corrosion-resistant plastic, and feature a floating stack design that provides resistance to abrasive damage, extending the life of the pump. They are available in flow ranges from 5 to 60 gpm, 1/2 though 5 hp, 115- or 230-volt, single and three phase. **800/769-7867; www.webtrol.com.**

DISTRIBUTION BOXES

Splitting distribution box

The **Tru-Flow Splitter** from **Clarus Environmental** is a distribution box that can accurately split wastewater effluent flows ranging from one-tenth to 30 gpm into two to five distribution lines. It is constructed of lightweight, non-corroding materials, and consists of two key components – the basin and the diverter. The bubble level design allows for simple post-construction adjustments, solving problems associated with distribution box settling. It may settle as much as 15 degrees to the front or back and/or 12 degrees to one side and, when adjusted, will still evenly split effluent. With a 4- or 6-inch riser to the surface, it is easy to inspect, adjust and maintain. **800/928-7867; www.clarusenvironmental.com.**

Stabilized distribution box

Distribution boxes from **Polylok/Zabel Environmental** are available in 12- and 20-inch sizes. They accept 2-, 3-, 4-, and 6-inch pipe. The 12-inch box comes with stabilizing feet to anchor and prevent them from floating. They will accept risers to easily bring the box to grade (critical in states that mandate at-grade access). Additionally, pumpers, inspectors and service technicians can quickly identify an issue within the system without excavation. **877/765-9565; www.polylok.com.**

Flow-dividing distribution box

Distribution boxes from **Tuf-Tite** offer flexibility in dividing septic tank effluent flow with the installation of the company's Speed Levelers in each outlet. The boxes are available with four, six, seven or nine holes. The levelers can be inserted in each outlet and turned to adjust flow level. Risers are available for the four- and seven-hole boxes. All boxes come with snap-in outlet seals to match pipe used in specific situations, including corrugated pipe. **800/382-7009; www.tuf-tite.com.**

DRAINFIELD MEDIA

Geotextile sand filter

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

Leaching system

The **GeoMat** leaching system from **Geomatrix Systems** consists of a core of fused, entangled plastic filaments surrounded by a high-capillary geotextile fabric. It is compatible with pretreated wastewater or septic tank effluent, when sized accordingly. Uses also include subsurface irrigation and evapotranspiration systems. It is 1 inch high and available in 6-, 12- and 39-inch widths. A pressurized distribution pipe typically runs the entire length of the lateral for uniform application of wastewater. Additionally, it can be configured with a time-dose pump station for flow equalization. The combination of pressure dosing and flow

equalization serves to reduce peak hydraulic loading. The thin and narrow profile, shallow burial depth and uniform hydraulic loading maximize oxygen transfer efficiency. It has complete surface contact with the soil, and is not reliant on complex valving and filtration systems. The distal head pressure is fully adjustable through manual zone valves. **888/764-5247; www.geomatrixsystems.com.**

Geosynthetic aggregate

EZflow from **Infiltrator Systems** is an environmentally friendly replacement for stone and pipe septic drainfields, using an engineered geosynthetic aggregate modular design. Ideal for shallow installations, sloping sites or areas where contouring around trees and landscaping is needed, it is designed to improve infiltrative performance by eliminating the fines and by reducing compaction and embedment associated with crushed stone. Lightweight and easy to transport, the preassembled units feature a 3- or 4-inch perforated pipe surrounded by polystyrene aggregate and will not crush, degrade or breakdown over time. The aggregate is held in place with durable, high-strength netting. It comes in easy-to-contour 5- and 10-foot lengths in diameters of 7, 9, 10, 12, 13 or 14 inches. **800/221-4436; www.ezflowlp.com.**

Drainfield dispersal system

Advanced Enviro-Septic (AES) from **Presby Environmental** is designed for residential, commercial and community use, and has been proven to remove up to 99 percent of wastewater contaminants without the use of electricity or replacement media. It does this by quickly and naturally establishing multiple bacterial treatment environments throughout the system that break down and digest wastewater contaminants leaving the septic tank. This passive process allows the system to discharge highly purified wastewater, preventing soil clogging and groundwater contamination. It is approved to the highest levels of treatment resulting in significant reductions in size, and has third party certifications from NSF Class-1, Cebedeau and BNQ. **800/473-5298; www.presbyenvironmental.com.**

PIPING

Slide rail system

The lift-out slide rail system from **E-Z Out Manufacturing** is designed for most vertical discharge-type submersible pumps under 5 hp, with 1-, 2- and 3-inch NPT discharge nozzles or 2- or 3-inch horizontal discharge. It is designed to provide easy aboveground service access for most submersible sewage, sump and grinder pumps from wet pit applications. The system can prevent the need or risk of a confined-space entry to service pumps. Pumps are removed from above sump for inspection and service. **604/942-7994.**

PVC sweeps

Sim/Tech Filter offers long-radius white schedule 40 PVC sweeps for use on pressurized distribution laterals. In the past long-radius gray electrical sweeps have been used; however, some codes don't allow use of electrical fittings on water systems. Two 45-degree elbows are commonly used, but don't have the same long sweeping radius that allows much easier access to distribution laterals. They meet both the code and the convenience of the long radius. **888/999-3290; www.simtechfilter.com.**

Distribution Equipment and Systems

By Craig Mandli

Dripline system solves discharge issues in Indiana community

Problem: With limited soils and small lot sizes, most of the septic systems in the community of Fulda, Ind., discharged to existing stormwater drains and a small creek. Exposed sewage and pungent odor during warm weather forced them to look for an alternative solution. Flows for the 64 total connections (59 residential, one church, one tavern, one gas station, one community center and one small industrial business) were estimated to average 8,750 gpd.

Solution: Bernardin, Lochmueller and Associates Inc. installed an **Eco-Treatment System** from **Geoflow** consisting of three primary components: a constructed wetland, a vegetated recirculating gravel filter and a 3.6-acre subsurface drip dispersal area with **Wasteflow** dripline. Permitted as a land application project, the dripline was buried belowground, where it effectively dispersed the effluent in green spaces in the community.

Result: Not only did the system and drip field overcome soil and site limitations, eliminate exposure and eliminate odors, it also met Indiana's groundwater standard of 10 mg/L or less of total nitrogen on a year round basis. The system is proving to be cost-effective, particularly in operation and maintenance costs. **800/828-3388; www.geoflow.com.**

Rockless system solves drainfield issues at central Florida convenience store

Problem: RaceTrac, a high-volume gas station/convenience chain with a store in Orange City, just north of Orlando in central Florida, was plagued with rising maintenance costs from a problematic aerobic system and a failed drainfield. Engineers decided to retrofit their existing tanks with pumps converting to a pressure-dosed system.

Solution: The store hired Acme Environmental Services of Mims, Fla., to install a low-profile multi-pipe "rockless" drainfield system from **Plastic Tubing Industries**. The 1,200-square-foot design involved eight separate 50-foot runs of the MPS-11 configuration. A 1-inch PVC pressure-dosed pipe was fed through end caps placed on the MPS-11 white lined two-hole distribution pipe. The distribution pipe was flanked by bundles of void pipe, eliminating the need for gravel. A PVC inspection port/riser was constructed at ground level within each distribution pipe.

Result: The riser provided the ability to monitor performance of each dosed pipe and check the drainfield level in each run. Since the dosing pipe rests unattached within the distribution pipe, it could be serviced without having to dig up the entire run by removing the end caps to retrieve a plugged line. The system has worked flawlessly since its completion in early June 2013. **800/780-5121; www.pti-pipe.com.**

Worksaver John Deere skid-steer adapter

The John Deere loader to skid-steer adapter from Worksaver enables skid-steer type attachments to be used on tractors equipped with John Deere model 48/58 loaders and buckets retained by 1 1/4-inch pins. Features include an all-welded design and plated handles, spring and lock pins. 217/324-5973; www.worksaver.com.

Mustang 4000V vertical-lift skid-steer

The 4000V vertical-lift skid-steer from Mustang, powered by a 99 hp Cummins engine, has a rated operating capacity of 4,000 pounds, true vertical lift height of 144 inches and breakout force of 9,150 pounds. 800/628-0491; www.gehl.com.

Little Beaver soil sampling tools

The portable Big Beaver auger drill rig (26 inches wide and 80 inches tall) with optional SSK-1 kit from Little Beaver is designed for standard penetration testing and limited access. The rig is available with a 20-hp gasoline engine and can be used with other hydraulic tools, including concrete saws, breakers, tampers and chain saws. One person can maneuver the two-wheeled unit through gates and doorways. The SSK-1 kit includes an additional hydraulic valve, Cathead and tower kit with stabilizing legs. It can be used with Little Beaver's AWJ drilling rod and 24-inch split spoon sampler. 800/227-7515; www.littlebeaver.com.

Gehl V400 vertical-lift skid loader

The V400 vertical-lift skid loader from Gehl has a rated operating capacity of 4,000 pounds, true vertical lift height of 144 inches and breakout force of 9,150 pounds. 800/628-0491; www.gehl.com.

Orenco prefabricated fiberglass shelters

Prefabricated fiberglass shelters from Orenco Systems are designed to house and protect mechanical and electrical controls, process equipment, chemicals and workers. Standard sizes are 8 feet tall, 4 to 16 feet wide and up to 42 feet long. Custom widths and heights are available. Shelters are made of foam-core fiberglass walls, close-molded for a watertight bond and coated with UV-stable gelcoat. Roofs can handle up to 100 psf and, when properly anchored, resist winds up to 130 mph. Standard walls and ceilings range from 2 to 4 inches thick with insulation values of R12 to R24. 800/348-9843; www.orenco.com.

associationnews

By Scottie Dayton

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

MICHIGAN

Association wages battle over disposal

A Michigan Court of Appeals ruling against Gmoser's Septic Service, Whitney Blakeslee and the Michigan Septic Tank Association set a precedent for septage disposal. The plaintiffs argued that local ordinances first banned land application, then mandated that septage pumped within the local unit of government be disposed of at the municipal facility, thus creating a monopoly free to charge an arbitrary price for the service.

The Court of Appeals ruled local governments are within their rights with the requirements. A lack of preemption in MCL 324.11715(1) allows local governments to make stricter requirements than the law states, such as restricting haulers to dispose of septage originating within their boundaries at only their facility. Consequently, more townships and counties are taking steps to enact similar provisions.

MSTA president Joe Hall, writing in the association's summer issue of *Professional Pumper*, reports the effect increased disposal rates have had on pumpers and their customers. Leoni Township wastewater treatment plant reported receiving 3.7 million gallons of septage (14 septic tanks per day) in 2007. The plant reported 2.3 million gallons (nine septic tanks per day) in 2011, after increasing the disposal fee to $210 for dumping 1,000 gallons of septage. In comparison, the current rate to dispose of 1,000 gallons of septage is $10 at the Munising plant, $15 at the Ludington plant, and $25 at the Alpena plant.

MSTA legislative consultant Judy Augenstein and State Rep. Ken Goike (R-Ray Township) are drafting legislation that would allow haulers to go to the facility of their choice. The bill also would remove the 2025 ban on septage storage facilities.

GEORGIA

Septage survey ongoing

The Georgia Onsite Wastewater Association has asked everyone in the state's pumping industry to complete an online survey to help determine the extent of the septage disposal problem. Officials will use the results to persuade legislators to mandate more disposal options. Go to http://survey.constantcontact.com/survey/a07e7bw9slphffohqpz/start.

NOVA SCOTIA, CANADA

Mandatory effluent filters

As of May, Nova Scotia required effluent filters on all new residential septic tanks. The Waste Water Nova Scotia Society commissioned lawyer Ian MacLean to suggest ways onsite professionals could limit their liability. Besides recommending they do quality work and educate the homeowner, MacLean drafted a form for homeowners to sign, verifying that they understood they have an effluent filter and the importance of regular maintenance. A copy of the form is in the May 2013 newsletter at www.wwns.ca (scroll down). The form may be modified.

The association also created three educational onsite videos and plans to add more to its online library. Currently available are Selecting and Constructing a Raised Drainfield, Construction of a Pressurized Drainfield, and Flushing an Onsite Sewage Disposal System.

NOWRA

NOWRA Nuggets

The field trip associated with the National Onsite Wastewater Recycling Association's annual conference Nov. 17-20 in Nashville will cover a large cluster facility in the planning stage, another in the construction stage and a third in the operational stage. The conference will also have a three-hour session to explore establishing an industry standard for advanced onsite system design.

NOWRA is participating in a U.S. Environmental Protection Agency project to identify tools to help designers, engineers and community leaders decide whether large decentralized systems are better alternatives than municipal sewers. "Making it easier for communities faced with that crucial decision to find useful information on decentralized systems has been one of our industry's biggest challenges," says Eric Casey, NOWRA executive director. "The EPA's efforts will help put decentralized systems more on a par with centralized options."

Casey believes many tools that ought to be part of EPA's toolbox are already available or in development. Examples include the decentralized wastewater cost estimation tool developed by John Buchanan, an effort spearheaded by the University of Minnesota to create a Community Septic System Owner's Guide, and other projects from the Decentralized Wastewater Resources Collaborative. "One benefit of the effort may be to identify gaps where additional tools and resources should be developed," says Casey.

NOWRA also is active in the U.S. Water Alliance, established to advance the nation toward watershed-based approaches to water quality and quantity challenges. Alliance executive director Ben Grumbles invited NOWRA to participate, as he felt decentralized wastewater treatment was a big part of the answer.

"The alliance is an excellent platform from which to implement one-water management, and move away from managing stormwater, drinking water and wastewater as separate entities," says Casey. "One-water management is about diversifying our industry, creating jobs and changing people's attitudes to accept large decentralized systems as viable alternatives to sewers. NOWRA wants those systems to become a stronger leg of the stool supporting the industry."

To that end, NOWRA and the Water Environment Federation are cosponsoring a seminar on Oct. 6 in Chicago at WEFTEC 2013 that will make the case to engineers and utility managers that large decentralized systems can be profitably built and maintained at lower cost than conventional sewers.

NOWRA is renewing its efforts to secure more money from the Clean Water State Revolving Fund for individual, commercial and community-based onsite systems. Board member Bob Himschoot will chair the association's Government Affairs Committee and spearhead the effort to lobby Congress. "If we can persuade Washington to change the rules, it will make a tremendous difference for our industry," says Casey. "Our goal is always to improve conditions, support our members and sustain them in the future by providing more options."

CALENDAR OF EVENTS

Oct. 6-8

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

Oct. 8-10

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

TRAINING AND EDUCATION

Alabama

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

- Oct. 2-4 – Advanced Installer I
- Oct. 24-25 – Continuing Education, Mobile
- Nov. 6-8 – Advanced Installer II

The first day of continuing education classes is for installers and the second day is for pumpers and portable restroom operators. Call the training center at 205/652-3803 or visit http://aowatc.uwa.edu.

Arizona

The University of Arizona Onsite Wastewater Education Program has a Soil and Site Evaluation for Onsite Wastewater Systems course Oct. 28-29 in Camp Verde. Contact Kitt Farrell-Poe at 520/621-7221, kittfp@ag.arizona.edu, or http://ag.arizona.edu/waterquality/onsite.

California

The California Onsite Wastewater Association is offering these classes:

- Oct. 2-3 – NAWT Operation and Maintenance Level 1, Napa
- Oct. 17 – System Controls, Sonora
- Nov. 12-13 – Integrated Water Technologies, Sacramento

Call Kit Rosefield at 530/513-6658 or visit www.cowa.org.

Delaware

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

- Online: Pumps, Motors and Controls – enrollment 9/15 to 12/13
- Sept. 18 – Lagoon Treatment & Spray Irrigation of Treated Wastewater: An Operator's Guide
- Sept. 21 – Basic Surveying Principles
- Sept. 27 – Onsite Disposal System Hydraulics
- Oct. 3, 10, 17 – OSHA (1926) Construction Safety Course
- Oct. 22 - Dec. 3 (7 sessions) – Onsite License Preparation Course
- Oct. 1 – Basic Principles of Onsite Pumping Systems
- Oct. 2-3 – Operation and Maintenance of Onsite Septic Systems for Service Providers Workshop
- Oct. 7 – Confined Space Entry
- Oct. 9 – Excavation Safety
- Oct. 21 – Pumps: Motors and Controls
- Oct. 23 – Inspection of Onsite Wastewater Systems
- Oct. 28 – Membrane Technology & Application for Selective Pollutant Removal
- Oct. 30 – Designing Drip Irrigation Onsite Systems
- Nov. 7 – Innovative and Alternative Onsite Systems
- Nov. 7 – DOT Regulations Review for Pumpers
- Nov. 8 – Pumps: Installation, Maintenance and Repair
- Nov. 13 – Risers, Baffles and Filters: Installation and Repair
- Nov. 13 – Vacuum Truck Basics
- Nov. 13 – Operation and Maintenance of Innovative and Alternative Systems
- Nov. 14 – Aggregate-Free Alternatives for Onsite Disposal Systems
- Nov. 15 – Pump Hydraulics
- Nov. 20 – Alternative Treatment and Disposal Options for Wastewater Facilities
- Nov. 22 – Onsite Control Systems
- Nov. 22 – Submersible Pumps
- Nov. 26 – Soils-Based Approach to Siting Wastewater Disposal
- Nov. 27 – Replacement of Onsite Systems

Call Hilary Valentine at 302/259-6384.

Iowa

The Iowa Onsite Waste Water Association has these courses:

- Oct. 9 – Basic System Design and Installation, Charles City
- Nov. 22-23 – Installation Overview with CIOWTS Test, Knoxville

Contact Alice Vinsand at 515/225-1051, execdir@iowwa.com, or visit www.iowwa.com.

Minnesota

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

- Oct. 3 – Soils Continuing Education, Brainerd
- Oct. 22-25 – Intermediate Onsite System Design and Inspection, Brainerd
- Nov. 20-21 – General Continuing Education, St. Cloud

Call Nick Haig at 800/322-8642 (612/625-9797) or visit http://septic.umn.edu.

Missouri

The Missouri Smallflows Organization has these CEU courses:

- Oct. 9-10 – High Strength Waste, Maryland Heights
- Oct. 30 – Earthen Structures, Camdenton
- Oct. 31 – Hydraulics, Camdenton
- Nov. 5-6 – Operations & Maintenance, Liberty
- Nov. 19-20 – Operations & Maintenance, Springfield

Call Tammy Trantham at 417/739-4100 or visit www.mosmallflows.org.

New England

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

- Oct. 1 – Technology Vendor Field Demo
- Oct. 3 – Bottomless Sand Filter Design and Installation
- Oct. 31 – Rhode Island Designer Examination Prep
- Nov. 5 – AutoCALCS - Automated Support Materials for Pump Timers, Tanks, Chambers, Bottomless Sand Filter Sizing and Buoyancy Calculations
- Nov. 14 – Identifying and Managing High Strength Wastewater
- Nov. 21 – Rhode Island Regulatory Setbacks and Buffers

Call 401/874-5950 or visit www.uri.edu/ce/wq.

North Carolina

The North Carolina Septic Tank Association has these classes:

- Oct. 14 – Installer/Inspector, Mooresville
- Oct. 28 – Installer/Inspector, Bolivia
- Oct. 29 – Pumper and Land Application, Bolivia
- Nov. 11 – Installer/Inspector, Greensboro
- Nov. 12 – Pumper and Land Application, Greensboro

Call the association at 336/416-3564 or visit www.ncsta.net.

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

Oregon

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

(continued)

Utah

Utah State University has onsite wastewater treatment certification and renewal workshops in Logan on:

- Oct. 8-10 – Level 3 Certification
- Oct. 16 – Level 3 Renewal

Call Ivonne Harris at 435/797-3693 or visit http://uwrl.usu.edu/partnerships/training/classes.html.

SJE-Rhombus hosts control panel training

SJE-Rhombus held a training session for 16 attendees representing distributors, installers and manufacturers at its headquarters in Detroit Lakes, Minn. The course included a float/alarm overview, basic electrical theory with multi-meters, component overview, control panel overview and configuration, hands-on control panel assembly, operation and troubleshooting, best installation practices and a tour of the facility.

Thompson Pump names branch manager of the year

Bobby Thompson

Thompson Pump named Bobby Thompson Branch Manager of the Year. Thompson is manager of the Panama City, Fla., location and was recently promoted to territory manager, covering portions of Alabama, Florida and Georgia. He also received the Thompson Pump President's Award for Excellence in Health & Safety for achieving zero OSHA recordable accidents and injuries.

Gorman-Rupp names rental sales manager

Jamie Schoenian

Gorman-Rupp Co. promoted Jamie Schoenian to rental sales manager. He has 15 years experience and will be responsible for sales, service, aftermarket, technical support and product forecasting between Gorman-Rupp and National Rental accounts.

ONSITE installer™ classifieds

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AERATORS

We sell Flagg-Air 340, Secoh, Gast and Medo Linear, FPZ and Gast Regenerative, Thomas and Gast Rotary Vane aerators, rebuild kits and alarms at wholesale prices. Septic Services, Inc. www.septicserv.com. 1-800-536-5564. (IM)

BUSINESSES

Septic contracting and sewer service, Central Florida - Established for over 20 years. Terms to the right group. Over $1,000,000 in 2012. SepticForSale.com Bill 407-641-4775 (C09)

HAND TOOLS

T&T Tools, Probes, Hooks: Probes feature steel shafts with threaded and hardened tips. The insulated **Mighty Probe**™ tested to 50,000 volts. **Top Poppers**™ open manhole covers easily. Free catalog. **www.TandTtools.com.** Phone **800-521-6893.** (PBM)

Crust Busters - Portable, lightweight machine guaranteed to mix up septic tanks and grease traps! Save time and money! **www.crustbusters.com**, 1-888-878-2296. (IM)

PIPELINE REHABILITATION

Complete Lining System (3",4",6",8") - Inversion gun, rollers, etc. Hot water boiler system & ambient cure system. Great start-up kit, used regularly. $29,000. Please contact Kevin: 303-591-3191 (C09)

One trade-in model of Pipe Genie heavy-duty, pipe bursting equipment. Excellent condition, looks new, 30-ton, 100 feet cable, full 2-year warranty. 877-411-7473. (CBM)

PUMPS

Hydromatic, Zoeller, Liberty, ABS, Myers, grinder and effluent pumps. Lift station packages and high water alarms are also available. Septic Services, Inc. www.septicserv.com, 1-800-536-5564 (IM)

ABOUT THE AUTHOR
Eric Casey is NOWRA's Executive Director. NOWRA is dedicated to representing and educating all segments of the onsite/decentralized industry. For more information or to join, visit www.nowra.org, or call 800/966-2942.

2013 Annual Conference

Nashville calling: 10 reasons why you should answer

By Eric Casey

There are a lot of reasons you might want to join your colleagues in Nashville, Tenn., for the National Onsite Wastewater Recycling Association's 2013 Annual Conference & Expo, Nov. 17-20, 2013, at the Millennium Maxwell House Hotel. Here are 10 great ones:

1. Get ideas to help support your current business. Through education sessions, conversations with colleagues and meetings with many of the industry's most progressive and innovative companies in the exhibit hall, you can get new ideas for building your existing business or pursuing new business opportunities.

2. Discover speed vending. This is sort of like speed dating, except the goal is to help you develop relationships with onsite industry product companies. We've set aside time for each exhibitor to help you better understand what they do through a brief (10 minutes maximum) overview of their products and services.

3. Find out the latest in high-strength wastewater. HSW is more than just restaurant wastewater. Most non-residential onsite systems address waste streams that qualify as "high-strength," and this topic is not covered enough. You'll learn the latest design, engineering and technological trends in the development of high-strength wastewater treatment. We are devoting a full day of sessions to this important but infrequently covered topic.

4. Meet your continuing education requirements. In most states, NOWRA's conference curriculum qualifies for credit hours in licensing or professional certification programs. With more than 30 breakout sessions, general sessions and a field trip, you can probably satisfy your continuing education requirements right here.

5. Attend a field trip highlighting the wide variety of decentralized systems in Tennessee. The Nashville area offers a diverse mix of decentralized technologies and management regimes and the field trip is intended to provide attendees with a broad survey of that mix. Participants on the field trip will visit and discuss: decentralized cluster systems with a variety of management types in place – owners, government and private industry; different technologies for high-strength waste solutions; residential systems and decentralized clusters under construction.

6. Learn why the Chesapeake Bay cleanup may have an impact on the entire onsite industry. Without a great deal of fanfare, the U.S. Environmental Protection Agency has developed a detailed guidance document for management of onsite systems within the Chesapeake Bay watershed. Why does this matter to you if you don't live in that watershed? Because this document may be the template EPA will use for watersheds around the country as they continue to require nutrient reductions for nitrogen and phosphorous.

7. See how the lack of federal funding hurts our industry and what we must do about it. The onsite industry represents 25 percent of the nation's wastewater infrastructure, yet receives little or no federal support, while public sewer systems receive billions of dollars. The time has come for our industry to fix this unfair situation. Hear about NOWRA's plans to change this and why it matters to you.

8. Get back more than you put in. If you get one good idea that translates into more business or a better way to do things, you will more than justify your cost of attending. Attending this conference is an investment in you and your business.

9. See old friends; make new ones. Sometimes the best takeaway ideas at a conference come from the people you meet – a chat in a hallway, at lunch, over a cocktail. You'll have lots of time to connect with colleagues at receptions, lunches and breakfasts. Plus we'll provide shuttle service for a night on the town in Nashville's awesome entertainment district.

10. Have fun in Nashville. Nashville offers a dazzling variety of things to do and see – museums, plantations, shopping and great dining – but the biggest attraction in Music City is, well, music! While Nashville is well known as the home of country music, you can find pretty much any kind of music and entertainment in the city, especially in the dozens of restaurants, clubs and music venues in the heart of the downtown Entertainment District.

To find out everything the NOWRA conference has to offer, visit www.nowra.org/AC2013 for full details. Hotel and early registration discounts end October 24.

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